Spring 5-9-2010

Sleep Disturbance in the Homeless Population: The Relationship between Homelessness, Sleep and Health

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Abstract

Little is known about how sleep disruption impacts physical health among the homeless. The association between homelessness, quality of sleep and physical health were investigated in the current study. Convenience sampling was used to select participants from a pool of people attending the programs of Ecclesia Ministries. Interviews were conducted with 32 persons from the Boston metropolitan area, of whom 23 were currently homeless. The researcher assessed level of sleep disturbance, number of health problems and degree of homelessness using a standard demographic questionnaire, the General Health Questionnaire-12 (GHQ-12) and the Pittsburgh Sleep Quality Index (PSQI). Our results found evidence of significant sleep disturbance as well as significant mental and physical health problems in the sample. Correlational analyses provided partial support for the hypothesis that degree of homelessness impacts both sleep quality and physical health. Future work should investigate whether change in homelessness status alters sleep quality and physical health and also whether interventions may be utilized in this understudied and vulnerable population.

Introduction

Homelessness emerged as a significant issue in the United States in the late 1970s and has since become an increasingly prevalent feature of the American socioeconomic landscape, affecting an estimated 2.3 to 3.5 million Americans in a given year (Poverty, 2007). As the rates of homelessness have increased, the aspects of homelessness that have received the most attention from researchers are the physical and mental health problems commonly suffered by this population (Davis & Shuler, 2000; Muñoz, Crespo, & Pérez-Santos, 2005).

While a confluence of poverty-related factors affect the lives of the homeless, it is clear that the condition of homelessness itself (i.e. lack of consistent shelter) is a driving force in determining physical health. Even when compared to a low income, at-risk-for-homelessness group of people, the health status of homeless persons was significantly poorer (Muñoz et al., 2005). In fact, the mortality rate for the homeless population is two to four times higher and their life expectancy is 20 years less than those with a home (Muñoz et al., 2005). Among the potential factors contributing to this increased mortality rate are unstable living conditions and constant exposure to the elements (Davis & Shuler, 2000). Examples of these include overcrowding in shelters, lack of nutritional food, lack of hygiene and exposure to inclement weather (Vazquez, Muñoz, Crespo, Guisado, & Dennis, 2005). Violent acts targeting the homeless also pose a substantial risk. From 1999 through 2007, there have been 774 acts of violence by housed people, resulting in 217 murders of homeless people and 557 victims of non-lethal violence in 235 cities from 45 states (National Coalition for the Homeless, 2008). Complicating matters, the lack of housing can make treatment of health problems—whether in sanitary care, medication or follow-up—extremely difficult (Vazquez et al., 2005).

Apart from the risk of traumatic injury, various acute and chronic physical health problems plague the homeless population. Bronchitis, asthma, vision impairment, skin and bone problems, positive tuberculosis skin tests and joint complaints are common. Rates of arthritis, high blood pressure, diabetes and sexually transmitted diseases are also elevated within the population (Vazquez et al., 2005).

Further research on homeless persons has found that their living conditions contribute significantly to mental health problems. Neurotic disorders in the homeless population are twice the rate of that in the general population (Sims & Victor, 1999). This increased incidence is associated with stressful life events such as long-term illness and lack of social support. Furthermore, mental health typically worsens as homelessness continues (Sims & Victor, 1999). The potential causes of this phenomenon are indicated throughout the scientific literature. In a study on the mental health consequences of exposure to violence, homeless persons who had witnessed various forms of violence tended to exhibit more symptoms of anxiety and paranoia (Fitzpatrick, LaGory, & Ritchey, 1999). Additionally, depression, schizophrenia, anxiety and chronic stress have all been linked to homelessness (DeForge, Belcher, O'Rourke, & Lindsey, 2008). The actual prevalence of mental illness within the homeless population varies, but data indicates that it generally hovers around 20 to 30% (Mowbray, Cohen, Harris, Trosch, Johnson, & Duncan, 1992). Interestingly, affective disorders and schizophrenia are known to be associated with sleep disorders (Davis & Shuler, 2000), another aspect of homelessness that is often overlooked.

The primary element of interest in the current study is sleep disturbance and its connection to physical and mental health in homeless populations. Included in sleep disturbance are those disorders of initiating and maintaining sleep (insomnias), disorders of excessive

somnolence (hypersomnias), and disorders of the sleep-wake cycle and dysfunctions related to sleep, sleep stages or partial arousals (parasomnias) (Cormier, 1990). Insomnia, defined as difficulty falling asleep, difficulty staying asleep or difficulty waking up too early (Meisler, 1998), is a consistent predictor and risk factor for depression, anxiety disorders, other psychological disorders, alcohol abuse or dependence, drug abuse or dependence, and suicide. Furthermore, insomnia is related to decreased immune functioning, and may also be a risk factor for cardiovascular disease (Taylor, Lichstein, & Durrence, 2003). However, little research has examined insomnia in the context of homelessness. This is a large gap in the scientific literature, given that the many potential sources of insomnia—environmental disturbances, pain, stress, hunger, consumption of alcohol, sleeping during the day and physical activity just prior to bedtime—are common conditions of the homeless experience (Davis & Shuler, 2000).

