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Using Cognitive Behavioral Therapy to Treat Insomnia in Adults

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Abstract

Background: Insomnia is a physically, mentally, and psychologically complicated and distressing medical condition that can affect adults with or without comorbid conditions. Research indicates that cognitive behavioral therapy (CBT) is an underutilized, but extremely beneficial intervention that may support individuals in overcoming insomnia and other comorbid conditions, without ever ingesting a pill. Unfortunately, CBT is underutilized due to the patient educational time requirements; therefore, medication is often prescribed as a first line of treatment for insomnia. Adults suffering from insomnia with or without comorbid conditions such as psychiatric disorders or cancer have benefitted from CBT as opposed to oral medications such as Ambien and therefore, CBT should be the first line treatment of insomnia in the primary care setting. Provider recommendation of CBT to treat insomnia may be increased with the addition of an online interactive CBT program, thereby decreasing the tolerance and addiction to prescribed sleep medications. *Purpose:* The purpose of this quality intervention project was to improve DNP and Psych NP students' education about using CBT and SHUTi, an online CBT program to treat insomnia among the adult patient population. *Methods:* DNP and Psych NP students were asked to complete a pre-test about CBT and SHUTi, watch 2 videos on CBT and SHUTi about treating insomnia, browse the SHUTi demo product, and complete a post-test about these treatments. Students' knowledge about CBT and SHUTi were evaluated based on answering questions correctly in the post-test versus the pre-test. *Results:* Of the 18 students surveyed, only 13 completed both the pre and post-tests. The other 5 completed only the pre-test. Results demonstrated that these 13 students who completed both the pre and post tests scored higher about CBT and SHUTi in the post-test versus the pre-test. None of the students in the pre-test had heard about SHUTi, and in the post-test, most of the students stated that they

were very likely to use SHUTi for future patients. Additionally, the average score of correct questions among all participants in the post-test was 94% as opposed to 43% in the pre-test, indicating that the 13 students acquired knowledge about CBT and SHUTi to treat insomnia after the intervention. *Implications to Practice:* This project demonstrates the benefit of teaching nurse practitioner students about SHUTi and CBT as the first line of treatment for insomnia in the adult population. Teaching these students may increase the likelihood that CBT and SHUTi will be recommended to future patients suffering from insomnia. *Conclusion:* Providing NP students with information about CBT and SHUTi increased their likelihood to recommend CBT and SHUTi for future patients experiencing insomnia.

Keywords: “CBT and insomnia in adults”, “insomnia and SHUTi”, “cognitive behavioral therapy and insomnia”, “interactive CBT and insomnia” and the MeSH search term “Sleep Initiation and Maintenance Disorders”.

Introduction

Background

The Sleep Health Foundation reports that approximately 1 in 3 adults suffers from insomnia (SHF, 2016). Causes of insomnia range from a variety of health conditions including stress, anxiety, post-traumatic stress disorder, medications such as those for asthma or high blood pressure, GERD, Parkinson's disease, cancer, sleep apnea, caffeine intake, and countless other health variables (Mayo Clinic Staff, 2016a). Poor sleep is linked with chronic diseases and illnesses including diabetes, cardiovascular disease, high cholesterol, obesity, and depression. Additionally, poor sleep is responsible for many motor vehicle and machinery-related crashes, causing many individuals to suffer from injury and disability on a yearly basis (CDC, 2015). Treatments to combat and eliminate insomnia include medications such as benzodiazepines, melatonin agonists, and antidepressants, as well as nonpharmacological approaches such as meditation, yoga, exercise, and cognitive behavioral therapy (Bonnet, 2016). Unfortunately, due to the time constraints associated with evaluating each patient's unique case of insomnia and the potential causes, providers select oral medications for treatment which may be ineffective and lead to addiction.

Significance

New research indicates that cognitive behavioral therapy (CBT) is more effective than any medication currently on the market in treating insomnia (Brasure et al., 2016; Qaseem et al., 2016; Shaughnessy, 2016; Trauer et al., 2015). In fact, a systematic review of five studies analyzing low to moderate grade evidence, indicates that CBT has

greater efficacy and compliance over the use of benzodiazepine and non-benzodiazepine medications (Mitchell et al., 2013). Additionally, CBT may support improved daily functioning as a result of a restful night's sleep, without the negative effects that may occur in the morning as a result of pharmacological treatments. CBT is a recommended first line of treatment, but it is often underutilized by healthcare providers (Mayo Clinic Staff, 2016b). Giving clinicians the right tools to provide high quality, low cost, and time-effective CBT may encourage providers to support this treatment more regularly and think twice about prescribing a medication as a first line of treatment. Given that Psychiatric Mental Health Nurse Practitioners will very likely treat patients suffering from insomnia, it is crucial that they be knowledgeable about this approach.

Problem Statement

The risk of insomnia among adults is increased by chronic health conditions such as heart disease and diabetes, a reduced immune system, poor psychological outcomes, and early aging. Insomnia often, but not always, results from preexisting physical and psychological health issues, and providers rarely implement CBT and measure sleep treatment outcomes. CBT will decrease the use of medication to treat insomnia as this method helps individuals to cope with insomnia in the long-term. This quality intervention project focuses on teaching psychiatric mental health nurse practitioner (Psych NP students) and family care nurse practitioner students (FNP students) about an online interactive CBT program for insomnia in the hopes of encouraging these students to recommend this treatment for patients in the future.

