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Sweet Slumber: A Case for Melatonin as a Sleep Aid

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Chapter 1: Introduction

This paper will present the process and groundwork of a university based sleep challenge as well as a pertinent literature review for a focused research question. The Methodology section outlines how the on campus research study was planned and conducted. The Results and Discussion portion contains a narrative of research assistant duties performed for the study. Lastly, the paper concludes with an Evaluation section discussing the learning experience and application to clinical practice.

Background

Inadequate sleep is a rising problem in university students across the nation. Hershner and Chervin (2014) report that as many as 70% of college students do not get adequate sleep and 50% report symptoms of daytime sleepiness. Inadequate sleep may not only be detrimental to a student's health, it can incur decreased academic and social performance, lower grade point averages, and academic failure compared to students who receive sufficient sleep (Hershner & Chervin (2014). The Center for Disease Control and Prevention (CDC) in 2014 called inadequate sleep a public health epidemic, linking sleep deprivation to the cause of many unwelcome motor vehicle accidents, workplace catastrophes, and medical errors (CDC, 2014). While there is no specific pill that can cure sleep deprivation, only a significant lifestyle change can promote healthy sleep hygiene and resulting sleep patterns.

The lack of sleep hygiene in college-aged populations led Southern Adventist University's (SAU) Graduate Nursing Department to conduct a sleep challenge on campus during the month of February. Participants were expected to practice sleep hygiene by retiring one to two hours prior to midnight and to arise at the same time each day. SAU also planned a

spiritual component of devotional reading that would also be investigated as to its effectiveness in enhancing sleep quality.

Research Question for Campus Study

The aim of this study was to investigate the impact of a two arm, 28-day and 14-day sleep challenge combined with a nightly assigned Bible reading on sleep, stress, and personal faith practice in the lives of college students attending a private university.

Statement of Purpose

For the purposes of this paper, the direct focus will be on the use of exogenous melatonin on initiating sleep and sleep quality in healthy populations. Students participating in the Zoe 2.0 Sleep Challenge responded to a demographic form that inquired on the frequent use of sleep aids. While the vast majority of the population studied did not use any sleep aids, melatonin was the most frequently used at SAU. The question of melatonin's effectiveness and usefulness in aiding in sleep quality in the college age student should be investigated. The aim of this capstone paper is to explore the effectiveness of exogenous melatonin in initiating sleep when compared with no treatment or placebo in healthy populations of all ages.

Problem

Sleep deprivation and insomnia are not only an issue for college students, but they are widespread issues that present problems nationwide. In the national 2013 Youth Risk Behavior Survey, not even 8% of high school students were sleeping the recommended amount. Only a third of high school students were reaching the minimal eight hours of sleep per night, and less than 25% of seniors reporting the same. YRBS reports that a significant decrease in sleep is linked to increased daytime sleepiness, sleeping in class, decreased focus, headaches, and poor performance in school. In the same data analysis, researchers linked inadequate sleep with drug

and alcohol use, increased sexual activity, suicide attempts, depression, and obesity (Youth Risk Behavior Survey, 2015).

The National Sleep Foundation (2014) reported that 70 % of parents of children ages six to eleven reported that their children need over nine hours of sleep and that on school nights the children typically get at least one hour less than they should. In the same data analysis, parents estimated their children's sleep quality. They found that parents reported older children to have poorer quality of sleep than younger children (National Sleep Foundation, 2014). In 2013, the National Sleep Foundation did an international survey on sleeping habits in adults. They discovered that Americans get the fewest amount of hours per night (less than six hours) on weekdays/workdays when compared with other countries. Twenty one percent of those surveyed reported getting less than six hours of sleep on workdays, another 32% reporting less than seven hours, and another 25% tallying less than eight hours. Only 44% of Americans surveyed agreed that they have a good night's sleep almost every night, 25% of those surveyed report "rarely" or "never" to the same question (National Sleep Foundation, 2013).

