



## Article

# A Sleep Health Education Intervention Improves Sleep Knowledge in Social Work Students

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**Abstract:** **Introduction:** Social workers, the largest group of mental health clinicians in the United States, play a pivotal role in mental health promotion. Despite the importance of sleep for mental health, there is no empirical research on sleep education interventions for social workers. **Method:** We designed an online sleep health education intervention to equip social work students to promote healthy sleep practices among their clients. An interdisciplinary team of experts devised the 90 min intervention using an empirically supported behavioral change theoretical model (COM-B). The intervention discusses multi-level factors that impact sleep and emphasizes considerations for health disparities in populations commonly served by social workers (e.g., unhoused populations, clients with substance use disorders, etc.). We assessed sleep knowledge, sleep quality, and acceptability using survey and focus group data. **Results:** Ninety social work students (92.2% female, 38.8% non-Hispanic white) completed pre- and post-intervention assessments. Participants demonstrated significant improvements in sleep health knowledge and their personal sleep quality. Quantitative and qualitative data revealed perceived usefulness for social work practice. **Conclusions:** A short online sleep education intervention can improve sleep health knowledge, offering a practical method to expand social workers' understanding of healthy sleep promotion that can be readily implemented in clinical training and practice.

**Keywords:** health education; sleep; sleep hygiene; sleep health; social work



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## 1. Introduction

Social workers comprise the majority of the mental health workforce (Heisler 2018), thus representing the key workforce to promote healthy mental health practices across diverse clinical and community settings, including public welfare, health care, substance use treatment, administration and management, advocacy, community organizing, and child welfare (Perry 2006; Types of Social Work n.d.). As such, social workers commonly work with clients from minoritized populations affected by social-, structural- and economic disparities, who are more likely to present with health co-morbidities, including poor sleep (Billings et al. 2020). Thus, social workers are uniquely and well-positioned to play an important role in promoting health and well-being among populations at greatest risk for suboptimal sleep.

### 1.1. Importance of Sleep Health for Mental Health

Suboptimal sleep, including short sleep duration and poor sleep quality, is considered an underrecognized public health problem (Hale et al. 2020). Poor sleep is associated with negative health outcomes such as cardiovascular disease, diabetes, and premature mortality (Addison et al. 2014; Albakri et al. 2021; Jackson et al. 2015). The link between suboptimal sleep and mental health is also profound. There is strong evidence that poor sleep plays a causal role in the development of mental health disorders, including depression, anxiety, psychosis, substance use, relapse, and suicidal ideation and attempts (Addison et al. 2014; Biddle et al. 2019; Freeman et al. 2017; Harvey et al. 2011; Scott 2021). Various systematic reviews and meta-analyses have also found a link between poor sleep and mental health problems (Deng et al. 2021; He et al. 2023).

### 1.2. Sleep Health and Social Work

Clinicians and scholars have recently published calls to advance sleep health education and awareness among the public health workforce (Lim et al. 2023; Shelgikar 2024). Engaging in healthy sleep practices is important for optimal sleep, and sleep is crucial for physical and mental health. This information is particularly relevant for social workers and social work students. As social workers represent the largest discipline in the field of mental health (Heisler 2018), they can play an important role in educating their clients on healthy sleep and promoting optimal sleep. Furthermore, social work practice often integrates behavioral change theory (Hackstaff et al. 2004), focusing on both the individual and their external context. Thus, social workers have the skills to readily assist clients with behavioral changes specific to sleep. Social workers can apply their social justice lens and focus on underserved clients to promote sleep health among populations that experience health disparities. Individuals with socio-economic disadvantage and racial and ethnic minority groups disproportionately experience the burden of chronic disease, are more likely to experience suboptimal sleep duration and quality, and yet may be less aware of the importance of sleep for optimal health (Caraballo et al. 2022; Hale et al. 2020; Jackson et al. 2015). Furthermore, sleep health information dissemination efforts and sleep health interventions targeted towards underserved populations remain limited, partly because these demographic groups have difficulty accessing fragmented services in often siloed systems of care. Social justice and service are core values of the social work profession (National Association of Social Workers: Code of Ethics n.d.); social workers often provide services to members of these underserved populations.

### 1.3. Current Study

Despite the important role that social workers could play in promoting sleep health, accredited undergraduate and graduate social work programs in the United States do not require sleep health training as a part of their curriculum (2022 Educational Policy and Accreditation Standards 2022). Generally, behavioral health practitioners have little to no formal sleep health education (Zhou et al. 2021). Online sleep education programs can be a feasible educational modality for healthcare providers (Sawyer et al. 2022).

Unsurprisingly, there have been multiple calls in the literature on the importance of sleep education among social workers and social work students (e.g., Lee et al. 2022; Spadola et al. 2023a, 2023b; Wolfson and Germain 2019). However, despite the strong association between sleep and mental health (Biddle et al. 2019; Freeman et al. 2017; Harvey et al. 2011; Scott 2021), there is a significant gap in the literature on sleep health education interventions among social workers. This is particularly concerning given social workers' crucial role in the mental health field and highlights the need for research and education in this area.