Organizational Gap Analysis of Project Site

The quality improvement project will take place through UMASS Amherst's Psychiatric Nurse Practitioner Program and Family Care Nurse Practitioner Program in order to promote the knowledge of cognitive behavioral therapy for insomnia (CBT-I) as well as SHUTi, the online CBT-I program that patients can use independently at home. In order to make sure participants could learn about SHUTi and CBT-I, the DNP student reached out to SHUTi requesting access to their demo version. The SHUTi Customer Care team graciously provided the DNP student demo access for participants to browse through and learn about SHUTi and CBT-I (BeHealth Solutions, 2018). Students participated in this study in order to become more aware of CBT treatment measures for insomnia to utilize when practicing after graduation.

While there are many treatments for insomnia, CBT-I is recommended as the first line treatment for all adults with chronic insomnia disorder (Brasure et al., 2015). CBT-I also appears to be successful and safe in treating insomnia disorders, while medications may only be safe for short term use and have serious side effects (Brasure et al., 2015).

Review of the Literature

A comprehensive search of the literature for CBT and insomnia from articles published between 2011-2016 included the following databases: Web of Science, PubMed, CINAHL, Ovid, and Science Direct. Search terms included "CBT and insomnia in adults", "insomnia in cancer and CBT", "cognitive behavioral therapy and insomnia", "CBT and insomnia and psychiatric disorders", and the MeSH search terms "Sleep Initiation and Maintenance Disorders". Inclusion criteria included the following:

the article must be published within the last 5 years to ensure analysis of the most up to date research, CBT was utilized without medication as an intervention in the study, and the methods were clearly defined. Studies were excluded if the study was before 2011, if the participants were children or adolescents, and if medication was used in conjunction with CBT as part of the intervention to treat insomnia. The search yielded, 1,671 articles total. Thirty-two abstracts were reviewed, and 10 full articles were selected on the criteria previously listed. Of the 10 articles selected, all 10 were randomized control trials and no less than grade B evidence rating as per the JHNEBP Evidence Rating Scales (Newhouse et al., 2005). The articles selected analyzed various members of the adult population suffering from insomnia, including those without comorbid conditions, adults with psychiatric disorders, and cancer patients and survivors.

Results

Traditional Cognitive Behavioral Therapy

Taylor et al. (2014) demonstrated in a level 1 randomized clinical trial (RCT) that CBT-I (cognitive behavioral therapy for insomnia) group showed significantly greater improvement in sleep efficiency between pre and post-treatment assessment than the waiting list control group (WLC). The CBT-I group demonstrated longer total sleep time, improved sleep quality, and greater reduction of fatigue than the WLC group. Similarly, Lovato et al. (2013) observed in a level 1 RCT that immediately after treatment and at the 3-month follow-up evaluation, the CBT-I group reported a greater reduction in impaired daily feelings and functioning, lessening in perceived insomnia severity, and improvement of sleep efficacy than the control group. At post-treatment, the CBT-I

group also reported reductions in the number of awakenings and sleep onset latency, but these findings were not maintained at the 3 month follow up (Lovato et al., 2013). In a level 1 RCT, Wong, Ree, and Lee (2016) compared CBT with mindfulness-based therapy (MBT), which involves accepting thoughts, but not rejecting or reacting to them. After 4 treatment sessions in adults between 21 and 66 years of age, Wong, Ree, and Lee (2016) discovered that insomnia reduction in the CBT versus the MBT groups did not differ significantly, but both groups demonstrated higher rates of insomnia reduction than the waitlist group (no treatment) overall. Total sleep time also improved with the CBT and MBT groups, but not the waitlist group (Wong, Ree, & Lee, 2016).

CBT in the Work Setting

Using CBT in high stress work place settings can help alleviate and reduce insomnia among employees. Bostock, Luik, and Espie (2016) conducted a RCT in a global “Fortune 500” company of 270 participants ages 21 and older reporting frequent poor sleep. Digital CBT, which involves a zero human contact, highly interactive and virtual therapist catered to each individual’s characteristics, personal goals, sleep diaries, and progress as a result of the program’s algorithm, was compared against the placebo (waitlist) intervention. Participants in the digital CBT (CT) condition, compared with the waitlist group (WL) reported higher quality of sleep ratings and reduced daytime fatigue (Bostock, Luik, & Espie, 2016). Similarly, Thiart et al. (2015) evaluated the efficacy of a guided internet-based recovery training for 128 teachers suffering from insomnia including well-established methods from cognitive behavioral therapy for insomnia, including sleep restriction, stimulus control, and decreasing rumination. Results of this

RCT revealed that participants in the intervention group reported greater reduction in insomnia severity than participants in the waitlist control group (Thiart et al., 2015).

At Home Internet-Based CBT

Internet-based CBT programs may be particularly beneficial for many healthcare professionals to recommend as these do not require the provider to be well-versed in CBT, but rather are non-human, interactive, and tailored programs to guide the patient through CBT in the comfort of his or her own home. An internet-based cognitive behavior therapy for insomnia, known as SHUTi, compared with an insomnia patient education website demonstrated significantly improved sleep for those using SHUTi, with 56.6% of participants achieving insomnia remission status at 1 year follow up (Ritterband et al., 2017).

