

THE IMPACT OF SLEEP HYGIENE INTERVENTIONS ON MASTER OF  
SCIENCE IN OCCUPATIONAL THERAPY GRADUATE STUDENTS

A Thesis submitted to the faculty at Stanbridge University in partial fulfillment of the  
requirements for the degree of Master of Science in Occupational Therapy

by

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## Certificate of Approval

I certify that I have read *The Impact of Sleep Hygiene Interventions on Master of Science in Occupational Therapy (MSOT) Graduate Students* by Vanessa Cicchini, Al-Yasah Esmael, Joshua Nam, and Nicole Napoli, and in my opinion, this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Occupational Therapy at Stanbridge University.



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## Abstract

Sleep is an important occupation that impacts our overall health, well-being, and participation in daily life. The way people prepare for and participate in sleep is unique, and many studies do not consider the differences that may present within various groups and populations. Researchers have been raising awareness on the importance of utilizing non-pharmacological approaches for improving sleep (Gutman et al., 2017). Given that sleep is a universal occupation, further studies that look at how people can make individual changes and adaptations to improve their sleep participation are necessary. As a result, our study aimed at identifying various sleep hygiene practices that would impact the perceived sleep quality and sleep outcomes of our participants. The participants were recruited from all three Stanbridge University Master of Science in Occupational Therapy (MSOT) cohorts via email. A pre-survey and post-survey were administered via Google Forms assessing participants' sleep quality, sleep quantity, sleep latency and sleep hygiene practices, before and after participating in several sleep hygiene interventions. Our intervention consisted of a sleep hygiene pamphlet containing information about technology usage, sleep environment, journaling/reading, meditation/prayer, exercising, self-care practices, and diet. Each participant was asked to implement their interventions of choice over the course of two weeks. All responses that were collected were kept anonymous, and there was no compensation for participation in this study. Dedoose was used to help highlight commonalities and differences within our participant responses. Ultimately, this study shed light on some effective sleep hygiene practices that were used by MSOT graduate students.

*Keywords:* sleep quality, sleep latency, occupational therapy, sleep hygiene, cognitive behavioral therapy, environmental modifications, sleep preparation, sleep participation, sleep intervention(s), routine(s)

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## **The Impact of Sleep Hygiene Interventions on Master of Science in Occupational Therapy (MSOT) Graduate Students**

On average, more than one third of U.S. adults get less than the recommended seven hours of sleep per night (Smallfield & Molitor, 2018). A good night's sleep consists of a substantial duration of sleep that ultimately allows for the time necessary to achieve a homeostatic restorative process (Barbato, 2021). Sleep directly relates to aspects of our own health and well-being, contributing to factors such as sleep quality, immune function, cognition levels (i.e., attention, problem-solving, memory, and decision-making), energy, mood, and several more (Centers for Disease Control and Prevention, 2022). Individuals that do not get enough sleep are at risk of experiencing negative symptoms such as, but are not limited to, lack of energy, excessive daytime sleepiness, and sleep disorders. It is imperative that every individual, regardless of age, receives the appropriate amount of sleep, as it is foundational for various daily occupations. The American Occupational Therapy Association (AOTA, 2017) "2025 Vision" reads, "As an inclusive profession, occupational therapy maximizes health, well-being, and quality of life for all people, populations, and communities through effective solutions that facilitate participation in everyday living" (p. 1). By introducing and bettering sleep hygiene practices, we hope to immediately contribute to the improvement of one's well-being, quality of life, and ability to engage in activities of daily living and instrumental activities of daily living over time. Better sleep practices ultimately impact how we engage in our chosen occupations.

With the heavy workloads and busy schedules associated with higher levels of education, it is widely reported that graduate-level students are typically part of the

population that receive less than the minimum amount of 7 recommended hours of sleep per night (Smallfield & Molitor, 2018). A study conducted on graduate healthcare students found that students reported an average of 6.5 hours of sleep per night, while averaging 30 minutes to fall asleep (Landa-Gonzalez & Chan, 2022). Poor qualities of sleep and sleep latency are linked to several health complications such as, but not limited to, motor vehicle accidents, sleep disorders, cardiovascular diseases, diabetes, obesity, cognitive dysfunction, and mental health issues like depression and anxiety (Landa-Gonzalez & Chan, 2022). There are multiple intrinsic and extrinsic factors that exacerbate an individual's ability to sleep and increase sleep sufficiency. Factors such as academic stress, alcohol and drug consumption, and schedule inconsistency can all influence sleep quality, which further adds to levels of stress and more (Landa-Gonzalez & Chan, 2022). The effects of having insufficient sleep have a detrimental effect on the whole individual and are multiplicative, further stacking with preexisting health problems. However, effective sleep hygiene practices that help improve poor sleep quality and latency will hopefully reverse the factors that are known to worsen sleep. This will lead to overall improved health, quality of life, function, and satisfaction. Understanding both the domains and processes outlined within the Occupational Therapy Practice Framework (OTPF), one can see the value and efficacy behind occupational therapy (OT) practices in serving graduate-level students who suffer from sleep-related issues (AOTA, 2020). Three Master of Science in Occupational Therapy (MSOT) curricular threads served as a guide for our study: the psychosocial aspects of care & psychological support, evidence-based clinical reasoning, and occupation-based focus

(Stanbridge University, n.d.). The purpose of this study was to examine the efficacy of the implementation of sleep hygiene interventions on current Stanbridge MSOT students.

### **Literature Review**

#### **Social Significance**

Over 70 million individuals in the United States are impacted by sleeping disorders (Gutman et al., 2017). In the United States today, many people are faced with issues relating to their quality of sleep. According to Smallfield & Molitor (2018), one third of the U.S. population reports getting less than the recommended eight hours of sleep a night. Sleep is a basic human need and is a part of one's everyday life. It is an essential physiological need that is crucial for health maintenance, and it is said to be the occupation with the most significant impact on health (Magnusson et al., 2021). In fact, inadequate sleep and poor sleep quality is an ongoing public health problem among adults and can lead to detrimental short-term and long-term health consequences, emphasizing its impact on our health (Peuters et al., 2022). Poor sleep goes beyond the person who is directly experiencing the effects. Those who take care of people with sleep disturbances as well as those who live with them are reporting lower quality of life (Webster et al., 2020).

Sleep hygiene is defined as practicing behaviors that help facilitate sleep, and avoiding behaviors that interfere with sleep (O'Donnell & Driller, 2017). By implementing better sleep hygiene practices and eliminating harmful ones, such as using electronics before bed or going to bed late, individuals may achieve better sleep quality and efficacy. Ongoing sleep deprivation can hinder an individual's ability to successfully engage in other occupations such as driving, work, leisure, and social participation. Sleep deprivation can also include physical symptoms of fatigue, depressed mood, anxiety,

memory difficulty, and relationships with others (Smallfield & Molitor, 2018). As a result of these challenges, many adults have begun to seek various interventions, including but not limited to pharmacological methods, non-pharmacological methods, and sleep hygiene practices. A key to improving this issue overall is by creating and introducing practical, effective, and long-term suggestions that promote positive sleep hygiene.

### **Common Theme 1: Cognitive Behavioral Therapy**

Cognitive behavioral therapy (CBT) is defined as “a psychological treatment desired to break patterns of maladaptive thinking and behavior” (Espie et al., 2019, p. 22). With this framework, there is a behavioral, cognitive, and educational component. CBT looks at how we think and what we do, to restructure the way we feel about a situation, such as one’s sleep. In a study for insomnia, CBT treatment included “stimulus control, relaxation, and cognitive restructuring of dysfunctional beliefs about sleep” (Leonard & Duncan, 2020, p. 224). Leonard and Duncan (2020) found that following the intervention, there was a huge success in changing the narrative behind the participants’ sleep myths. Sleep quality, sleep latency, daytime dysfunction, nighttime awakenings, and sleep hygiene practices were also significantly improved. In another study done on patients with insomnia, they found that CBT for Insomnia is effective in improving insomnia symptoms in 70–80% of patients and helps prevent long-term effects of recurrence (Okajima et al., 2011). After analyzing the participants’ intervention groups’ sleep diaries at the end of treatment and at 3-month follow-up, they found that sleep latency, total sleep time, total wake time, wake time after sleep onset, early morning awakening, time in bed, and sleep efficiency all significantly improved, showing that

there is great potential in breaking the cycle of poor sleep habits and reversing such adverse physiological effects through CBT for Insomnia (Okajima et al., 2011).

Smallfield et al. (2021) also found a study that improved these same characteristics of sleep by providing 6-weekly individual sessions of CBT, including relaxation techniques, sleep hygiene, and sleep loss management techniques. Smallfield et al. analyzed another study on relaxation techniques that focused on eight 2-hr long sessions on mind-body wellness interventions, which resulted in significant improvement in self-reported sleep difficulties compared to the control group and was consistent after a 1-year follow-up.

Studies by Gutman et al. (2017) and Smallfield and Molitor (2018) looked at sleep hygiene practices and utilized sleep journals as a part of their interventions.

Journaling is used as an effective form of CBT as it allows for the recognition and restructuring of thought patterns. The participants' use of journals allowed them to track their progress during their respective interventions and assess their overall quality of sleep (Gutman et al., 2017). Smallfield and Molitor (2018) conducted a study on patients with dementia where the intervention consisted of sleep hygiene, stimulus control, sleep compression, relaxation, sleep education, and the use of a sleep diary. By using the diary, reviewing their sleep logging, and implementing minimal sleep education, significant improvements were found in sleep quality for the two intervention groups compared to the control group (Smallfield & Molitor, 2018). Ultimately, CBT can be understood as any activity or intervention that identifies thought patterns, restructures certain thinking, and highlights relaxation. These activities are all common methods widely practiced in OT.