So the question remains why Americans of all ages are getting insufficient amounts of sleep on a night-to-night basis. Some of the deficit can be attributed to chronic medical conditions or mental health problems. But what about those in the population getting inadequate sleep with no medical or mental problems? The CDC (2015) defines primary insomnia as an inability to begin or sustain sleep. The problems can also present with middle of the night/early morning rising with the inability to resume sleep. Insomnia can manifest symptoms of daytime sleepiness and decreased functioning and performance during the day. As with any type of sleep deprivation, insomnia also poses increased risks to others as a consequence of the lack of adequate sleep (Center for Disease Control and Prevention (CDC), 2015).

Rational for PICO

In light of conventional wisdom and present research on the topic of sleep deprivation and insomnia in healthy populations, further exploration into alternative methods of achieving better sleep is needed to help find a valuable solution to the widespread problem of sleep deprivation and insomnia. Exogenous melatonin, an over the counter herbal supplement is an alternative method for achieving better sleep worth investigating. As a result of this literature review, this researcher is optimistic that a feasible solution to the problem of inadequate sleep will be found with the use of exogenous melatonin. Questions of safety and effectiveness are also points to ponder when considering this addition to sleep therapy.

Theoretical Framework

The theoretical framework chosen for this project is the CREATION Health model. The CREATION Health model focuses on the wholistic care of the entire person and embodies the topic of this project in one of the main pillars of the model. The model, CREATION, represents Choice, Rest, Environment, Activity, Trust, Interpersonal Relationships, Outlook, and Nutrition. This project focuses on the "R" or Rest section of the model and the importance of adequate sleep and achieving optimal rejuvenating rest to regenerate the mind, body, and spirit (CREATION Health, 2015).

Chapter 2: Literature Review

A widespread investigation of the current available literature was completed using CINAHL and the following key terms: melatonin, sleep, quality, and insomnia. This resulted in 828 articles. The vast majority of the literature pertained to specific populations and was not useful for this project; however, 23 articles were appropriate for the proposed research question. Furthermore, many of the articles were not original studies and therefore not of particular use for this project. The following is a review of the literature found on exogenous melatonin.

Pharmacological Profile of Exogenous Melatonin

Lyseng-Williamson in 2012, released a drug profile on extended release melatonin. Melatonin is a neurotransmitter, and the main regulator in regulating circadian rhythms. The assets of melatonin that promote sleep are known to be in connection with its activity at melatonergic receptors (MT1, MT2). MT1 is thought to play a role in inducing sleep when melatonin is present, and MT2 assists the body in shifting from day and night circadian rhythms. In her study, Lyseng-Williamson evaluated the effectiveness of Circadian PR 2mg, an exogenous melatonin and recommended it for use in patients over the age of 55 with history of primary insomnia. Benefits such as better sleep ($p<0.05$), increased daytime performance ($p<0.05$), and no impairment of postural stability ($p<0.01$) were found to be in correlation with taking melatonin. The only downside was possible "muzzy-headedness" if used in conjunction with other sleep aids (Lyseng-Williamson, 2012).

Prolonged Release Melatonin Studies

In a different vein of research, two studies performed research on Melatonin prolonged release (PR) Circadian 2mg given to patients with primary insomnia in different age groups. The first study performed by Wade et al. (2010), was a double blind six-month study where patients (n=746) between ages 18-80 (mean 63.8) were given either melatonin PR 2mg (Circadian) or placebo. The study incorporated a single blind run in and run out to evaluate for rebound effects and withdrawal symptoms. Patients were instructed to take medication at designated times and to record sleep times and wakening in a sleep diary. Patients also completed subjective instruments Pittsburg Sleep Quality Index (PSQI), World Health Organization -5 Wellbeing Index (WHO), and Clinical Global Impression of Improvement (CGI). Patients were also tested prior to the start of the study to determine if they were low excretors of melatonin. At the three-week mark, low excretors were no different when compared with baseline (p =0.924). The 65-80 year old experimental group was found to have significant results at the three-week mark when compared

with placebo group (p=0.002). In the extended 26-week period, low excretors still remained insignificant for sleep latency, quality and morning alertness when compared with baseline and placebo (p=0.174, 0.266, 0.426 respectively). For the experimental 65-80 age group results remained significant for sleep latency (p=0.002) with an average of falling asleep 15.6 minutes earlier than placebo (Wade et al, 2010).