In a similar level 1 randomized controlled non-inferiority trial, adult participants suffering from insomnia were allocated to either an internet delivered CBT program intervention compared to a group delivered intervention for insomnia and both groups demonstrated pronounced improvements for reductions in insomnia symptoms based on the Insomnia Severity Index. There were no statistical differences between either group (Blom et al., 2015).

Furthermore, a 6-week intervention of web-based CBT was compared with telehealth-based delivery of CBT in a level 1 RCT in a population of 73 adults and results indicated that both methods of delivery produced similar changes in reducing daytime fatigue and overall severity of insomnia as well as improved sleep quality. Interestingly, a considerable percentage of participants in both groups reported reduced usage of

sedating medications during the study (Holmqvist, Vincent, & Walsh, 2014).

Additionally, Kaldo et al. (2015) discovered that in a level 1 RCT comparing 148 adult patients allocated to either an internet CBT group versus a control treatment group over an 8-week period, the internet CBT group was significantly more effective than the control group in reducing insomnia severity symptoms and reduction in insomnia severity was sustained after one year. Sleep medication decreased and sleep parameters such as sleep efficiency improved as well (Kaldo et al., 2015).

It is clear that various members of the adult population may benefit from CBT in resolving insomnia. The choice to use internet-based CBT versus face-to-face CBT performed in a healthcare setting, depends on the provider's ability and time to teach CBT as well as the patient's time to see a provider on a regular basis. While both methods of CBT are found to be incredibly useful in treating insomnia, online-guided CBT is particularly beneficial for those with adequate computer literacy and access to the internet at home. Additionally, online CBT allows patients to become more independent in managing their health and sleep hygiene as they may perform this intervention in the comfort of their home without a provider present. Both methods of CBT offer an individualized plan for the patient to recover from insomnia and improve sleep behaviors in the long term.

Evidence Based Practice: Verification of Chosen Option

Based on the review of literature, cognitive behavioral therapy is an effective tool to treat insomnia (Taylor et al., 2014; Thiar et al., 2015, Wong et al., 2016). Psych NP and FNP students reported their understanding of CBT to treat insomnia, as well as

SHUTi, the online behavioral CBT program to treat insomnia, before and after watching two very brief educational videos and examining SHUTi, the online CBT program to treat insomnia.

Theoretical Framework/Evidence Based Practice Model

Spielman's Three-Factor Insomnia Model (Buysse et al., 2011) describes various factors that can cause and further perpetuate the vicious cycle of insomnia (Appendix A). There are three P factors forming this model: predisposing factors, precipitating factors, and perpetuating factors. Predisposing factors describe biological traits, psychological traits, and social factors that may impact an individual's susceptibility to insomnia. Precipitating factors include medical illnesses such as cancer, psychiatric illnesses such as depression, and stressful life events that may initiate acute insomnia symptoms in an individual with or without predisposing factors. Lastly, perpetuating factors are those that further propel the continuation of insomnia and prevent the individual from restoring previous normal sleeping habits (Buysse et al., 2011). Spielman's Three-Factor Insomnia Model will be used to assist this capstone project in allowing the individual utilizing cognitive behavioral therapy to determine which type of factors are causing the insomnia and to change patterns of thinking and behaviors accordingly. The approach to CBT depends on which factors are causing insomnia and are unique to every individual, and therefore, this model is compatible in supporting the theory and framework.

Providers (including MDs, NPs, DOs, and NPs) should always work to determine the underlying cause of insomnia instead of simply prescribing medication. Cognitive behavioral therapy will allow the patient to determine the various factors that are

associated with insomnia on an individual level. There are various causes of insomnia so every individual should be evaluated on an individual basis. Thus, CBT will allow the patient to uncover the physical, mental, and emotional factors that may be causing insomnia and laying a foundation for healthy strategies to obtain quality adequate rest on a nightly basis.

Goals, Objectives, and Expected Outcomes

The main objectives of this quality intervention project were to educate and assess understanding of Psych NP and FNP students about the purpose and effectiveness of CBT for insomnia as well as an online CBT program for patients suffering from insomnia, known as SHUTi, which stands for Sleep Healthy Using the Internet. The ultimate long-term goal of this educational session was to encourage future nurse practitioners to utilize CBT for patients with insomnia. Additionally, empowering the nurse practitioner students with this knowledge will help improve these patients' quality of life with CBT and to reduce and hopefully eliminate the supposed need for PCPs to prescribe sleep-promoting medication.

Project Design

Project Site and Population

A brief online educational session was available to the entire student body of UMASS Amherst's psychiatric nurse mental health practitioner program and family care nurse practitioner program. Resources needed included access to a demo version of SHUTi with permission by the SHUTi Customer Care Team, a 30 second video about

CBT use for treating insomnia and a 4-minute video discussing SHUTi, (Sleep Healthy Using the Internet), both found on the SHUTi website (<http://www.myshuti.com>) for free viewing. Before watching the two brief videos and accessing the demo version of SHUTi, students first completed a short survey, testing their knowledge of CBT and SHUTi to treat insomnia, then proceeded to watch the two videos, browsed through the demo version of SHUTi, and answered survey questions afterwards to determine how well they understood this intervention. Several studies have demonstrated the efficacy of SHUTi in reducing insomnia symptoms and improving sleep quality in the adult population (Quigg et al., 2016; Ritterband et al., 2009; Ritterband et al., 2017; Thorndike et al., 2013; Zachariae et al., 2016).

