Sleep Health Assessment Among Men Experiencing Homelessness at the House of Charity: A Community Survey

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Authors

Brittany Bannon, SRHD Research Scientist III

Ryan Drobny, SRHD Research Scientist I

Danielle Wrenn, SRHD Data Center Program Manager

Morgan Rosengrant, SRHD Research Scientist II

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Cover page: House of Charity | Inlander | Mitch Ryals

Page 6: Tents outside Spokane City Hall | Young Kwak

Page 12: Homeless man sleeping | Srdjan Randjelovic

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Introduction

This report presents findings from the Sleep Health Assessment survey, completed by 70 individuals staying at the Catholic Charities of Eastern Washington's House of Charity program. The House of Charity (HOC) is a low-barrier shelter in Spokane that provides emergency shelter, transitional respite for recovery from hospitalizations and acute health issues, meals, case management, health education, medical consultation, and other support services to men experiencing homelessness in the area. The Sleep Health Assessment survey was administered in-person at the HOC shelter from October to November 2022. The focus of the survey was to assess the sleep health and related needs of adult men experiencing homelessness staying at the House of Charity (HOC), the factors that may impact their sleep, and how poor sleep affects other outcomes, including day-to-day functioning and overall health.

The HOC Sleep Health Assessment survey included multiple-choice questions and some open-ended questions regarding respondents' demographic characteristics, homelessness experiences, sleep duration and quality, sleep-related beliefs, barriers and facilitators to sleep, general mental and physical health, pain, substance use, chronic disease self-management, and social determinants of health including feelings of safety. The research questions to be addressed in this report were as follows:

- What is the quantity (duration) of sleep and the quality of sleep among men experiencing homelessness at HOC?
- What factors are associated with individuals' sleep quality?
- How are poor sleep quality or sleep deficits related to individuals' day-to-day cognitive functioning and decision-making?
- How are poor sleep quality or sleep deficits related to individuals' health?

The St. Joseph Community Partnership Fund sponsored this needs assessment through a Providence Community Capacity Initiative (PCCI) grant to identify new opportunities for program planning and service improvements. Results of this report can be used by HOC staff, St. Joseph Community Partnership Fund, and the broader health services community and local community partners to support the needs of men experiencing homelessness through the development and piloting of programs and services for the promotion of sleep and health. Results may also be used by the funder to support future funding decisions.

These data had some limitations, including:

These survey data were obtained from a convenience sample at a single site location, rather than a random sample from the broader population. Therefore, the survey responses and results from these data cannot be generalized to the entire population of men experiencing homelessness in the area. Findings should not be used to extrapolate beyond this sample of respondents. The goal of the survey, however, was to inform the organization's program planning and identify opportunities for service development. To this aim, the use of this survey approach was appropriate.

The use of cross-sectional, correlational methods to examine associations among this study's relevant constructs limits our ability to make causal claims from these data. For example, although these data can speak to the strength and statistical significance of associations between sleep quality and outcomes, it is not possible to infer the direction of causality. For example, this cross-sectional approach does not allow us to claim that poor sleep quality causes poor health, or conversely, that poor health causes sleep deficits.

The surveys were self-administered on paper and responses were subsequently entered online by members of the research team. This presented some data quality challenges (e.g., numeric fields such as respondents' age and typical hours of sleep could not be restricted to valid ranges or formats). However, the percentage of missing items among the sample was low. In the few cases where a participant selected multiple responses for a single survey question, the question was set to missing to avoid biasing the results. In cases where open-ended responses were not legible to the research team, the item was left missing or uncertain words and phrases were enclosed in brackets to avoid any "guessing".

Additionally, these data were collected by a team of five individuals across multiple weeks, rather than a single-day session, which made it more difficult to monitor and prevent duplicate responses. However, we implemented an eligibility screening form to determine participants' eligibility, which included a question asking respondents if they had taken the survey before. To our knowledge, only two individuals attempted to take the survey twice, and their duplicate data were removed prior to analysis.

Key Findings

Regarding the respondents' backgrounds, most individuals identified as Non-Hispanic White, were older (between 50 and 64 years-old) and had lower educational attainment. A substantial proportion, more than one quarter (27.5%) of the respondents had never experienced homelessness before, reporting that it was their first time. Furthermore, although many respondents (39.1%) reported staying outdoors prior to visiting HOC, a subset (nearly 1 in 5) had been housed and reported staying in homes, apartments, or even assisted living facilities before visiting HOC. Approximately half of the respondents reported having a diagnosed mental health disorder or a chronic pain condition. Regardless of chronic pain, most respondents reported experiencing aches and pains frequently (at least weekly). Half of respondents reported being in fair-to-poor physical health, and nearly half were current cigarette smokers.

Survey respondents' sleep duration averaged between 6 and 7 hours and was generally in line with U.S. clinical recommendations for adults, albeit slightly fewer hours as compared to the adult populations in Washington State or Spokane County. However, many respondents reported poor sleep quality. More than two-thirds of respondents (67.8%) experienced clinically significant levels of sleep disturbance, or difficulty with falling and staying asleep, and exceeded the normal healthy adult range. Additionally, nearly two-thirds (61.2%) experienced clinically significant impairment to their daytime functioning (e.g., alertness, concentration, task completion) related to poor sleep, exceeding the normal healthy adult range. Top-reported barriers to getting good sleep included mental health, disruption from others, and pain or discomfort. Top-reported facilitators to sleep included establishing nighttime routines to relax (e.g., reading, meditation), medications like sleep aids, and managing energy during the day (e.g., through naps or keeping busy with tiring work).

Regarding factors related to sleep quality, respondents' feelings of safety and security where they slept, frequency of aches and pains, chronic pain, frequency of poor mental health, and sleep-related self-efficacy (i.e., confidence in their ability to lie in bed feeling mentally relaxed), were consistently associated with the levels of sleep disturbance they experienced. Other factors were also examined but did not have significant associations with levels of sleep disturbance. These factors included respondents' age, length of stay at HOC, homelessness history (e.g., whether it was their first time experiencing homelessness, number of times homeless, and duration), whether respondents had a mental health diagnosis, and whether they were a current smoker.

In turn, poor sleep quality was associated with outcomes related to individuals' cognition and health. For example, respondents' sleep quality ratings were positively associated with their general cognitive function, which included memory and the ability to keep track of tasks despite interruptions. Individuals who rated their sleep quality as "Very good" scored nearly 20 points (or two standard deviations) higher on cognitive ability than those who rated their sleep quality as "Poor". Sleep disturbance was not associated with respondents' self-rated general health. However, sleep disturbance was strongly and positively associated with the severity of respondents' depression and anxiety symptoms. The more sleep disturbance individuals experienced; the more severe their mental health symptoms were. Sleep deficits were not significantly related to respondents' self-efficacy for achieving their personal goals in this sample. However, the strong links of sleep quality with cognition and mental health from these data may suggest indirect impacts on individuals' ability to achieve their long-term goals, through reductions in cognitive function or the exacerbation of depression and anxiety symptoms.

In sum, a subset of the individuals experiencing homelessness staying at HOC had levels of sleep disturbance and impairments to daytime functioning related to poor sleep that are considered outside of the healthy adult range. Pain was also a common and frequent experience among the respondents, and both chronic pain diagnoses and the experience of aches and pains, more generally, were associated with poor sleep quality. Other sleep health needs emerged including individuals' feelings of safety and security, and sleep-related self-efficacy beliefs. Lastly, the links between sleep deficits and the cognitive and mental health of respondents suggest the detrimental effects that poor sleep can have on individuals' day-to-day functioning, and conversely, the impacts of mental health on sleep quality.

Description of Respondents

Demographics

Most of the respondents (89.9%) were staying at the HOC's general shelter, and the rest were from the transitional respite program. Respondents ranged in age from 18 to 71 years-old, and the largest proportion, 42.9%, were middle-aged (i.e., age 50 to 64 years, see **Figure 1**). The median age was 51.5 years.