We developed and tested a theoretically grounded, asynchronous online 90 min sleep health educational intervention designed to equip social work students with the knowledge and resources necessary to educate their clients on sleep health. In this paper, we describe the development of the sleep health education intervention and address the following

research questions: (1) Does the sleep health education intervention improve sleep health knowledge? (2) Is the sleep health program deemed to be useful and acceptable among social work students? (3) While not a primary aim of our study, we also explore the impact of the sleep health education program on social work students’ self-reported sleep duration and quality before and after the intervention.

**2. Methods**

*2.1. Intervention Development*

The intervention content was informed by (1) the COM-B model for behavior change (Michie et al. 2011), (2) qualitative research with the target population to assess needs and preferences for the intervention, and (3) input from an interdisciplinary team of experts. We first conducted qualitative research to examine social work student preferences for content (Spadola et al. 2023b) and online learning (Groton and Spadola 2022). Next, the lead authors formed an interdisciplinary team of 25 content experts across 7 universities to help develop the content. The interdisciplinary team had expertise in sleep health, health disparities, behavioral sleep medicine, sleep medicine, social work, and online learning.

To facilitate behavior change and to properly motivate and equip social workers to promote sleep health among their clients, we grounded our intervention in the COM-B model for behavior change. Sleep health education interventions are more likely to have a positive impact if they use a behavior change framework (Mead and Irish 2020). The COM-B model has been effectively applied to health and sleep interventions (Horsch et al. 2017; Spadola et al. 2020), with calls for further application in future sleep health interventions (Semsarian et al. 2021). In brief, the COM-B model addresses three conditions that are necessary for behavior change (B) to occur: Capability (C), Opportunity (O), and Motivation (M). The COM-B model offers a consensual, reliable, interdisciplinary characterization of techniques used in behavior change interventions. Table 1 details the content specific to the COM-B model.

**Table 1.** Theoretical guide for sleep health module: COM-B model for behavior change.

COM-B Component	Behavior Change Technique	Behavior Change Technique Applied to Intervention Program
Capability	Information about healthy sleep behaviors & health consequences of suboptimal sleep Habit formation	<ul style="list-style-type: none"> <li>- Provision of written, verbal, and visual information about the importance of sleep for overall health and well-being; common sleep disorders and the importance of treatment; evidenced-based, publicly available sleep infographics from AASM and CDC.</li> <li>- Encouragement of continuous practice of healthy sleep behaviors</li> </ul>
Opportunity	Restructure the physical environment Adding objects to the environment	<ul style="list-style-type: none"> <li>- Instruct participants on the importance of individual physical environmental changes clients can make (e.g., removing TV from bedroom to avoid watching TV before bed; leaving phone outside of bedroom)</li> <li>- Advise participants on encouraging client use of white noise, ear plugs, temperature control of bedroom (if needed), lighting of bedroom</li> </ul>
Motivation	Verbal persuasion about capability Identification of self as role-model	<ul style="list-style-type: none"> <li>- Role play on providing positive reinforcement to clients to promote self-efficacy</li> <li>- Inform participants that by describing to clients how they promote their sleep and practice sleep hygiene, other household members might follow suit (i.e., children).</li> <li>- Encourage participants to highlight to clients that sleeping well leads to greater role functioning (e.g., less irritable, more attentive, alert).</li> </ul>

This 90 min intervention was designed to provide a foundational knowledge of sleep health so social workers could ultimately provide sleep health education to their clients. The intervention included education on (1) the importance of sleep health for physical and mental well-being; (2) modifiable behaviors that can improve sleep health; (3) effective

ways to promote clients' sleep health; and (4) evidence-based and freely available resources for sleep health promotion.

The study team developed a course blueprint with the University's Center for Online Learning to ensure that course objectives were mapped onto the course content. The intervention comprised five modules on the following subjects grounded in the COM-B model for behavior change (Table 1): Introduction to sleep health, sleep hygiene, fatigue and fatigue countermeasures, sleep disorders, and sleep considerations for special populations (described in the following paragraph).

The overall course level objectives were to: (1) apply concepts and practices of sleep, fatigue, sleep hygiene, and sleep health to serve clients; (2) describe sleep disorders, their characteristics, and recommended treatments; (3) describe unique contexts and implications surrounding sleep health among varying demographic groups (e.g., individuals experiencing homelessness, children, adolescents, older adults, and substance-using populations); and (4) identify the importance of referring to a primary care provider and/or sleep physician if clients demonstrate symptoms of a sleep disorder. The modules incorporated interactive activities (e.g., create a sample sleep diary so that participants are equipped to explain sleep diaries to their clients) and case scenarios in which social workers engaged in discussions about sleep with their clients.