The DNP student contacted the Psych NP and FNP students of UMASS Amherst via email and provided the webpage containing a 4-minute online video discussing SHUTi and a 30 second video discussing CBT for insomnia, as well as the username and password to access the SHUTi's demo version for unlimited viewing. At least 10 students were needed to complete this pre and post-video survey for statistical purposes. Student participants received a \$10 Amazon gift card upon completing both the pre and post surveys, which was specified in the recruitment email.

Setting facilitators and barriers

A major convenience of this project was that the UMASS Amherst students already have computer access and demonstrate computer literacy, and therefore had the ability to watch the two videos, browse through the demo version, and complete the two surveys that were emailed to them. Given that the project site is UMASS Amherst, it was

easy to keep track of the students via umass.edu emails. One drawback was that the students may be so busy with school work that they refuse to complete the survey. Luckily, the DNP student required only 10 students needed at a minimum for this QI project, so not all students in the program had to participate. The students were also instructed in the recruitment email that they would receive a \$10 Amazon gift card for completion of both surveys. Another drawback is that the DNP student implementing this QI project was not able to meet with the student participants in person and had to rely on email communication to employ the QI project. This was particularly frustrating when 5 students completed a pre-survey, but not a post-survey, and information on these students could not be obtained because of anonymity. If the project had taken place in person, this likely would not have occurred.

One future potential barrier for students' willingness to recommend CBT for insomnia upon practicing after graduating is that SHUTi costs \$174, a rather expensive financial burden for the patient and unfortunately a cost which is not covered by insurance. However, patients can receive a discount when the provider agrees to be a clinical partner. And giving Psych NP and FNP students the opportunity to learn about SHUTi, increases the chance that the treatment will be recommended to patients in the future. Clinical partner program responsibilities involve recommending SHUTi to patients that could benefit from using this tool, providing feedback of SHUTi, and allowing BeHealth, the organization offering SHUTi Clinical Partners Program to include the provider's name and logo in the lists of Program Partners (BeHealth Solutions, 2015). Other benefits in the clinical partner program include availability of the Insomnia Severity Index (ISI) as a screening tool for providers to assess patients and access to

standard SHUTi Partner reports, which consist of certain sleep measure and progress information established from the provider's patients stored in SHUTi (BeHealth Solutions, 2015).

Additionally, when discussing cost versus benefit for insomnia treatments, is important to point out that Oral Ambien 5 mg costs approximately \$70 for 6 pills and given that patients with insomnia will likely require greater quantities of medication over time, the cost will multiply and thus, SHUTi is ultimately cheaper in the long run, particularly for those without health insurance. While it is true that the generic version, Zolpidem, costs about \$8 for the same amount and dose, this cost does indeed add up over time if the patient continues to require medication for insomnia without addressing the problem and treating the underlying issue (GoodRx, 2017). Even for patients with adequate health insurance, the cost of Ambien will add up over time and the effects of the medication will not be substantial in the long run as tolerance increases or the patient suffers from possibly dangerous side effects.

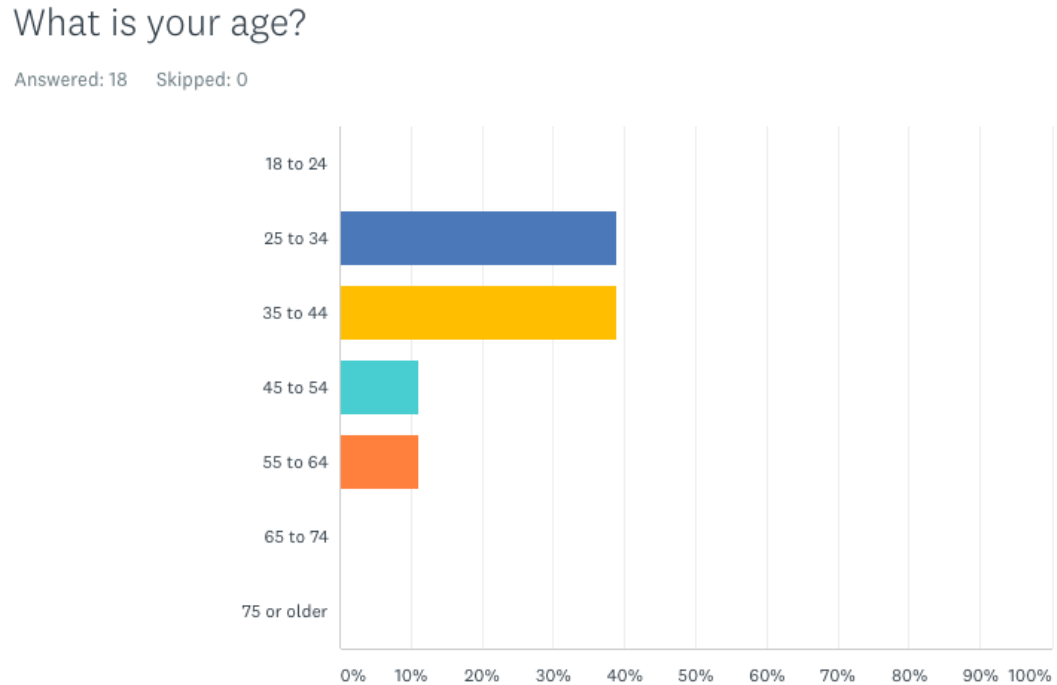
Additionally, the sedative effects of Ambien can be deleterious and life-threatening. The National Highway Traffic Safety Administration warned that users who ingested Ambien to the point of intoxication could experience sedation up to 16 hours after taking the drug. Furthermore, individuals may inadvertently ingest Ambien with other central nervous system depressants such as alcohol, opioids, or tranquilizers, thus increasing the sedative effects and increasing the risk of overdose or serious injury (American Addiction Centers, 2017). Ambien can also lead to complex behaviors such as sleep-driving and sleep-eating. While it is obvious that sleep-driving is dangerous, sleep-eating can lead to vomiting, food poisoning (if the user is ingesting uncooked or

raw dairy or meat), and weight gain over time. Sleep-eating can also pose a risk for severe injuries as a result of operating a stove or oven during an Ambien blackout.