In a similar 2007 study by Lemoine, Talinir, Laudon, and Zisapel, researchers investigated the effects of Circadian on quality of sleep and morning alertness in primary insomnia patients (n=170) who were over the age of 55 (mean age 68.5). They performed a comparable study that included single blind two-week washout periods at the beginning and end of the experimental period and a double blind, randomized, controlled three-week treatment period. The study used the Leeds Sleep Evaluation Questionnaire, and recorded sleep quality and daytime quality in a sleep diary using Likert scales. The results were found to be significant when comparing sleep quality in the treatment versus placebo groups (p=0.047), and when compared with run in period baseline (p<0.0001). Morning alertness results also showed significant results when compared with placebo and baseline (p=0.002, p=<0.0001) (Lemoine, Talinir, Laudon, & Zisapel, 2007). The results amongst studies seemed to be in favor of melatonin in the elder populations when endogenous melatonin levels are decreased. In both studies however, melatonin was only effective against the placebo.

Melatonin in Children and Adolescents

The effects of melatonin in children and adolescents were studied differently than the adult populations. In a small Swedish study, researchers investigated the effects of giving one-milligram melatonin in the afternoon on sleep induction, length of sleep, and daytime drowsiness on adolescents with sleep induction insomnia. Eckerberg, Lowden, Nagai, and Akerstedt (2012) performed a study on 23 teenagers (14-19) and were to keep sleep diaries and produce saliva

samples intermittently for a 5-week study. Participants would be intermittently receiving placebo or control predetermined by crossover groupings and would serve as their own control. Results were between the placebo and experimental group were found to be statistically significant at week one, two (p=0.05, 0.005). By the end of the fifth week 89% of participants reported lengthier sleep times on school days than at week one (p=<0.05). Weekend sleep quality and onset also was found to be significant when compared with placebo (p=0.05) In regards to side effects, some students noted excessive tiredness when taking melatonin, others complained of headache (Eckerberg, Lowden, Nagai, & Akerstedt, 2012).

In contrast, a study involving children with insomnia was conducted by Smits, Nagtegaal, Heijden, Coenen, and Kerkhof, (2000). A five-week, double blind, randomized controlled study was done on children ages 6-12 (n=40) diagnosed with primary insomnia for more than one year. Children enrolled in the study were to take either 5mg melatonin or placebo pill. The study consisted of a one-week baseline period followed by a four-week experimental trial. After the four-week experimental period, melatonin levels (saliva), sleep latency and length, and attention performance were assessed. Total sleep time was considered significant (p=0.035) between placebo and intervention groups. Melatonin levels via saliva samples correlated with sleep diaries provided by parents of participants (p=0.016) and actigraphic data (p=0.033). Results for attention to performance were not found to be significant for either group (p>0.05). Side effects reported by parents included: two of the participants complaining of headache, one developed mild epilepsy, and many of the children developed excessive sleepiness (Smits, Nagtegaal, Heijden, Coenen, & Kerkhof, 2000).