**Common Theme 2: Environment**

The environment and circumstances one sleeps in have been found to be important in the overall outcome of sleep quality. With people increasingly seeking non-pharmacological sleep interventions, it created a shift in changing one's own space and daily practices. Gutman et al. (2017) performed a study focusing on stress reduction by analyzing both external environmental modifications, such as incorporating a pillow that produced audio vibrations, and internal environmental modifications. A study conducted by Magnusson et al. (2021) looked at different external environmental modifications such as adjusting the lighting in a room or making sure the sleep environment was quiet. For example, having a peaceful sleep environment, such as a comfortable bed, can also help reduce sleep disruptions (Lee et al., 2021). According to the National Sleep Foundation, factors that are categorized as internal environmental modification include food intake, caffeine, alcohol, and screen time (Gutman et al., 2017). In young adults, emotional factors such as stress and smartphone usage were among some of the biggest predictors of sleep outcomes (Kyung et al., 2021). Webster et al. (2020) found that not being fed too late into the evening and avoiding caffeinated tea were also some internal environmental adjustments that were found to help, while Smallfield & Molitor (2018) found that internal environmental modifications such as nutrition and exercise helped with improving overall sleep quality. Factors such as self-care, safety, health, alertness, and productivity were found to be improved because of the appropriate internal regulations (Gutman et al., 2017). Lee et al. (2021) conducted a study with Master of Social Work students and found that educating these students about healthy sleep habits and positive environments can be more effective to address and easier to control when compared to

addressing any of their other high stressors or lifetime traumatic stress. The inclusion of an OT lens can help ensure that such environmental modifications and regulation practices are areas that are improved upon.

### **Common Theme 3: Sleep for College Students**

Positive sleep quality in college students translates to a better quality of life. Several studies show that it is important for students to get an optimal amount of sleep, to perform well in daily occupations. Being a college student can be very rigorous and stressful, however, it is important that students learn about the significance of sleep and how to promote optimal sleep preparation. Having a lack of sleep has both physical and psychological implications on the body, with some psychological impacts including mood disturbances, depression, bitterness, burnout, and anxiety (Khawaja et al., 2023). According to Allen et al. (2020), students from two public universities in the Mid-Atlantic U.S. were asked to take a web-based survey about their feelings of exhaustion, stress, cynicism, inefficient sleep, sleep duration, and sleep quality. The results from the survey showed that higher levels of stress had a significant correlation with lower sleep duration. They found that the relationship between stress and exhaustion was lower when there was a high sleep duration and perceived sleep quality was positive (Allen et al., 2020). In a study conducted in medical colleges, the participants' most identified complaint was shortened periods of concentration, because of a lack of sleep (Khawaja et al., 2023). Such psychological impacts translate into how people perform and present themselves in their everyday life. Regarding physical impacts, a study conducted in South Korea found that poor sleep quality increased the chances of obesity, diabetes, cardiovascular disease, and hypertension (Kyung et al., 2021). These are all factors that



ultimately lead to a poorer quality of life, making education on such sleep hygiene practices crucial to address in OT.

### **Gaps in Knowledge**

Some gaps in evidence include the lack of diversity and variation within the examined populations. This is evident throughout our research, where one study focused solely on the women that resided in Sweden (Magnusson et al., 2021), one study focused on older adults within the United States (Smallfield & Molitor, 2018), and one study focused on target populations with specific clinical conditions, such as dementia or traumatic brain injury (Webster et al., 2020; Mumbower et al., 2019). This reveals a large gap in evidence, seeing as how these small, yet specific, sample groups make it difficult to apply these results to a larger population. According to Mumbower et al. (2019), given the complex nature of sleep, individuals within the same population can still experience their own, unique experiences. This makes it extremely difficult to generalize such research findings and disseminate them to larger, broader samples of people. As such, studies must continue to target and tie in multiple populations, to consider important factors such as diversity and individuality. Despite all this, because health has a huge impact on both sleep hygiene and quality, being able to confidently equate such research findings to a wider representation of health statuses would provide a deeper understanding of the complexities surrounding this issue. Results and findings that stem from healthy individuals cannot be easily applied to those with chronic illnesses, due to health disparities that affect both sleep hygiene and quality, and conversely, results and perceptions from individuals with chronic illnesses cannot be applied to those who are healthy.

Research has revealed that there is not enough evidence-based research about sleep hygiene practices training. Occupational therapists and occupational therapy assistant students are not receiving enough education about sleep hygiene throughout their schooling. Sleep hygiene is a very important intervention for occupational therapists to use and educate their patients, as it can help a numerous number of people that they treat. One study by Poole et al. (2022) gave a sleep evaluation survey to occupational therapists evaluating sleep routines and the sleep interventions that they personally provide to their patients. Results showed that 53.7% of occupational therapists conduct sleep assessments, and 69.8% of occupational therapists utilize sleep interventions in no more than 25% of patients (Poole et al., 2022). More than half of the participants reported having no formal sleep management instruction in their professional education program. Ludwig et al. (2022) conducted a study in which only 33% of their participants reported receiving any sort of sleep education while they were in school, yet 87% believe that sleep is a very important occupation. Given this information, a big area of opportunity is ensuring that OT students are receiving the necessary tools and education to be able to address this topic more regularly. More formal education and evidence-based practice research about sleep hygiene practices and interventions will help occupational therapists implement more of these techniques with their patients.

### **Clinical Significance**

Based on the studies identified, sleep hygiene and sleep practices are very important to OT. The OTPF states that rest and sleep are “activities related to obtaining restorative rest and sleep to support healthy, active engagement in other occupations” (AOTA, 2020, p. 32). Because sleep is a crucial part of our well-being and functioning,

representing its own occupational domain, sleep preparation and sleep participation are important components of daily living. It is important for occupational therapists to address sleep and rest for their clients because good sleep quality is essential to complete daily routines successfully and efficiently. Occupational therapists' roles in such areas of practice can include making environmental modifications, addressing sleep hygiene practices, and working on restructuring thoughts around sleep to name a few. Based on Gutman et al. (2017) and Smallfield and Molitor (2018), a sleep journal showed strong evidence for improved sleep quality. Sleep journaling is a CBT intervention that occupational therapists can implement into their client's therapy sessions that struggle with sleep distribution. As depicted in one of the studies, higher levels of occupational balance were associated with higher levels of sleep quality (Magnusson et al., 2021). Another CBT intervention that occupational therapists can implement to improve their client's quality of sleep focuses on self-management training. This type of training focuses on teaching health-specific skills such as managing medications, monitoring weight or blood sugar, and increasing physical activity (Smallfield et al., 2021). Finally, external and internal environmental regulations are two other critical aspects to work towards improving the overall quality of one's sleep (Gutman et al., 2017).

### **Literature Review Conclusion**

In a survey conducted by the National Sleep Foundation (2020), 55% of US adult participants reported not sleeping enough. Sleep engagement is vital to our daily occupations, not only to maintain our health, but to maintain and improve an individual's work performance, leisure, social participation, and other occupations (AOTA, 2020). Inadequate sleep can lead to a plethora of health consequences that may further

complicate and hinder one's sleep hygiene, which can further disrupt occupational performance in their activities of daily living. Measures such as interventions, medications, and habitual practices must be considered to maximize one's overall sleep quality. Commonalities that we found were consistent in some of the research articles include having a healthy sleep environment, maintaining a balanced internal regulation, and journaling as an effective form of CBT intervention. These factors seem to hold increased significance when associating them with the context of sleep hygiene. However, gaps in evidence make it difficult for these findings to be applied to a more general consensus. The existing literature only includes very limited groups such as people with chronic illness, insomnia, traumatic brain injury, and older adults, to name a few. Other factors such as time frame and intervention length must also be considered so that research findings are not inaccurate or skewed. Ultimately, sleep has proven to be very pertinent within the field of OT. Evidence has shown that occupational therapy techniques have shown efficacy in improving sleep hygiene and sleep quality. Additional research is needed to examine sleep hygiene and how it can improve sleep quality. We will be working towards filling this gap by looking at the specific population of MSOT students.

### **Statement of Purpose, Hypothesis, Research Question**

The purpose of this study was to determine how modifications to one's existing sleep hygiene practices can hopefully improve their overall quality of sleep. Given that sleep is an important occupation that impacts many facets of the person, we wanted to see if positive changes could be made to existing routines with the help of some proper sleep hygiene education. We hoped and predicted that an introduction to some practices,

routines, and habits pertaining to sleep would help improve quality of life to some degree. Getting adequate, healthy sleep is something many people today have difficulty with. The research team was aware that everyone has different needs and preferences when it comes to their nighttime routines, and we wondered if our participants' results would reveal a trend in chosen interventions. The population for our study was Stanbridge University MSOT students. Our intervention consisted of providing the participants with a sleep hygiene educational pamphlet containing seven different categories. They were able to make modifications or implementations within these areas that would hopefully help their sleep preparation and sleep participation. The seven categories included environment, diet, exercise, mindfulness/prayer/meditation, journaling, technology, and self-care. They had the ability to choose any number of interventions of their liking. Our comparison consisted of analyzing which of the seven interventions were the easiest and which were the most difficult to implement as well as which interventions were the most commonly and least commonly implemented. We hoped for our outcome to include an improvement in the perceived sleep quality of our participants. With our PICO in mind, our research question was: Does the implementation of sleep interventions improve overall sleep quality in OT graduate students?

### **Theoretical Framework**

Sleep is an important occupation everyone must partake in to be healthy, functional beings. The Person-Environment-Occupation-Performance model (PEOP) is a model that addresses how sleep is an occupation and how OT could have a role in sleep management for those with sleep problems (Ho & Siu, 2022). The PEOP model addresses the interdependence between a person, their environment, and their occupation.

These three components exist in relationship with one another and in turn impact performance. Person refers to someone with “a set of attributes, competences, and life experiences” (Chang et al., 2021, para. 8). For the study we conducted, our participants were Stanbridge MSOT students. Chang et al. (2021) states that environment refers to the cultural, physical, social, and socio-economic components of a person’s environment. The students who chose to participate altered and adjusted their existing sleep environments. Occupation refers to the activities that the person participates in. Sleep participation, as well as sleep preparation, are both important components of this occupation. Performance refers to the outcome of the person, environment, and occupation domains. Sleep problems can result from personal factors as well as environmental factors. We chose to use the PEO model to guide our research because it is a framework that organizes individual, environmental, and occupational strategies to address sleep hygiene and sleep problems (Ho & Siu, 2022). The interconnectedness of these core aspects is needed when looking at the various elements of sleep.