We also included information on evidenced-based sleep health resources and behavioral treatments for insomnia, specifically cognitive behavior therapy for insomnia (CBT-I) and brief behavior therapy for insomnia (BBT-I). Additionally, we included a testimonial emphasizing the significance of mental health professionals recognizing sleep disorders. Specifically, a student shared her experience of being misdiagnosed with treatment-resistant depression for several years until she switched mental health providers. Her "new" mental health clinician referred her for a sleep study, leading to the accurate diagnosis of narcolepsy.

We created content and summary sheets available for download that addressed sleep health considerations at the micro, mezzo, and macro levels for special populations, including unhoused individuals, clients involved with the child welfare system, and those dealing with substance use disorders. These summary sheets, available in the Appendices A–C, detail multi-level factors related to sleep health. They were created based on a comprehensive literature review during the intervention's release in 2019 and in collaboration with content experts.

Our qualitative, formative research highlighted the importance of an interactive experience to optimize online learning (Groton and Spadola 2022). We designed the sleep health intervention to include experiential activities such as a sleep diary and self-check questions. Following the content development, the researchers collaborated with multimedia experts from their university's center for online learning to develop an asynchronous online training hosted in Canvas, the university's learning management system.

## 2.2. Recruitment

Following approval from the University's Institutional Review Board, we invited students enrolled in a social work program at a public university to participate in the online sleep health intervention study. Recruitment emails were distributed via a university list-serv to approximately 800 students. Eligibility requirements included enrollment as a social work student in a bachelor's, master's, or doctoral program at the host university. Exclusion criteria included participation in the initial qualitative formative research conducted by the study team. Given the asynchronous nature of the sleep health education intervention, participants were admitted to the study at any point during the data collection window.

## 2.3. Sampling

Three waves of data collection were conducted in Fall 2019, Spring 2020, and Fall 2020. Originally planned for two rounds, an additional round became necessary due to recruitment challenges from the COVID-19 pandemic during Spring 2020. After completing an online consent form, participants were invited to the learning management system

(Canvas) to participate in the training. To ensure confidentiality, participants were assigned an anonymous identifier that was linked to survey responses.

#### 2.4. Research Design and Assessments

This study had a pre- and post-measurement design. At the baseline assessment, we elicited information on sociodemographic characteristics, sleep beliefs, and sleep quality. At the post-intervention assessment, we repeated the sleep assessments and collected qualitative data on acceptability and usability. Each data collection window, spanning approximately one month, allowed participants 30 days to complete the baseline assessment, the sleep health educational module, and the post-intervention assessments.

#### 2.5. Quantitative

*Demographics.* We developed a short demographic questionnaire that was administered at baseline. The demographics questionnaire included questions about age, gender, race, ethnicity, and social work degree program (bachelor's, master's, doctoral).

*Sleep Beliefs Scale.* We administered the 20-item Sleep Beliefs Scale (Adan et al. 2006) (SBS) pre- and post-intervention to assess knowledge of sleep health, including healthy sleep behaviors. The SBS explores sleep health knowledge and awareness surrounding the influence of certain behaviors (e.g., relaxation, caffeine use) on sleep. Correct answers are worth 1 point, and incorrect answers are worth 0 points; total scores range from 0–20, with a higher score indicating higher sleep health knowledge. An example item from the SBS includes: “Going to bed and waking up always at the same hour”. Participants were asked to indicate if this behavior had a “positive effect”, “neither effect”, or “negative effect”. Thus, the SBS assesses sleep health knowledge, not personal sleep health behaviors.

*Pittsburgh Sleep Quality Index.* We administered the Pittsburgh Sleep Quality Index (PSQI) at baseline and follow-up to assess sleep quality. The PSQI is a widely used and validated measure that calculates a global score of sleep quality based on seven domains of sleep: sleep latency, perceived sleep quality, sleep duration, sleep efficiency, sleep disturbances, use of medication, and daytime functioning (Buysse et al. 1989). Global sleep quality scores range from 0 to 21, with the higher score indicating poorer sleep quality. A global score >5 indicates poor sleep quality. We collected data within a month window to allow students enough time to complete the module asynchronously. The PSQI asks about sleep in the past 30 days. We used this measure, unedited at the baseline assessment, and modified the post-intervention PSQI to ask about sleep “since the last time you took the survey”.

*USE questionnaire.* We adapted items from the Usefulness, Satisfaction, and Ease of Use (USE) questionnaire (Lund 2001). Questions asked participants to rate the training on a Likert scale regarding usefulness for social work practice.

#### 2.6. Qualitative Responses

To obtain more granular data about the acceptability and utility of the training, we included open-ended questions: (1) “What did you like about the training?” (2) “What didn't you like about this training?”; and (3) “What would you change about the training?”