Unlike CBT, Ambien withdrawal symptoms include sleeplessness, agitation, dizziness, anxiety, headaches, tremors, nausea, and muscle cramps (American Addiction Centers, 2017).

Implementation Plan/Procedures

While all eighteen UMASS Amherst Psych NP and FNP students completed the pre-test, only 13 completed both the pre and post-test. The data indicated that 17 out of 18 participants were female and 1 was male. Most of the participants (77.78%) were between the ages of 25-44 (Figure 2). Additionally, the majority of the participants lived in the Northeast, with 12 of the 18 participants stating they were from towns in Massachusetts such as Leominster, Winchendon, Montague, and Norwood. However, two of the participants were not from the Northeast with one participant from Phoenix, AZ and the other participant from Chicago, IL.

Figure 2: *Age Range of Participants*

Participants agreed to take a pre-test evaluating their knowledge about CBT-I and SHUTi, then watched two videos: “Experience SHUTi”, a short 4-minute video on SHUTi, and “How Does CBT-I Work?”, a 30 second video about CBT, available on the same web page. The students also browsed through the demo version of SHUTi, and lastly, completed a brief post-video survey to test their understanding of both SHUTi and CBT for insomnia. Lastly, students reported their likelihood to utilize SHUTi for treatment purposes in the future. The research proven SHUTi program is comprised of 6 interactive lessons spanning over a 6-week period, online daily sleep diaries, personalized sleep window recommendations each week, sleep improvement progress reports, reference materials to share with family and friends, and also the ability to sync Fitbit Activity and Sleep Tracker (BeHealth Solutions, 2016). At the end of the post-video

survey, students were evaluated on their understanding of CBT-I and SHUTi as well as their likeliness in recommending SHUTi to treat patients in the future.

Measurement Instruments

In order to evaluate the outcomes of this project, descriptive statistics and schematic analysis were employed to examine the students' knowledge and understanding of SHUTi as well as the effectiveness of CBT for insomnia before and after watching the two short videos discussing CBT and SHUTi.

Data Collection Procedures

Students were asked to complete a brief questionnaire before and after watching the SHUTi video assessing understanding of the use of CBT to treat insomnia and whether or not they believe this program will be effective for use in their field (Appendix B and Appendix C). The surveys were provided through Survey Monkey and students had 1 month to watch the video and complete the survey.

Data Analysis

Data was analyzed using descriptive statistics and schematic analysis to determine any differences in students' knowledge via the survey questions, before and after watching the two short videos. The DNP student was responsible for post-intervention statistical analysis.

Results

Pre-test Results

Out of the 4 graded questions in the pre-test (questions 6, 8, 9, and 10), the mean score of correct answers was 43%. Question 9, “How often do you think SHUTi’s core learning and strategy session is given to patients through SHUTi on a weekly basis?”, was answered least correctly, with an average score of 17%. Question 10, “Does CBT address people’s fears, concerns, and worries about poor sleep and the impact on their lives during daytime functioning?”, had the highest correct responses, with 78% of participants answering this question correctly. Interestingly, question 6 which asks “based on your current knowledge, what is the first line treatment for insomnia” had a mean correct group score of 33%. In other words, only 33% of participants in the pre-test answered that CBT was the first line treatment of insomnia, while 27.3% stated the first line of treatment for insomnia was behavioral therapy. One student recorded that Ambien was the first line therapy for insomnia and 1 student recorded that all of the above (Ambien, behavioral therapy, and cognitive behavioral therapy) were first line treatments. Five students stated that they did not know the first line therapy for insomnia. Moving forward, none of the students had ever heard of SHUTi before this intervention.

Post-test Results

As previously mentioned, of the eighteen students surveyed, only 13 completed both the pre and post tests. The other 5, while they completed the pre-test, failed to complete the post-test. According to the 13 post-test results, the mean score of correctly answered questions was 94% as opposed to 43% of questions correctly answered in the pre-test. In the post-test, 92% of participants correctly answered the question “What is

the first line treatment for insomnia”? Additionally, 92% of participants knew that the recommended timeframe for SHUTi to be completed is 6 weeks. Similarly, 92% of participants in the post-test knew that the patients are required to use SHUTi’s core learning and strategy session once a week for 40 minutes. In the post-survey, 100% of participants correctly acknowledged that “CBT does address people’s fears, concerns, and worries about poor sleep and the impact on their lives during daytime functioning”. More specifically, 100% of students correctly answered that “CBT works to address to the root of the problem, addressing the cause of why the individual is suffering from insomnia, to change patterns of thinking and behavior that are causing poor sleep habits”. In terms of how likely these DNP and Psych NP students were to recommend SHUTi in the future, 7 out of 13 students stated they were “very likely” to recommend this program to patients in the future and 5 students stated they were “somewhat likely” to recommend this program to participants in the future. None of the students reported that they were “very unlikely” to recommend SHUTi for future patients, and 1 participant was “unsure at this time” if he or she would be willing to recommend SHUTi. However, none of the students between the ages of 55-64 completed the post-test and cannot be included in this part of the analysis.

