

Sleep Hygiene Education for Rural Adults

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### **Abstract**

Sleep is an essential determinant of health that has become an unmet public health concern. Sleep deprivation and poor quality of sleep has been attributed to increased mortality and the development of chronic diseases such as cardiovascular disease, diabetes, depression and obesity (Watson et al., 2015). The literature provides robust evidence that sleep hygiene education programs implemented in the community setting produce favorable outcomes (Black et al., 2015; Smallfield & Lucas Molitor, 2018; Wang et al., 2016). This capstone project examined what effect a community based sleep hygiene education program had on the quantity and quality of sleep in rural adults. Participants received a 45 minute oral PowerPoint presentation on sleep hygiene and were given an educational handout. The Pittsburgh Sleep Quality Index (PSQI) questionnaire was used to subjectively evaluate a participant's sleep habit pre- and post-intervention (Buysse et al., 1989). Strong evidence suggests that the sleep hygiene intervention improves the overall PSQI global scores and overall quality of sleep. A paired sample t test was calculated to compare the means of differences between pre- and post-global PSQI intervention scores. The means of differences was 2.44, a statistically significant increase from the pretest to the final was found ( $t(8) = 4.859, p < 0.001$ ). Implementation of a community based sleep hygiene education can produce positive sleep health outcomes in rural adults, however, a larger more diverse sample size would be required to validate these findings.

## Sleep Hygiene Education in Rural Adults

Sleep is a critical determinant of health that has become an unmet public health concern. More than one third of American adults fail to achieve the necessary seven hours of sleep that is required each night to promote optimal health and reduce the risk for the development of chronic health diseases such as cardiovascular disease, obesity, diabetes and depression (Centers for Disease Control and Prevention [CDC], 2016). The significant health effects from the lack of sleep led to sleep health being recognized as a new topic of concern by *Healthy People 2020* (U.S. Department of Health and Human Services [HHS], 2014). The objective for sleep health is to increase the public's knowledge of how adequate sleep can improve health, quality of life, promote safety at work and while traveling on the roads (HHS, 2014, Sleep health, para. 1).

Characteristics of rural living compromise sleep health and the ability of adults to engage in healthy behaviors. Rural areas are geographically isolated with limited access to primary care providers, screening and preventative services and lack health care coverage (Rural Health Information Hub, [RHIH], 2017, Rural health disparities). A community based sleep health education program is needed in rural communities to increase public awareness of the importance of sleep, promote sleep health and reduce the incidence of chronic health disease.

### **Overview**

#### **Background**

Sleep deficiency is a result of a decrease in the quantity, amount of sleep time, or a decline in the quality of sleep caused by fragmented sleep. Nationally, 25% of adults in the United States receive less than six hours of sleep, 15 out of every 30 days (American

Sleep Apnea Association [ASAA], 2017). Insufficient sleep and poor quality of sleep elicits a dysregulation in the immune response, cardiometabolic function, and disrupts a person's ability to learn and recall information (Mukherjee et al., 2015). The chronic loss of sleep has been associated with increased mortality and coincides with the increasing trend of chronic diseases such as diabetes, hypertension, heart disease and obesity (HHS, 2014; Mukherjee et al., 2015). In Nebraska, 30% of adults report receiving less than seven hours of sleep every night and engage in poor health practices such as physical inactivity, smoking, excessive alcohol consumption and obesity (CDC, 2014). Among these sleep deprived Nebraskans, chronic health problems such as asthma, diabetes, depression and arthritis were prevalent (CDC, 2014).

Over the past 30 years, trends indicate that society has prioritized work schedules, commuting, social and family time over attaining adequate sleep (Mukherjee et al., 2015). This has resulted in the decline in the average duration of sleep each day. Although some adults may chose social activities over sleep, many adults suffer from medical or psychological causes that can disrupt sleep. More than 50 million Americans are reported to have a sleep disorder such as sleep apnea, chronic insomnia and restless leg syndrome that contribute to sleep deprivation (ASAA, 2017). The economic burden of sleep disorders in the United States is approximately \$16 million dollars each year and is attributed to increased medical cost and loss of workplace productivity (Wang, Chair, Wong, & Li, 2016).

Sleep deprivation and drowsiness are common complaints made by patients in the primary care setting. Many patients present to the clinic requesting sleep pills, increasing the risk for abuse and overdose of hypnotics. "Some researchers have argued for sleep

hygiene education as the first-line treatment for sleep disorders” (Soleimani, Motaarefi, & Hasanpour-Dehkordi, 2016, p. 3). Despite this increased interest from patients, sleep hygiene education provided in the primary care setting is limited (Irish, Kline, Gunn, Buysse, & Hall, 2015). *Healthy People 2020* (HHS, 2014) recommends offering sleep health education and promotion strategies to the general public to stress the importance of sleep health.

### **Problem Statement**

Poverty and attributes of rural living can negatively influence sleep behaviors and lead to the development of chronic disease (Chang, et al., 2012). In 2017, Nebraska’s population was estimated at 1.9 million with 34% of the population living in rural areas (RHH, 2017, Nebraska, para 1). Nearly 11.8% of rural Nebraskans were living in poverty compared to the 10.2% in urban areas (RHH, 2017, para 3). In 2015, the Centers for Disease Control and Prevention issued a report indicating that poverty stricken rural adults that slept 6 hours or less experienced a significant decline in the family’s income, in comparison to their urban counterparts. In addition to poverty, rural adults are more likely to have low literacy and limited access to primary medical care or health education programs (Chang et al., 2012). Sleep hygiene education is a recommended treatment for insufficient sleep that is highly underutilized and can be implemented in a community based setting. The PICOT question for this evidence-based practice capstone project is: In rural adults’ age 19 years and older (P), how does the initiation of a sleep hygiene education program (I) affect the quantity and quality of sleep of those who attended (O) within one month (T)?



**Purpose Statement**

Evidence suggests that behavioral therapies including sleep hygiene education, relaxation and cognitive behavioral therapy offers minimal risk and are highly effective in improving the overall sleep experience (Bonnet & Arrand, 2018). Sleep hygiene education is a low cost, easy accessible intervention that can be employed to improve the sleep health of the adults. Therefore, the purpose of this project was to improve the quality and quantity of sleep in rural adults by offering sleep hygiene education in the community setting.

**Outcomes**

The primary outcome of this capstone project focused on measuring the sleep quantity and quality of rural adults. The project utilized the Pittsburgh Sleep Quality Index (PSQI) questionnaire which provided a subjective assessment of a person's sleep habits within the last month (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Participants completed the PSQI questionnaire prior to the educational program and then returned in one month to repeat the questionnaire. Individual scores were assessed to determine if the adult experienced an increase in sleep quantity and quality post intervention. The desired outcome of this evidence-based capstone project was to increase the quality and quantity of sleep experienced by rural adults after receiving sleep hygiene education.

**Review of the Literature****Search Plan**

The search plan for this evidence-based project utilized the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed databases through the

Nebraska Methodist College website. A search was accomplished by using the Boolean/Phrase method.

The clinical question was placed into the PICOT format and key words were identified to conduct the literature search. A list of searchable terms and key words are provided in Table 1. The literature search was carefully traced and documented to allow for replication of the search.

Table 1

*PICOT Terms*

<b>PICOT</b>	<b>TERMS AND KEYWORDS</b>
P (population/problem)	Sleep problem*, sleep disturbance*rural adults
I (intervention)	Sleep education, sleep hygiene education
C (comparison)	No comparison.
O (outcome)	Sleep quality, sleep quantity
T (timeframe)	No terms used.

### **Database Search Strategy**

The literature search was guided by the PICOT framework to yield relevant research articles, within the last five years that was related to the clinical question. Limiters were utilized throughout the search and included articles written after January 1, 2013, as well as articles that were peer reviewed, written in the English language and those that contained the population of interest, adults older than 19 years of age. Initial attempts to further restrict the population to rural adults were found to be too restrictive and yielded no results. Numerous research articles used the terms sleep problems and

sleep disturbance interchangeably; therefore these terms guided the search for the clinical problem of interest and resulted in a total of 4,625 articles. The literature search continued with the intervention term sleep education and sleep hygiene education, resulting in 154 articles and 72 articles respectively.

The next search was conducted on the outcome portion of the clinical question and included key terms such as sleep quality and sleep quantity. A significant amount of research articles measured sleep quality, yielding 5,344 articles versus 235 articles that measured sleep quantity. The final search was completed using the population, intervention and outcome groups combined using the Boolean phrase “and”, which returned 20 articles. One article was a duplicate in both CINAHL Complete and the PubMed database therefore 19 articles were reviewed with inclusion and exclusion criteria applied. A detailed search diagram can be found in Appendix A.

### **Inclusion/Exclusion Criteria**

The criteria used to determine suitability for inclusion in the research was focused on the final PICOT question criteria: population, intervention, comparison, outcome and timeframe. Articles for inclusion needed to be written in the English language, and published in a peer-reviewed research journal after January 1, 2013. The studies included adults with an age greater than 19 years of age and sleep education or sleep hygiene education as an intervention. Although the PICOT question identified sleep quality and sleep quantity as an outcome, articles that only measured one of these outcomes were not excluded. In order to attain the highest level of evidence-based research, articles that did not address the PICOT question, as well as articles that were non-research articles were

excluded. After inclusion and exclusion criteria were applied, a total of 5 articles underwent critical appraisal.