Environmental modifications facilitate more time-efficient changes in the person. Modifications within the person take greater amounts of time and require more intention. In the ‘person’ domain, psychoeducation, awareness, and increasing knowledge are effective strategies used for shedding light on positive coping and overall sleep hygiene (Ho & Siu, 2022). As it pertains to our study, several person-related interventions that we posed included journaling, meditation, prayer, and reading. In the environment domain, interventions included modifications of our sleep environment, sleeping aids, or specific adaptations (Ho & Siu, 2022). Our proposed interventions relating to the environment included sound machines, decluttering the space, light-blocking curtains, keeping cool

temperatures, and reduction of noise. Limiting television and screen lighting were other factors that were important, yet commonly found to impact many people negatively. In the ‘occupation’ and ‘performance’ domains, participating in meaningful activities, encouraging occupational balance, forming new habits, and self-monitoring are all ways to promote healthy changes to one’s lifestyle (Ho & Siu, 2022). The interventions from this aspect of the model included the implementation of self-care routines, avoidance of caffeine and alcohol, limiting large quantities of food before bedtime, and engaging in healthy physical activity. Whether it be the implementation of one intervention or five different interventions, each of them had the potential of making a positive change in one’s perceived sleep quality.

Given the nature of our study, it was necessary to look at the person on a holistic level. Sleep has many different components and dimensions, and it may look different for each person. Our study aimed to educate and propose to the participants ways in which they can actively modify their current practices, based on personal preference. The choice aspect also allowed them to pick practices that not only best fit their ‘person’ domain but fit their given environments as well. With the adaptation of this framework, our aim was that at least one of these components contributed to the improvement of overall sleep preparation, sleep participation, sleep duration, and sleep quality. The PEOP model served as a guide to introduce four major aspects of our being and how they intersected.

### **Methodology**

The goal of our study was to educate future MSOT students about various sleep intervention practices that promote better sleep quality. We encouraged MSOT students at Stanbridge University to implement different sleep interventions with hopes to better

improve their personal sleep quality. In turn, we also hoped they would feel more informed to address different sleep intervention practices with future clients who might be experiencing sleep disruptions that impact their engagement in their occupations.

We administered our study to the MSOT cohorts from all three of Stanbridge University's campuses in Los Angeles, California, Irvine, California, and Riverside, California. After we received a media agreement from Stanbridge University, the Media Department sent a widespread recruitment email to all 213 MSOT students across the three campuses. Attached to the recruitment email was a link to Google Forms asking students to fill out the consent/pre-survey questionnaire. If students chose to participate in our study, they would have marked "yes" on the consent form, which guided the user directly to the pre-survey questionnaire. The only identifiers we asked our participants were their age and gender. There were a total of nine qualitative and quantitative questions such as: "Rate your current sleep satisfaction," "How many hours do you sleep daily," "How long does it take you to fall asleep," "Do you currently have any routines to prepare for sleep," etc. They had two weeks to fill out the consent/pre-survey questionnaire before it closed. Within the recruitment email, there was an educational sleep hygiene pamphlet and daily sleep log. The educational pamphlet consisted of a description of seven different sleep hygiene practices that we encouraged participants to implement for their sleep preparation and sleep participation over the course of two weeks. The pamphlet provided information about technology usage, sleep environment, journaling/reading, meditation/prayer, exercising, self-care practices, and diet. The daily sleep log was given to participants to help keep track of what sleep hygiene practices they chose, how many hours of sleep they got, and their daily mood as a result. Next, the



Media Department sent out an additional email to all 213 MSOT Stanbridge students, regardless of whether or not they filled out the pre-survey questionnaire. This ensured anonymity to our participants who did fill out the pre-survey questionnaire, as we did not record names or emails. This secondary email consisted of another Google Forms link to the post-survey questionnaire. The first question asked the students if they completed the pre-survey questionnaire. If students clicked “yes”, they were guided to the next questions of the post-survey questionnaire. The post-survey had a total of 13 quantitative and qualitative questions such as “What sleep intervention did you implement”, “What sleep intervention was the easiest?”, “What sleep intervention was the hardest?”, and “Rate your current sleep satisfaction from 1-10” etc. Participants had two weeks to fill out the post-survey questionnaire before it closed. Participants' responses were deleted after data was analyzed through Google Forms and Dedoose (<https://www.dedoose.com>). We analyzed outcomes such as perceived quality of sleep, total hours slept, sleep latency, and effectiveness of intervention before and after the two weeks of sleep interventions.

### **Advantages**

Some advantages to our methodology included participants having a sense of autonomy during the study. Participants were given the option to choose to implement any of the provided sleep interventions, and they were also allowed to come up with their own sleep hygiene practices. In addition to the seven sleep hygiene categories we provided, we wanted to give participants the opportunity to educate the research team about effective sleep intervention practices they chose to implement that were not included in the sleep hygiene pamphlet. Different sleep hygiene practices may work better for one person and not the other. Another advantage of this study was that it was

completely anonymous, and the research team did not have access to any names or emails. We not only wanted to protect the privacy of our participants, but we also wanted the participants to be comfortable and honest when answering our survey questions. Participants were not penalized if they chose to decline to participate in our study or withdraw at any time. This study had minimal interference with work, school, or family obligations, and there were no financial demands. Participants were not required to purchase anything for the sleep hygiene intervention time frame, and they were encouraged to work within their existing spaces. Lastly, our study was distributed through safe and secure online software that was encrypted to keep participants' personal responses private.

### **Participants**

We targeted MSOT students to participate in our study with hopes of better informing the future population of occupational therapists about the benefits of sleep hygiene interventions. We received a media approval form from Stanbridge University for the Media Department to contact the total of 213 active MSOT students via Stanbridge email. Of the maximum 213 students that received the recruitment email, we obtained a sample size of 11 participants. Participants needed materials such as electronic devices to access surveys and materials as well as their desired journaling method (e.g. notebook, smartphone, etc.). All other materials were optional (e.g. sound machine, blackout curtains, etc.), and modifications and adaptations took place within a pre-existing environment. Our inclusion criteria stated that participants must be current MSOT students at one of the Stanbridge University campuses, and all participants who willingly agreed to participate in the study must be at least 18 years of age. Participants

could not be from a program other than MSOT and could not be younger than 18 years of age. Participants received no incentives for their time in the study, and participation was completely voluntary.

### **Measures**

We coded for different themes and looked for patterns amongst the participants' responses, such as perceived quality of sleep, total hours of sleep, sleep latency, and most/least effective sleep intervention. Since we compared the mean results from the same groups, we conducted a paired t-test. Participants' responses consisted of a combination of Likert scale questions, multiple choice, and open-ended questions. To analyze the data, we utilized Google Form's response tabs to compare and contrast participants' pre and post-test survey responses. Google Forms generated pie charts and bar graphs that were utilized to represent the data. The open-ended questions were coded through Dedoose software, and Microsoft Excel, which were used to compare and organize participants' responses.

Participants' responses were kept in a password-protected folder and were not distributed to the facility, the program, or the university. The only people who had access to the participant's information were the four research students and the faculty advisor. The survey was conducted through Google Forms which had its own privacy and security policies. We deleted all participants' pre- and post-survey responses two weeks after the post-survey questionnaire was closed. Survey responses were kept for two weeks seeing as how this time frame provided us with adequate time to collect values for our data analysis, while prioritizing our participant's privacy at the forefront of our study.

Although we used standardized instruments to collect and analyze our data, they may not have contributed to the reliability and validity of our study. Since the participants completed the study procedures on their own, recalling their experiences and recording them in the surveys, it leaves the study vulnerable to external factors that were not originally accounted for. It was also difficult to say that the surveys consistently and confidently measured sleep quality, affecting the study's reliability, without the use of additional standardized tests.

### **Ethical and Legal Considerations**

Prior to beginning the study, a site agreement form was filled out and submitted to the appropriate personnel. We did not distribute any study materials until the Stanbridge University site agreement form and Institutional Review Board application were approved. As soon as we obtained approval, the recruitment process began and a mass email containing the consent form, pre-survey, and study materials was sent to each current student within the MSOT Program across all three campuses in California. Another mass email containing the post-survey was sent out two weeks after the recruitment period ended, initiating the data analysis portion of our study. This method of communication was used to promote efficiency and ease, to contact a large group of students in a short amount of time. Despite this, anonymity was maintained throughout the study. The pre-test survey and post-test survey generated through Google Forms were designed not to collect the participants' email addresses or names. Also, the questions in the surveys themselves did not ask for any identifiable factors, only age and gender. The confidentiality and privacy of participants were protected by accessing the surveys in the comfort of their homes, and there was no list of participants generated by the research

team or faculty advisor at any point in the study. The research team was not able to determine the students participating, nor were the other participants able to know as well.

The informed consent form was given by clicking and completing a Google Forms link in the email participants received during the recruitment process. The consent form mentioned that their participation was strictly voluntary, and they should not have felt forced or obligated to participate, as it would not affect their program standing or grades. It stated that to be eligible to participate in the study, they needed to indicate so by responding “Yes, I agree to voluntarily participate in this study” and only then did they receive access to the pre-survey questions. We did not feel the need to subject participants to in-person methods of data collection, as that would have compromised their anonymity, privacy, or ease of participation. Participants were also given the autonomy to choose which modifications best suited them and their lifestyles for the study, choosing between seven categories of sleep hygiene practices to implement. Data was collected and kept secure and anonymous on a Google spreadsheet stored on a Google Drive that was private and password protected. Only the group members and thesis advisor had access to the data in a password-protected email account. Due to the voluntary nature and freedom of the study, participants were allowed to withdraw from the study at any given moment, and this was reiterated within the informed consent form. There was no circumstance in which the data was shared with other researchers, to protect the anonymity and privacy of each participant. No forms of incentive or compensation were given that would lead to skewed participation, which was communicated in the consent form. The participants were not expected to make any

financial expenses, nor was it required. There would be no other physical, financial, legal, or emotional risks involved in the study.