Figure 1. Ages of Respondents

- 17.1% — 18-34 years
- 24.3% — 35-49 years
- 42.9% — 50-64 years
- 15.7% — 65+ years
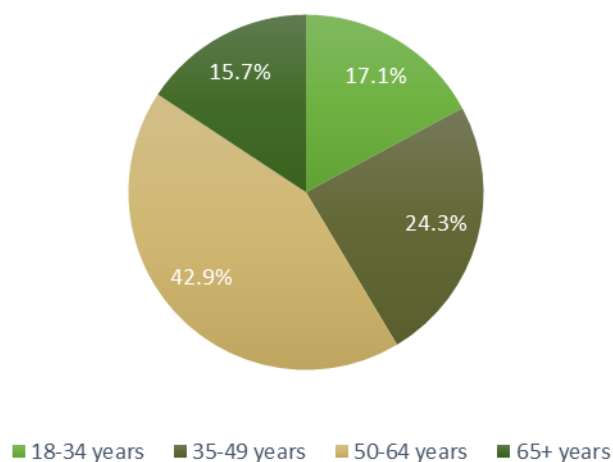
A subset of respondents (14.5%) were also Veterans. Regarding race and ethnicity, 68.6% of respondents identified as Non-Hispanic White, and 14.9% of respondents identified Hispanic as their race (Figure 2). The remaining respondents who were Black, Indigenous and Other People of Color (BIPOC) included those who identified as Non-Hispanic Black, Non-Hispanic American Indian/Alaska Native, Non-Hispanic Native Hawaiian or Other Pacific Islander, Non-Hispanic Multi-Racial and Other.

Figure 2. Race & Ethnicity of Respondents

- Non-Hispanic White — 68.7%
- Non-Hispanic Black, Indigenous and Other People of Color (BIPOC) — 20.9%
- Hispanic as race — 14.9%
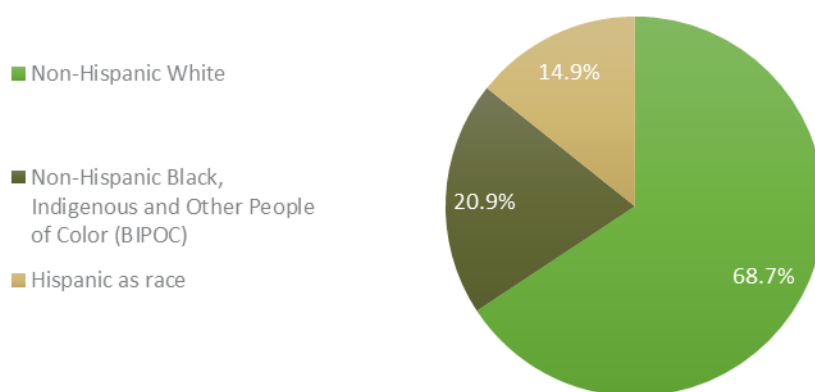
Regarding educational attainment, more than half of respondents (50.7%) were high school graduates or had received GEDs (**Table 1**). Some individuals reported attending some college (17.4%) or some high school (14.5%) but did not receive degrees. A smaller proportion of respondents held degrees including trade school or technical certifications, 2-year Associates degrees, or 4-year college degrees and higher (17.4% combined). Most respondents (51.4 %) reported their relationship status as single and never married, whereas more than one-third (35.7 %) were either divorced or separated from their partners.

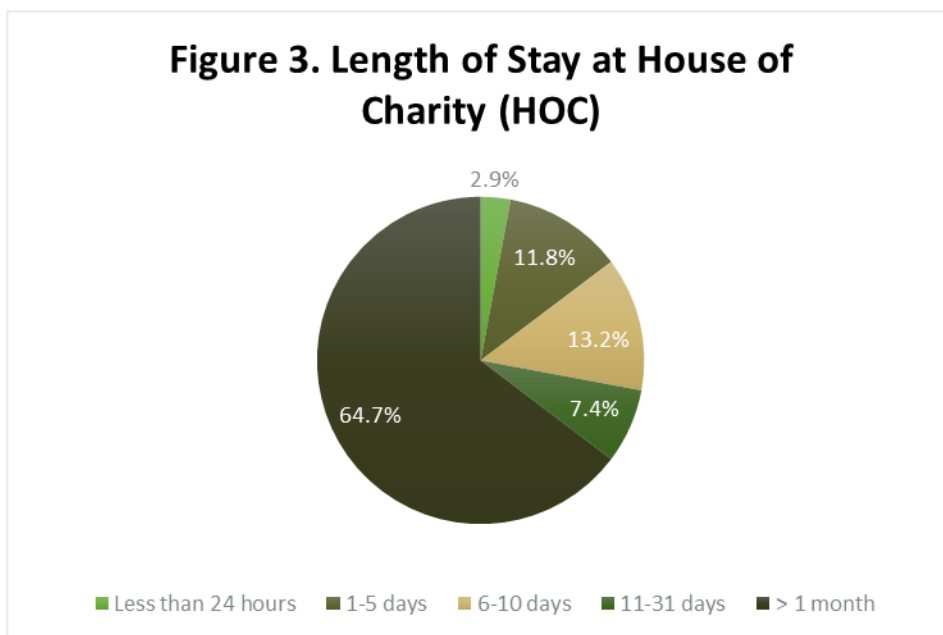| Table 1.	
Educational Attainment	**Percent**
Some high school, but did not graduate	14.5
High school graduate or GED	50.7
Some college, no degree	17.4
Trade school or technical certification / 2-year college or Associates degree	10.1
4-year college degree or higher	7.3

Homelessness History

Nearly two-thirds (64.7%) of the respondents had been staying at HOC for more than one month, and a small subset (14.7%) had visited HOC very recently, within the past five days or fewer (**Figure 3**).

Prior to visiting HOC, more than one-third of respondents (39.1%) reported staying most of the time outdoors in a tent, vehicle, abandoned building, or other place not meant for sleeping. The next most frequently reported places

Figure 3. Length of Stay at House of Charity (HOC)

2.9%
11.8%
13.2%
64.7%
7.4%

■ Less than 24 hours ■ 1-5 days ■ 6-10 days ■ 11-31 days ■ > 1 month

individuals had stayed were at a friend or family member's house, "couch surfing" (17.4 %) and write-in responses of "Other" (17.4%), the majority of which included their own homes, apartments, and assisted living facilities.

More than one-quarter of the respondents (27.5%, or 19 individuals) reported that it was their first time experiencing homelessness. Of the remaining 50 individuals (72.5% of respondents) who had experienced homelessness before, nearly half (44.9%) had experienced homelessness one to two times prior, 26.5% had experienced homelessness three to five times prior, and 26.5% reported experiencing homelessness at least six times. Regarding respondents' current experience of homelessness, just prior to their stay at HOC, nearly half of individuals (43.5%) reported they had been homeless for less than two months, whereas 21.7% reported experiencing homelessness for the last one to two years.

Health Status

Regarding respondents' health status, the highest proportion of respondents rated their health in general as "Fair" (29.4%) or "Good" (26.5%). Overall self-rated health among respondents was low, however, with 50% of respondents rating their health as either "Fair" or "Poor" (**Figure 4**).

Nearly half of the respondents (47.8%, or 33 individuals) reported having been diagnosed with a mental health disorder. The most common diagnoses reported were depression (50.0% of the respondents), anxiety, and bipolar disorder. When asked to report on the number of days in the past thirty days that their mental health was not good, more than half of respondents (53.2%) reported experiencing poor mental health on fourteen or more of the days. This is a substantially higher frequency of mental distress as compared to the 5-year (2016-2020) combined average of 15.0% with fourteen or more days of poor mental health among the general adult population in Spokane County.[1] The median number of days with poor mental health in the past 30 days among respondents was 15 days, with the bulk of respondents reporting between 4 and 30 days of poor mental health.

Figure 4. Self-Rated Health Among Respondents
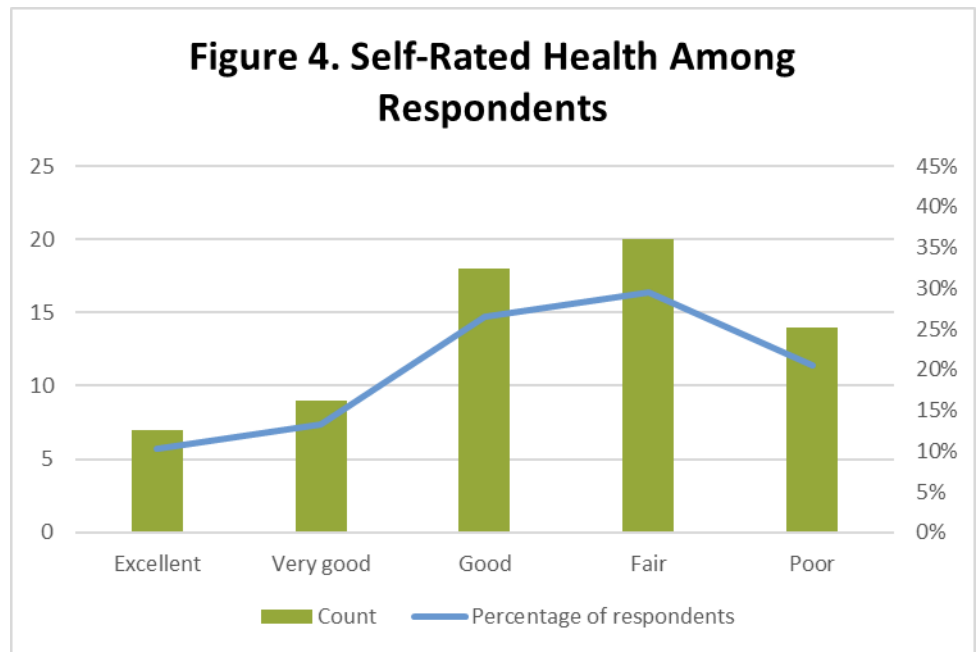
Similarly, more than half of respondents (51.4% or 36 individuals) reported having a chronic pain diagnosis. The most common diagnosed conditions included back pain (two-thirds, or 66.7%, of the respondents), arthritis, and nerve pain or neuropathy. Regarding aches and pains, more generally, respondents reported a high frequency of pain during the past three months. Nearly half of respondents (42.9%, or 30 individuals) reported experiencing aches and pains daily (**Figure 5**), and 21.4% reported experiencing aches and pains between two and six times per week.