Primary Insomnia and Melatonin

Two studies were performed involving patients with a diagnosis of primary insomnia. A double blind, controlled 60-day study in Italy in 2011, was conducted on patients

with primary insomnia in a long-term care residence. This study used a combination of medications infused in a pear pulp that included melatonin 5 mg, 11.25 mg of zinc, and 225mg of magnesium. Participants were otherwise healthy and screened for other causes of insomnia prior to induction of the study. The researchers aimed to determine if their concoction would have a positive effect on sleep quality in the long-term care facility. Subjects (n=43) were given either a placebo of pear pulp or the mixture of supplement and melatonin (5mg) for 60 days. Patients answered subjectively to many instruments; however, the PSQI was most reliable. The researchers discovered a difference between the placebo and the treatment groups *(p*<0.001) and a significant change from baseline in the treatment group (*p*<0.001) Many of their secondary outcomes were also worth mentioning, all significant: increased morning alertness and activity (*p*=0.001), increased mood scores on the Geriatric Depression Scale (*p*=0.002), and increase in total sleep time (*p*=0.001) (Rondanelli, Opizzi, Monteferrario, Antoniello, Manni, & Klersy, 2011).

In a contrasting study, Montes, Uribe, Sotres, and Martin (2003) conducted a double blind controlled crossover study using melatonin as a treatment for primary insomnia. They used melatonin 0.3mg or 1mg as the intervention and a standard placebo for the control group. Participants (n=10, mean age 50) were to take medication one hour before bedtime and sleep was then recorded via polysomnography. Each participant would eventually take all three treatments (placebo, 0.3mg, 1 mg melatonin) for a week followed by a five-day washout phase, with each serving as their own control in the crossover design. Subjects submitted subjective evaluations on sleep quality each morning and EEG recordings were reviewed before data analysis. The researchers found that there was no significant difference between groups or placebo for sleep quality (*p*=0.33), latency (*p*=0.11) or length of sleep (*p*=0.83).

Melatonin in Healthy Adults

In a study testing health adults without insomnia, both melatonin 6mg, and the expectation of receiving melatonin was investigated as to its effects on sleep quality and feelings upon awakening. Rose & Kahan, 2001, performed a small eight-day study for healthy adults aged 26-71 (n=53). Patients who participated were involved in a 2x2 study (expected treatment x actual treatment) crossover design. All patients would receive two days of expecting melatonin and receiving melatonin, two days of expecting treatment but receiving placebo, two days of expecting placebo and receiving melatonin, and two days of expecting placebo and receiving placebo. On average, patient's ratings of sleepiness were greater if they received melatonin (p=0.01), however, ratings were not significantly different from those who expected to receive melatonin but received placebo (p=0.32). In regards to continuous sleep, participants rated sleep better when they expected melatonin, regardless of whether they received placebo or melatonin (p=0.02). Overall, the expectation of melatonin regardless if the participant received it or not produced significant results (Rose & Kahan, 2001).

In an isolated study, Wyatt, Dijk, De Cecco, Ronda, & Czeisler in 2006, performed a controlled sleep study on healthy adults (ages 18-30) in a sleep center with the omission on time/space inquiry. Participants were given exogenous melatonin of either 0.3mg or 5 mg dose or placebo pill half an hour prior to scheduled six-hour sleep sessions. Participants' sleep was measured by polysomnography sensors throughout the study. Participants were exposed to light and dark situations at scheduled times both on and off natural circadian rhythms. The difference of sleep latency between melatonin and placebo groups was not found to be significant (p=0.25). There were also no significant differences found between sleep latency and consolidated sleep between melatonin and placebo group (p>0.05). The only comparison that results were found to be significant was when melatonin was given during the circadian day and endogenous

melatonin was not already present (Wyatt, Dijk, De Cecco, Ronda, & Czeisler (2006). Neither of the two above studies showed significance for the use of melatonin in healthy adult populations.