### **Analyzing the Literature**

Critical appraisals were completed on five research articles using guidelines from Polit & Beck (2012). A matrix table was created for each article to organize and evaluate the literature, using six major categories: 1) article citation and level of evidence, 2) setting, participants and sample size, 3) background and purpose for the research, 4) research methods and study design, 5) findings and summary of the research, and 6) comments about the article relative to the applicability of the PICOT question to the capstone project. The detailed matrices are found in Appendix B.

Levels of hierarchy of evidence were assigned to the five articles by using the guidelines obtained by Polit and Beck (2012). Evidence hierarchies are noted as Levels I-VII and rank the studies according to the strength of evidence they provide. Level I on the hierarchy represents the strongest possible evidence, using systematic reviews from multiple randomized controlled trials (RCTs) or non-RCT, while Level II on the hierarchy is the second strongest possible evidence, and includes a single RCT or non-RCT. One research article provided a meta-synthesis of Level I evidence on sleep outcomes in community dwelling adults, while the remaining four research articles represented Level II, experimental RTCs measuring sleep outcomes after a single intervention of sleep hygiene education or in comparison with other behavior interventions such as mindful meditation, cognitive behavioral therapy or music therapy.

**Level I evidence.** Smallfield & Lucas Molitor (2018) conducted a systematic review for literature which contained evidence of effective nonpharmacological

interventions that can be employed by occupational therapists in the community setting to improve sleep health in the older adult. A total of 13 Level I studies were critically reviewed. All the studies contained behavioral interventions such as relaxation techniques, meditation, sleep hygiene education, sleep diaries and guided imagery. Interventions were grouped according to three themes; 1) one-to-one single component intervention, 2) one-to-one multiple component intervention, and 3) group multiple component intervention. The review found that superior one-to-one behavior components included computer based educational training, while a one-to-one multiple component intervention should contain “sleep hygiene education, progressive relaxation, goal setting, development of a sleep schedule and use of a sleep diary” (Smallfield & Lucas Molitor, 2018, p. 7). Group interventions require multiple components to improve sleep outcomes and should combine relaxation and meditation practices, incorporate goal setting and journaling, and provide sleep hygiene education and cognitive behavioral therapy (Smallfield & Lucas Molitor, 2018).

**Level II evidence.** Black, O’Reilly, Olmstead, Breen, & Irwin (2015) conducted a community based RCT study on adults 55 years and older that experienced sleep disturbance which was defined by a PSQI score exceeding 5. The purpose of the study was to determine if mindful meditation practices prove superior in promoting sleep quality over sleep hygiene education. The researchers established two measurable outcomes. The primary study outcome was to evaluate differences in the PSQI scores between the mindful meditation group and sleep hygiene intervention group post intervention. Secondary outcomes related to sleep disturbance such as insomnia, depression, anxiety, stress, fatigue and the presence of inflammatory signaling nuclear

factors (NF-kB), which contribute to the development of chronic diseases were measured using validated tools.

Subjects were randomized into a control group that received weekly, two hour sleep hygiene education sessions guided by information from the National Institute for Health and National Sleep Foundation. The intervention group received weekly, two hour mindful awareness instruction from a teacher certified in mindful practice. Both groups completed a total of six sessions. The primary outcome results showed improved PSQI scores in the control and intervention group, with the greatest improvement seen in subjects that participated in mindful awareness practices. The mindful awareness practice group revealed significant improvement in secondary outcomes of “insomnia symptoms, depression symptoms, fatigue interference, and fatigue severity ( $p < .05$  for all)” (Black et al., 2015, p. 494). In addition, NF-kB concentrations in both groups declined overtime ( $p < .05$ ) offering subjects an anti-inflammatory benefit that may lend to a reduced risk of chronic disease.

Martinez et al., (2014) conducted a similar experimental RCT evaluating the sleep outcomes and the clinical improvement of fibromyalgia patients after they received either cognitive-behavioral therapy (CBT) or a sleep hygiene education (SHE) as an intervention. The study was inclusive of only women, with 30 participants receiving CBT and 29 receiving SHE. Similar to the Black et al., (2015) study, a trained professional was required to provide subjects with CBT, with interventions concluding after six weeks. The CBT and SHE session was shorter in duration compared to the Black et al., (2015) study with sessions lasting one hour. Researchers found that sleep quality improved in both groups from pre- to post-treatment with the most improvement seen

with the CBT group. Habitual sleep efficiency was near significance in women who received SHE with  $p=0.07$ . The CBT group showed statistical improvement in daytime functioning, general fatigue, pain, anxiety and depression and pain intensity near significance with CBT at  $p=0.08$ .

Wang et al., (2016) evaluated the effects of music and SHE among community dwelling adults age 60 years and older. This two-armed RCT consisted of a control group that was provided with SHE only and an intervention group which received SHE plus a music intervention. Both groups were provided with face-to-face SHE consisting of basic sleep aspects such as promoting an optimal sleep environment, and avoiding stimulants such as smoking, tea and alcohol prior to bed. The SHE was completed by the researcher in 15 minutes and all participants received biweekly phone calls reviewing and reiterating key points of SHE. The intervention group was provided with an MP3 player that contained stable melodies of 60-80 beats per minute. The subjects were instructed to listen to the music 30-45 minutes every night before retiring to bed. PSQI scores were measured at baseline, at one month, two months and three months with a PSQI of  $>7$  indicating poor sleep quality. Researchers found sleep quality continuously improved over the period of three months in both the control and intervention group. The control group's global PSQI score declined from 12.26 at baseline to 8.72 within the 3 month time frame versus the intervention group that experience a PSQI decline of 13.53 to 7.28. The intervention group experienced improvement in sleep efficiency with 81% of subjects at baseline unable to fall asleep within 30 minutes, three or more times per week. The number declined to 12.5% at the completion of the 3 month music SHE intervention.

A RCT conducted by Saeedi, Shamsikhani, Farahani & Haghverdi (2014) investigated the sleep health of hemodialysis patients after completing six sessions of sleep hygiene education. Sleep quality was assessed by the PSQI scores pre- and post-intervention. Patients that received SHE had a significantly lower global PSQI score after the intervention in comparison to baseline values ( $p < .001$ ) and sleep latency, sleep quality, sleep disturbance and daytime dysfunction were improved in the intervention group (Saeedi et al., 2014).

### **Summary of Findings**

The review of the literature indicated that sleep hygiene education, while not superior to CBT or mindful awareness practices, consistently showed improvement in sleep quality outcomes in adults. The research studies by Black et al., (2015) and Martinez et al., (2014) required highly trained professionals to carry out CBT. The shortage of providers trained in CBT is problematic and the overall benefit from CBT can be diminished if therapy is administered by inexperienced providers (Bonnet & Arand, 2018). Sleep hygiene education as a solitary intervention can be effective in improving the sleep health in adults with renal failure that require hemodialysis and may reduce the overall concentration of anti-inflammatory markers that increase the likelihood of developing a chronic disease (Black et al., 2015; Saeedi et al., 2014). In addition, sleep hygiene education programs demonstrated favorable sleep health outcomes when implemented in a community setting (Black et al., 2015; Smallfield & Lucas Molitor, 2018; Wang et al., 2016). The overall findings support this evidence based capstone project, which will implement a sleep hygiene education program in the community setting in an effort to improve sleep health of rural adults.



## **Theoretical Framework**

### **Evidence-Based Framework**

Evidence-based models are used in clinical decision-making and assist in the design and implementation of changes in practice (Melynk & Fineout-Overholt, 2015). Although several evidence-based models were considered, the Stetler model of evidence-based practice was the most suitable for this capstone project. The Stetler model was developed in 1976 and has been revised to provide precise guidance in evaluating and applying research into practice (Melynk & Fineout-Overholt, 2015). The Stetler model is known as a “practitioner-oriented model because of its focus on critical thinking and use of findings by the individual practitioner” ((Melynk & Fineout-Overholt, 2015, p. 279). The model contains five phases which offer fluidity in integrating research into practice; a) preparation, b) validation, c) comparative evaluation and decision making, d) translation and application, and e) evaluation (Melynk & Fineout-Overholt, 2015).

The first phase of the Stetler model is the preparation phase. During this phase, a clinical problem and desired outcomes are identified to guide the literature search for relevant evidence to address the problem. This capstone project identified poor sleep practices among adults in rural Nebraska were contributing to the increased prevalence of chronic diseases (CDC, 2014). The desired outcome for this project included improved sleep quality and quantity for adults that received sleep hygiene education. During this phase, internal and external factors that affect sleep health are identified. This includes health-related behavior practices such as substance abuse, physical activity, and nutrition as well as factors such as the sleeping environment, use of medications, and presence of stress and chronic disease. These types of health-related practices were taken into account when developing the educational intervention.