Figure 5. Pain Frequency (Past 3 Months) Among Respondents
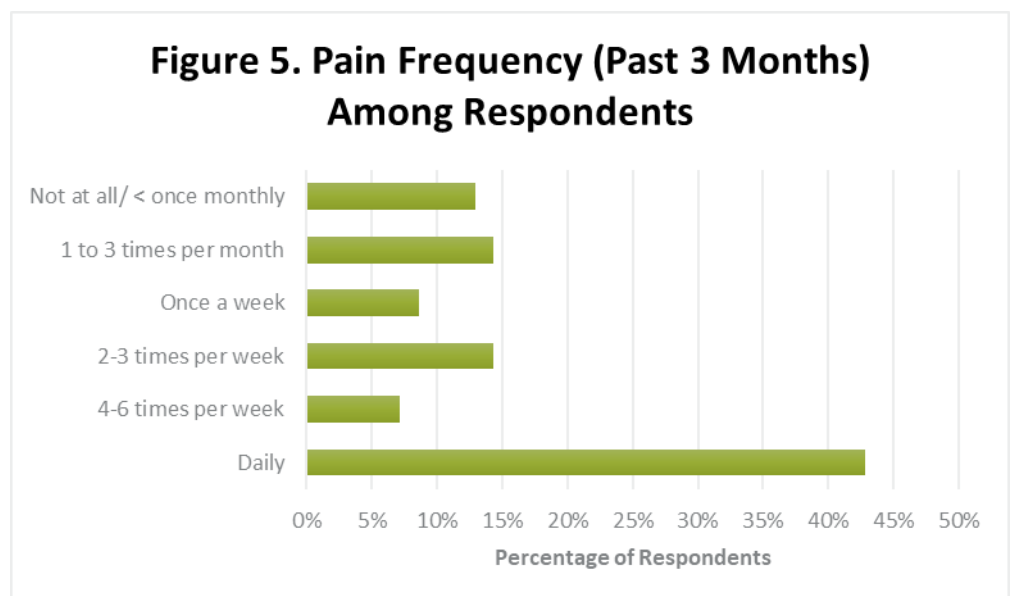
Sleep Duration

Sleep duration was assessed by asking respondents, "On average, how many hours of sleep do you get in a 24-hour period?". The average number of hours reported was 6.5 (with a standard deviation of 2.11) (**Figure 6**), and the bulk of values (i.e., the middle half of all responses in the data) fell between 5 and 8 hours of sleep. The number of hours reported ranged from 1 to 14 overall. This report sample's average of 6.5 hours nearly aligns with clinical recommendations for adults of 7 to 9 hours of sleep.[2] However, the

Figure 6. Respondents' Average Sleep Duration

estimate is slightly lower than the average sleep duration of 7.1 hours reported among the general population of adults living in Washington state and in Spokane County from the 2020 Behavioral Risk Factor Surveillance System (BRFSS) survey.[3]
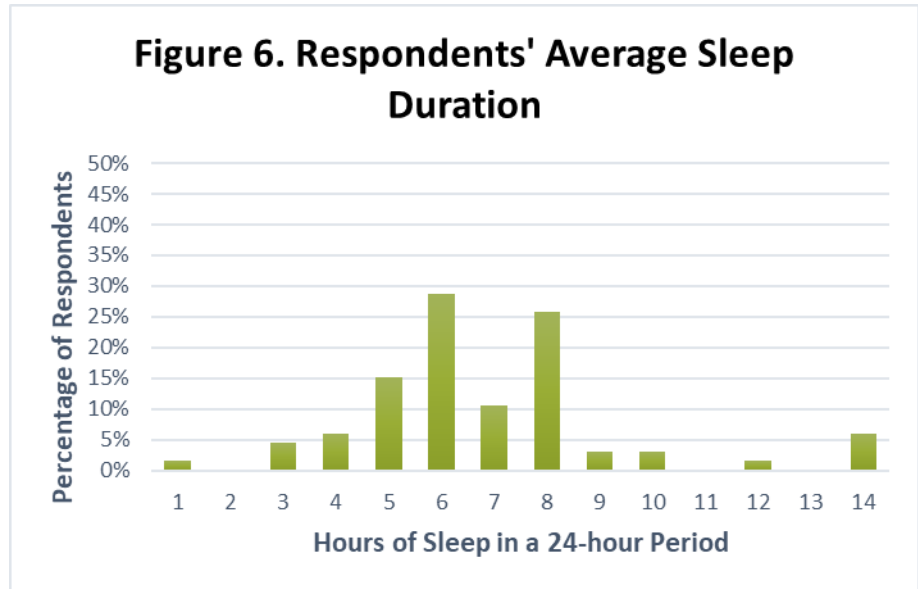
Sleep Quality

Sleep quality was assessed with two sets of questions. The first set of questions included eight items from the Patient-Reported Outcomes Measurement Information System (PROMIS®) Sleep Disturbance Scale (Adult Short Form 8a)[4], for which respondents indicated how often during the past 7 days they experienced trouble falling or staying asleep (e.g., In the past 7 days… "I had difficulty falling asleep", "My sleep was restless", etc.). The second set of questions included four items from the PROMIS® Sleep-Related Impairment Scale (Adult Short-Form 4a)[4], for which respondents indicated how often during the past 7 days they experienced impairments to their daytime functioning related to poor sleep (e.g., In the past 7 days…"I had a hard time getting things done because I was sleepy", "I had a hard time concentrating because of poor sleep", etc.).

For each scale, the scores for the items were combined by summing them into a total raw score (after reverse-scoring some of the positively- worded items). The raw scores were then converted to standardized T-scores with a mean of 50 (representing the average score of the general adult population with chronic conditions) and a standard deviation of 10, using the reference manual Appendix tables for each measure. Individuals who were missing responses to any of the items did not receive a score. Of the 70 respondents, 61 received a sleep disturbance score and 67 received a sleep-related impairment score.

Higher composite scores on both measures reflected worse health, or higher levels of sleep disturbance and impairment. For example, a T-score of 60 on the Sleep Disturbance scale would be interpreted as one standard deviation worse than the general adult population. Any score above 50 can be considered outside of the average healthy adult range. Additionally, clinical cut points for the PROMIS® sleep domain were used to classify individuals' scores into clinically meaningful severity categories of mild, moderate, or severe sleep disturbance and impairment.[5,6]