## **Results**

### **Participants**

Of the 213 MSOT students who received the email, n=11 completed the pre-survey, and a total of n=10 participants completed the post survey. Of the pre-survey participants, five (45.5%) identified as female and six (54.5%) identified as male (see Figure 1). Our participants fell into a variety of age groups, including 54.5% (n=6) between the ages of 21-25, 27.3% (n=3) between the ages of 26-30, 9.1% (n=1) between the ages of 31-35, and 9.1 % (n=1) over the age of 36 (see Figure 2). Our pre-survey contained a couple open-ended questions to help us further examine the MSOT students' current understanding on sleep hygiene, as well as any perceived obstacles they had to obtaining optimal sleep. As far as understanding sleep hygiene, many participants pointed out that it involves bedtime preparation, healthy habits, routines for optimal sleep quality, environmental factors, and the involvement of mind and body. One participant said, "To me, sleep hygiene is everything you do to optimize sleep such as bedtime routines, activities like food and exercise that influence sleep, and having a good physical and mental state to sleep optimally." Another participant said, "Sleep hygiene are healthy habits or routines an individual performs to maintain optimal sleep quality, whether it's done before, during, or after bedtime." These answers reveal the diversity and individuality of any chosen sleep hygiene practices. We also see that these practices can take place at any time, over the course of the day.

## **Pre-Survey Findings**

### ***Qualitative Results***

Two themes we identified were external and internal obstacles that affected participants' sleep quality. We asked our participants about some of the obstacles they currently face when it comes to obtaining optimal sleep, to gain a better understanding and identify any possible trends. Upon analyzing the results, external factors included school, homework, and work. One participant shared, "waking up early for school and work or staying up to do homework" are their challenges. Internal obstacles included anxiety, stress, and excess energy. "Anxiety about school keeps me up at night," shared by one participant. Some environmental factors shared included sound, temperature, and technology. Another participant shared, "Weather, sound, and stress" are their obstacles. These answers revealed the impact that external and internal factors can have on the quality of sleep people get.

### ***Quantitative Results***

With the obstacles our participants shared, the pre-intervention sleep satisfaction scores ranged from 4 to 8 on a 10-point scale. A rating of 1 indicated that it was the "worst it could be" and a rating of 10 indicated that it was "as great as can be." There were three participants (27.3%) who rated their current sleep satisfaction a 4 out of 10, three participants (27.3%) who rated it a 6 out of 10, three participants (27.3%) who rated it a 7 out of 10, and two participants (18.2%) who rated it an 8 out of 10 (see Figure 3). When asked how many hours they currently sleep on any given weeknight, four (36.4%) participants reported sleeping seven hours a night, three (27.3%) participants reported sleeping six hours, three (27.3%) participants reported sleeping five hours, and one

(9.1%) person reported sleeping eight hours (see Figure 5). On the other hand, when asked the average amount of hours our participants reported sleeping on weekend nights, four (36.4%) participants reported sleeping seven hours, three (27.3%) participants reported sleeping nine or more hours, two (18.2%) participants reported sleeping eight hours, one (9.1%) participant reported sleeping five hours, and one (9.1%) participant reported sleeping less than four hours (see Figure 6). Comparing the weekend sleep hours to the weeknight sleep hours, the participants' answers for the weekend showcased a larger interval, or a discrepancy in sleep hour values, when looking at the minimum and maximum values.

Of the current routines that the participants had before going to bed, the majority identified use of phone or other electronic devices (n=9, 81.8%) and skin care routines (n=9, 81.8%). Another large majority identified watching TV (n=6, 54.5%) as part of their routine. Snacking (n=1, 9.1%), sound machines (n=2, 18.2%), listening to music (n=1, 9.1%), reading (n=3, 27.3%), journaling (n=1, 9.1%), and praying (n=1, 9.1%) were among some of the other selected responses (see Figure 4). With these routines in mind, none of the participants were able to identify falling asleep immediately when asked how long it takes to fall asleep. Of the participants, five (45.5%) reported needing around 30 minutes to fall asleep and another five (45.5%) reported needing 15 minutes or less to fall asleep. One person (9.1%) reported needing more than 45 minutes to fall asleep (see Figure 7).



## **Post-Survey Findings**

### ***Qualitative Results***

Following the two-week intervention period, our participants were asked to fill out a second survey for us to collect new and updated data following the intervention period. With the help of Dedoose software, we found two themes that were most implemented among our participants. The practice of a self-care routine (see Figure 12) was the most used theme we identified. One participant shared, “taking time for self-care at night has helped my mind and body calm down to prepare for bed” and another said, “I have started creating more of a routine before bed with showering, skincare, and winding down in bed before actually trying to fall asleep.” After analyzing participants’ responses, self-care was the most used sleep intervention that participants implemented as well as the most beneficial sleep intervention. Results show that establishing a personal self-care routine is the most helpful sleep intervention for achieving optimal sleep.

The next theme that was the most identified practice was change in technology use before bed. One of our participants responded to the survey with, “Turning phone off an hour before bed” when asked about a routine that worked. Several others also shared the value they found in minimizing screen time before bed. These answers also revealed the impact that calming the mind can have on perceived sleep quality. When our participants were asked if they found the study to be useful, all but one indicated ‘yes’ in their survey response. Many of them shared the importance of being aware of their current sleep patterns and implementing good habits into their routines. Most importantly, a few of our participants identified an overall improved sleep quality. One

participant indicated that they did not find this study useful as they did not implement any changes.

### ***Quantitative Results***

In order to identify any changes, our participants were asked similar questions found in the pre-survey, in addition to a few new questions. Based on the results we found, there were some clear improvements and benefits to their chosen sleep hygiene interventions. Of the 11 students who completed our pre-survey, 10 completed the post survey. This discrepancy in participant responses will be addressed in the limitations section of our paper. Of the post survey participants, six (60%) identified as female and four (40%) identified as male (see Figure 8). When asked about their current sleep satisfaction post intervention, six (60%) participants rated it a 7 out of 10, three (30%) participants rated it an 8 out of 10, and one (10%) participant rated it a 6 out of 10 (see Figure 10). As found in the pre-survey, a rating of 1 would indicate “the worst it could be” and a rating of 10 would indicate “as great as can be.” When asked how many days participants implemented sleep interventions, three participants (30%) answered that they participated all 14 days, three participants (30%) answered that they participated between 7 to 13 days, and three participants (30%) answered that they participated in 6 days or less (see Figure 11). One person (10%) answered that they did not participate at all. This set of statistics was taken into consideration in the discussion of results.

When asked about the specific interventions, six participants (60%) selected self-care routine as the easiest intervention to implement. Three participants (30%) selected between reading/journaling, meditation/prayer, and diet changes, and one participant (10%) selected not applicable (see Figure 13). According to our participants, the most

difficult intervention to implement was technology use, as indicated by six participants (60%). The remaining four participants (40%) selected between meditation/prayer (n=1, 10%), exercise (n=1, 10%), and environmental modifications (n=2, 20%; see Figure 14). In terms of the most beneficial interventions, four participants (40%) selected self-care routine, three participants (30%) selected technology use, and the remaining three participants (30%) selected meditation/prayer (n=1, 10%), environmental modifications (n=1, 10%), and exercise (n=1, 10%; see Figure 14). After the completion of the study, when asked about the average amount of hours they received on weeknights, seven participants (70%) reported sleeping seven hours a night, two participants (20%) reported sleeping eight hours a night, and one participant (10%) reported sleeping six hours a night (see Figure 17). Looking at the average amount of hours they received on weekends post-study, five (50%) participants reported sleeping eight hours a night, two participants (20%) reported sleeping seven hours a night, and one participant (10%) reported sleeping six hours a night. Two participants (20%) reported sleeping over nine hours a night.

### **Discussion**

Through the review of survey results and responses, the importance of implementing an achievable and beneficial sleep routine was made apparent. Given that everyone experiences and participates in sleep differently, routines have commonalities, but also remain unique to the individual. The underlying reasonings for emphasizing sleep routines in our study was to educate participants about sleep hygiene practices, help them understand their benefits, show how they can lead to optimal sleep, and enhance occupational performance. Upon being asked to reflect on current sleep and implement changes they felt appropriate for them, participants were able to see positive results. The

goal of this study was to see an increase in sleep satisfaction as well as encourage the adoption of healthy sleep hygiene practices. Upon analyzing the participant results, we found an overall improvement in sleep satisfaction.

Our initial goal was to obtain 50 participants for our study. We had expected a larger pool of participants, given that our study required very little time overall, and everything could be done within the comfort of one's own home. Some ideas we talked about that could have increased our participant sample included offering incentives, such as a gift card. Participant recruitment could have improved utilizing platforms such as social media, instead of email alone.

Our sample size, although small, revealed some very interesting findings regarding potential future research focuses. Given that sleep quality, sleep latency, and satisfaction are affected by multiple factors, it is impossible to limit the cause to one factor alone. Unmodifiable factors such as gender also contribute to the differences seen in sleep quality, indicating that females (65.1%) have a higher prevalence of poor sleep quality compared to males (49.8%; Fatima et al., 2016). Altering our study design to connect responses to gender could have been possible to draw further patterns and conclusions about sleep and the plethora of factors that impact them. Ultimately, the goal was to not only improve sleep quality among MSOT students, but to also add and contribute to existing research.

Sleep satisfaction scores increased as a whole, as all responses were at least scored a 6 or above. Initially, only three of the 11 participants had rated their sleep satisfaction at a score of 7 out of 10. At the end of the post survey, we found that six out of the 10 participants rated their sleep satisfaction as 7 out of 10, which is doubled from

the pre survey. At the pre survey, only two of the 11 had rated their sleep satisfaction at a score of 8. An improvement was indicated through the post survey when it revealed that three of the 10 participants had rated their sleep satisfaction at a score of 8.

Weeknight sleep duration also improved overall. Our pre-survey had six of 11 people (54.6%) sleeping between five and six hours a night. Four of the 11 participants (36.4%) slept seven hours and only one participant (9.1%) slept eight hours a night. Our post study results revealed that two of the 10 participants (20%) reported sleeping eight hours a night, seven out of 10 participants (70%) sleeping seven hours a night, and one person (10%) reported sleeping six hours a night. Given these numbers, there was an overall increase in total hours slept, steering our participants closer to the recommended nightly average of seven to eight hours. Per the recommended minimum of seven hours a night for adults, 90% of our participants were able to fall within or above the recommended range upon completion of the two-week intervention period.

Quantitative results in the pre-survey revealed a high usage of phones, electronics, and TV. While these are practices that many do every day, they can lead to a sedentary lifestyle, anxiety, loneliness, and more (Kyung et al., 2021). High usage of screens before bed is something worth exploring further in addition to unmodifiable factors such as gender that contribute to differences in sleep quality. Moreover, other factors such as health ailments/conditions and even medications should be considered as to how they can play a part in sleep disturbances.