The second phase of the model is the validation phase, where the literature is reviewed and critically appraised for level of evidence and quality. The literature should be relevant to the clinical problem, desired outcome and intervention (Melynk & Fineout-Overholt, 2015). In this capstone project the literature was critiqued considering that a community based sleep hygiene education program would be developed and act as the intervention. In addition, the research was assessed for validity and rated using the level of hierarchy of evidence by Polit and Beck (2012).

The third phase of the Stetler model involves comparative evaluation and decision making of the evidence. In this phase the evidence is reviewed and decisions are made as to what articles can be utilized to guide the EBP project (Melynk & Fineout-Overholt, 2015). In this capstone project, articles that provided substantial evidence of positive outcomes after a sleep hygiene education intervention were retained. The findings were compiled into detailed matrices.

The fourth phase includes translation and application of the research findings into a plan of action that can be applied to practice (Melynk & Fineout-Overholt, 2015). In this capstone project, the evidence and components that were used to develop and deliver the sleep hygiene education in the appraised articles were extracted to guide the projects educational intervention. In addition, multiple studies used the Pittsburgh Sleep Quality Index (PSQI) tool to measure the quality and quantity of sleep. The PSQI tool was proven reliable and valid in multiple studies and was utilized in this project to measure sleep outcomes.

The final phase of the model involves evaluating if the desired outcomes were achieved post intervention (Melynk & Fineout-Overholt, 2015). The evaluation should

also consider the cost and benefit of the practice change. In the capstone project improved sleep outcomes were evaluated by comparing the PSQI scores pre- and post-intervention.

### **Model/Theory**

The principles of Nola Pender's Health Promotion Model (HPM) guided this evidence-based practice project. Pender's model focuses on the holistic aspects of human behavior and recognizes how a person's unique characteristics and experiences affect subsequent lifestyle behaviors that can lead to the development of a chronic disease (Masters, 2011). The model focuses on three aspects of health promotion including individual characteristics and experiences, behavior specific cognition and affect, and behavioral outcomes (Masters, 2011). An individual's characteristics and experiences are influenced by prior related experiences and personal factors such as age, gender, ethnicity, self-esteem, perception of health, and self-motivation (Alligood & Tomey, 2011). Behavior specific cognition and affect are the individual's perceived benefits of action and barriers to action as well as perceived self-efficacy and activity related affect (Masters, 2011). Other behavior specific cognitions include interpersonal and situational influences that can affect health promoting activities. An individual's personal beliefs, expectations from significant others and social support can directly affect health related behaviors (Alligood & Tomey, 2011). Finally, Pender's model discusses behavioral outcomes as a commitment and conscious effort to engage in health promoting behaviors. The Pender Health Model was well positioned to assess and identify the influential factors that contributed to poor sleep practices in rural adults. Sleep hygiene education interventions that are tailored to address behavior specific variables can induce a change

in health related behaviors and create positive sleep outcomes for rural adults.

### **Organizational Assessment**

This evidence-based sleep hygiene project was implemented in a rural, Midwestern church in Nebraska. Healthcare services in the area are limited with the health care needs being met by one medical clinic and a 23 bed, critical access hospital. Results from the 2016 community needs assessment survey recognized there was a lack of access to health screening and education being provided on the prevention of chronic diseases (Steckler, 2016). Although the residents expressed an interest in preventative health education, the survey suggested residents failed to identify sleep health as a determinant of chronic disease, substantiating the need for this sleep hygiene project (Steckler, 2016).

The overall reduction in the rural health care workforce proved problematic and limited the amount of preventative screenings and education programs that were scheduled within the community following the survey. Currently, residents are provided with a yearly, one day health fair that offers screening and education on topics such as diabetes, heart disease, colon cancer, stroke and skin cancer.

Facilitators identified in this project include the low cost of the educational project as well as the ease in accessing residents in the population. In the rural communities religious institutions remain a cornerstone, closing the gap on health disparities and acting as a larger social network reaching the most vulnerable populations. Therefore, this project utilized a rural church as a convenient setting in which to provide sleep hygiene education.

Barriers that were anticipated in the implementation of the project included a resident's lack of willingness to attend an educational session in a faith-based setting, as well as individual time constraints. There had been no previous education programs conducted in the church setting in this rural community.

### **Methodology**

This capstone project used a pretest and posttest design to evaluate the effectiveness of a sleep hygiene education program. The timeline for this evidenced-based practice project can be viewed in Appendix C. The project collected quantitative data on seven sleep domains by using the Pittsburgh Sleep Quality Index (PSQI) form to assess changes experienced in adult sleep habits following the intervention.

### **Setting**

This sleep hygiene project was conducted in a rural church in the Midwest. This rural community consisted of approximately 3,500 residents with 88.2% having a high school education or higher (United States Census Bureau, 2017). Although a majority of the population had a high school education, the poverty rate among residents was 0.8% and approximately 11.7% were living without health insurance (United States Census Bureau, 2017). In addition, the community lacked ethnic diversity with approximately 94% of the population Caucasian, 1% African American, 3% Hispanic, and 2% Asian (U. S. Census Bureau, 2016). This lack of ethnic diversity was considered when interpreting the results of the study.

The church community consisted of approximately 139 active members and contained diverse age groups with most members over the age of 30 years. Sleep hygiene education was provided in a large classroom off the sanctuary.

**Sampling/Recruitment**

Support for the project was obtained from key stakeholders at the church including the pastor and by a group of elected elders known as The Session. The Session met monthly and had full authority over all business aspects of the church. The members of the Session played a vital role in influencing the congregation and the community at large. A letter of approval was received from the church pastor.

Participants for this capstone project were recruited by posting information regarding the project in the monthly church newsletters and on the church bulletin board. A convenience sample of participants was recruited with the inclusion criteria of being English-speaking individuals, aged 19 years and older, and whose permission had been obtained to participate in the project. Exclusion criteria for the project included those participants under the age of 19 years and participants with a history of dementia or narcolepsy.

**Project Design**

This capstone project consisted of a pretest and posttest evaluation to analyze the effectiveness of the sleep hygiene education as an intervention. Participants meeting inclusion criteria were directed to a classroom setting within the church. Participants were provided with a letter outlining the details of this evidence-based practice project. The letter was accompanied by a demographic form (Appendix D) as well as the PSQI questionnaire. Participant permission was implied by completing the demographic form and PSQI questionnaire. The PSQI questionnaire was administered to eligible participants as a pretest and the sleep hygiene education intervention followed (Appendix

E). Upon completion of the intervention, participants were encouraged to use the sleep hygiene tips and return in one month to complete the PSQI questionnaire as a posttest.

### **Measurement Instrument(s)**

In order to measure the outcomes of this capstone project the Pittsburgh Sleep Quality Index (PSQI) questionnaire was used to subjectively evaluate a participant's sleep habit pre- and post-intervention (Buysse et al., 1989). The PSQI is an instrument that utilizes seven components to measure sleep quality and quantity over the last month. A total of 19 questions are used to assess sleep quality, latency, duration, efficiency, sleep disturbance, use of sleep medications and daytime dysfunction (Buysse et al., 1989). Each component on the questionnaire is awarded a score ranging from 0-21, with higher scores indicating a poorer quality of sleep. The PSQI instrument has good internal validity and reliability with a Cronbach's  $\alpha$  of 0.83 (Buysse et al., 1989). According to Buysse et al., (1989) "a PSQI score of greater than 5 yielded a diagnostic sensitivity of 89.6% and specificity of 86.5% ( $\kappa = 0.75, p < 0.001$ ) in distinguishing good and poor sleepers" (p. 193). For purposes of this project global PSQI scores will be evaluated at baseline and post intervention to evaluate if the post intervention scores surpass baseline scores, marking improved sleep quality and quantity following sleep hygiene education. Subjects that have a PSQI score of less than 5 will not be excluded from the intervention. Permission to use the PSQI instrumentation was obtained by Dr. Daniel Buysse at the University of Pittsburgh School of Medicine.

Participants also completed a demographic intake form to collect personal data such as gender and age range (Appendix D). The demographic form contains two additional questions that are not assessed in the PSQI questionnaire that may affect sleep;

these include a current history of substance use, or taking any over the counter or prescribed medications to aide in sleep. Learning more about the initial sleep habits and sleep health of the participants' aides the primary investigator in evaluating if significant improvement was seen in sleep health post intervention.

### **Data Collection Procedure**

Eligible and consenting participants appeared on the designated day of the intervention and was directed toward the church classroom. Participants were provided with a PSQI questionnaire that is assigned with a numerical code to deidentify participants by the church secretary. A code book with a list of the participants and the assigned numerical code was kept by the church secretary in a locked cabinet. Participants were instructed to place the completed PSQI questionnaires in a manila envelope at the back of the classroom prior to the intervention. Completed questionnaires were relocated to a locked cabinet, which can only be accessed by the project coordinator. Data obtained from the questionnaire was transferred to an ironkey USB storage drive that is password protected by the project coordinator to secure the data. Participants returned in one month to the church classroom to complete a post intervention PSQI questionnaire. The participant was expected to recall his or her assigned numerical code and label the PSQI questionnaire with this identifier when completing the posttest evaluation to allow for comparison of individual pre- and posttest scores. If participants were unable to recall the assigned numerical code, the church secretary consulted the code book as a reference.