#### 2.7. Data Analysis

We conducted descriptive analyses for most variables using SPSS v. 25. Wilcoxon signed-rank tests assessed differences in the mean pre- to post-training scores for the SBS and PSQI. We conducted a sensitivity analysis to assess missing data. For the open-ended responses, the first and second authors completed a content analysis (Kleinheksel et al. 2020; Krippendorff 2018) using NVIVO version 14.

### 3. Results

Of the 106 participants who provided consent and completed pre-intervention surveys, 90 participants (84.9%) completed the intervention and post-intervention surveys. Missing

data was not associated with age, educational level, or racial and ethnic identity; listwise deletion was utilized, and the data from the 90 participants who completed both the pre-and post-intervention surveys were analyzed.

### 3.1. Demographics

Our sample was primarily female (92.2%) and racially and ethnically diverse, with 38.8% identifying as Non-Hispanic/White, 33.3% African American or Black, 23.3% Hispanic or Latinx, and 4.4% other (See Table 2).

**Table 2.** Demographic Characteristic.

	N	%
Age, mean (SD), range	28.3 (9.3), 18–55	
Gender		
Female	83	92.2
Male	4	4.4
Non-Binary	1	1.1
Transgender	1	1.1
Prefer not to say	1	1.1
Race		
African American or Black	30	33.3
White or Caucasian	35	38.8
Hispanic or Latinx	21	23.3
Other	4	4.4
Degree Program		
Bachelor of Social Work	44	48.9
Master of Social Work	43	47.8
Doctor of Social Work	3	3.3

### 3.2. Sleep Knowledge

At baseline, the average score on the Sleep Beliefs Scale was 13.8 (SD = 3.1). The participants demonstrated a significant improvement in sleep health knowledge with a post-sleep health intervention score of 16.2 (SD = 2.6;  $p < 0.001$ ), (See Table 3).

**Table 3.** Sleep knowledge and characteristics.

Outcome	Baseline Mean (SD.)	Post-Intervention Mean (SD.)	p-Value
<b>Sleep knowledge</b>			
Sleep Beliefs Scale	13.8 (3.1)	16.2 (2.6)	<0.001
<b>Sleep characteristics</b>			
Sleep duration in hours (PSQI) *	6.6 (1.20)	6.9 (0.91)	0.07
Global sleep quality (PSQI) *	8.2 (3.6)	6.8 (3.5)	<0.001

\*  $n = 89$  due to missing data.

### 3.3. Usefulness of the Training

When asked to rate the usefulness of the training, almost all (95.5%) agreed or strongly agreed that the training was helpful for their social work practice. Of the sample, 92% either agreed or strongly agreed that the training made them feel more confident about discussing sleep health with their clients, and 94.3% agreed or strongly agreed that the training covered everything they would expect. Figure 1 further details the findings from the USE questionnaire.