Tying in how individuals can have varying opinions and preferences on different sleep hygiene practices, and experience different outcomes, we felt it was imperative to promote autonomy. We did this by giving the participants the ability to choose which

sleep hygiene practice(s) would be most beneficial to implement into their daily lives. Restricting or forcing the participants to select only from certain categories or conduct specific sleep hygiene routines would limit the number of conclusions we can draw from improving sleep. We also hoped it would help us discover the variety of sleep hygiene routines that we did not include or were not aware of. However, despite coming to this conclusion and choosing to design the study this way, this was not the case. Looking at the implementation of interventions, there was a clear preference for self-care routines. Self-care routines consisted of showering, skin care, and other activities that all contributed to providing a more relaxed mental state before going to sleep. Participants reported that they would take more time for self-care routines to effectively wind down and prepare themselves for better sleep. This improvement in sleep meant a decrease in sleep latency, increase in sleep duration, and overall improvement in subjective sleep quality, which were goals of improvement for this study. Quantitative results post intervention showed that a self-care routine was the easiest and most beneficial to implement among our sample size.

With the overall success and target goals met, OT practitioners may draw from certain areas of this study for application to current practices and research. Practitioners who see the efficacy of sleep hygiene interventions may adopt and tailor different sleep hygiene techniques to educate clients so that they are encouraged to use them. We believe we can continue to improve the health, well-being, and quality of life for all people, as evident through the twofold improvement of sleep quality within our participants, aligning with the AOTA “Vision 2025,” “of maximizing health, well-being, and quality of life” (AOTA, 2017, p. 1).

Surprisingly, there was a low interest in environmental modifications. This could have been due to the fact that some people are unable to change their environments if they share a space, for example. Also, modifications such as sound machines or black-out curtains may come with too much of a financial burden. With 20% of participants responding that environmental modifications were the second hardest intervention to implement, one would be curious to find out more about the hesitation to implement this intervention. This was a very interesting statistic, and one that we would be curious to find out more about the hesitation to adopt this intervention. The research team also felt that there was a low response towards dietary changes, which would be worth examining in the future. There is a lot of research that talks about the benefits of a consistent eating schedule and not eating or snacking too close to bedtime. As far as intervention time goes, a few participants did not participate in their chosen sleep hygiene practices for all fourteen days. Some potential reasons to consider are the busy schedules and numerous responsibilities of graduate students, which may have contributed to inadvertent forgetfulness. The reasoning behind this inconsistency is something we are curious about. Reminders may have helped raise this number a bit. Supplemental tools such as an alarm clock to remind them of their participation would have also aided in improving consistency within this study.

### **Limitations**

After completing the study, we concluded that there are various limitations that should be mentioned. Given that the study was conducted with only Stanbridge MSOT graduate students, we are unable to generalize our results to a larger population since it is a highly specific group. Sleep is complicated to study because, despite individuals

belonging to the same population, they can still experience differences in factors such as sleep quality and sleep latency. This reiterates the idea that sleep is unique to each person, emphasizing the inability to generalize the results. Other limitations of the study can be found within the study design itself being a self-completion study. Wanting to maintain participant autonomy, participants had the freedom to select any intervention from the seven categories listed in the pamphlet they received and conduct them in the comfort of their own home. As a result, since no regulation measures were set in place to ensure that the participants were adhering to the study procedures as instructed, there is no guarantee that the participants completed the study as intended.

Further limitations can be found in the data collection and utilization of surveys. After analyzing our data and going through the questions listed in both the pre- and post-survey, one limitation was that each survey contained a biased question, given the poor formatting and phrasing of the question. This could have caused our participants to skew their open-ended responses to reflect a certain answer that is catered towards what we wish to see, opposed to answering honestly. For instance, the post-survey contained a question phrased, "Which routines/habits did you implement that you felt changed the quality of your sleep?" By phrasing it this way, it guides the participants thinking to input an answer that has improved their sleep quality and may be unable to answer if their sleep quality did not change at all, even after implementing sleep hygiene interventions listed in our pamphlet. Another limitation is that simply trusting that our participants were telling the truth when they responded to both of our surveys, is not reliable. Given that we did not collect any identifiable information, there was no way to accurately follow up with participants and ensure that the same number of participants showed up in both the



pre-survey and post-survey. At the conclusion of the post-survey period, we ran into this exact instance, obtaining 10 responses, compared to having 11 responses in the pre-survey. This also could be attributed to the fact that no additional follow-up or reminder emails were sent out, apart from the consent/pre-survey and post-survey being, indicating the possibility that the last participant could have forgotten to fill out the post-survey form.

In addition, our study lacked a control group, preventing us from having the ability to properly establish a baseline measurement for comparison of the dependent variable, which in this case was sleep quality, after the implementation of the two-week study. In this case, it is not fully accurate to say that the interventions being implemented, which serve as the independent variables, solely resulted in changes to sleep. We did not account for other uncontrollable, external factors that could have affected the participant's overall quality of sleep. As with any self-completion survey, given that participants had to recall the previous night's sleep to answer the questions mentioned in the post-survey, there is always a chance of recency bias, making the participant's answers potentially inaccurate. It is worth mentioning that due to administering online surveys and consent forms, there may have been limited participation from those who have limited or no access to the internet or have any other limitations that could negatively impact their participation, such as vision impairments.

Additional limitations included failing to provide our participants with incentives or compensation for their time commitment to the study, and participants feeling pressured to participate in the study, due to the faculty advisor and student research team's association with Stanbridge's MSOT Program. Despite prefacing in the consent

form that their participation would not affect their standing or grades within the program, participants still could have felt influenced to participate in our study, due to researcher bias.

### **Conclusion**

Lack of sleep is an ongoing public health problem among adults. Inadequate sleep and poor sleep quality can act as the precursor to multiple short- and long-term health consequences (Peuters et al., 2022). Failing to receive appropriate sleep can affect one's ability to successfully engage in occupations. Yet, despite how crucial sleep is to our health and health maintenance, about one-third of adults in the U.S. still report sleeping less than the minimum hours needed (Smallfield & Molitor, 2018). Individuals are continuing to struggle in obtaining adequate, healthy sleep. As a result, the purpose of this study was to not only teach, but also encourage the implementation of sleep hygiene practices from seven different categories. These practices were aimed at improving their overall quality of sleep and introducing beneficial sleep routines they could continue after the conclusion of our study. Considering sleep is an important occupation that impacts many facets of the person, we wanted to provide the necessary information needed for our participants to further disseminate such knowledge, utilize it personally, and educate others about proper sleep hygiene. Our desired outcome was for the participants to report having improved sleep quality and sleep latency post-intervention. We found that many of the MSOT students had a general understanding of sleep hygiene but needed to bridge the gap and implement those positive habits and routines. As found in our research, there is not enough education in graduate programs about sleep hygiene practices, assessing sleep, and impact on occupation. Overall, sleep durations increased, and self-care

routines were among the highest implemented practices. Decreasing electronic usage and making environmental modifications are two areas that may be interesting to look at for future research.

From the research collected, sleep hygiene and sleep practices are both significant and relevant in OT. As stated in the OTPF, rest and sleep are essential to obtain restorative rest and sleep and support healthy, active engagement in other occupations (AOTA, 2020). Sleep is a crucial part of our well-being and functioning, so sleep preparation and participation are important factors to consider daily. The PEOP model is one that ties closely to the way humans interact with sleep because of unique personal factors such as family, health, socioeconomic background, cognition, social environment, sensory experiences, and activity and task involvement, to name a few. Examples of the occupational therapists' role in this scope of practice include making environmental modifications, as necessary, addressing sleep hygiene practices, and working on restructuring thoughts around sleep. If more occupational therapists addressed the importance of proper and sufficient sleep for their clients, as well as educated them about ways to obtain that optimal sleep, people overall could work towards increasing their quality of life.

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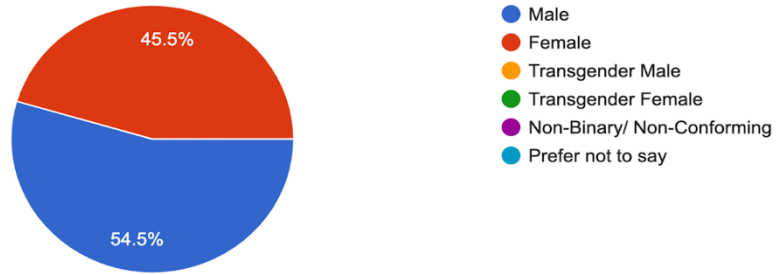
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**Figure 1**

*Participants' Gender (pre-test results)*

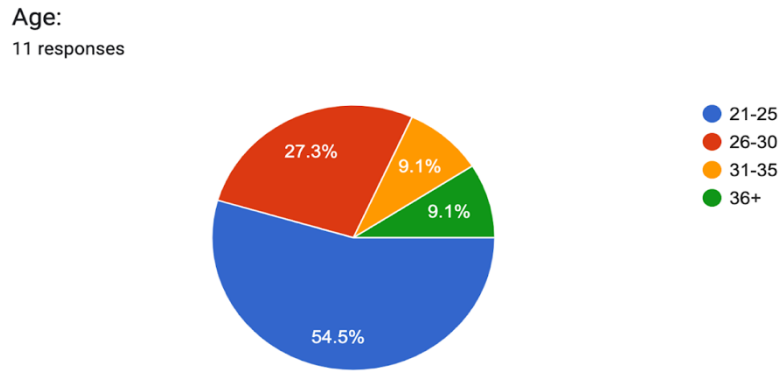
Gender:  
11 responses



*Note.* The data in Figure 1 represents the participant's gender in the pre survey.

**Figure 2**

*Participants' Age (pre-test results)*

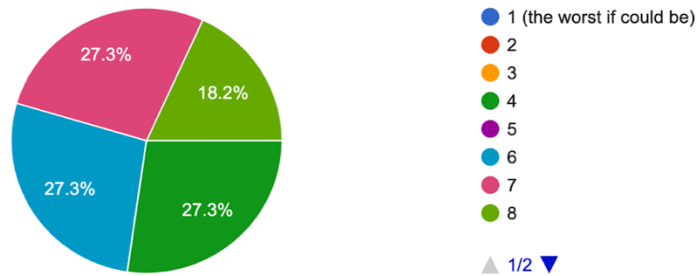


*Note.* The data in Figure 2 represents the participant's age in the pre survey.