**Intervention**

The purpose of this evidence-based practice project was to evaluate the sleep quality of rural adults and offer sleep hygiene education as an intervention strategy to improve the sleep habits in this population. In keeping consistent with the Stetler model, phase IV guides the intervention by translating the evidence into a sleep hygiene education program that can promote a change in the participants. Research conducted by Black et al. (2015), found sleep quality was improved after participants were provided with sleep hygiene education content from the National Sleep Foundation and National Institutes of Health. Therefore this capstone project employed a sleep hygiene education intervention that was guided by sleep health information supported by the National Health Institutes of Health.

The intervention for this capstone project consisted of a 45 minute oral PowerPoint presentation and an educational handout. The PowerPoint presentation included the following information: the recommended amount of sleep for adults, negative effects of sleep deprivation on overall health and mood, drowsy driving and sleep hygiene guidelines to improve sleep health (Appendix E). Following the presentation, the participants were provided with an educational handout from the U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute (2011) as well as sleep hygiene information that was adapted from the National Sleep Foundation (2018) (Appendix F). Participants were encouraged to use the sleep hygiene practices discussed in the educational session and return in one month to reevaluate sleep quality and quantity using the PSQI questionnaire.

**Ethical Considerations/Protection of Human Subjects**

Steps were taken to insure this capstone project is ethical and offers protection and privacy of the subjects participating in this evidence-based practice project. Prior to implementing the project the primary investigator and doctoral mentor completed the Collaborative Institutional Training Initiative (CITI) program of human research for social behavioral research investigators in order to be educated on ethical research practices. In addition, the primary investigator obtained written approval from the Nebraska Methodist College (NMC) Institutional Review Board (IRB) prior to initiation of the capstone project.

**Integrity of Data.** Permission to participate was sought from participants prior to any intervention and participant confidentiality was maintained by de-identifying the PSQI questionnaire by use of a numerical code. Questionnaire results were kept anonymous to those outside of the capstone project and reported as aggregate data. Data was stored in a locked cabinet and on an ironkey encrypted flash drive that can only be assessed by the project coordinator. The code book with a list of the participants and the assigned numerical codes was kept by the church secretary in a locked cabinet between the pretest and posttest. The codebook was destroyed by the secretary upon completion of the posttest.

**Conflict of Interest.** The project coordinator was a member of the church in which this capstone project took place posing a potential conflict of interest. Although the project coordinator did not serve in a leadership position or as an elder of member of the Session, possible coercion to complete the survey and participate in the project

existed. To address this potential risk, the church secretary administered and collected the surveys to protect anonymity.

**Data Analysis.** Each participant's information from the demographic intake form and global PSQI score was organized by the project coordinator and transcribed into a PSQI scoring database with results compiled into an Excel spreadsheet. Data analysis was completed comparing pretest scores to posttest scores.

Data was entered into a PSQI scoring database that was available for use from the University of Pittsburgh Sleep and Chronobiology Center (n.d.). The data was then transferred into an Excel spreadsheet where statistical analysis was done in coordination with the statistician from Nebraska Methodist College. Specifically, question number four on the PSQI that measures sleep duration was analyzed to determine if sleep quantity was improved following sleep hygiene interventions and question six was analyzed to determine if sleep quality improved. The global PSQI score was also evaluated to determine if sleep had improved across the seven domains of sleep (quality, latency, duration, efficiency, sleep disturbance, use of sleep medications and daytime dysfunction). According to D.Buysse (personal communication, October 5, 2018) question ten on the PSQI questionnaire should not be used in the overall scoring of sleep health and was included for informational purposes only. This question was included in the administration of the questionnaire as it specifically asks about the sleep habits of a participant's bedroom partner which can affect the overall sleep health of the participant but was not included in the overall scoring of the tool.

A paired t test analysis was used to evaluate for statistical significance between pretest and posttest scores following the intervention. Descriptive statistics were used to

analyze the variables assessed by the questions in the demographic intake form (Appendix D).

## Results

### Participants

Eleven participants consented to participate in this capstone project, which included eight women and three men (See Table 2). Ten participants were older than 56 years of age, with one participant between the age of 36 and 56 years. Demographical data was analyzed and revealed that 73% of participants consumed caffeine, while 18% consumed caffeine plus alcoholic beverages on a regular basis. There was one participant that abstained from drinking caffeine or alcohol. The use of sleep aides was also assessed and revealed that 18% of the subjects used an over the counter sleep aide, specifically Tylenol PM, while 9% of the population utilized the prescribed medication, Ativan for sleep.

Table 2

#### *Participant Demographics*

<b>Characteristics</b>	<b>n</b>	<b>%</b>
<b>Age</b>		
19-35 years	0	0
36-55 years	1	9
56 years and older	10	91
<b>Gender</b>		
Female	8	73
Male	3	27
<b>Substance Use</b>		
None	1	9
Alcohol only	0	0
Caffeine only	8	73
Alcohol+ Caffeine both	2	18
<b>OTC Sleep Aide</b>	2	18
<b>Prescribed Sleep Aide</b>	1	9

## Outcomes

This capstone project's primary outcome was to evaluate what effect sleep hygiene education has on the quantity and quality of a person's sleep within one month's time. All eleven participants returned in one month to complete the PSQI posttest (See Table 3).

**Sleep Quantity.** Question four on the PSQI questionnaire regarding sleep duration was analyzed to provide insight into participants' sleep quantity. Four participants (36%) had improved sleep quantity, while six participants (55%) did not experience any change in sleep quantity after one month. One participant's sleep quantity worsened during this timeframe. The participant provided a notation on the questionnaire attributing decreased sleep to having to get up in the middle of the night to check cattle during the calving season. Data analysis using a paired t test showed no statistical significance between pretest and posttest scores for sleep quantity.

**Sleep Quality.** Question six on the PSQI questionnaire was analyzed to provide insight into the participants' sleep quality. Three participants (27%) had improved sleep quality while seven participants (64%) did not experience any change in sleep quality. One participant failed to answer the question on the pre and posttest. Data analysis indicated no statistical significance between the pretest and posttest scores for sleep quality.

Table 3

*Duration and Quality Paired Samples t-test Results*

	Paired Differences		t	df	Sig (2-tail)
	M	95% Confidence Interval in Difference			
Pair t Test		Lower Upper			
<b>Duration</b>	0.3636	0.1798 0.9071	-1.4907	10	0.1669
<b>Quality</b>	0.3636	0.1798 0.9071	-1.4907	10	0.1669

\* $p < .001$  \*\*there was one missing value

**Overall Sleep Quality.** The PSQI global score was analyzed to determine if sleep quality improved across the seven domains of sleep (quality, latency, duration, efficiency, sleep disturbance, use of sleep medications and daytime dysfunction). Eight participants (73%) experienced overall improved sleep quality one month after receiving sleep hygiene education, while one participant's score remain unchanged. Five participants (45%) were able to achieve an overall posttest PSQI global score of 5 or less indicating good sleep quality was achieved. Two participants failed to complete one of the seven domains of sleep questions within the questionnaire resulting in the inability to calculate an overall PSQI global sleep quality score. Strong evidence suggested that the sleep hygiene intervention improved the overall PSQI global scores and overall quality of sleep. A paired sample t test was calculated to compare the means of differences between pre- and post-global PSQI intervention scores. The means of differences was 2.44, a statistically significant increase from the pretest to the final was found ( $t(8) = 4.859$ ,  $p < 0.001$  (Table 4).

Table 4

*PSQI Global Sleep Quality Paired Samples t-test Results*

	Paired Differences		t	df	Sig (2-tail)
	M	95% Confidence Interval in Difference			
Pair t Test		Lower Upper			
<b>PSQI Global</b>	2.4444	1.2844 3.6045	-4.859	-8	-0.001*

\*p= <.001\*\*there was two missing values

### Discussion

This capstone project sought to examine the effect of sleep hygiene education on the sleep quality and quantity of rural adults. There is little research examining the sleep health of rural adults. In the capstone project, the pretest scores of rural adults revealed that 73% scored greater than or equal to five on the PSQI global score indicating, most participants had a poor quality of sleep. This number far exceeded the CDC's (2014) estimate that 30% of Nebraskan's experience poor sleep, and suggests additional sleep health research may be needed among the rural population.

This capstone project demonstrated that a community sleep hygiene program can significantly improve the overall sleep health of rural adults. Interestingly, the participant's subjective assessment of the individual components of sleep duration and sleep quality showed little improvement after sleep hygiene education, however mean global PSQI sleep quality scores were statistically significant with five participants (45%) reaching normal (PSQI score of 5 or less) sleep health scores. The significant improvement of mean global sleep scores following sleep hygiene education aligns with previous research conducted by Saeedi et al. (2014) and Black et al. (2015). In contrast, this capstone project demonstrated improved sleep health outcomes following one sleep

hygiene education session versus six sessions that were required in the Saeedi et al. (2014) and Black et al. (2015) studies.