Figure 7. Levels of Sleep Disturbance Among Respondents
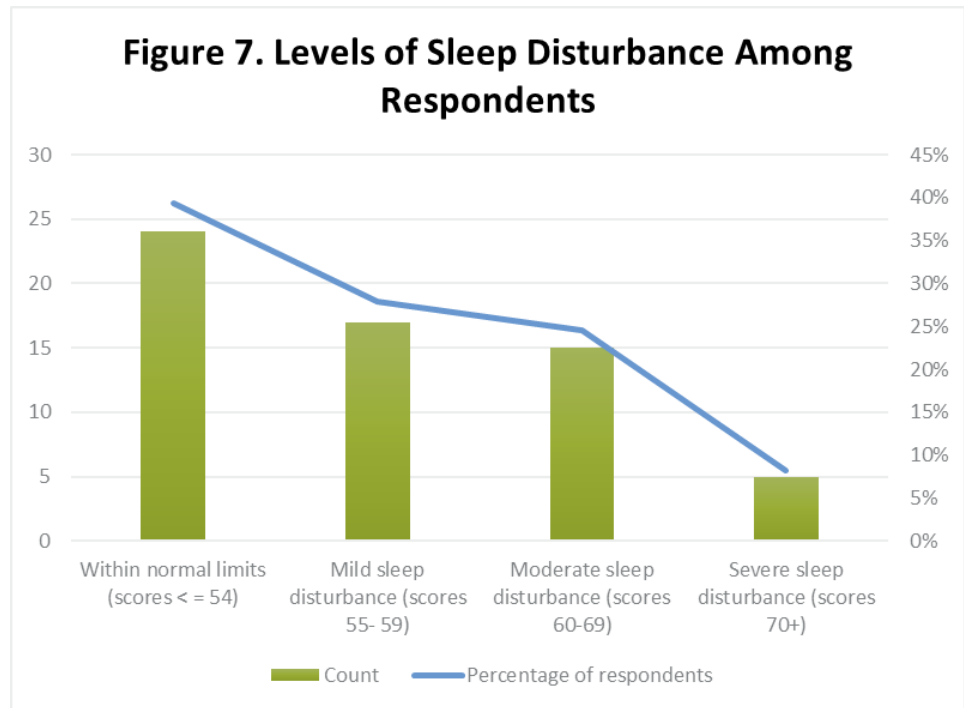
Regarding sleep disturbance, most respondents reported higher-than-average difficulty than the general adult population. The mean sleep disturbance score was 56.5 (SD= 8.5), as compared to a mean score of 50 in the general population, and scores ranged between 38.1 and 74.1. Additionally, nearly one-third (32.8%) of respondents reported moderate-to-severe sleep disturbance **(Figure 7)**.

Similarly, most respondents reported a higher-than-average level of sleep-related impairment than the general adult population. The average sleep-related impairment score among respondents was 56.1 (SD= 10.7) and the median score was 58.6. Scores ranged between 36.2 and 77.7. More than one-third of respondents (38.8%) experienced moderate-to-severe levels of impairment to their daytime functioning caused by poor sleep **(Figure 8)**.

**Figure 8. Levels of Sleep-Related Impairment Among Respondents**
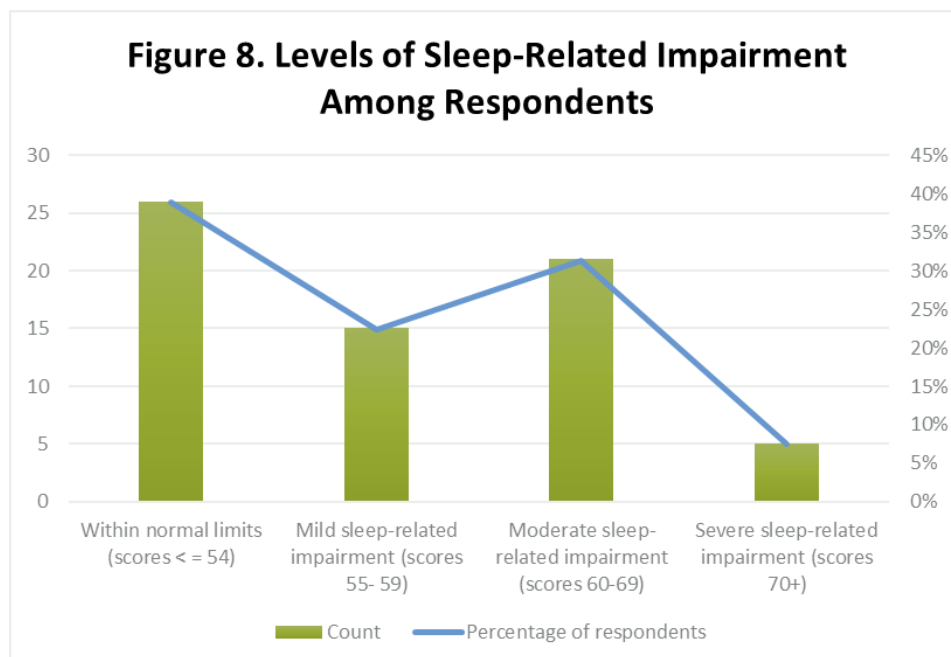
Factors Related to Sleep Quality

Respondents' feelings of safety and security, frequency of pain, chronic pain diagnoses, frequency of poor mental health, and sleep-related self-efficacy (i.e., level of confidence in their ability to "lie in bed feeling mentally relaxed") were consistently associated with the levels of sleep disturbance they experienced.

Safety

One of the survey questions asked, "How safe and secure do you feel in the place you sleep currently?". Feelings of safety were negatively associated with sleep disturbance scores ($r_{(60)}$= - 0.34, p=0.0077 (**Figures 9-10**); the more safe and secure respondents reported feeling in the place that they slept currently, the less sleep disturbance they experienced. This was a moderate, statistically significant association.

Figure 9. Correlation Between Perceptions of Safety and PROMIS® Sleep Disturbance T-Scores
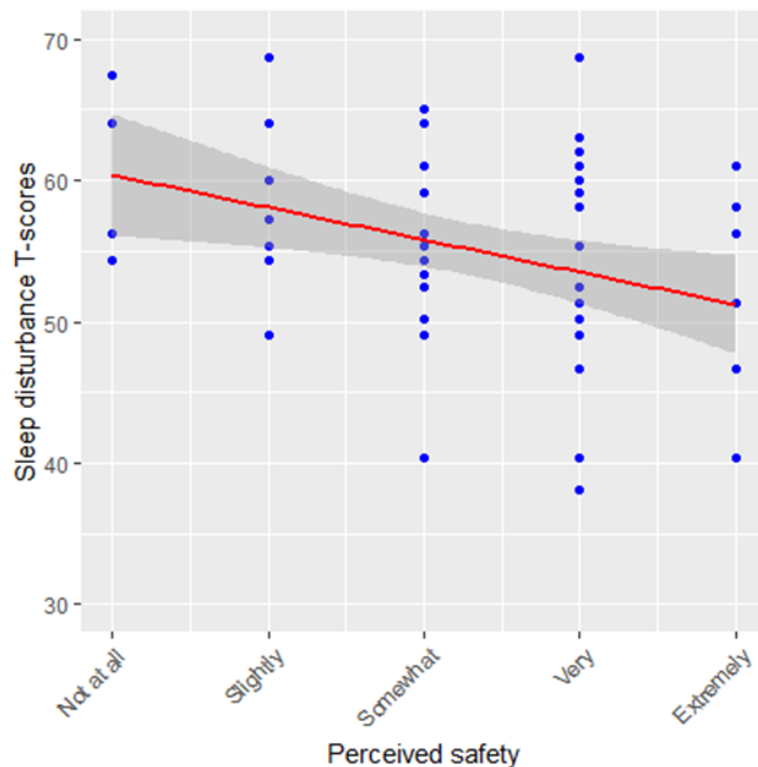
Note. This figure is a scatterplot of the Spearman rank-order correlation between safety ratings and sleep disturbance. The blue dots are data points, and the red line is the line of best fit to the data. An upward sloping line reflects a positive relationship (both values increase together); a negative sloping line indicates a negative relationship (as one increases, the other decreases). A flat line indicates no relationship. A correlation (r) value ranges between 0 and 1; the closer to 1 (whether positive or negative), the stronger the association.

Figure 10. Sleep Disturbance Severity by Feelings of Safety
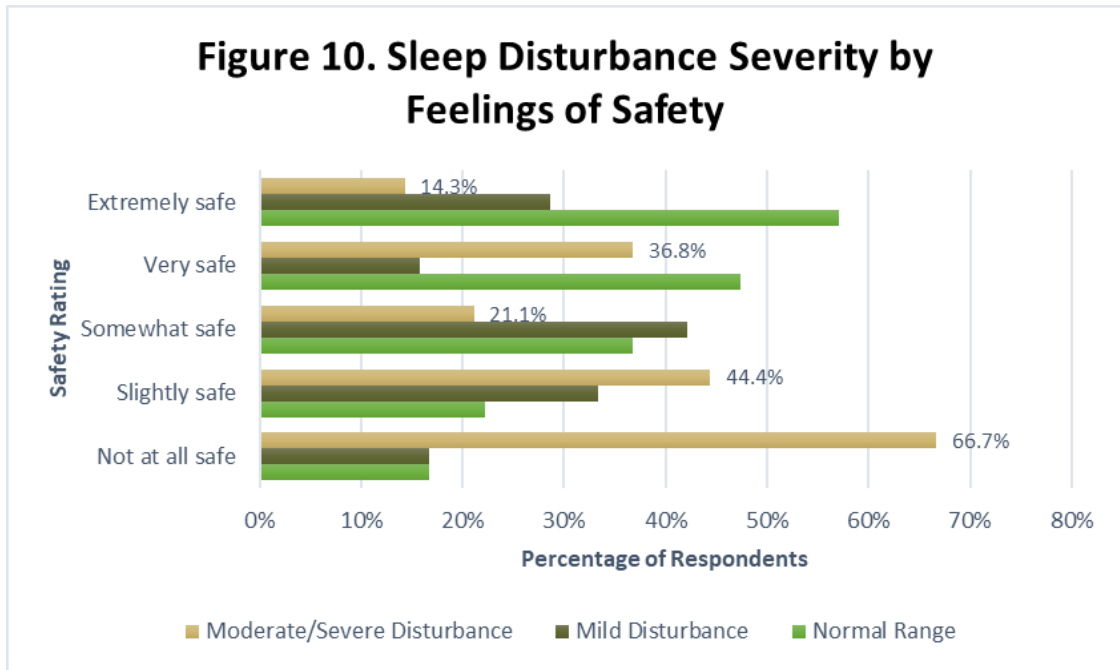
Pain