**Figure 3***Participants' Current Sleep Satisfaction (pre-test results)*

How would you rate your current sleep satisfaction on a scale from 1-10?

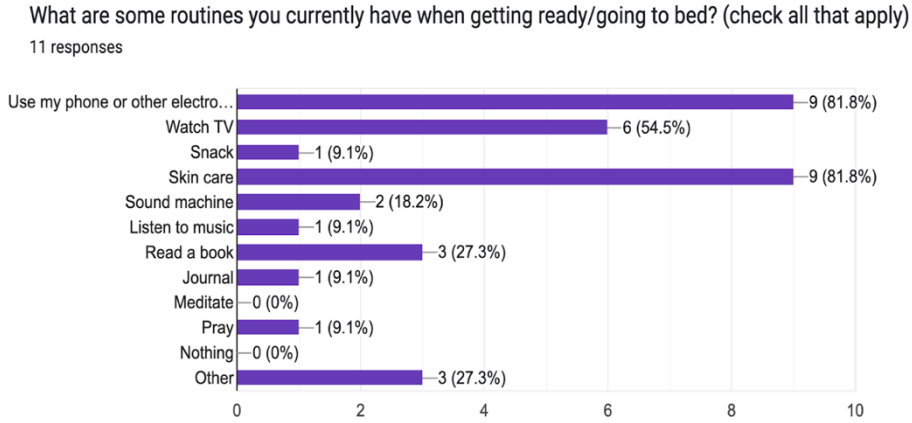
11 responses



*Note.* The data in Figure 3 represents the participants' current sleep satisfaction before intervention.

**Figure 4**

*Participants' Current Sleep Routines (pre-test results)*



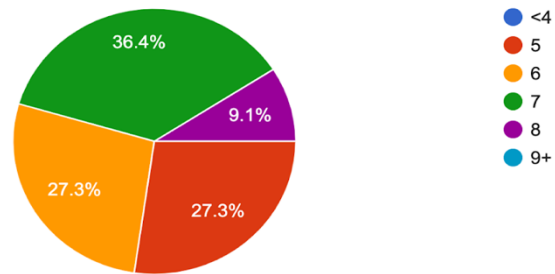
*Note.* The data in Figure 4 reports the x-axis as the number of participants and the y-axis reports the participant's current sleep routine to get ready for bed.

**Figure 5**

*Participants' Hours of Sleep on Weeknights (pre-test results)*

On average, how many hours do you sleep on a weeknight?

11 responses



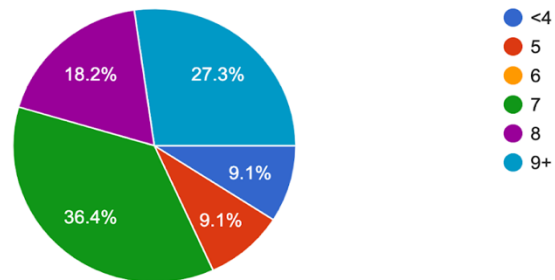
*Note.* The data in Figure 5 represents the number of hours of sleep the participant obtains on weeknights pre-intervention.

**Figure 6**

*Participants' Hours of Sleep on Weekend Nights (pre-test results)*

On average, how many hours do you sleep on a weekend night?

11 responses

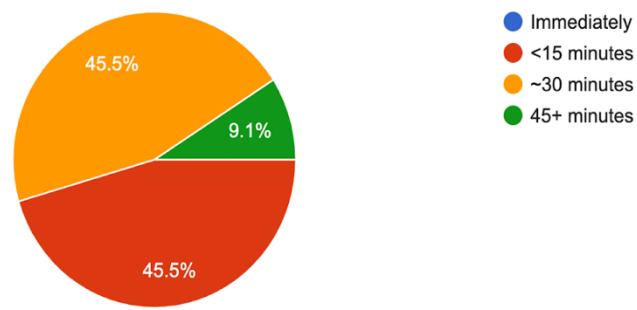


*Note.* The data in Figure 6 represents the number of hours of sleep the participant obtains on weekends pre-intervention.

**Figure 7***Participants' Sleep Latency (pre-test results)*

On average, how long does it take you to fall asleep?

11 responses

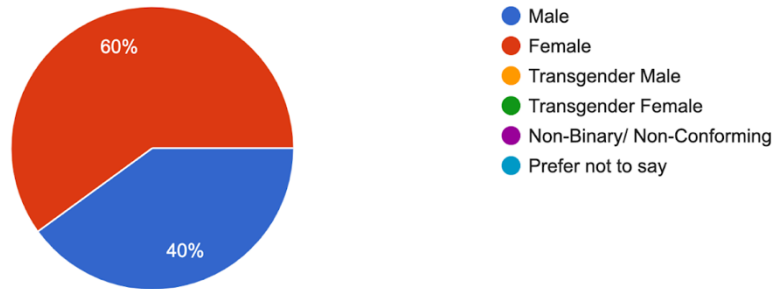


*Note.* The data in Figure 7 represents the amount of time the participant falls asleep pre intervention.

**Figure 8**

*Participants' Gender (post-test results)*

Gender:  
10 responses



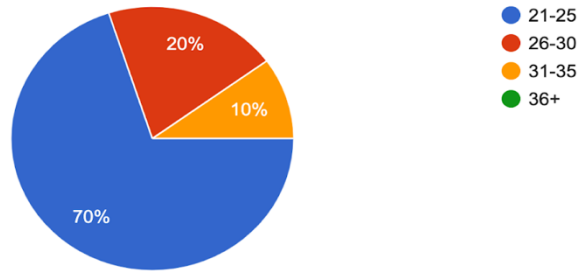
*Note.* The data in Figure 8 represents the participant's gender in the post survey.



**Figure 9**

*Participants' Age (post-test results)*

Age:  
10 responses



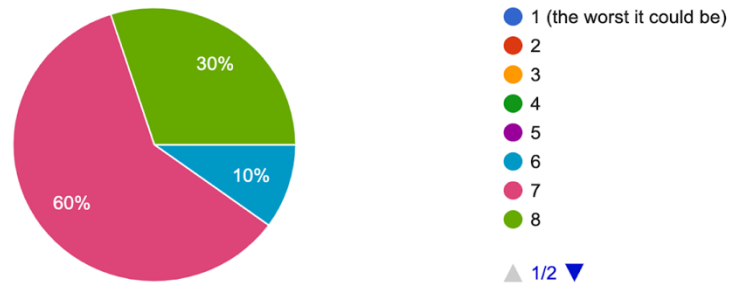
*Note.* The data in Figure 9 represents the participant's age in the post survey.

**Figure 10**

*Participant's Current Sleep Satisfaction Post Intervention (post-test results)*

How would you rate your current sleep satisfaction on a scale from 1-10?

10 responses



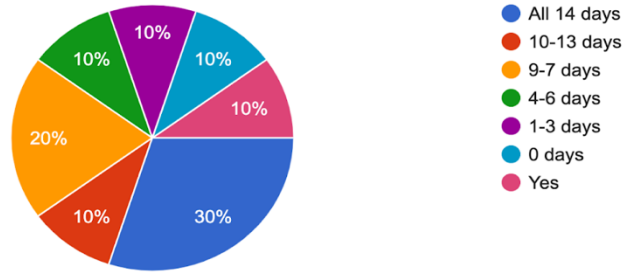
*Note.* The data in Figure 10 represents the participants current sleep satisfaction post-intervention.

**Figure 11**

*Days Participants Implemented Sleep Interventions (post-test results)*

How many days did you implement an educational sleep intervention?

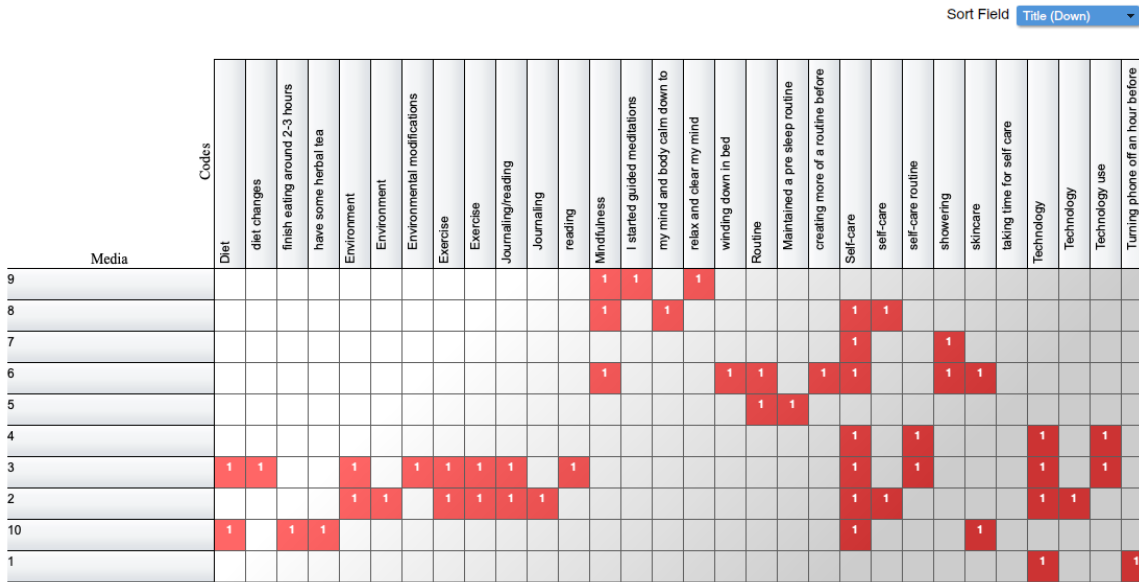
10 responses



*Note.* The data in Figure 11 represents the number of days each participant implemented sleep hygiene practices during the intervention period.