### **Limitations**

**Internal Validity.** Every effort was taken to control for extraneous variables and ensure internal validity with this project, however threats were present. The selection process for participants included using a convenience sample to represent the rural adult population. The project coordinator remained in the room while participants were taking the PSQI questionnaire. Some participants wanted clarification of a question and the project coordinator's explanation may have influenced the way the participants answered the survey. Also, participants were provided with a 45 minute oral presentation on sleep hygiene however, upon completion of the presentation, a 20 minute discussion ensued. Participants shared stories of poor sleep experiences and asked several questions of the primary investigator regarding sleep hygiene practices that may have influenced the posttest outcomes. The participants in this capstone project were given a pretest survey prior to the intervention. The pretest may have sensitized participants and threatened the credibility of the participants' sleep performance as participants were preexposed to the pretest questions and asked to complete these questions again as a posttest survey.

Finally, this capstone project did not evaluate what sleep hygiene interventions were used by each participant during the month. Given the statistical significant improvement in sleep health among this population, future studies may wish account for what interventions were used by each participant.

**External Validity.** The limitations for this project included a small sample size and 100% of the participants studied were Caucasian. In addition, 91% of the sample



was older than 56 years of age and 73% of participants were female. Future studies with a larger more diverse sample would be required to increase this projects validity.

**Construct Validity:** The validity of this capstone project may be compounded by the presence of reactivity with participants acutely aware that their sleep habits are being evaluated. Participants may have mindfully chosen to answer the posttest questions to demonstrate favorable sleep outcomes instead of reporting their genuine experience.

**Plan for Sustainability.** This sleep hygiene capstone project was designed for sustainability. This project served to promote positive sleep health outcomes among the participants. This may prompt participants to discuss their experience with others in the congregation, promoting increased awareness. A copy of all the education materials was provided to the church pastor and secretary to be disbursed to inquiring members of the congregation in the future. In addition, the favorable outcomes from this project may prompt members of the Session to seek guidance for additional community educational health programs that can be held at the church.

**Nursing Implications.** As previously mentioned, sleep is a critical determinant of health that if unmet leads to the development of chronic disease. The literature confirms that adult sleep disturbance is prevalent, however there is a lack of literature examining the sleep health among the rural adults population. This capstone project attempted to provide insight into the sleep habits of rural adults. Adults in rural America often face disparities and have limited access to health care providers, health insurance or preventative educational offerings. Faith-based institutions outnumber medical clinics in rural areas and offer sanctuary to all populations including the economically disadvantaged, diverse racial and ethnic minorities, the uninsured, the elderly and the

homeless (Martin, Williams, Crawford & King, 2017). This capstone project attempted to demonstrate that faith-based institution can take an active role in meeting the public health needs of a community by providing an entry point for community health care educational offerings. The positive outcomes from this sleep hygiene project may prompt interest in using faith-based organizations as a platform for education in promoting healthy behaviors in the future.

### **Conclusion**

The lack of sleep remains a significant health risk for the development of chronic disease. A community based sleep hygiene program is a low cost intervention that may increase public awareness of the importance of sleep and improve sleep health. This non-pharmacological approach was safe and allowed for immediate health behavior changes to be made within a short time to improve a person's sleep and overall health. Sleep health and preventative health education can be successfully delivered in faith-based institutions in rural areas.

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**Appendix A**

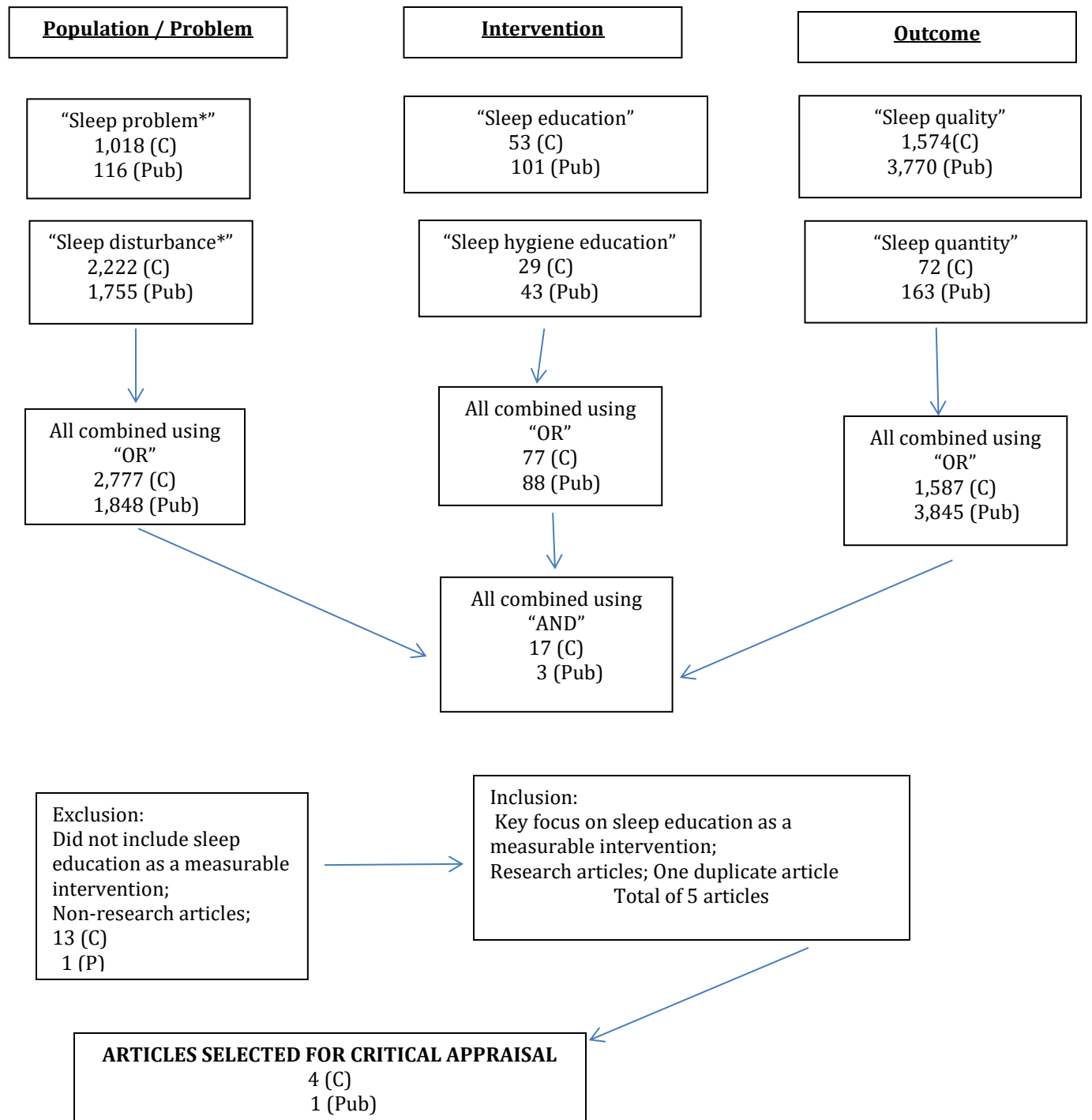
**Search Flow Diagram**



**Search Flow Diagram**

In rural adults, age 19 years of age and older attending a faith-based institution, how does the initiation of a sleep hygiene education program affect the quantity and quality of sleep of the faith-based community within one month?

Search completed in CINAHL Complete (C) and PubMed (Pub).  
 Limiters: January 1,2013-present; Full text; English; Peer Reviewed; Research Adults 19 years+



**Appendix B**

**PICOT Appraisal Matrix**

<b>PICOT</b>					
<b>In rural adults, age 19 years of age and older, how does the initiation of a sleep hygiene education program affect the quantity and quality of sleep of those who attended within one month?</b>					
Citation/Level of Evidence	Setting/Participants/Sample	Purpose/Background	Methods/Design	Findings/Summary Strength/Weaknesses	Applicability to Own Research
<p>Black, D. S., O'Reilly, G. A., Olmstead, R., Breen, E. C., &amp; Irwin, M. R. (2015). Mindfulness meditation and improvement in sleep quality and daytime impairment among older adults with sleep disturbances: a randomized clinical trial. <i>JAMA Internal Medicine</i>, 175(4), 494-501. doi:10.1001/jamainternmed.2014.8081</p> <p>Level of evidence: Experimental study, Level II, Single Randomized Controlled Trial (RCT), (Polit &amp; Beck, 2012).</p>	<p>Setting: Community Setting, Los Angeles, California; UCLA Medical Center</p> <p>Inclusion: English speaking, Older adults <math>\geq 55</math> years with sleep disturbance (PSQI exceeding 5 at screening)</p> <p>Exclusion: Persons who smoke, have cognitive impairment (MMSE Score &lt;23), substance dependence, obesity (BMI of &gt;34.9), depression, practice any form of meditation &gt;15 minutes per day and those non-English speaking. Also any subject with a current inflammatory disorder, sleep apnea, restless leg, infection or illness.</p> <p>Sample size n= 49</p>	<p>Purpose: The purpose of this study is to evaluate if mindful meditation practices are superior to sleep hygiene education in improving sleep outcomes.</p> <p>Background: Literature review indicates that movement based meditation such as tai chi as an intervention to improve sleep quality but little research has been done on non-movement forms of meditation such as mindfulness meditation. In addition, the authors</p>	<p>Methods/Design: The research design was an experimental, parallel-group RCT.</p> <p>Patients were randomized into a control group that received a weekly, 2 hour sleep hygiene education session for a total of 6 sessions guided by information on the National Institute for Health and National Sleep Foundation.</p> <p>The intervention group received weekly, 2 hour mindful awareness instruction from a</p>	<p>Findings: Research findings explained in detail and provided in Tables 2 and Figure 2 and 3.</p> <p>Primary Outcomes: Both SHE and MAP showed improved sleep outcomes through PSQI measurement although not statistically significant. The MAP intervention group showed a greater improvement over the SHE control group.</p> <p>Secondary Outcomes: Measurements collected from the Athens Insomnia</p>	<p>The setting for this study is community based which is comparable to the setting of my research.</p> <p>The study specifically measured quality of sleep after sleep hygiene education which directly relates to my PICOT. The PSQI was used to measure quality, and this tool can be used in my research.</p> <p>The study demonstrates that patients benefit from sleep hygiene although</p>