The frequency of aches and pains in the past three months was moderately and positively associated with sleep disturbance scores ($r_{(61)}$= 0.46, p= 0.0002) (**Figure 11**); the more frequently respondents reported experiencing aches and pains, the more sleep disturbance they experienced, and vice versa. This was a moderate, statistically significant association.

Figure 11. Correlation Between Pain Frequency and PROMIS® Sleep Disturbance T-Scores
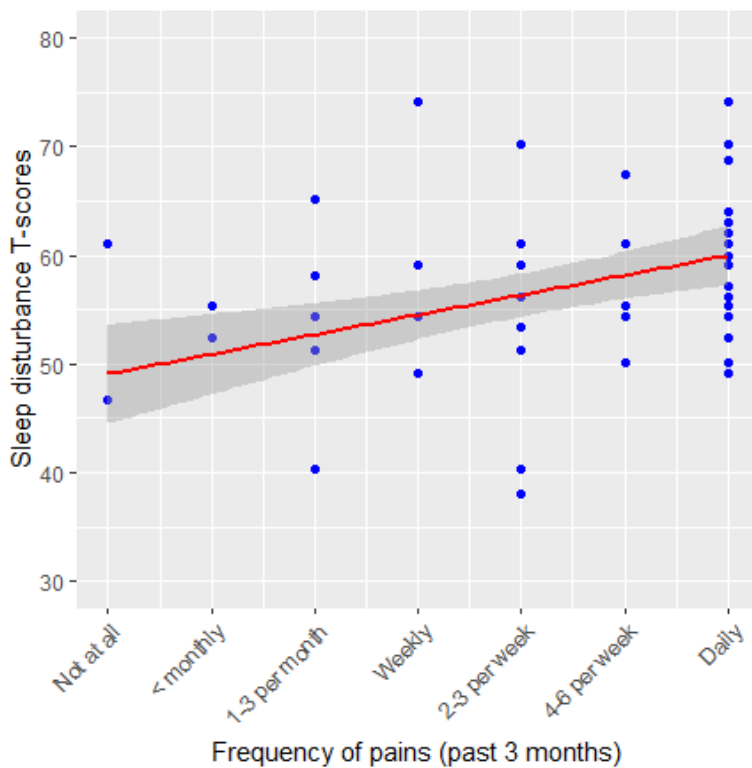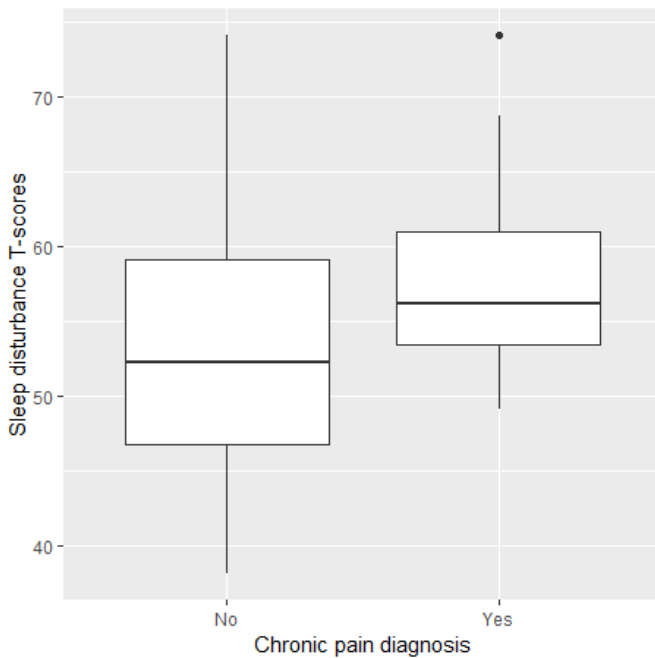
Figure 12. Subgroup Differences in Average PROMIS® Sleep Disturbance T-Scores by Chronic Pain Diagnosis


Additionally, those with a chronic pain diagnosis reported significantly higher average levels of sleep disturbance than those without chronic pain ($t_{(33)}$ = - 2.13., p= 0.0404.) (**Figure 12**). Although the average sleep disturbance score of both groups were outside of the normal adult range (i.e., above 50), respondents with a chronic pain condition had average sleep disturbance scores more than half of a standard deviation higher than those without chronic pain (mean scores of 57.8 versus 52.6, respectively, or a difference of more than 5 points).

Mental Health

The frequency of poor mental health was moderately, positively associated with respondents' levels of sleep disturbance ($r_{(55)}$ = 0.46, p = 0.0004.) (**Figure 13**). The more days during the past month that respondents reported experiencing poor mental health, the more sleep disturbance they experienced.

Figure 13. Correlation Between Days in Poor Mental Health and PROMIS® Sleep Disturbance T-scores
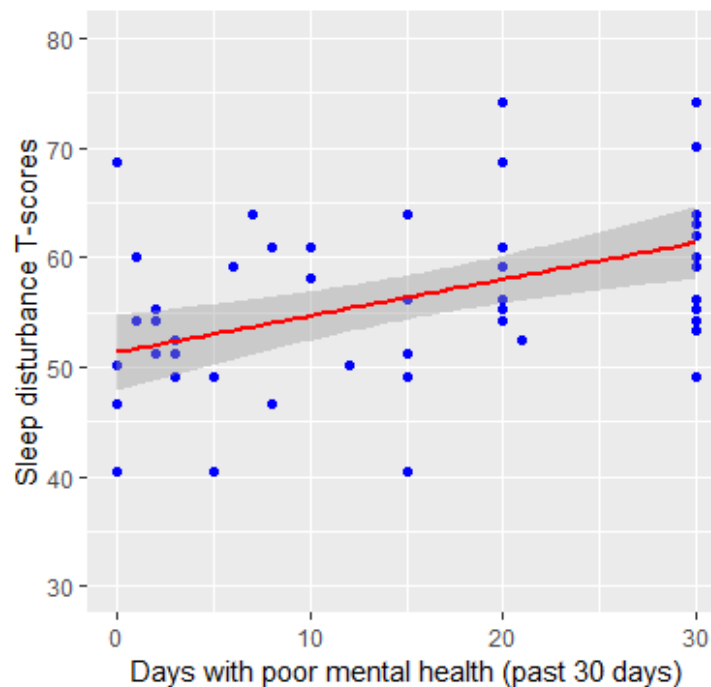
Furthermore, mental distress was significantly associated with sleep disturbance severity ($\chi^2_{(2)}$ = 6.30, p= 0.0429). Respondents with frequent mental distress (i.e., reported 14 or more days of poor mental health in the past month) were less likely to have levels of sleep disturbance within the normal, healthy adult range than those with fewer days of mental distress (adjusted p-value=0.075). Sixty percent of those who experienced less than 14 days of poor mental health had sleep disturbance scores within the normal adult range, whereas only 26.7% of those who reported 14 or more days of poor mental health were within the normal healthy adult range (**Figure 14**).