A small 35-day study involving 12 subjects (aged 20-45) studied melatonin's effects on circadian rhythms was conducted by Crowley and Eastman in 2012. Participants in this study shifted sleep schedules an hour forward nightly from previous night while following a sleep schedule set by the researchers. Participants were instructed to take either melatonin or placebo 11 hours prior to midpoint in sleep session. Endogenous levels of melatonin were also measured via saliva samples. Participants also took tests via mobile devices to assess sustained attention and focus. The researchers found that there was no significant difference in sleep length for baseline and experimental groups or placebo. They did conclude that the addition of exogenous melatonin and gradually earlier bedtimes did shift the dim light melatonin onset by 38 minutes sooner than participants only taking placebo. A downside however, showed that participants were more tired and drowsy upon awakening on days when melatonin was taken the previous night when compare with the baseline data ($p<0.05$). The 3mg dose of melatonin showed a faintly better circadian shift than the placebo drug. The researchers of the study did not recommend the use of melatonin alone to shift circadian clock (Crowley & Eastman, 2012).

Chapter 3: Methodology

Research Design

The research design for the Zoe 2.0 Sleep Challenge was a two-arm quasi-experimental control group design with 28-day and 14-day experimental and control groups. The 28-day arm began the first day of February; the 14-day arm started 14 days later so that both arms concluded at the same time. Both arms of the study had intervention and control groups. The experimental groups focused on two interventions: 1) make a valiant effort for bedtime one to two hours before midnight, and 2) read a short devotion nightly provided by researchers before bedtime.

Throughout the study, participants were asked to get a minimum of eight hours of sleep per night, including weekends and to retire at least one to two hours before midnight each night. Participants were also encouraged to rise at the same time each morning to develop consistency and routine.

In addition to the pre and post data tools utilized for all participants (see "Measurements" below), the study collected daily sleep logs via an online survey tool for the two intervention groups. The surveys were intended to keep track of bedtime, wakeup time, devotion compliance, and subject's perception of sleep quality the night before.

Population/Sample

The sample for this sleep challenge was derived from students at Southern Adventist University. Students were given the choice to volunteer for either the control group or the challenge group. Recruitment for the study consisted of flyers, publications in school newspaper, and in class presentations from members of the research team. Students with personal medical history of sleep apnea, narcolepsy, or who are currently on prescription sleep aids were excluded from the study.

Ethical Considerations

The Zoe 2.0 Sleep Study did not pose any particular risk to participants; however, each participant was required to sign an informed consent form that illustrated potential risks and confidentiality matters. An IRB was submitted to the University's ethics committee for review prior to beginning of research study.

Procedures

Participants were recruited in a variety of ways throughout campus. Some students inquired about the study after seeing postings around campus. The research assistants enrolled the majority of students in the Zoe 2.0 Study through in-class presentations. Participants were

asked to complete a demographic form, Pittsburg Sleep Quality Index (PSQI), Perceived Stress Scale (PSS-14), and Daily Spiritual Experience Scale (DSES) as a part of baseline data and an informed consent upon enrolling in the study and at the conclusion of the study. Daily four-question surveys were sent out via email through QuestionPro, a survey response system for the course of the study to obtain daily feedback from participants. If participants did not respond to daily survey by noon, a reminder emails with links to outstanding surveys were sent to the delinquent participants.

Variables

The independent variable(s) in this research study were the components of the sleep challenge that participants agreed upon when entering the study. The subjects strived to get to sleep at least one to two hours before midnight and read the nightly devotional before retiring for the evening. The dependent variable for the study was effect the intervention has on the participant's quality of sleep, perceived stress, and spiritual wellbeing.

Measurements

The data collected consisted of four measurements as well as a demographic questionnaire at the start of the study. Three instruments were completed both at the start and completion of the study, the last was a daily survey sent out throughout the course of the sleep challenge.

The first instrument used for the study was the Pittsburgh Sleep Quality Index (PSQI) that was used to subjectively measure the quality of sleep and any particular patterns in sleep habits. The PSQI has an internal consistency reliability rating of .83 computed by Cronbach's Alpha. The instrument measured on a Likert scale ranging from poor to good and tested seven areas related to sleep. The Likert score ranged from 0 to 3 for each individual question and the

addition of all 7 questions gives a global score, which is then rated to determine overall sleep health (Buysse, Reynolds III, Monk, Berman, & Kupfer, 1989).