**Figure 12**

*Results of Most Used Sleep Intervention (post-test results)*

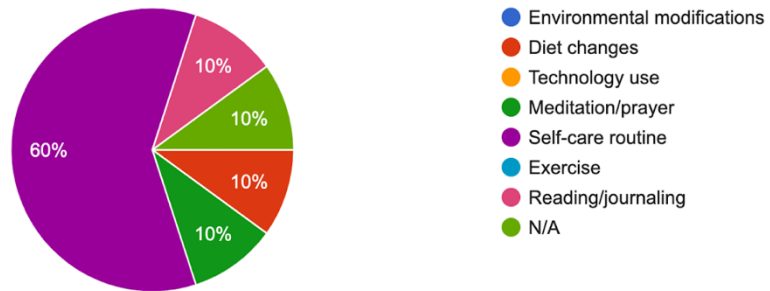


*Note.* The data on this figure shows that self-care was the most used code. Participants implemented self-care the most to their sleep routine/sleep habits.

**Figure 13***Easiest Educational Sleep Intervention Implemented (post-test results)*

Which educational sleep intervention was the easiest to implement?

10 responses



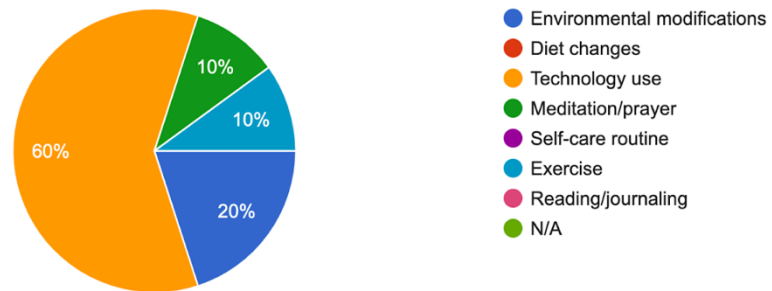
*Note.* The data in Figure 13 represents the participants' opinion on the easiest sleep intervention to implement during the intervention period.

**Figure 14**

*Most Difficult Educational Sleep Intervention Implemented (post-test results)*

Which educational sleep intervention was the most difficult to implement?

10 responses



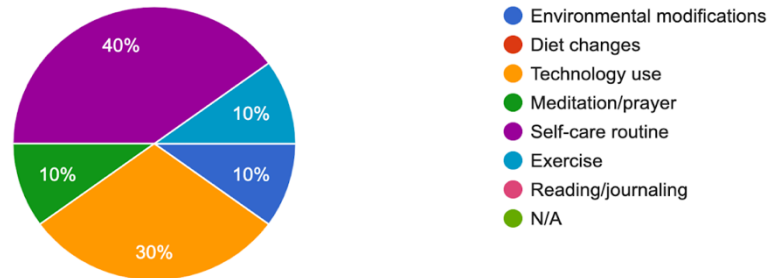
*Note.* The data in Figure 14 represents the participants' opinion on the hardest sleep intervention to implement during the intervention period.

**Figure 15**

*Most Beneficial Educational Sleep Intervention Implemented (post-test results)*

Which educational sleep intervention was the most beneficial to implement?

10 responses

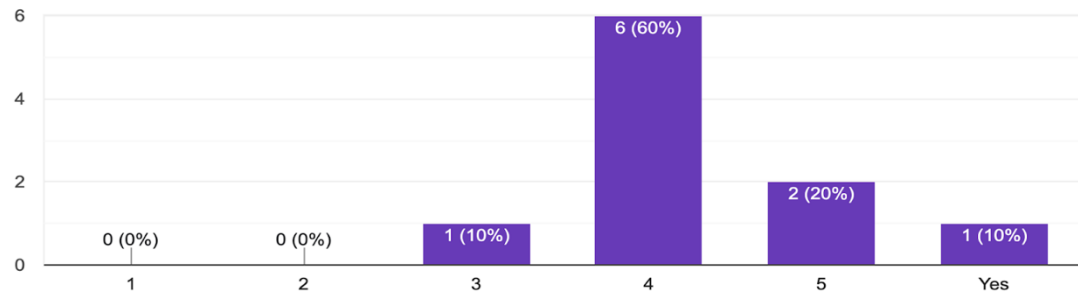


*Note.* The data in Figure 15 represents the participants' opinion on the most beneficial sleep intervention to implement during the intervention period.

**Figure 16**

*Participants' Likelihood of Continuing Sleep Interventions in the Future (post-test results)*

How likely are you continue to use the educational sleep interventions in the future?  
10 responses



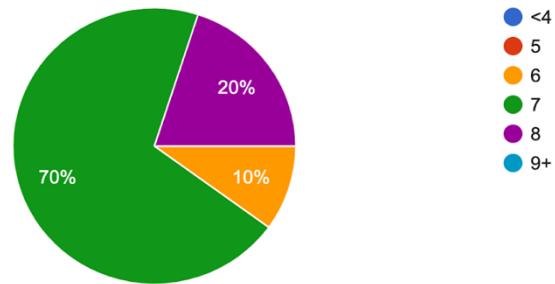
*Note.* The data in Figure 16 reports the x-axis as the number of participants and the y-axis reports the likelihood of the participant continuing sleep interventions in the future.



**Figure 17**

*Participants' Average Number of Hours of Sleep on Weeknights (post-test results)*

On average, how many hours do you sleep on a weeknight? (Post study)  
10 responses



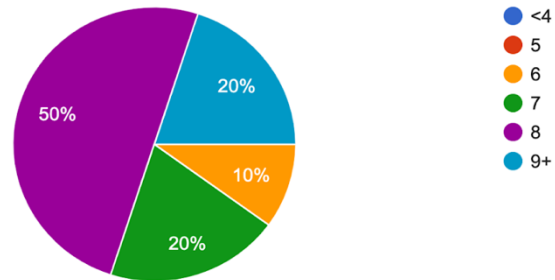
*Note.* The data in Figure 17 represents the number of hours of sleep the participant obtains on weeknights post intervention.

**Figure 18**

*Participants' Average Number of Hours of Sleep on Weekend Nights (post-test results)*

On average, how many hours do you sleep on a weekend night? (Post study)

10 responses



*Note.* The data in Figure F11 represents the number of hours of sleep the participant obtained on weekends post intervention.

**Appendix A****Institutional Review Board Approval**

07/28/23

Hello,

After review of the requested revisions to your IRB application for Study ID #11MSOT012 has now been approved by the IRB and you may initiate your study at this time. NOTE, this approval is limited to the activities described in your IRB application. Any anticipated changes require submission of an IRB Modification Form, with subsequent IRB approval required, prior to initiation of those changes to the approved protocol or supporting study materials (including your approved recruitment materials, study instruments, and consent documents). Note this also includes a prospective submission of an IRB Modification Form for a change in the total number of subjects stated in your approved IRB application, with NO additional subjects enrolled until you have received IRB Modification application approval.

Please submit a single pdf file containing only your IRB approved Informed Consent Form. It will be stamped to notate official IRB approval and returned to you via email for your use with subjects. Note only copies (electronic/screen-shot is acceptable) of this final approved version of your Informed Consent for your study clearly displaying the IRB approval stamp may be utilized with subjects.

Congratulations and we wish you success with your thesis project.

Sincerely,

Julie Grace MS, MA | IRB Chair

## Appendix B

### Informed Consent Form

#### Informed Consent Form

**Title of Study:** Sleep Hygiene Interventions for Occupational Therapy Graduate Students

#### **Description**

Hello,

Thank you so much for your interest in participating in this study. I am one of the four student researchers in this study, along with three other students in a study team. I am an occupational therapy student (OTS) at Stanbridge University's MSOT Program attending the Irvine Campus and am one of four students making up the study team.

This study aims to assess and improve the participant's current sleep quality and educate them about various sleep hygiene routines/practices they can benefit from and implement into their own lives and pass on to future OT students. Many current research studies sleep, sleep quality, and sleep latency (or how fast one can fall asleep) but hardly any addresses its association with graduate-level OT students and their occupations.

#### **Participant Selection**

To be selected for this study, you must be enrolled in Stanbridge University's MSOT Program at either of their three different campus locations—Riverside, Irvine, or Los Angeles.

#### **Procedures**

Since this is a self-completion study that will be performed in the comfort of your own home, we trust that you will adhere to the guidelines completely. First, you will receive a recruitment email including a link to fill out a consent form, followed by a pre-test survey, where you will complete questions asking about your current sleep quality. Once that has been filled out and submitted, in that same email, you will find both a PDF attachment of an educational pamphlet listing different sleep hygiene practices, underneath different categories and a daily sleep log to help record your sleep quality from the previous night. From there, the participant will select their chosen intervention once a day for 2 weeks and continue to make note of their perceived sleep quality. After those 2 weeks, the participant will receive an email containing a link to a survey attesting that they have completed the pre-test survey as well as the study. Once they indicated "Yes," it will go straight to the post-test survey, where they will answer similar questions pertaining to their sleep quality.

#### **Time Involvement**

The time commitment for this study is going to be a little over 2 weeks. The pre-survey and post-survey will each take at least 5 minutes—no more than 10 minutes— of their time. The participants will do their chosen interventions once a day for 2 weeks. The daily logs are encouraged to be used and will take a few minutes at most each day.