Figure 14. Sleep Disturbance Severity by Mental Distress (Past 30 days)
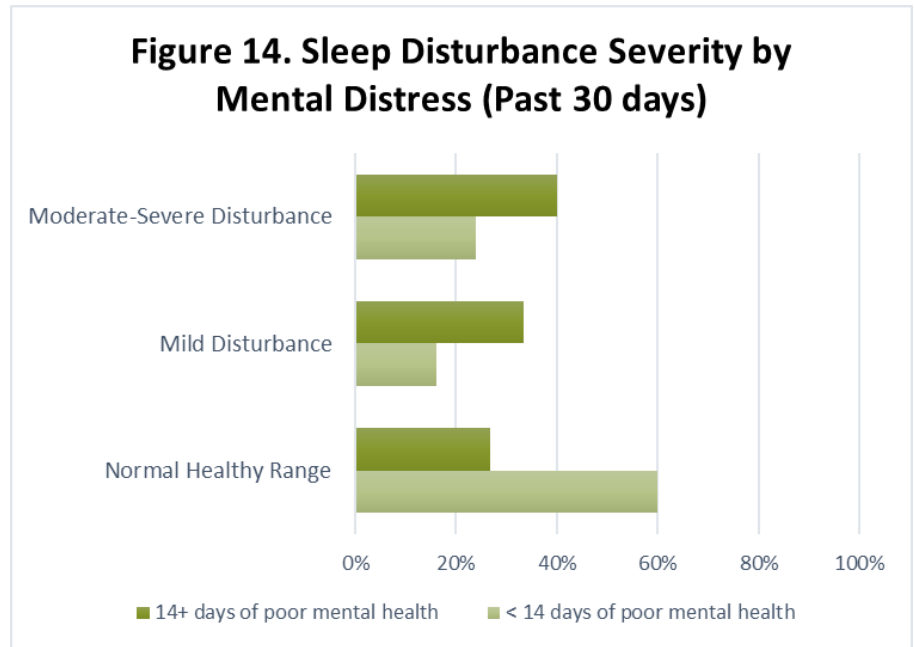
Sleep Self-Efficacy Beliefs

To assess self-efficacy beliefs related to sleep, respondents were asked, "Indicate how confident you are that you can lie in bed feeling mentally relaxed.", by selecting a number from 1 to 5 reflecting their level of confidence in their ability to carry out that behavior.[7] A score of 5 reflected high confidence, whereas a score of 1 indicated they were not confident. Sleep-related self-efficacy was moderately and negatively associated with sleep disturbance ($r_{(61)}$ = -0.41, p= 0.0011) (**Figure 15**). The more confident respondents were that they could lie in bed feeling mentally relaxed, the less sleep disturbance they experienced.

**Figure 15. Correlation Between Sleep Self-Efficacy and PROMIS® Sleep Disturbance T-scores**
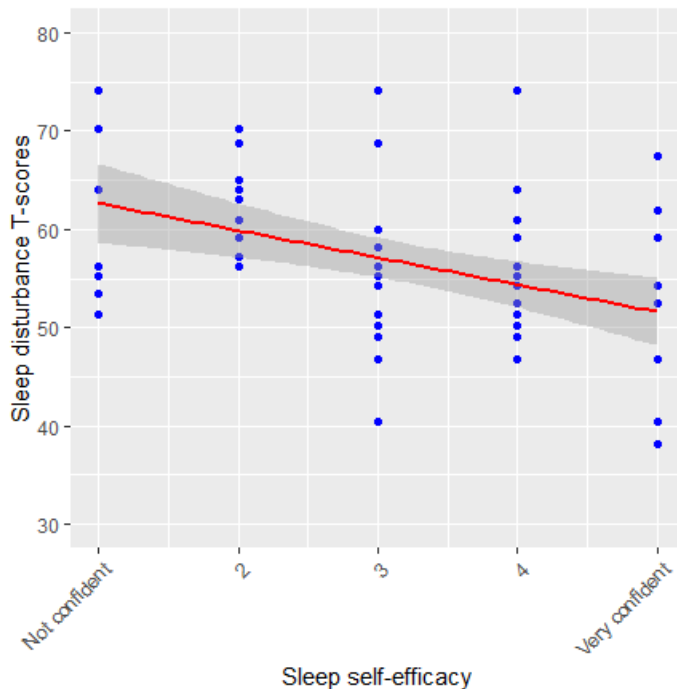
Sleep Barriers & Facilitators (Qualitative analysis)

The survey included two open-ended questions asking participants to report on any challenges they face in getting good sleep (barriers), and anything they have found to be helpful for improving their sleep (facilitators).

Regarding barriers to sleep, the three top barriers reported by participants were challenges related to mental health (mentioned in more than one-third, 37.5%, of responses), challenges regarding noise and disruption from other people (mentioned in 21.4% of responses), and challenges related to physical discomfort (mentioned in 19.6% of responses) **(Figure 16)**. Examples of mental health challenges included anxiety, worry, racing thoughts, and references to specific mental health conditions. Examples of noise and disruption from others included snoring, coughing, and yelling. Examples of physical discomfort included aches and pains, mention of specific physical health conditions, or uncomfortable sleepwear such as pillows.

Figure 16. Top Barriers to Respondents Getting Good Sleep (*n*= 56)
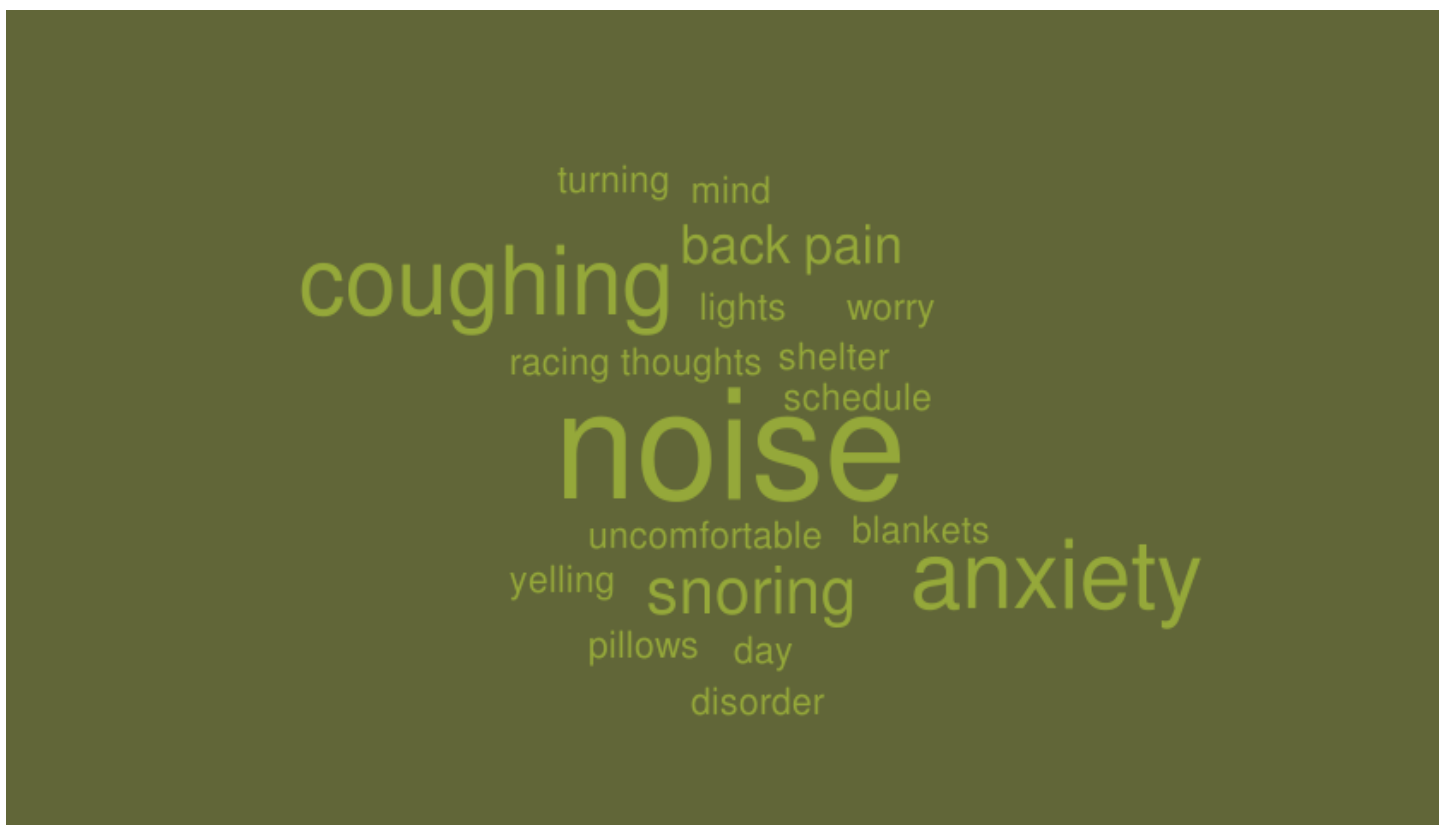
Regarding facilitators, the three top themes reported were nighttime activities or routines (mentioned in 25.5% of responses), medication (mentioned in 23.6% of responses), and managing energy throughout the day (mentioned in 14.6% of responses) **(Figure 17)**. Examples of nighttime routines included watching TV, listening to the radio, hot showers, meditation, and drinking hot tea and cocoa. Examples of medication included sleep aids like melatonin and pain pills. Examples of energy management included taking naps during the day, being more active, and working hard during the day to become more tired at night.