A 16-item instrument assessing everyday experiences in correlation with spiritual life was utilized for the spiritual component of the study. The Daily Spiritual Experience Scale (DSES) measured concepts ranging from feelings of inner peace to diving connection with a higher power. The Cronbach's alpha of internal reliability consistency is reported as .95 (Underwood, & Teresi, 2002).

The Perceived Stress Scale (PSS-14) is a 14-question instrument devised to gauge the level of stress an individual perceives in their lives. The participants specify to which degree they have found themselves feeling out of control, erratic, and encumbered in the last 30 days. The internal consistency validity of the instrument was measured via Cronbach's alpha and tested between .60 and .91. Test-retest reliability of the PSS-14 instrument was >.70 computed via correlation coefficient (Lee, 2013).

The daily survey consisted of four questions pertaining to the subject's sleep habits the night before (see Appendix B). In the survey, the participants were asked to rate their quality of sleep on a zero to ten Likert scale, indicate the actual times of sleep and awakening, and answer honestly if they successfully read the nightly devotion. The researchers of the Zoe 2.0 Sleep Challenge formulated the brief survey and a test of validity and reliability was not performed. The purpose of the survey was to collect day-to-day data and provide graphical trends that may help explain pre and post instrument results.

Data Analysis

The current plan for data analysis will include an independent *t*-test to identify alterations between the control group and experimental group for both the 28-day and 14-day arms. Independent t-tests will also be performed to determine changes within the groups from pre and

post sleep challenge data. A multiple regression analysis is also planned to determine correlations between demographic factors such as age, gender, housing situation, caffeine intake, exercise, and alternative therapies used for sleep and sleep quality.

Chapter 4: Results & Discussion

Research Findings

At this time, the data has been cleaned and the initial preliminary tests are being performed on the data. Initially, 10.2% of participants reported they used melatonin for sleep on a regular basis while 86% reported no medication use. Lesser used Valerian and Benadryl constituted 1.2% for each. The research team is still in the process of conducting preliminary independent *t*-tests to determine pre and post differences and differences between the placebo and intervention groups.

Research Assistant Duties

Participant Recruitment. As a research assistant, I assisted at the main information meeting for the Zoe 2.0 Sleep Challenge. A brief information meeting was conducted and informed consents and contact information were obtained from participants.

Research Design. During the planning phase of the Zoe 2.0 project, I was involved in the formation of a demographic form (see Appendix A) that would help the researchers grasp a sense of the overall population being studied. The demographic form also served the purpose of enlightening the researchers as to the many variables that may affect the subject's sleep patterns; for example, caffeine intake, light/noise exposure, current medications, and current medical conditions. This data was collected at the beginning of the study when participants enrolled and signed consent forms.

Data Collection. Data collection is where I spent the majority of my time as a research assistant. As a part of the data collection duties, I fostered the implementation and collection of

the daily surveys. Participants were instructed to submit a brief four-question survey every morning upon awakening. My job was to dispatch the e-mail link to the survey every morning and reminder e-mails throughout the day to participants who had not yet submitted their answers. The Zoe 2.0 study utilized QuestionPro, a survey response system, to obtain survey results from participants. These results were automatically transferred into Excel files where the participants' QuestionPro generated identification numbers were converted to the assigned ID numbers given by the Zoe 2.0 study.

Data Entry. The main tasks for my portion of data entry was to accurately and manually enter all the data from the demographic form into SPSS version 21. This was done by creating an SPSS file with all the components of the demographic form integrated into an arrangement that can be easily analyzed by the program. Two researchers entered each demographic form into separate SPSS files to verify accuracy and consistency.

Data Cleaning. After the initial input of data into the SPSS file, the data was tested by another research assistant who then determined if there were any discrepancies found in the demographic data submitted. Even after multiple entries and edits from both researchers, some data still was not a consistent match and is still being checked against the participant responses on the demographic forms.