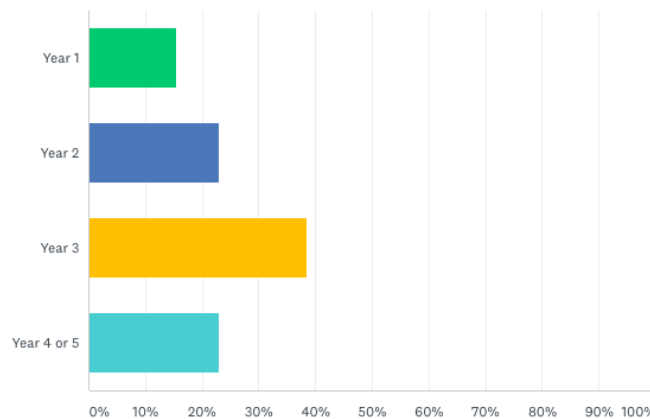
Student year levels were also recorded in the post-test and analysis indicated that most participants were in the 3rd year (38.46%) of their respective programs. Additionally, the fewest number of participants were 1st year students (15.38%). Twenty-eight percent of participants were 2nd year students, and 28% were 4th or 5th year students (Figure 3). One hundred percent of 1st year students stated they were “somewhat likely” to recommend SHUTi for future patients. Two thirds of 2nd year students were “very

likely” to recommend SHUTi and one third was “somewhat likely” to recommend SHUTi. Sixty percent of 3rd year students were “very likely” to recommend SHUTi, 20% were “somewhat likely” to recommend SHUTi, and 20% were unsure at this time. Two thirds of 4th and 5th year students were “very likely” to recommend SHUTi and one third was “somewhat likely” to recommend SHUTi. Students in different stages of their respective programs may have different attitudes and opinions regarding their likelihood to recommend and use CBT and SHUTi. There were no students in the first year that were “very likely” to recommend SHUTi, but more than half of 4th and 5th year students were “very likely” to recommend SHUTi.

Figure 3: *Participants’ Levels of Education at UMASS in Respective Programs.*

What year are you currently in at UMASS Amherst's Psych NP or FNP Program?

Answered: 13 Skipped: 0



Interpretation/Discussion

In assessing the pre-test responses, the most incorrectly answered question was “How often do you think SHUTi’s core learning and strategy session is given to patients

through SHUTi on a weekly basis?”, with only 17% of students answering this question correctly. Given that this is a specific question of SHUTi and none of the participants had heard of SHUTi prior to the educational session, this is not a surprising finding. However, the fact that SHUTi is not well-known amongst students at any level in their educational nurse practitioner programs is a bit alarming because numerous research articles have shown how successful this program is and how easy it is to recommend this treatment for a patient (Ritterband et al., 2017; Thorndike et al., 2013; Tiara et al., 2015). Professors should include education about CBT and SHUTi to treat insomnia for nurse practitioner students to utilize for their patients in the future. Even more shocking, is that only 33% of students knew that CBT was the first line treatment for insomnia. CBT must be demystified so that patients suffering from insomnia can benefit from this treatment.

As stated earlier, while all 18 students completed the pre-test, only 13 completed the post-test. Therefore, outcomes for the 5 students that completed the pre-test, but not the post-test cannot be included in the data. In order to make sure that the students in the future complete both the pre and post-test questions, the DNP student could either travel to campus and be present while the students are completing the survey questions, or combine the pre and post-test questions on Survey Monkey so that the post-survey questions occur right after the pre-survey questions. The DNP student could also have clarified the pre-test and post-test instructions in the email to make sure that the 5 students that did not complete the post-survey understood the directions.

Based on the post-survey results, the 13 participants scored between 90-100% correctly on each question asked about CBT and SHUTi and this demonstrates that the educational program was successful in teaching these students about the first line

treatment of insomnia. More students answered each graded question correctly in the post-test than in the pre-test questions. Additionally, the fact that most of the students stated they were “very likely” to recommend SHUTI for patients in the future also demonstrates the success of the intervention. It is possible that the one participant who was “unsure at this time” may become “very likely” to recommend SHUTi in the future once more research and knowledge on the topic of CBT to treat insomnia and SHUTi as an at-home invention are explored. Since there was only 1 male participant in this study, including more male participants in the future may reveal gender response differences and suggest possible gender-based results. Question responses may have been skewed due to the large amount of female participants. Additionally, since almost 80% of the participants were between the ages of 25-44 years old, and 20% of the participants were between the ages of 45-64 years old, it would be interesting to see if older participants would have been more or less likely to recommend SHUTi. Unfortunately, given that all participants between ages 55-64 years old only completed the pre-test and not the post-test, the likelihood of their willingness to recommend SHUTi in the future is uncertain. Only 50% of the participants between the ages of 45-54 completed the post-test, and stated that they were “somewhat likely” to recommend SHUTi in the future. Therefore, nurse practitioner students over the age of 44 may be less likely to recommend SHUTi than younger students, as per these findings.