Figure 17. Top Facilitators to Improving Respondents' Sleep (*n*= 55)
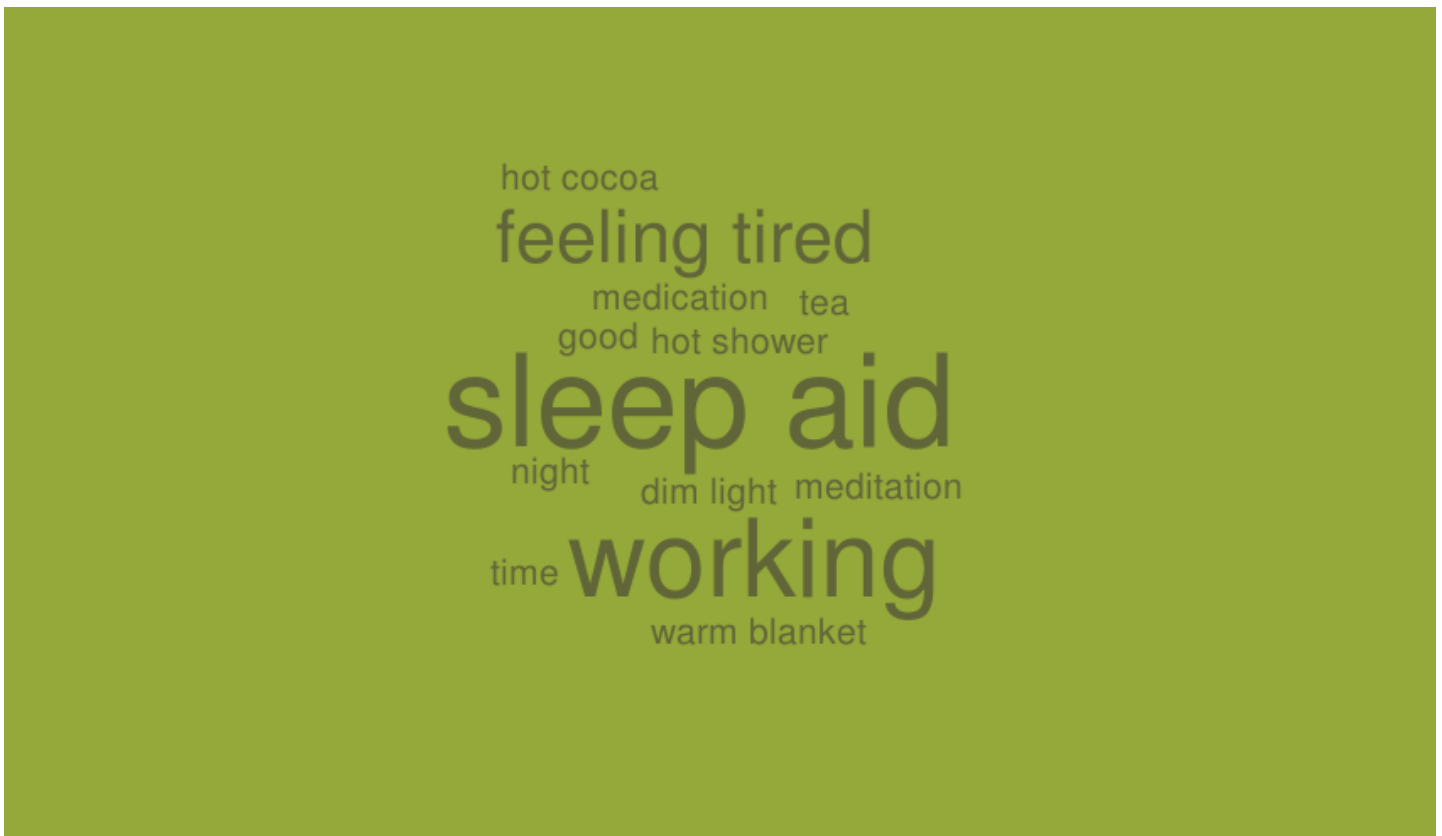
Sleep Quality's Associations with Daily Functioning and Health

Sleep quality was significantly associated with individuals' general cognitive function and ability, as well as their mental health symptoms. Sleep quality was not associated with respondents' self-rated general health or self-efficacy beliefs for achieving their personal goals.

Cognitive Function

Cognitive function was assessed with four questions from the PROMIS® Cognitive Function measure (Abilities Subset - Adult Short-Form 4a).[8] Responses across the four items were summed into a composite, and the raw composite scores were manually converted to standard T-scores (Mean= 50, *SD*= 10) using the reference manual Appendix table. There was a high degree of missingness, with only 50 respondents receiving a composite score. Higher scores on this measure reflected better health, and any scores 50 or above can be considered within the normal healthy adult range. For example, a score of 60 would indicate higher-than-average cognitive function (an improvement of one standard deviation) relative to the general adult population.

Regarding the relationship between sleep quality and respondents' cognitive abilities, there was a moderate, positive association between sleep quality ratings and cognitive function scores (r (50) = 0.37, *p*= 0.0091). The better respondents rated their overall sleep quality, the better their cognitive function and abilities were **(Figure 18)**.

Figure 18. Correlation Between Sleep Quality Ratings and PROMIS® Cognitive Function T-Scores
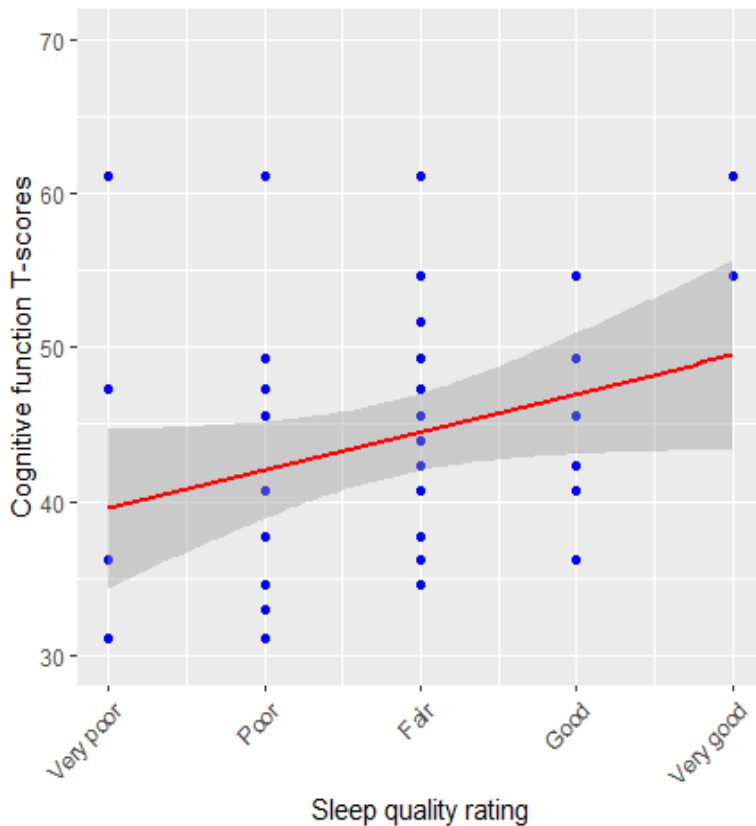
Additionally, there were significant differences in average cognitive function scores based on sleep quality ratings ($F_{(4, 45)}$ = 2.87, p= 0.0334). Pairwise comparisons between the response rating categories revealed statistically significant differences in average cognitive function between individuals who reported "Very good" sleep quality and those who reported their sleep quality was "Poor" (adjusted p-value=0.0432) (**Figure 19**). Those reporting "Very good" sleep scored 19.18 points higher in cognitive ability as compared to those who rated their sleep quality as "Poor".