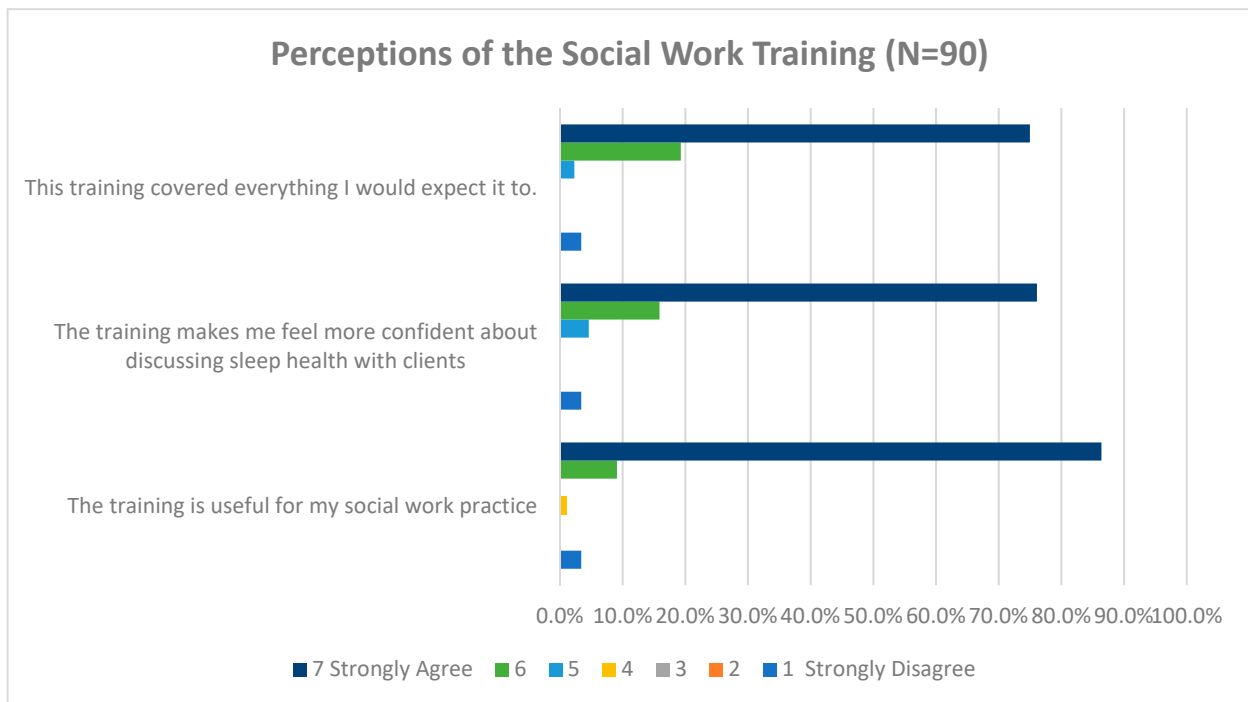


Figure 1. Perceptions of the social work training (N = 90).

We also examined the usefulness and acceptability of the intervention using qualitative data. Four prominent themes were identified, which are detailed below.

**Favorable elements of the training.** In response to “What did you like about the training?”, four main themes were derived from the data: (1) the type of content provided ( $n = 31$ ); (2) the personal and professional benefit of the training ( $n = 19$ ); (3) hearing from multiple experts ( $n = 16$ ); and (4) the real-world application of the training ( $n = 11$ ). Participants noted that the content was concise but informational; one participant stated: “I like how it went into sleep and not just basic information I thought it would go into”. Participants also noted that they foresaw benefits to their professional careers and their personal sleep health because of the training: “I’m satisfied that I was able to take away a lot of good information not only for my clients but for myself as well”. Incorporating videos and “guest lectures” from different experts was also very well received: “I enjoyed that it was not just “question and answer” based, but also included professionals and professors giving their research [sic] into perspective to what the module was about”. Finally, participants saw how the training provided real-world applications to the sleep health information provided: “It used real situations in which we can, or maybe one day will be able to relate to”.

**Least favorable elements of the training.** Some participants had criticisms about the intervention. Just under half of the participants reported there was nothing that they didn’t like about the training, or they left this question unanswered. The most common critique was related to technical issues, specifically an error in the learning management system that prevented participants from saving their progress in the last two modules ( $n = 20$ ). Specific to the training format and content, some participants did not like the training length of 90 min ( $n = 14$ ) or the video recordings for the guest lectures ( $n = 10$ ). Some found aspects of the content were not engaging ( $n = 6$ ), or that desired content was missing ( $n = 4$ ). The most common critiques provided on the video guest lectures were either that the video segments should have been shortened, and/or about “the tone of the video being a bit slow”. The participants who indicated concerns related to content indicated that they wanted additional interactive components and more in-depth material that would directly relate to their social work practice.

**Suggested changes to the training.** Most participants ( $n = 52$ ) indicated they would not change anything about the training or did not provide a response to this question. Of the remaining participants, recommendations included editing or redoing certain videos ( $n = 11$ ), adding additional content ( $n = 11$ ), adding interactive components ( $n = 10$ ), and shortening the training ( $n = 6$ ). Similar to other critiques of the training, these recommendations specifically included shortening video length and/or refilming to increase video quality and animation of guest lecturers, adding information about more populations social workers will interact with, and increasing the number of interactive activities.

### 3.4. Sleep Characteristics

We also explored whether the intervention was associated with changes in participants' self-reported sleep duration and sleep quality. Participants demonstrated a significant improvement in overall global sleep quality as assessed via the PSQI (8.2 (SD = 3.6) pre-intervention to 6.81 (SD = 3.5) post-intervention,  $p < 0.001$ ). At baseline, participants reported an average sleep duration of 6.6 h per night (SD = 1.2). There was no significant change in sleep duration post-intervention (see Table 3).

## 4. Discussion

This study marks the first empirical investigation of the development, implementation, and assessment of a sleep health education intervention tailored for social work. Findings indicate that a brief, web-based educational program rooted in a scientifically supported behavior change model correlates with enhanced sleep health knowledge and is deemed professionally beneficial for social work students. Additionally, the intervention may bring about personal benefits for participants' sleep, as evidenced by a significant improvement in subjective sleep quality observed from pre- to post-intervention.

We found significant improvements in sleep knowledge as assessed via the SBS. The average increase post-intervention in the SBS was 2.4. Our findings align with prior research in demonstrating the effectiveness of sleep health education in improving sleep knowledge. For example, [Levenson et al. \(2016\)](#) implemented and evaluated a sleep health promotion intervention for college students and observed an SBS score increase of 1.5 points ([Levenson et al. 2016](#)). Other research demonstrates that online sleep education holds promise for improving sleep-related knowledge. [Sawyer et al. \(2022\)](#) recently developed and tested an asynchronous online sleep education program among 149 primary care nurse practitioner students, and participants demonstrated a significant improvement in sleep health knowledge after the intervention ([Sawyer et al. 2022](#)). While there are other reports in the empirical literature on successful sleep health educational interventions among students in health care and psychology programs ([Booker et al. 2020](#); [Meaklim et al. 2020](#); [Richardson et al. 2021](#)); we cannot place our findings in the context of these interventions due to different outcome metrics.