None of the 1st year students was “very likely” to recommend SHUTi in the future, but at least 60% of 2nd, 3rd, 4th or 5th year students were “very likely” to recommend SHUTi in the future. It is possible that 1st year students have limited knowledge about CBT and higher level students may have been more likely to

recommend SHUTi because they were more knowledgeable about the benefits of CBT and other treatment modalities given their longer time in their respective programs.

Also, given that most of the participants were from the Northeastern states, it would be worthwhile to perform this intervention on students across the United States, representing more of the Midwest, west coast, and southern states. Nurse practitioner students in various areas of the country and in different communities may have different opinions regarding CBT to treat insomnia, as well as utilizing SHUTi. Limited access to technology and other healthcare resources could impact the likelihood to use SHUTi in certain areas. It may be easier in some communities for providers to prescribe medication instead of recommending CBT-I for patients with insomnia. Obtaining a more diverse student population from areas all over the country may provide a better idea of which students would be most likely to recommend this program in the future.

Cost-Benefit Analysis/Budget

There was not cost to UMASS Amherst for this QI project, as the SHUTi team generously provided the DNP student access to the demo version with permission to distribute to the Psych NP students. However, the DNP student offered each of the 13 participants that completed both of the surveys a \$10 gift card to Amazon.

Timeline

The entire time frame for this project began in December 2017 and terminated in April 2018 (Table 1). The IRB reviewed the proposal at the end of December 2017 and therefore, participant recruitment was initiated at the end of December 2017. The DNP

student sent two separate emails to all Psych NP and FNP classes between December 2017 and February 2018. Students completed the video and answered the surveys questions between from the end of December 2017 to the end of February 2018. Post-intervention analysis began in March 2018 with results shared with participants afterwards.

Table 1

CBT Project Outline from November 2017-March 2018

Project Phase	Dec.	Jan.	Feb.	Mar.	April
1. Participant recruitment	√	√	√		
2. SHUTi Video and Post-video Survey		√	√		
3. Post-intervention analysis				√	
4. Results distributed to participants					√

Ethical Considerations/Protection of Human Subjects

The DNP student filed the Human Subject Determination Form with the UMASS Institutional Review Board (IRB). The student participants reported answers on survey monkey and responses were recorded. No personal information was shared upon result analysis.

Conclusion

Research clearly supports the notion that CBT can be used to treat insomnia, but the major inconvenience is that this intervention is incredibly complex and tailored to the individual. The individual must be willing to work on CBT skills on a daily basis to stay on track and improve sleep in the long term. Luckily, internet-based programs such as SHUTi, which are specific to the patient based on his or her needs and personal struggles with insomnia, can alleviate the need for primary care providers to be experts in teaching CBT as well as eliminate the time in the office to implement this treatment plan. Given that online CBT programs are so specific to each individual, this also helps patients to work through and identify the personal problems causing insomnia in order to overcome certain thoughts and unhealthy nighttime behaviors. Providing education to future nurse practitioners about the use of CBT in treating insomnia will hopefully assist in increasing the use of this therapy in the real world. Furthermore, of the participants that completed both the pre-test and the post-test, there were more correctly answered questions in the post-test than in the pre-test, demonstrating improved knowledge regarding CBT and SHUTi. Most students (92%) in the post-test stated that they were “somewhat likely” or “very likely” to recommend SHUTi in the future.

Overmedicating patients is not the answer for promoting long term health and healthy sleeping patterns. Healthcare experts must teach patients that the body and mind are connected and that one cannot be in excellent health without the two in balance. CBT offers individuals the empowerment to transform sleep hygiene and achieve a holistic view of health for longevity and a higher quality of life and well-being.