	<p>Control (SHE) n= 25; Intervention (MAP) n=24 67% of the sample was female</p>	<p>recognized that research indicates that sleep hygiene education (SHE) has improved sleep outcomes.</p> <p>The authors hypothesized that mindful awareness practices (MAP) “relative to SHE would confer superior improvement in sleep quality” (Black, O’Reilly, Olmstead, Breen &amp; Irwin, 2015, p 495).</p>	<p>teacher certified in mindful practice for a total of 6 sessions.</p> <p>Self-assessments and questionnaires were completed in a private room.</p>	<p>Scale, Fatigue Inventory and Beck’s Depression showed improvement at post intervention with MAP. A reduction in Beck’s Anxiety Scores was significant with the MAP intervention (p&lt;.05).</p> <p>Strengths: “First RCT to date to examine the effects of MBI on sleep disturbances and solely in older adults” (Black et al., 2015, p. 499). Reduction in blood inflammatory transcription factor nuclear (NF)-KB concentration which has been implicated in the development of chronic disease, in MAP and SHE although not statistically significant.</p> <p>Weaknesses include 6 subjects (12%) who failed to complete the</p>	<p>not statistically significant. An added benefit is the findings in this article that indicates inflammatory markers (NF-KB), known to cause chronic disease, were reduced after SHE.</p>
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				<p>post intervention. In addition, the sample consisted of predominantly female participants (67%) and those with higher education, restricting external validity. Results limited to older adults with normal cognitive function.</p>	
<p>Martínez, M. P., Miró, E., Sánchez, A. I., Díaz-Piedra, C., Cáliz, R., Vlaeyen, J., &amp; Buela-Casal, G. (2014). Cognitive-behavioral therapy for insomnia and sleep hygiene in fibromyalgia: a randomized controlled trial. <i>Journal Of Behavioral Medicine</i>, 37(4), 683-697. doi:10.1007/s10865-013-9520-y</p> <p>Level of evidence: Experimental study, Level II, Single Randomized Controlled Trial (RCT), (Polit &amp; Beck, 2012).</p>	<p>Setting: Granada, Spain</p> <p>Inclusion: Women between the ages of 25 and 60 years with fibromyalgia for 6 months or longer. Stable on antidepressants, and analgesics for at least one month and meets criteria for insomnia.</p> <p>Exclusion: Pregnancy, significant neurological/head injury, major depressive disorder or suicidal ideation, sleep apnea, or being treated with a type of psychology or physical therapy intervention during the study.</p>	<p>Purpose: The purpose of this study was to evaluate sleep outcomes and clinical manifestations for improvement after subjects received either cognitive-behavior therapy or sleep hygiene education.</p>	<p>Methods/Design: The research design was an experimental parallel -group RCT. Research was guided by CONSORT 2010 guidelines.</p> <p>Randomization by computer into two groups; sleep hygiene education versus cognitive-behavioral therapy.</p> <p>Questionnaires completed at pre-,post-treatment, and follow-up as well as at 3 months and 6 months.</p>	<p>Primary Outcome: Sleep quality measured by PSQI.</p> <p>Sleep quality improved in both groups from pre to post treatment. More improvement seen with CBT than SHE. Habitual sleep efficiency near significance seen after SHE with <math>p=0.07</math>. Subjective sleep quality post treatment and sleep disturbance at first follow up were statistically significant.</p> <p>Secondary Outcome: CBT group showed statistical</p>	<p>This study is relative to my project as it showed improved, although not significant in sleep quality.</p> <p>The article clearly states the education topics included in the sleep hygiene education group that can be applied to this project.</p>

	<p>Sample size n=64 patients randomized (59 completing treatment)                  CBT-Intervention n=32                  SHE n=29</p>		<p>CBT and Sleep Hygiene education provided by trained therapists. Sessions conducted once a week for 6 weeks, one hour in length.</p>	<p>improvement in daytime functioning, general fatigue, pain, anxiety and depression. Pain intensity near significance with CBT at p=0.08</p> <p>Limitation: Sleep quality self-reported and subjective.</p>	
<p>Smallfield, S., &amp; Lucas Molitor, W. (2018). Occupational therapy interventions addressing sleep for community-dwelling older adults: A systematic review. <i>American Journal of Occupational Therapy</i>, 72(4), doi: <a href="https://doi.org/10.5014/ajot.2018.031211">https://doi.org/10.5014/ajot.2018.031211</a></p> <p>Level of evidence: Meta synthesis Systematic Review, Level I evidence (Polit &amp; Beck, 2012).</p>	<p>Inclusion: The search included full-text, peer-reviewed articles published between 1995 and 2015 in the English language. Only articles containing Level I, Level II, and Level III evidence were included.</p> <p>Exclusion: Data from presentations, conference proceedings, dissertations, and non-peer reviewed literature was excluded. Non-English literature excluded.</p> <p>Sample: A total of 1,895 articles were collected and reviewed. PRISMA flow chart available to show sampling decisions (Figure 1).                  n=13 articles contained</p>	<p>Purpose: The purpose in this systematic literature review is to examine the evidence, searching for effective interventions to improve sleep health that can be employed by occupational therapy.</p> <p>Background: Older adults with chronic health problems may experience sleep deprivation turn to prescription medication which has been known to increase daytime fatigue, cognitive</p>	<p>Methods/Design: This was a metasynthesis systematic review with the level of evidence and strength of the studies guided by recommendations made by the U. S. Preventative Task Force.</p> <p>Supplemental Table 2 outlines each article according to synthesized theme, findings, and level of evidence. The authors indicate that an EBP methodology consultant was utilized to review</p>	<p><u>One-on-one single component outcome:</u>                  In the three studies with one-on-one single components used, two studies utilized telephone educational interventions to improve insomnia in older adults with the third utilized a computer based education program. All were effective in improving sleep outcomes.</p> <p><u>One-on-one multiple component outcomes:</u>                  Three studies with one-on-one multiple component interventions used</p>	<p>The authors conducted a meta synthesis on qualitative studies that address interventions on how to improve sleep outcomes in community-dwelling older adults. This corresponds to the targeted population in my research, community dwelling adults and looks specifically at sleep outcomes.</p> <p>The metasynthesis for</p>