Most social work students in our sample quantitatively and qualitatively assessed the intervention as beneficial for their clinical practice as well as for their personal use. Qualitative comments include: "After completing this training, I see the importance of sleep for myself and clients. . . I now see how important it is to discuss sleep health with clients who may be facing challenges with sleep". Another participant noted: "Not only will I adopt these healthy sleep habits, I will always ask my clients how they are sleeping!".

While the primary focus of our study was to improve sleep health knowledge so social workers and social work students could promote sleep health among their clients, our participants also demonstrated an increase in sleep quality from pre- to post-intervention. These findings suggest that sleep health education can lead to improvements in sleep. Notably, prior research has indicated that sleep education is associated with improved sleep quality ([Brown et al. 2006](#); [Ellis et al. 2015](#)). Nonetheless, interventions that improve sleep knowledge may not necessarily translate into improved sleep or sleep behaviors. For example, [Semsarian and colleagues](#) found an increase in sleep knowledge among university



students but no change in sleep behaviors. However, this study had a low response rate (35%) so conclusions may be limited (Semsarian et al. 2021).

Our finding was that the sleep education intervention was associated with improved sleep quality for several reasons. By design, we optimized behavioral enactment by utilizing the COM-B model for behavior change to specifically address social workers' capability, opportunity, and motivation (Table 1) to promote their own sleep health (in addition to promoting their client's sleep health). Though we did not collect information on changes in specific sleep behaviors, qualitative comments demonstrated motivation to integrate sleep promotion both personally and professionally (e.g., "not only will I adopt these healthy sleep habits, I will always ask my clients how they are sleeping."), suggesting that sleep knowledge obtained from the intervention translated to behavior change. Furthermore, because social work degree programs have a social welfare focus, our population of social work students might have been more motivated and self-reflective than other university populations to implement sleep health recommendations.

Improving sleep among social workers is a salient initiative. Our participants reported 6.6 h of sleep, below the recommended 7–8 h per night (Consensus Conference Panel et al. 2015). It is important to note that although participants improved their sleep quality post-intervention, the average sleep quality score was still above 5, indicating poor sleep quality. Prior research conducted among social work students reveals sub-optimal sleep (Lee et al. 2022; Spadola et al. 2023a), which can be correlated with students' prior traumatic experiences and perceived current stress (Lee et al. 2022).

#### 4.1. Recommendations for Future Interventions

Sleep health educational programming for social work practice should include components on promoting social workers' sleep health as part of their self-care routine and explore strategies to promote sleep health effectively. Social workers may be exposed to traumatic events and are at risk for burnout and compassion fatigue due to on-the-job stress (Bride 2007). Sleep deprivation is also associated with difficulty interpreting others' emotions (Killgore et al. 2017; van der Helm et al. 2010) and difficulty controlling one's own emotions (Palmer and Alfano 2017; Tomaso et al. 2021), skills that are important in social work.

Sleep health interventions should address modifiable lifestyle factors and practical strategies to induce positive changes in sleep-related behavior in addition to sleep health knowledge (Gupta et al. 2021). Our intervention included practical sleep health strategies that social work students could recommend to their clients and implement themselves, contributing to the positive outcomes of our intervention.

Myriad socio-ecological factors impact sleep health, including neighborhood, perceived safety, discrimination, and socio-economic disadvantage (Nyarko et al. 2023; Troxel et al. 2020). As such, our intervention addressed sleep health strategies tailored to populations with contexts that could negatively impact sleep and who are frequently assisted by social workers—namely, unhoused individuals, those grappling with substance use disorders, and clients within the child welfare system (see Appendices A–C). We wanted to provide information specifically on populations commonly encountered by social workers yet whose sleep needs might have been previously ignored. Moreover, sleep needs among these groups might be particularly unique, and conventional sleep health guidelines may not be directly applicable. This initiative has recently been reinforced by recent calls in the literature for multi-level approaches to sleep health promotion (Jackson et al. 2020) and for effective sleep health interventions to consider interpersonal and environmental barriers to obtaining optimal sleep (Rottapel et al. 2020). Recent calls to action have also prioritized sleep health among children involved in the child welfare system (Hash et al. 2022) and in individuals dealing with substance misuse.