Only one study to date has specifically examined the effects of sleep disturbance on homeless persons. Davis & Shuler (2000) examined altered sleep-wake patterns in 50 homeless women from the Los Angeles area. Compared to the general population, atypical sleep patterns, namely a day/night sleep pattern and sleeping six or less hours a day, were present in over half the participants. Restless sleep was also a common complaint. The authors attributed this sleep disturbance to a number of causes, including inadequate sleeping arrangements, substance abuse, mental illness, anxiety and concerns about safety.

Similar to the aforementioned study, the focus of the current study is to investigate the connections between homelessness, quality of sleep and health conditions through interviews with homeless persons. Unlike the study noted above, homelessness will be assessed in terms of its severity. Conceptualizing homelessness by severity is not in itself new, as it has been previously thought of in terms of levels, distinguishing living with friends and relatives, living in

shelters and living on the streets (DeForge et al., 2008). A similar distinction is made in the current study, with severity of homelessness starting low and increasing from sleeping in one's own house or apartment, someone else's house/apartment, a hotel, a shelter and outside. Designating sleep and health conditions as dependent variables and degree of homelessness as the independent variable, it is hypothesized that these three factors will be inter-related. It is expected that as the degree of homelessness increases, the number of health problems and the level of sleep disturbance will also increase. If there is such an association between sleep quality, homelessness and health, this research will shed light on the import with which homelessness should be treated, and where national priorities should be in terms of solving a problem that affects 2.3 – 3.5 million Americans each year.

Method

Participants

Participants were selected from a pool of people attending the programs of Ecclesia Ministries, a Boston organization that performs street ministry and provides social services to homeless persons. Ecclesia's programs include lunch at St. Paul's Cathedral, ministry at Barbara McInnis Hospital for the homeless, Common Art and Common Cinema—art and film-showing programs. The author attended these events and built rapport with attendees for approximately one month prior to beginning interviews. For the interviews, convenience sampling was used to select participants, and the same questionnaire was administered to all; there was no assignment to groups. The agreement made between each participant and the researcher was that at the end of the interview, or when he/she chose to discontinue the interview, he/she would receive a pair of socks as compensation. Thirty-five participants were recruited for the study, however 3 dropped out, generating a total sample size of 32 participants for the current analysis.

Materials

Each interview included a demographic questionnaire, the General Health Questionnaire-12 (GHQ-12) and the Pittsburgh Sleep Quality Index (PSQI). Copies of each of these measures are available in the appendices. The demographic questionnaire consisted of 23 items, including both open and close-ended questions. The items included age, gender, ethnicity, major medical problems, mental illness diagnoses, housing status and self-ratings of health, daily diet, physical activity and sleep location safety and comfort. Using items from the demographic questionnaire, an individual's degree of homelessness was assessed by current housing status (housed or unhoused), the sleep location during the past month, the level of safety and comfort the individual reported regarding that location, and if unhoused, the duration of time the individual had been experiencing homelessness.

To assess mental and physical health, both the GHQ-12 and the following items from the demographic questionnaire were used: the presence or absence of major medical problems and the participant's subjective rating of his/her health, daily diet and daily physical activity. The GHQ-12 consisted of 12 close-ended questions that are designed to detect psychological distress. Several of the 12 questions were reverse-scored. A sample question from this questionnaire is: "Have you recently been able to concentrate on whatever you are doing?" with the response options, "More so than usual; Same as usual; Less so than usual; Much less than usual."

The PSQI was modified slightly from its original version, removing language that assumed strictly a night schedule for sleeping. The six questions that were originally at the end of the PSQI, and which required a bed partner to respond, were also removed. This did not change the method for scoring, as only the self-rated questions are used for this purpose. The 18 self-rated items were later broken down into the seven component scores of subjective sleep

quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction. A sample question from the PSQI is: "During the past month, how often have you had trouble sleeping because you cannot get to sleep within 30 minutes?" with the response options, "Not during the past month; Less than once a week; Once or twice a week; Three or more times a week."

Procedure

Ecclesia Ministries was contacted prior to the start of the project for approval to use their programs to meet and interview participants. Approval from the Institutional Review Board at the University of Connecticut was then secured preceding any participant interviews. The director of the Barbara McInnis Hospital for the homeless reviewed the IRB approval and authorized the researcher to interview consenting individuals in the hospital's common rooms. Once interviewing commenced, participants were interviewed at the location of an activity (e.g. the Common Art program). To ensure participant comfort, the option to leave the room of the activity and be interviewed in a quieter adjoining room was made available. Participants were informed that the interview would take approximately 15 minutes and their participation would be anonymous. A brief explanation about the interview and the questionnaires involved was provided. Upon giving his/her consent, the interview began and the researcher explained that she would read each question and all the answer options (where applicable), and would record the participant's response.

Data analyses

Relationships between categorical variables representing sleep, health and homelessness were measured using Spearman's correlation coefficient. Relationships between continuous

variables were analyzed using the Pearson correlation coefficient. A significance level of $p = .05$ was used.

Results

Descriptive measures of demographic, health and sleep characteristics of the participants are presented in Tables 1-5.