**Appendix C****Pre-Survey Questions**

1. Gender:
  - a. Male
  - b. Female
  - c. Transgender Male
  - d. Transgender Female
  - e. Non-Binary/Non-conforming
  - f. Prefer not to say
  
2. Age:
  - a. 21-25
  - b. 26-30
  - c. 31-35
  - d. 36+
  
3. How would you rate your current sleep satisfaction on a scale from 1-10?
  - a. 1 (the worst it could be)
  - b. 2
  - c. 3
  - d. 4
  - e. 5
  - f. 6
  - g. 7
  - h. 8
  - i. 9
  - j. 10 (as great as can be)
  
4. What are some routines you currently have when getting ready/going to bed?  
(check all that apply)
  - a. Use my phone or other electronic device
  - b. Watch TV
  - c. Snack
  - d. Skin care
  - e. Sound Machine
  - f. Listen to Music
  - g. Read a book
  - h. Journal
  - i. Meditate
  - j. Pray
  - k. Nothing
  - l. Other
  
5. On average, how many hours do you sleep on a weeknight?

- a. <4
  - b. 5
  - c. 6
  - d. 7
  - e. 8
  - f. 9+
6. On average, how many hours do you sleep on a weekend night?
- a. <4
  - b. 5
  - c. 6
  - d. 7
  - e. 8
  - f. 9+
7. What would you say are your biggest obstacles to obtaining an optimal night's sleep?
- a. Text-box/free response
8. On average, how long does it take you to fall asleep?
- a. Immediately
  - b. <15 minutes
  - c. ~30 minutes
  - d. 45+ minutes
9. Briefly define sleep hygiene in your own words.
- a. Text-box/free response

## Appendix D

### Post-Survey Questions

1. Gender:
  - a. Male
  - b. Female
  - c. Transgender Male
  - d. Transgender Female
  - e. Non-Binary/Non-conforming
  - f. Prefer not to say
  
2. Age:
  - a. 21-25
  - b. 26-30
  - c. 31-35
  - d. 36+
  
3. How would you rate your current sleep satisfaction on a scale from 1-10?
  - a. 1 (the worst it could be)
  - b. 2
  - c. 3
  - d. 4
  - e. 5
  - f. 6
  - g. 7
  - h. 8
  - i. 9
  - j. 10 (as great as can be)
  
4. How many days did you implement an education sleep intervention?
  - a. All 14 days
  - b. 10-13 days
  - c. 7-9 days
  - d. 4-6 days
  - e. 1-3 days
  - f. 0 days
  
5. If you responded YES to the question above, which routines/habits did you implement that you felt changed the quality of your sleep?
  - a. Text-box/free response
  
6. Which educational sleep intervention was the **easiest** to implement?
  - a. Environmental modifications
  - b. Diet changes
  - c. Technology use

- d. Meditation/Prayer
  - e. Self-Care routine
  - f. Exercise
  - g. Reading/Journaling
  - h. N/A
7. Which educational sleep intervention was the most **difficult** to implement?
- a. Environmental modifications
  - b. Diet changes
  - c. Technology use
  - d. Meditation/Prayer
  - e. Self-Care routine
  - f. Exercise
  - g. Reading/Journaling
  - h. N/A
8. Which educational sleep intervention was the most **beneficial** to implement?
- a. Environmental modifications
  - b. Diet changes
  - c. Technology use
  - d. Meditation/Prayer
  - e. Self-Care routine
  - f. Exercise
  - g. Reading/Journaling
  - h. N/A
9. How likely are you to continue to use the educational sleep interventions in the future?
- a. On a scale of 1-5, Not likely (1) → Very likely (5)
10. Did you find this study useful? If yes, please explain why. If not, please explain why.
- a. Text-box/free response
11. On average, how many hours do you sleep on a weeknight? (Post-study)
- a. <4
  - b. 5
  - c. 6
  - d. 7
  - e. 8
  - f. 9+
12. On average, how many hours do you sleep on a weekend night? (Post-study)
- a. <4
  - b. 5
  - c. 6



- d. 7
- e. 8
- f. 9+

13. Is there anything else you would like to us to know? If so, please share your thoughts with us below.

- a. Text-box/free response



## Appendix F

### Sleep Hygiene Practices Pamphlet

# SLEEP HYGIENE PRACTICES

## Technology

Technology generally pertains to devices that have a screen and can either promote or disrupt sleep quality (Mei et al., 2018).



Examples of modifications/interventions include:

- Blue-light-blocking glasses
- Sleep Apps/Audio (i.e., Calm, Headspace, Insight Timer, etc.)
- Refraining from screen time 1.5 hours before bed
- Smart lightbulbs to adjust brightness
- Devices playing relaxing sounds

## Journaling/Reading



Journaling is a form of CBT, writing can help with you reflect and organize your thoughts that can promote a space for positive sleep (Magnusson et al, 2021).

Reading before bed can help reduce stress and allow your mind and body to relax. Being in a state of relaxation lowers your heart rate and quiets your thoughts to enter into sleep (Saner, 2023).

## Meditation/Prayer/ Mindfulness



"Mindful meditation is defined as a "mind-calming practice that focuses on breathing and awareness of the present moment." (Corliss, 2020).

As you start unwinding and preparing to sleep,

1. Select a calming focus of your choice (a sound, soft music, your breathing, prayer, a phrase)
2. Allow your body to relax and let go for around 10-15 minutes, or as long as you see fit

## Exercise



Physical exercise is a nonpharmacological tool that can positively impact sleep quality (Rosa et al., 2022).

Physical Exercise can be defined as "a structured form of movement that results in energy expenditure and includes all activities of daily living (ADLs)...defined by its intensity, duration, and frequency" (Rodrigues D'Aurea et al., 2022).

Examples include, but are not limited to:

- Aerobic exercises (i.e., cardio)
- Resistance exercises (i.e., weightlifting, bands)
- Yoga



## Diet

A diet can have both positive and negative effects on sleep. It is important to avoid these disturbances before bed to optimize sleep hygiene (Mayo Clinic Diet, n.d.).

- Alcohol, caffeine, and sugar
- Large portions of food and spices close to bedtime
- Emotional distress
- Binge watching television



## Self-care

Self-care can promote relaxation, reduce stress, make the sleep environment more comfortable, and reduce insomnia symptoms (Villines, 2022).

Examples include:

- Diffuse essential oils
- Take a warm bath
- Practice a skincare routine
- Apply lavender lotion
- Ask a loved one for a massage



## Environment

Studies have shown that a healthy sleep environment is linked to a better quality of sleep (Pacheco, 2023).

Some ways to improve the sleep environment include:

- Blocking/reducing outside light, blue light, and white light.
- Reducing noise through earplugs
- Keeping temperatures cool by using a fan or window
- Using a mattress suited for your unique sleeping needs
- Changes pertaining to humidity or air pressure
- Declutter the space around your bed



## References

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- Pacheco, D. (2023). Bedroom Environment: What Elements Are Important? Sleep Foundation. <https://www.sleepfoundation.org/bedroom-environment>

## Appendix G

## Research Site Approval Form

**Research Site Agreement Form**  
Stanbridge University

**AGREEMENT**

Research Site: Stanbridge University (Orange County campus, Riverside campus, Los Angeles campus)  
 2041 Business Center Dr, Irvine, CA 92612 (OC), 1325 Spruce St STE 500, Riverside, CA 92507  
 Research Site Address: (Riverside), 2215 W Mission Rd, Alhambra, CA 91803 (LA)  
 Title of Proposed Research: Sleep Hygiene Interventions for Occupational Therapy Students

**RESEARCH STUDY INFORMATION****Student Investigator(s) Name(s):**

1. Vanessa Cicchini
2. Al-Yasah Esmael
3. Nicole Napoli
4. Joshua Nam

**Principle Student Investigator Name:** Vanessa Cicchini

Email address: vanessacicchini@gmail.com Phone Number: (310)871-3839

**Duration of the study:** 7/10/23-9/29/23

Authorization Effective Date: 7/10/23 Authorization Expiration Date: 9/29/23

Allowed Number of Contact Hours: \_\_\_\_\_ The study will be completed by (date): 9/29/23

**Description of Research:**

The aim of our research is to look at how various sleep interventions impact the overall sleep quality of the MSOT students participating in the study. Given that sleep is an important occupation, and it is not often addressed, we want to focus on future occupational therapy practitioners in hopes that they will feel a little more equipped to talk about sleep hygiene with their clients. While there are several studies done on sleep quality and latency, there are little to no studies that make the connection to OT and how exactly sleep affects our ability to engage in basic activities of daily living (BADLs) or meaningful occupations. Upon completion of the recruitment period and submission of consent forms, participants will be administered a pre-test via GoogleForms. This test will serve to gather information about each participants' current sleep preparation, sleep participation, and perceived sleep quality. The participants will then be sent an educational pamphlet containing different sleep interventions and practices that they can implement. The participants will have the choice to select whichever interventions they find more realistic, achievable, and best fit their lifestyle. The study's duration will last two weeks during which the participants will be encouraged to log their thoughts and perceived sleep quality. At the conclusion of the two weeks, the participants will be administered a post-test via GoogleForms which will assess their sleep quality following the implementation of the various interventions.



## Research Site Agreement Form Stanbridge University

### Intellectual Property Statement:

Stanbridge University reserves the right to use, publish, and disseminate the results of the research findings. The University shall provide the research site with a copy of the final research product at the earliest practicable time.

### Thesis Advisor Contact Information:

Name: Enjoli Filemu

Email address: efilemu@stanbridge.edu Phone Number: \_\_\_\_\_

### RECRUITMENT PLAN

Means by which the researcher(s) will contact and/or recruit participants:

Researchers will reach out to the MSOT cohorts across all three Stanbridge campuses, via email. Students will respond indicating their interest in participation on a voluntary basis. After participants have been identified, researchers will send out a consent form, pre-survey, one reminder, and a post-survey throughout the whole duration of the study. All communication will be done via email and GoogleForms.

### SITE REPRESENTATIVE AGREEMENT

I agree to the recruitment and data collection methods to be used in this study, and I authorize the investigator to conduct research at:

Facility Name/Research Site Name: \_\_\_\_\_

Representative authorizing agreement: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



Research Site Agreement Form  
Stanbridge University

STANBRIDGE UNIVERSITY AGREEMENT SIGNATURES

I/We accept the terms of this agreement.

Student Investigator 1: Vanessa Cicchini Title: Student Investigator

Vanessa Cicchini Signature Date 6/15/23

Student Investigator 2: Al-Yasah Esmael Title: Student Investigator

Al Esmael Signature Date 6/15/23

Student Investigator 3: Nicole Napoli Title: Student Investigator

Nicole Napoli Signature Date 6/15/23

Student Investigator 3: Joshua Nam Title: Student Investigator

Joshua Nam Signature Date 6/15/23

Faculty Thesis Advisor: Enjoli Filemu Title: Faculty Thesis Advisor

Enjoli Filemu Signature Date 6/16/23

Program Director: Myka Persson Title: MSOT Program Director

Myka Persson Signature Date 6/16/23

**Dr. Kelly Hamilton**  
Vice President of Instruction, Stanbridge University  
Signature \_\_\_\_\_ Date \_\_\_\_\_

Digitally signed by Myka Persson  
DN: cn=Myka Persson, ou=Stanbridge University, ou=MSOT  
Department, email=persson@stanbridge.edu, c=US  
Date: 2023.06.16 14:07:07 -0700