Promoting sleep health education in the field of social work is a critical initiative. There is a lack of sleep health awareness and education in health and behavioral health fields (Zhou et al. 2021; Vargas et al. 2023), and misinformation about sleep across health-

care settings (Vargas et al. 2023). Educating and training social workers on behavioral interventions for sleep disorders—that is, cognitive behavioral therapy for insomnia (CBT-I) and brief behavioral therapy for insomnia (BBT-I)—can be a critical first step in expanding providers to deliver these efficacious (Chan et al. 2017; Qaseem et al. 2016; Troxel et al. 2012) interventions. While our sleep health intervention provided information and resources to pursue training in CBT-I and BBT-I, providing training was beyond the scope of our intervention but could be explored in future interventions.

#### *4.2. Postulated Reasons for Intervention Success*

We tailored our intervention (content and online learning preferences) to our population, as informed by previous qualitative formative research. We ensured the material was relevant to social work students, which was supported in our qualitative findings, we used real-world scenarios and role-plays where social workers addressed sleep health concerns with their clients to promote self-efficacy. We involved an interdisciplinary team of experts to help inform the content. These experts also hosted “guest lectures” on their areas of expertise in the training, so speakers were varied, and perhaps interest was maintained. Moreover, grounding our intervention in the COM-B model for behavior change ensured that social work students’ capability, opportunity, and motivation were addressed (Table 1). Additionally, we ensured that the intervention was accessible and easy to use. We utilized the learning management system (Canvas) that was utilized by the university, ensuring participants did not need to learn how to use another interface to access the program.

#### *4.3. Limitations, Strengths, and Future Research*

Our pilot study had many strengths, including the utilization of a pre-post measurement, a racially and ethnically diverse sample, and the collection of both quantitative and qualitative data to assess the impact of the intervention. However, results should be interpreted within the limitations of the study. Namely, the sleep health education intervention was a single-arm study conducted only at one university. This study also used a purposive sample of social work students who self-selected to participate in the study. Thus, participants in this study may have been more interested or open to learning about sleep health than the general social work student body. Furthermore, as this is a pilot study, participants were not randomized, and thus, some potential effects could be due to Hawthorne effects or regression to the mean.

However, given the relative paucity of literature on the impact of sleep education on sleep outcomes in general, future research is needed to formally test our sleep education intervention and evaluate its impact overall (and among components) to identify the content and strategies that are most effective in influencing behavior change and quantify the impact on overall sleep quality. In addition, future research should examine how increased knowledge translates to increased sleep health promotion in clinical practice. As participants in this study showed personal benefits to their sleep health, future research may also explore the utility of this intervention or future interventions as a health promotion strategy among social work students.

### **5. Conclusions**

We developed, implemented, and assessed the first (to the best of our knowledge) sleep health intervention for social work students. The intervention was associated with significant improvements in sleep health knowledge and high satisfaction among participants. This short, asynchronous, online intervention could be an accessible modality to improve sleep health knowledge among social workers, in turn promoting sleep health among the clients that social workers serve, and the social workers themselves. Considering social workers are the largest group of mental health providers in the U.S., providing future and current social workers with sleep health education could be an important first step to alleviating health disparities through knowledge dissemination.

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## Appendix A

### Social Work Tips for Sleep Health and Child Welfare Systems (compiled 2019)

#### Individual Systems:

- I. Help parents and caregivers understand the different sleep needs and patterns for children and youth based on their ages and stages (Rao et al. 2017), utilizing guidelines set forth by the American Academy of Sleep Medicine: <http://bit.ly/aasmsleep> (accessed on 1 March 2019).
- II. Empower all family members, including children, youth, and caregivers with healthy sleep tips.
- III. Be aware that research suggests that children with sleeping troubles, and particularly those children with sleeping troubles who live without parents may have social issues and are more likely to be bullied (Littlewood et al. 2017).

#### Family Systems:

- I. Integrate sleep health promotion/healthy sleep tips into parenting classes offered in the community.
- II. Bio psychosocial assessments and family histories should include an assessment (Littlewood et al. 2017) of sleep health for children, youth, and caregivers.
- III. Help establish agency policy and program guidance to recommend best practices to promote healthy sleep practices during home visits.
- IV. Use sleep experiences of children, youth, and caregivers to better understand the nuances and dynamics of the family system. For example, the child's bedtime routine used to include a story read by their grandmother, but now, with their grandmother's new work schedule, the child has difficulty falling asleep.

#### Larger Systems:

- I. Work with early childhood centers and schools to display information about sleep health for children, youth and caregivers.
- II. Prioritize self-care (including healthy sleep behaviors); child welfare social work practice has high burn-out rates (Griffiths et al. 2018).

- III. Advocate for integration of sleep health information into programs and policies already targeting vulnerable youth (e.g., WIC, Healthy Start, juvenile justice). Studies suggest that currently, as few as 7% of these types of youth-focused programs formally include healthy sleep discussion or assessment (Pandey et al. 2019).
- IV. Design, implement and disseminate best practices regarding sleep health in all aspects of child welfare including policy, programs, quality assurance and evaluation.
- V. Educate community partners, including tribes and courts, on how to promote sleep health in their own work with children and families.