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Appendix A

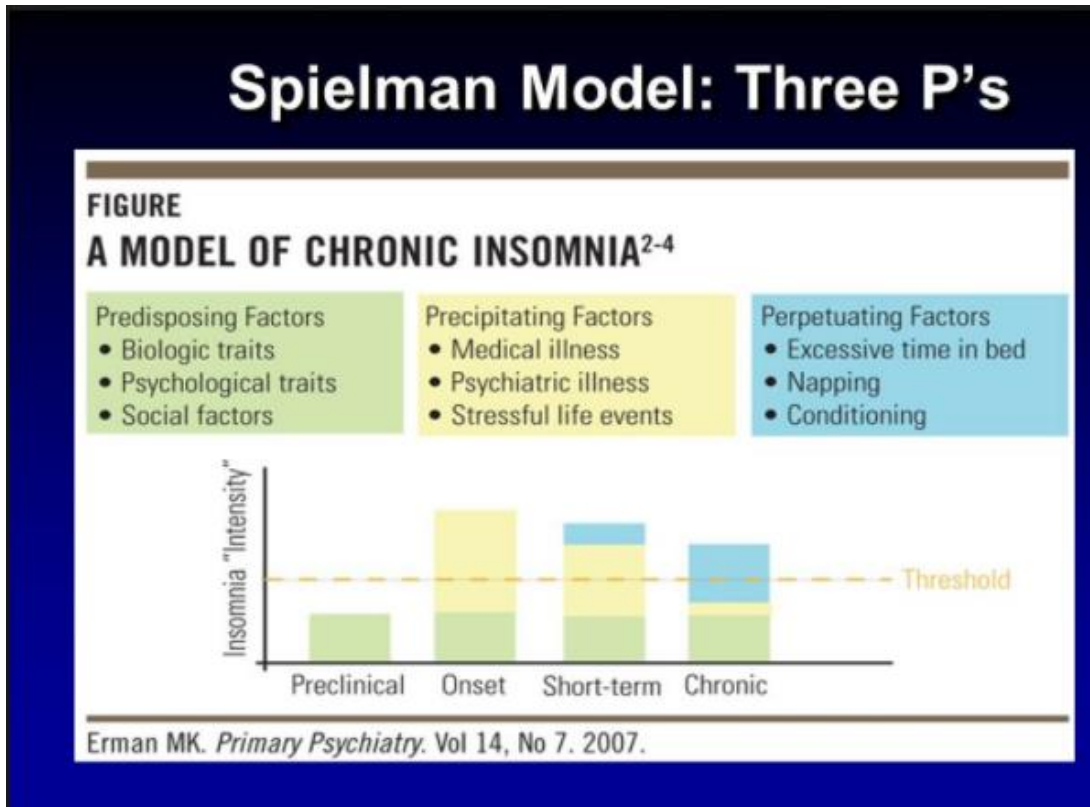


Figure 1. Spielman’s 3P Model of Chronic Insomnia

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Appendix B

Pre-test Student Participant Questionnaire via SurveyMonkey

1. What is your age?
 - a. 18 to 24
 - b. 25 to 34
 - c. 35 to 44
 - d. 45 to 54
 - e. 55 to 64
 - f. 65 to 74
 - g. 75 or older
2. What is your gender
 - a. Female
 - b. Male
 - c. Other
3. In what city do you live? (fill out text box)
4. Do you have experience prescribing medication or recommending treatment for sleep disorders?
 - a. yes
 - b. no
5. What might you recommend, suggest, or prescribe for a patient who presents with a chief complaint of suffering from difficulty sleeping for a year?
 - a. Ambien
 - b. Benzodiazepines
 - c. Behavioral therapy
 - d. Cognitive behavioral therapy
 - e. Other (please list)
 - f. I don't know
6. Based on your current knowledge, what is the first line of treatment for insomnia?
 - a. Ambien
 - b. Behavioral therapy
 - c. Cognitive Behavioral therapy
 - d. All of the above
 - e. I don't know

(Answer: c, CBT)

7. SHUTi is an online cognitive behavioral therapy (CBT) program used to treat insomnia.
Have you ever heard of it?
 - a. yes
 - b. no

8. How long do you think the online CBT treatment for insomnia, SHUTi, is recommended for patients?
- 1 year
 - 3 weeks
 - 6 months
 - 6 weeks
 - I don't know

(Answer: d, 6 weeks)

9. How often do you think SHUTi's core learning and strategy session is given to patients through SHUTi on a weekly basis?
- Every day for 40 minutes
 - Every other day 40 minutes
 - Once a week for 40 minutes
 - Once a month for 2 hours
 - I don't know

(Answer: c, once a week for 40 minutes)

10. Does CBT address people's fears, concerns, and worries about poor sleep and the impact on their lives during daytime functioning?
- Yes, CBT works to get to the root of the problem, addressing the cause of why the individual is suffering from insomnia, to change patterns of thinking and behavior that are causing poor sleep habits.
 - No CBT, is useful in helping patients to work through poor sleep habits, but does not address fears, concerns or worries, since it can be implemented through an online program such as SHUTi and not in person with a healthcare professional.
 - I don't know

(Answer: a, Yes)

Appendix C

Post-test Student Participant Questionnaire via Survey Monkey

1. What is the first line treatment for insomnia?
 - a. Ambien
 - b. Behavioral therapy
 - c. Cognitive Behavioral therapy
 - d. All of the above

(Answer: c, CBT)

2. How long is the online CBT program, SHUTi, recommended for patients? (6 weeks)
 - a. 1 year
 - b. 6 weeks
 - c. 6 months
 - d. 3 weeks

(Answer: b, 6 weeks)

3. How often do patients have to use the core learning and strategy session on a weekly basis?
 - a. Once a week for 40 minutes
 - b. Every other day 40 minutes
 - c. Once a month for 2 hours
 - d. Once a day for 40 minutes

(Answer: a, once a week for 40 minutes)

4. Does CBT address people's fears, concerns, and worries about poor sleep and the impact on their lives during daytime functioning?
 - a. Yes, CBT works to address to the root of the problem, addressing the cause of why the individual is suffering from insomnia, to change patterns of thinking and behavior that are causing poor sleep habits.
 - b. No CBT, is useful in helping patients to work through poor sleep habits, but does not address fears, concerns or worries, since it can be implemented through an online program such as SHUTi and not in person with a healthcare professional.

(Answer: a, Yes)

5. SHUTi costs \$174.00 for a one-time fee of 26 weeks of access, but healthcare providers can obtain discounts with SHUTi for their patients. How willing are you to recommend SHUTi for future patients suffering from insomnia as opposed to sleep-aid medication? (This question is not graded)

- a. Very likely to recommend SHUTi for future patients suffering from insomnia
 - b. Somewhat likely to recommend SHUTi for future patients suffering from insomnia.
 - c. Very unlikely to recommend SHUTi for future patients suffering from insomnia.
 - d. Unsure at this time.
6. What year are you currently in at UMASS Amherst's psychiatric mental health nurse practitioner or family nurse practitioner program?
- a. Year 1
 - b. Year 2
 - c. Year 3
 - d. Year 4 or 5