	<p>Level 1 evidence</p>	<p>decline and increase a person’s risk for falls.</p> <p>Nonpharmacological interventions such as relaxation techniques, education on sleep habits and increasing physical activity have been studied as an alternative to sleep medication but there is limited literature describing occupational therapy’s role in addressing sleep health.</p>	<p>the evidence table for accuracy and validity.</p> <p>Articles were divided into three themes according to interventions; one-on-one single component intervention, one-to-one multiple component interventions or group multicomponent interventions.</p>	<p>interventions such as sleep hygiene education and relaxation techniques saw improved sleep outcomes in older community-dwelling adults.</p> <p><u>Multiple component outcomes:</u> Seven studies contained group multicomponent interventions to improve sleep outcomes. These included sleep hygiene education, meditation, increased physical activity, cognitive therapy and use of a sleep diary was effective in improving the sleep quality of older adults.</p> <p>Weakness: Variance of intervention dosages and outcomes measurements does not allow author or reader to reach a consensus that one intervention is</p>	<p>these articles suggest that sleep hygiene education led to improved outcomes in the community dwelling adult population, regardless if sleep hygiene intervention was the single intervention or used in conjunction with other interventions such as meditation or increased physical activity. This is encouraging for my project as sleep hygiene education is the single intervention.</p>
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				superior in improving sleep outcomes over another.	
<p>Saeedi, M., Shamsikhani, S., Farahani, P. V. &amp; Haghverdi, F. (2014). Sleep hygiene program for patients on hemodialysis. <i>Iranian Journal of Kidney Diseases</i>, 8(1), 65-69.</p> <p>Level of evidence: Experimental study, Level II, Single Randomized Controlled Trial (RCT), (Polit &amp; Beck, 2012).</p>	<p>Setting: Hemodialysis centers of Arak Valiasr Hospital.</p> <p>Inclusion: 18 to 65 years of age, history of hemodialysis for at least 6 months undergoing dialysis 2-3 times per week.</p> <p>Exclusion: History of mental health disorders (anxiety and depression), cognitive impairment, severe physical and psychological crisis within the last 6 months (divorce, acute hospitalization, bereavement).</p> <p>Sample: Sample size n=82 Radomized (n=76 completing the study) Control n=38; Intervention n=38</p> <p>Mean age 45.12 ± 15.86 years; sample predominately women at 53.9%.</p>	<p>Purpose: The purpose of this study was to determine the effect of a sleep hygiene training program intervention in relation to sleep quality in hemodialysis patients.</p> <p>Background: Sleep hygiene education has been effectively used in combination with psychological interventions to improve insomnia in elderly patients with chronic pain. Researchers indicate little is known regarding the effect of sleep hygiene education in the hemodialysis patient population.</p>	<p>Method/Design: The design was a experimental RTC.</p> <p>Patients randomized into control and intervention group. Intervention group received sleep hygiene training sessions, 30 minutes in length every week for 6 weeks. Teaching methods varied and included lectures, face-to-face interaction and group discussions.</p> <p>Sleep quality was assessed with PSQI prior to sleep hygiene training and reevaluated at 6 weeks. PSQI score of greater than 5 indicated poor sleep.</p>	<p>Findings: The mean PSQI sleep quality score was significantly reduced following sleep hygiene training as compared to baseline (p &lt;0.001).</p> <p>Limitation: Sleep quality self-reported and subjective.</p>	<p>This study is relevant to my capstone as it shows significant improvement in sleep quality scores following sleep hygiene education.</p> <p>The study specifically uses the PSQI to measure sleep quality pre and post intervention.</p> <p>This study did explain topics that were discussed during each sleep hygiene education session. This can be referred to in the development of my capstone’s sleep hygiene education program.</p>



<p>Wang, Q., Ying, S., Wong, E. M., &amp; Li, X. (2016). The effects of music intervention on sleep quality in community-dwelling elderly. <i>Journal of Alternative &amp; Complementary Medicine</i>, 22(7), 576-584. doi:10.1089/acm.2015.0304</p> <p>Level of evidence: Experimental study, Level II, Single Randomized Controlled Trial (RCT), (Polit &amp; Beck, 2012).</p>	<p>Setting: subject from four urban communities in China</p> <p>Inclusion: Age 60 years or older, poor sleep quality (PSQI &gt;7), and Chinese speaking.</p> <p>Exclusion: Subjects with cognitive impairment, impaired hearing, or history of drug and alcohol.</p> <p>Sample: Sample size n= 64 Control n=32; Intervention n=32</p> <p>Mean age 69.38; 80.9% women with 79% with a secondary education.</p>	<p>Purpose: The purpose of this study was to “examine the effects of music intervention on sleep quality among Chinese community-dwelling elderly over a 3-month period” (Wang, Ying, Wong, &amp; Li, 2016, p. 577).</p> <p>Background: Systematic reviews show sedative music may improve sleep quality; however there is limited randomized control trials that have studied a population longer than 6 weeks. In addition, few studies have been conducted in China on community-dwelling older adults.</p>	<p>Method/Design: Two-armed randomized control trial set in China with community-dwelling elderly subjects. The researchers had a control group and an intervention group with data collected at one month, two months and three months.</p> <p>Control Group: Sleep hygiene education only.</p> <p>Intervention Group: Sleep hygiene education plus music intervention. MP3 provided with stable melodies of 60-80 beats per minutes. Subjects to listen to the music 30-45 minutes every night.</p> <p>All subject</p>	<p>Primary Outcome: Sleep quality with continuous improvement seen with PSQI scores: Baseline 13.53, 9.28 at one month, 8.28 at 2 months and 7.28 at 3 months. All with (p&lt;0.05)</p> <p>Weakness: Subjects were provided with telephone reminders biweekly to engage in listening to music 30-45 minutes per night. The actual amount of minutes of the musical intervention may vary among subjects. In addition, sleep quality measured by PSQI does not provide the most accurate objective information regarding deep sleep</p>	<p>The sample included community dwelling adults which is comparable to my population.</p> <p>The control group who only received sleep hygiene education reported sleep quality improvement over the period of three months, however there was no statistical significance. The intervention group which received sleep hygiene education as well as sedative music for 30-45 minutes per night showed statistically significant improvement in sleep latency, efficiency and</p>

			<p>provided with biweekly phone calls reviewing key points of sleep hygiene education and the intervention group reminded to listen to music.</p> <p>Sleep quality was measured using the Pittsburgh Quality Sleep Index (PSQI) self-reported questionnaire. The tool measures seven components of sleep quality.</p> <p>PSQI measurements were performed at one month, two months and three months. The researchers indicate that baseline data and intervention data were collected by the same research to allow consistency.</p>	<p>or REM duration as a measurement from a polysomnography could offer.</p>	<p>daytime dysfunction. In the development of my sleep hygiene education, recommendations can be made to incorporate sedative music to improve sleep.</p>
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**Appendix C**  
**Project Timeline**



**Appendix D**  
**Demographic Form**

1. What is your gender? \_\_\_\_\_

2. What is your age? *Please circle* a) 19-35 years b) 36-55 years c) 56 years or older

3. Which of these substance do you use on a daily basis?

*Please Circle* a) cigarettes b) alcohol c) caffeine d) none. How Much per day? \_\_\_\_\_

4. Do you take anything over the counter to help you sleep? *Please Circle* YES NO

If YES what do you use? \_\_\_\_\_ How often? \_\_\_\_\_

5. Do you take anything prescribed by your doctor to help you sleep? *Please Circle* YES NO

If YES what do you use? \_\_\_\_\_ How much? \_\_\_\_\_ How often? \_\_\_\_\_

**Appendix E**  
**Educational PowerPoint**

## Improve Your Sleep Health: Practice Sleep Hygiene

AMBER R. ROGERS, MSN, RN, CDE



*When you lie down, you will not be afraid; when you lie down your sleep will be sweet. Proverbs 3:21*

## Pittsburgh Sleep Quality Index (PSQI)

- PSQI survey- 19 questions measure the 7 different components of sleep
  - **Duration**
  - Disturbance
  - Latency
  - Daytime dysfunction due to sleepiness
  - Sleep efficiency
  - **Sleep Quality**
- **Global PSQI score:** Scores 0-21 point
  - ≤5 associated with good sleep
  - ≥5 associated with poor sleep



## True or False?



- During sleep the body and brain shut down and rest.
- Adults need less sleep as they get older.
- Getting 1 less hour of sleep every night reduces your ability to focus and function the next day.
- A person will die from sleep deprivation before food deprivation.

## What do we know about sleep?



- We spend 1/3 of our lives sleeping.
- Sleep is active process
  - No organs “shut down”
  - Stages of Sleep
- Adults need 7-8 hours of sleep each night to function well.
  - Newborns (0-3 months): 14-17 hours
  - Infants (4-11 months): 12-15 hours
  - Toddlers (1-2 years): 11-14 hours
  - Preschoolers (3-5): 10-13 hours
  - School age children (6-13): 9-11 hours
  - Teenagers (14-17): 8-10 hours (National Sleep Foundation, 2018, Excessive Sleepiness).

## The Sleep Cycle

**Stage 1**  
lightest (1-7 min)

- Heartbeat slows down
- Breathing slows down
- Eye movements slow down
- Muscles relax, and might occasionally twitch
- Brain waves begin to slow down

**Stage 2**  
light (10-25 min)

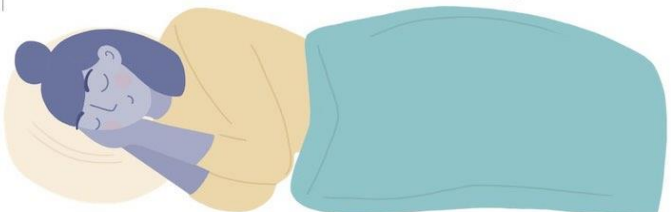
- Heartbeat and breathing slow down even more
- Muscles relax even more
- Body temperature drops
- Eye movements stop
- Brain wave activity slows

**Stage 3**  
deep sleep (20-40 min)

- Heartbeat and breathing slow to the lowest levels they will reach during sleep
- Muscles stay relaxed
- Brain waves slow down even more

**Stage 4**  
REM (20-40 min)

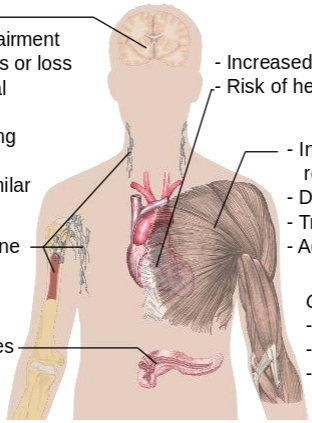
- Behind your eyelids, your eyes move rapidly from side to side
- Breathing speeds up and can become irregular
- Heart rate increases
- Blood pressure increases



Adapted from "Sleep Cycles: The Breakdown," by Mattress Clarity, 2019, *The Complete Guide To Your Sleep Cycle*, Retrieved February 2, 2019, from <https://www.mattressclarity.com/blog/sleep-cycle/>. Copyright 2019 by Mattress Clarity Corporation.