# Figure 19. Subgroup Differences in Average PROMIS® Cognitive Function T-Scores by Sleep Quality Rating
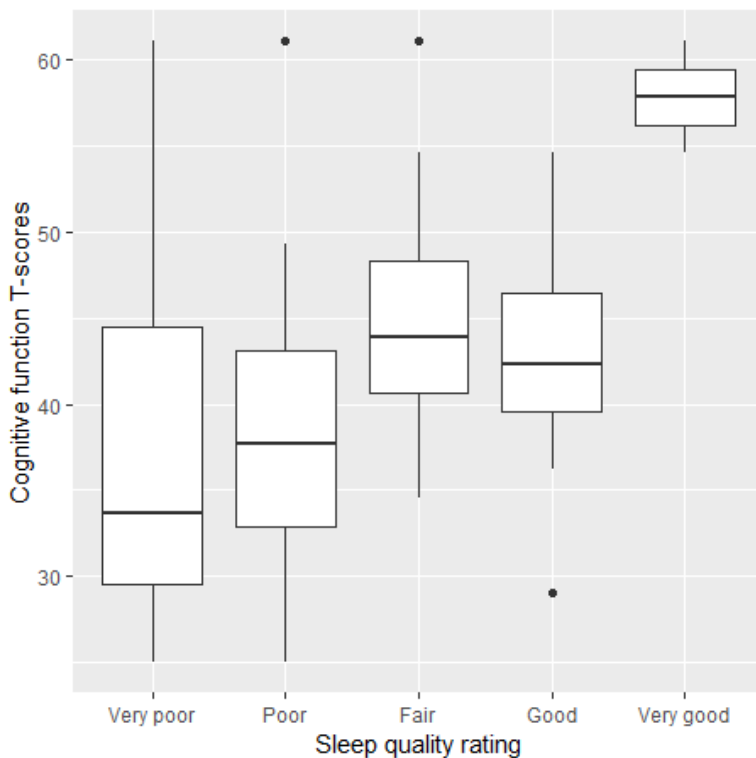
Depression Symptom Severity

Respondents' depressive symptom severity was assessed with the Personal Health Questionnaire Depression Scale (PHQ-8)[9], which includes eight questions about how often respondents had experienced symptoms (e.g., "Little interest or pleasure in doing things", "Feeling down, depressed, or hopeless", etc.) over the last two weeks. Responses to the eight questions were summed into a composite score ranging from 0 to 24. Higher scores reflected worse health, or more severe depression symptoms. Scores between 10 and 19 indicate major depression, and scores above 20 indicate severe major depression.[9]

Respondents' sleep disturbance was strongly and positively associated with depressive symptoms ($r_{(54)}$ = 0.59, $p < 0.0000$). The more sleep disturbance respondents experienced, the more severe their depression symptoms were (**Figure 20**).

Figure 20. Correlation Between PROMIS® Sleep Disturbance T-Scores and Depression Symptom Severity
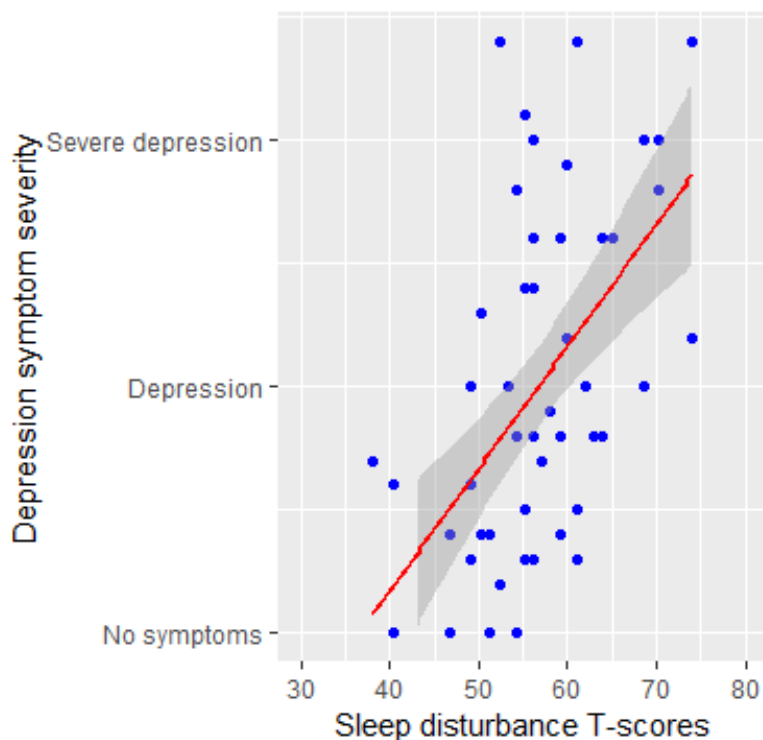

Anxiety Symptom Severity

Respondents' anxiety symptom severity was assessed with the GAD-7 Anxiety Scale[10], which includes seven questions about how often respondents had experienced symptoms (e.g., "Feeling nervous, anxious, or on edge", "Not being able to stop or control worrying", etc.) over the last two weeks. Responses to the eight questions were summed into a composite score ranging from 0 to 21. Higher scores reflected worse health, or more severe anxiety symptoms. Scores under 5 are considered minimal anxiety, scores 5-9 indicate mild symptoms, scores 10-14 indicate moderate symptoms, and scores above 15 indicate severe symptoms.[10]

Respondents' sleep disturbance was strongly and positively associated with anxiety symptoms ($r_{(60)}$ = 0.59, $p < 0.0000$). The more sleep disturbance respondents experienced, the more severe their anxiety symptoms were (**Figure 21**).

Figure 21. Correlation Between PROMIS® Sleep Disturbance T-Scores and Anxiety Symptom Severity
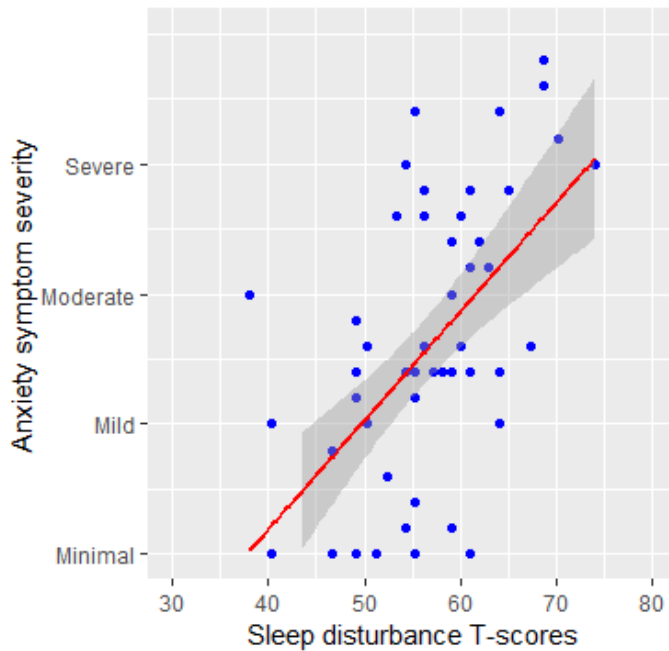
Recommendations

A subset of the men experiencing homelessness that were staying at HOC had levels of sleep disturbance and impairments to daytime functioning related to poor sleep that are considered outside of the healthy adult range. These individuals may therefore benefit from targeted programming and service development. Non-medical interventions addressing sleep challenges like worry and anxiety may improve sleep health of the clients while also targeting co-occurring, exacerbating issues like pain. Examples of such interventions and resources might include meditation, yoga, and cognitive-behavioral techniques to address individuals' feelings of self-efficacy for controlling sleep and managing their health, more generally. Because pain was a common and frequent experience among the respondents, and because pain frequency and chronic pain were both moderately associated with more severe levels of sleep disturbance, non-medical pain management strategies like physical exercises and massage could also be beneficial.

Feelings of safety or security was another factor related to individuals' sleep quality. It may therefore be useful to further identify clients' safety concerns to address the underlying causes of their insecurity (e.g., trauma, lack of knowledge about available resources). There may also be additional opportunities for communication and reinforcement of messaging around safety precautions and resources for personal safety while staying at HOC. Additionally, because respondents' sleep self-efficacy beliefs regarding their ability to feel relaxed were also associated with sleep disturbance, health education surrounding sleep hygiene and effective strategies might be considered. Other strategies to consider if feasible include noise reduction strategies (e.g., providing ear plugs at the shelter), environmental adjustments (e.g., lighting and temperature), and increased signage and messaging to help people understand the importance of sleep and why it is crucial for mental and physical health.

Lastly, the links between sleep deficits and the cognitive and mental health of respondents suggests detrimental effects that poor sleep can have on individuals' day-to-day functioning, as well as the impacts of mental health on sleep quality. To help clients achieve long-term stability and their own personal goals, we recommend that regular sleep, mental health, and pain assessments be included as part of clients' screening or clinical monitoring, to ensure that these individuals receive the appropriate resources available.

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