Chapter 5: Evaluation

Learning and Experience

Overall, I feel privileged to have had the opportunity to be involved in this research study. The ability to be engaged first hand in the throws of constructing, initiating and implementing the study has given me a front seat learning experience of all the details and time it takes to conduct research on even just a small scale. I learned that research is harder than it looks, and that the planning process is often more important than the actual study. A successful

study needs relentless scrutiny in the planning stages in order to illuminate all the potential pitfalls and unforeseen circumstances of the study. This experience has given me a new appreciation for the professional researchers who are relentlessly working to give the health community the latest and most evidence based practice recommendations.

Application to nursing practice

Based off the investigation into the use of melatonin as a sleep aid, the only population I can see myself prescribing melatonin is to the patient over the age of 65. Due to its safety profile and short half -life, I have found no reservation to prescribing this course of treatment.

The use of melatonin in younger populations and children presented mixed results and not enough consistent data to validate the use in practice. Further research of the use of melatonin is still needed in all areas.

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Appendix A

Southern Adventist University Participant ID #_____

DEMOGRAPHIC QUESTIONNAIRE

1.What is your current age? _____ years

2.What is your gender?

a. Male
b. Female

3. What is your current relationship status?

a. Single
b. Married
c. Widowed
d. Divorced

4.What is your current height? _____ft. _____ in.

5.What is your current weight? _____lb.

6.What is your ethnicity?

a. Caucasian
b. African American
c. Asian
d. Native American
e. Hispanic
f. Pacific Islander
g. Other: _____

7.Where do you live currently?

a. Dorm room
b. Off campus housing or apartment
c. At home with parents
d. Southern Village

8. What is your academic year?
a. Freshman
b. Sophomore

c. Junior
d. Senior
e. Graduate level

9. What is your current area of study (major)? _____

10.On average, how many minutes per week do you engage in vigorous physical activity (e.g. running, hiking, soccer, basketball)? _____

11.On average, how many minutes per week do you engage in moderate physical activity (e.g., walking)? _____

12. How many days per week do you eat after 7:00 PM? _____

13.On average, how many ounces of water do you drink per day? _____

14.How many caffeinated beverages do you typically drink per day? _____

15.What types of caffeine do you typically consume?

a. Coffee
b. Soda
c. Monster/ Red Bull
d.5 hour energy
e. Spark
f. Other: _____

16. Do you use any form of nicotine?

a. No
b. Cigarettes
c. Vapors
d. Chewing tobacco
e. Other:_____

17. At what hour do you typically go to bed? _____

18.How do you currently rank the noise in your sleeping environment?

a. 0 (no noise)
b. 1 (light noise)
c. 2 (moderate noise)
d. 3 (disturbing noise)
e. 4 (extremely disturbing noise)

19. How do you currently rank the light/brightness in your sleeping environment?

a. 0 (completely dark/black)
b. 1 (minimal light)
c. 2 (some light)
d. 3 (moderate light)
e. 4 (completely light)

20. Do you currently have problems sleeping due to pain?

a. No
b. Yes, (please rate your pain while trying to fall asleep on a 0-10 scale with 0 being no pain and 10 being the worst imaginable pain) _____

21. What medications, if any do you take for sleep? (Select all that apply)

a. No medication
b. No natural herbal products
c. Melatonin
d. Hops
e. Ambien
f. Lunesta
g. Benadryl
h. Tylenol PM
i. Zzz Quil
j. Alcoholic beverages
k. Valerian
l. Kava Kava
m. L-Tryptophan
n. L-Theanine
o. Chamomile
p. Other (please list):_____

22. Have you tried any of the following alternative therapies?

a. Acupuncture
b. Alpha – stimulation
c. Warm baths before bed
d. Aromatherapy
e. White noise
f. Other (please list):_____

23. Do you have a history of any of the following disorders/conditions in the last year? (Select all that apply)

a. Panic Disorder
b. Anxiety

c. Depression
d. Sleep Apnea
e. Insomnia
f. Hypo/Hyperthyroidism
g. Food sensitivities
h. Acid reflux (GERD)