## Effects of Sleep Deprivation on the Body

**Effects of Sleep deprivation**



- Irritability
- Cognitive impairment
- Memory lapses or loss
- Impaired moral judgement
- Severe yawning
- Hallucinations
- Symptoms similar to ADHD
- Impaired immune system
- Risk of diabetes Type 2

- Increased heart rate variability
- Risk of heart disease
- Increased reaction time
- Decreased accuracy
- Tremors
- Aches

*Other:*

- Growth suppression
- Risk of obesity
- Decreased temperature

## 2016 Declared a Public Health Concern by The CDC

- 1/3 of Americans fail to receive the necessary 7 hours of sleep per night (CDC, 2016).
- 13% increased mortality rate for those sleeping less than 6 hours per night (Hafner et al., 2016).
- 1 out of every 6 traffic fatalities (16.5%) and 1 out of every 8 crashes (12.5%) require hospitalization of the drivers or passengers and can be attributed to drowsy driving (National Sleep Foundation, 2018, Drowsy Driving)

## What causes us to loose sleep?



Adapted from "America's most sleep deprived workers," by Tom Wang, 2019, Retrieved February 22, 2019, from <https://www.cbsnews.com/pictures/americas-most-sleep-deprived-workers/> Copyright by CBS Interactive Inc.

## What contributes to a lack of sleep?

- **Poor Sleep Hygiene**
  - Sleep hygiene-sleep practices that help maintain your health.
  - Quantity of sleep is just as important as quality.
- **Sleep Disorders/- narcolepsy, restless leg syndrome, Sleep apnea**
- **Stress**

## Sleep Hygiene Practice That Promote Sleep

- **Regular Sleep Schedule**
  - Go to bed and get up at the same time.
  - Limit naps (under 30 minutes and no later than 3 p.m.).
- **Limit stimulating behaviors**
  - Avoid caffeine and nicotine.
  - Avoid alcohol Limit large or spicy meals. Limit eating 2-3 hours before bed.
  - Avoid exercise 2-3 hours before bed.

### Good sleep environment

- Bed for sleeping only
- No eating, reading, watching TV
- Keep the temperature cool.
- Comfortable mattress, sheets, pajamas
- Low Lighting, Avoid blue light from phones, TV's
- Wear a sleep mask to block light.

### Do Not Lie in Bed Awake

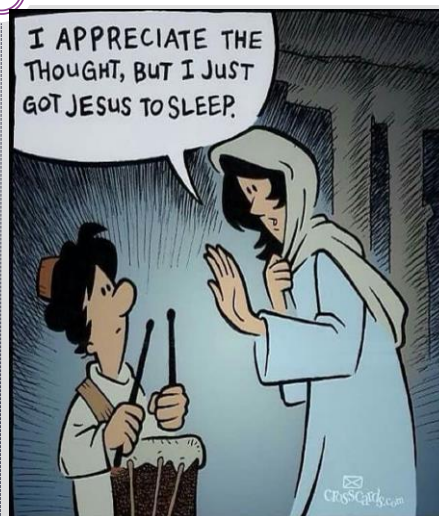
- If you can't sleep within 20 minutes get up and leave the bedroom
- Do something relaxing, such as read.



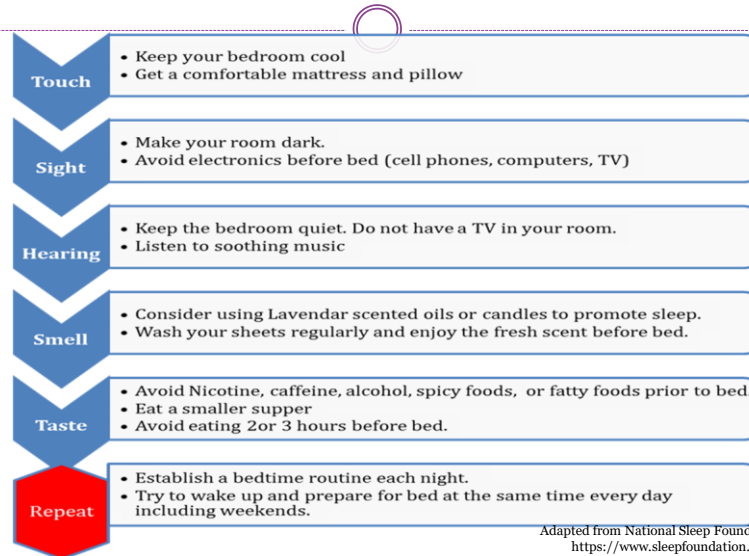
### Sleep Hygiene Practice That Promote Sleep

## Sleep Hygiene Practice That Promote Sleep

- RELAX
  - Read
  - Listen to Music
- Meditate
- PRAY
  - Count Sheep or Count on the Lamb?



## Trick Your Senses and Sleep Well



Adapted from National Sleep Foundation, (2018)  
<https://www.sleepfoundation.org/bedroom>

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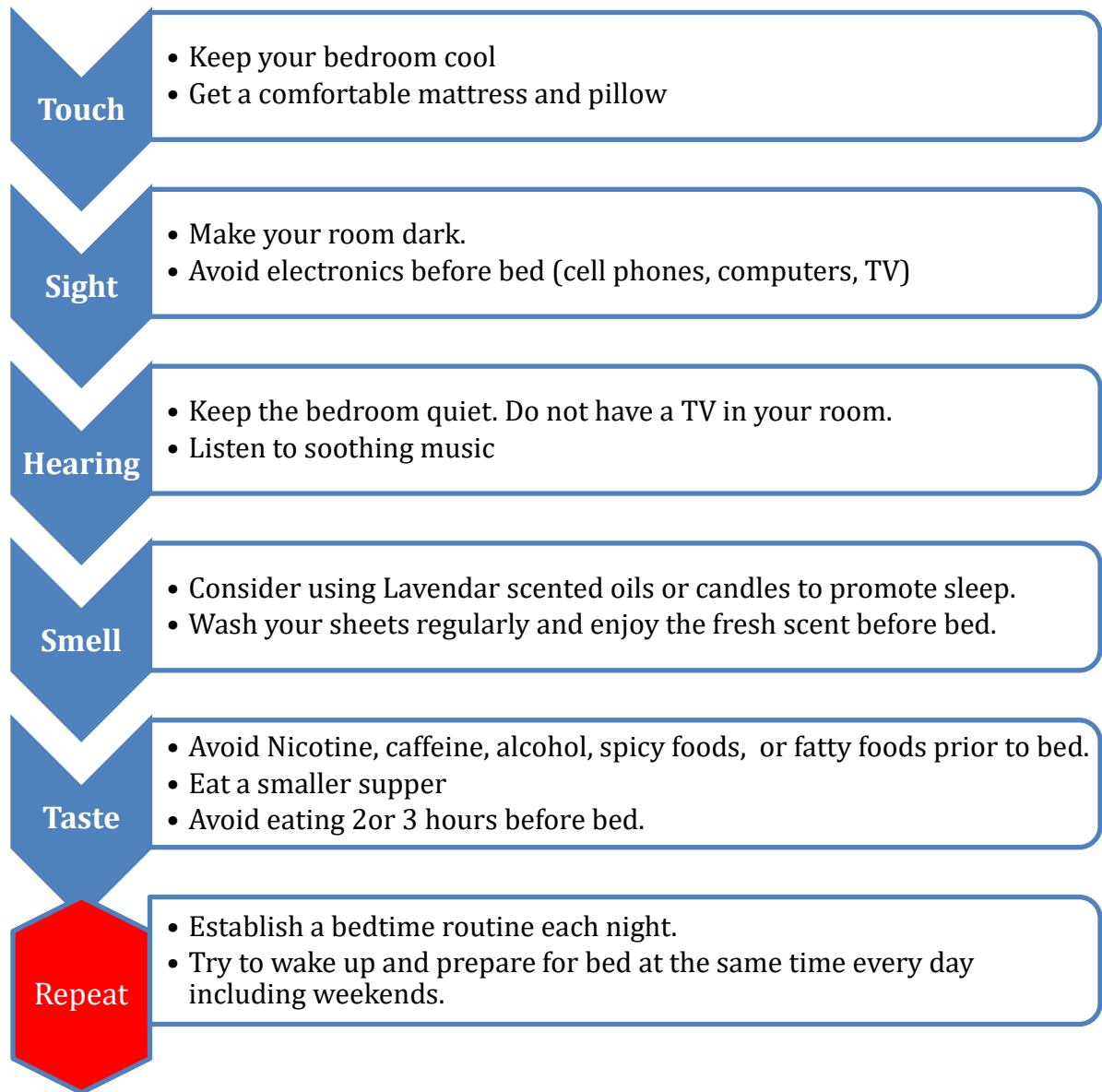
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**Appendix F**  
**Education Handout**

## Trick Your Senses And Sleep Well



Adapted from National Sleep Foundation, (2018)

<https://www.sleepfoundation.org/bedroom/>