By Dr. Christine Spadola (The University of Texas at Arlington) and Dr. Danielle Groton (Florida Atlantic University). Special thanks to Dr. Kerry Littlewood and Dr. Abhishek Pandey of the University of South Florida School of Social Work for their contributions to this information sheet.

## Appendix B

### Social Work Tips for Sleep Health and Unhoused Populations (compiled 2019)

#### Micro Level:

- I. If your client is currently living on the streets, seek out shelter services to get the client into a safe (Leger et al. 2017) location during the night. Studies show that sleeping on the street reduces sleep duration and quality.
- II. Discuss your client's eating habits in the evening and introduce meditation exercises and other strategies to help them sleep better.
- III. If you are working with children experiencing homelessness, keep in mind that they may have decreased performance in schools (Masten et al. 2015; Rafferty and Shinn 1992) due to fatigue from poor sleeping conditions (Humphreys and Lee 2006), and reach out to their school social worker or the school district's homelessness liaison to provide additional supports to that student.
- IV. Eyeshades and earplugs might be useful to clients without control over their sleeping environment; however, be mindful that if an individual is sleeping outside, these items will increase their vulnerability since they will be less aware of their environment.

#### Mezzo Level:

- I. Solicit donations of ear plugs and eye masks for programs who work with individuals experiencing homelessness.
- II. If working in an agency that addresses homelessness, consider including sleep health assessments with clients and consider how program design impacts sleep.
- III. Practice organizational advocacy with regards to:
  - a. Conflicting mealtimes and "bedtime" policies at shelters. For example, some shelters may not finish serving dinner until after 8 PM, and dinner might include caffeinated beverages. However, clients may still be expected to be asleep at 10 PM.
  - b. Special considerations for shift workers. Individuals who are employed while homeless often work the "third shift" (Olsen 2017), and if they are not allowed to use the shelter services during the day, they will have to sleep in public places on the days following their shift.

#### Macro Level:

- I. Given that homelessness negatively impacts sleep health, advocate for more Housing First and Permanent Supportive Housing availability, which ends homelessness and improves sleep (Henwood et al. 2019).
- II. People exiting homelessness may still need help with sleep as they transition to permanent housing and more research is needed on this topic.
- III. Conduct research on best practices regarding sleep health in housing programs.

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## Appendix C

### Sleep Health and Substance Use Disorders (SUDS) (compiled 2019)

#### Micro level:

- I. Let your clients know that difficulties with insomnia and sleep continuity are common in the recovery process and can persist for several months, although they do tend to improve over time with (Kolla et al. 2014; Arnedt et al. 2011) abstinence.
- II. Be aware of important trends related to sleep health and SUDs:
  - a. Some clients experience sleep health disorders prior to a SUD or started using substances to self-medicate (Kolla et al. 2014). For these clients, sleep health issues may persist even after full recovery and should be treated as a separate issue rather than a symptom of withdrawal (Brower and Perron 2010; Morgan and Malison 2007).
  - b. Sleep disturbances (pre-existing or due to withdrawal) increased risk of return to use.
  - c. Among emerging adults, poor sleep quality and inadequate sleep is associated with a greater risk for negative consequences related to drinking (Kenney et al. 2012).
  - d. Insomnia can be especially prevalent among adolescents who engage in risky drinking; management of sleep-related symptoms through alcohol and drug use might be likely (Lam et al. 2018).
  - e. While there may be anecdotal reports that cannabis use improves sleep outcomes, some research suggests cannabis use can negatively impact sleep quality (Ogeil et al. 2019).
- III. A combination of behavioral measures (e.g., engaging in healthy sleep behaviors) and medication(s) may be appropriate to address sleep concerns and reduce chances of return to use<sup>1</sup>. A referral to a sleep physician may be warranted.
- IV. Cognitive Behavioral Therapy for Insomnia (CBTI) has been shown to reduce insomnia among individuals with alcohol use disorders (Arnedt et al. 2011).

#### Mezzo Level:

- I. Advocate for treatment centers to include sleep health assessments at intake and discharge:
  - a. As many as 49% of individuals in residential treatment still reported sleep problems at discharge from treatment, which greatly increases risk of return to use (Arnedt et al. 2011).
  - b. Establish during intake if the client has a history of sleep-related problems.
  - c. Assessing sleep at discharge offers an opportunity to give clients resources to counter this increased risk, such as referrals or educational material on sleep hygiene.

#### Macro Level:

- I. Advocate for sleep health information dissemination as a prevention effort, as many individuals report using substances to self-medicate sleep disorders.
- II. Advocate for sleep health training for behavioral health professionals, nurses, primary care physicians, etc.
- III. Be an evidenced based practitioner. Assess research on best practices for addressing sleep concerns and disorders among individuals with SUDs in recovery.

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