24. Are you taking medications for blood pressure?

a. No
b. Yes, (please list) _____

Appendix B

Zoe 2.0 Daily Sleep Survey

1. What time did you go to sleep last night? (Please enter in hour format 00:00) ____
2. What time did you wake up this morning? (Please enter in hour format 00:00) ____
3. On a zero to ten Likert scale, how would you rate your sleep last night? _____
4. Did you read you devotional last night?
    a. Yes
    b. No

Appendix C

NRSG 594 - Capstone Research Activity Log

Name: Destiny Wheeler

Date	Time Spent	Activity	Place
10/6/14	1hr	Planning meeting with Sawyer and Research Team.	SAU FHH 1st floor conference room
11/4/14	0.5hrs	Meeting with Dr. Gates and Research Team	SAU FHH
11/17/14	1.5hrs	Planning meeting with Sawyer and Research Team.	SAU FHH 1st floor conference room
11/24/14	3 hrs	Researching potential data collection avenues and summarizing in word document for team to review	Home office
12/7/14	2 hrs	Demographic Questionnaire formulation	Home office
12/9/14	1 hrs	Demographic Questionnaire Revision	Home office
1/13/15	1 hr	Planning meeting with Sawyer and Research Team.	SAU FHH 1st floor conference room
1/15/15	1 hr	Imput of daily survey questions into Question Pro program.	Home office
1/27/15	2 hrs	CABL sleep challenge info meeting and Sleep Study presentation/recruitment	SAU FHH 1st floor conference room/Hulsey
1/27/15	2 hrs	Imput of daily survey questions into 28 separate surveys into Question Pro program.	Home office
2/1/15	1 hr	Imput of email addresses into QuestionPro research group	Home office
2/3/15	1 hr	Planning meeting with Dr. Tyron and Research Team	SAU FHH 1st floor conference room
2/1-2/7	2 hrs	Sending out daily emails and reminders for Daily Sleep Log Surveys	Home office
2/8-2/14	2 hrs	Sending out daily emails and reminders for Daily Sleep Log Surveys	Home office
2/13/15	1 hr	Creation of 14 day cohort Daily sleep log surveys and entry into Question Pro program	Home office
2/17/15	0.5hrs	Group Meeting with Dr. Tryon	SAU FHH 1st floor conference room
2/17/15	2 hrs	Entry of PSS and DSES surveys into Question Pro in 4 separate groups (14d cohort-experimental/contr	Home office
2/18/15	3 hrs	Demographic form input into SPSS (Creating labels/values)	Home office
2/16-2/21	2 hrs	Sending out daily emails and reminders for Daily Sleep Log Surveys	Home office
2/22-2/28	2 hrs	Sending out daily emails and reminders for Daily Sleep Log Surveys	Home office
22-Feb	2 hrs	Trouble shooting with survey not working	Home office
2/26/15	3 hrs	Answering email correspondents and trouble shooting. Sending out surveys from home email address	Home office
2/27/15	1 hr	Entering of PSQI survey into online question format into 4 separate groups	Home office
3/1/15	3 hrs	Sleep study data collection breakfast conclusion	SAU FHH
3/30/15	8 hrs	Demographic form input into SPSS	Home office
4/28-5/5	4 hrs	corrections to Demographic data	Home office
5/10-5/28	2 hrs	more corrections to demographic form data	Home office
6/2/15	2.5hrs	Meeting with Dr. Tryon and demographic data revisions	SAU FHH
6/2/15	1.5hrs	DATA Dictionary	Home office
8/10/15	2 hrs	Converting emails to ID Numbers and adding handwritten data to daily sleep log excel worksheets	Home office
8/11/15	2 hrs	Converting emails to ID Numbers and adding handwritten data to daily sleep log excel worksheets	Home office
TOTAL	62.5		