Demographics

Exactly half of the participants were interviewed at Ecclesia Ministries' Common Art program, while 15.6% were interviewed in Boston Common, 12.5% at the Monday lunch program, 12.5% at Barbara McInnis Hospital and 9.4% on the steps of St. Paul's Cathedral. As seen in Table 1, most of the participants were men (87.5%). A majority of the sample was white (71.9%), while 21.9% was African American, 3.1% was Asian American, and 3.1% was "Other". The average age was 48.44 (SD = 9.69), but the participants ranged from 29 to 66 years old. A majority had never married (68.8%), 6.3% were currently married and 25% were divorced. Fewer than half (43.8%) had had children. Almost one third (29%) had less than a high school education, and another 29% had graduated from high school. Of the remaining, 19.4% had some college education but no degree, 6.5% had an associate's degree, 9.7% had a bachelor's degree, and 6.5% had a master's degree. A large percentage had health insurance (90.6%), 64.5% received some form of financial assistance and 28.1% were currently employed.

Health

The prevalence of major medical problems was reported at a rate of 46.9% and mental illness diagnoses at a rate of 43.8% in the sample. Self-reported ratings of health, daily diet and physical activity on a scale of Excellent, Very Good, Good, Fair and Poor are reported in Table

2. Scores on the GHQ averaged at 15.22 (SD = 6.26) and ranged from 2 – 31 out of a possible 0 – 36.

Sleep

The average number of hours of sleep reported within a 24-hour span was 6.28 (SD = 1.7), but ranged from 3.5 – 10 hours. The sleep locations where participants reported having slept the most often during the past month are presented in Table 3. Ratings of both the safety and comfort of sleep locations, on a scale of Excellent, Very Good, Good, Fair and Poor are reported in Table 4. The average PSQI global score was 7.88 (SD = 4.09), and the range was 0 – 16 out of a possible 0 – 21. When divided into scores of 5 or less and greater than 5 (indicating clinically significant sleep disturbance), 28.1% of the sample scored the former and 71.9% the latter. Table 5 presents the descriptive statistics for the 7 separate components of the PSQI, which yield the global score when added together. The possible score for each component ranged from 0 to 3 (no difficulty to severe difficulty).

Homelessness

Regarding the sample's housing status, 71.9% of participants were currently unhoused, 12.5% were currently housed, but had been unhoused in the past, and 15.6% had never been unhoused.

Correlations

Spearman correlation coefficients (ρ) to assess for the association between homelessness, sleep and physical health are presented in Table 6. Among the significant findings is an association between a currently unhoused status and sleep location comfort ($\underline{r}$ = -.578, $\underline{p}$ = .001, n = 32), and a currently unhoused status and sleep location safety ($\underline{r}$ = -.436, $\underline{p}$ = .013, n = 32). Sleep location comfort and sleep location safety were themselves correlated ($\underline{r}$ = .816, $\underline{p}$ = 0, n =

32). Sleep location comfort and daily diet were associated (r = .353, p = .048, n =32), as well as the presence of a major medical problem and daily physical activity (r = -.409, p = .020, n = 32).

Pearson correlation coefficients (r) to assess for associations between components of the PSQI, GHQ and pertinent demographic variables including the degree of homelessness are presented in Table 7. Among the significant findings is an association between the GHQ score and PSQI component 1 (r= .5, p = .004, n=32), the GHQ score and PSQI component 7 (r = .411, p = .019, n=32), and the GHQ score and a mental illness diagnosis (r = .398, p = .024, n=32). The subjective health rating and PSQI global score are also significantly associated (r = .382, p = .031, n=32), as are the subjective health rating and PSQI component 5 (r = .485, p = .005, n=32), and the subjective health rating and PSQI component 6 (r = .403, p = .022, n=32). Major medical problems and PSQI component 5 are significantly related (r = .563, p = .001, n=32), as well as Daily Diet and PSQI component 1 (r = .362, p = .042, n=32), Daily Diet and PSQI component 5 (r = .451, p = .010, n=32), and Daily Physical Activity and PSQI component 7 (r = .355, p = .046, n=32). Lastly, the duration of time experiencing homelessness and PSQI component 5 are also significantly associated (r =.37, p = .037, n=32).

Discussion

The primary aim of this study was to examine the quality of sleep and health status of homeless individuals and to determine whether or not degree of homelessness was associated with sleep disturbance and physical health. Through interviews with 32 individuals from the Boston area, the association between sleep, health and homelessness were explored. The researcher hypothesized that these three factors would be related and that the number of health problems and level of sleep disturbance would increase with the degree of homelessness. She found partial support for this association as discussed below.

The motivation for this study grew out of an understanding that the homeless are a vulnerable segment of the population, and one that has been growing in recent years. The issue of homelessness is not being adequately addressed across multiple fields, including in the social sciences. There is a significant dearth of available research regarding this population's sleeping habits, which is unfortunate given the obvious problems for sleeping that the condition of homelessness poses. Furthermore, associations between sleep and health are prolific throughout research on the general population (Pilcher & Ott, 1998; Taylor et al., 2003), lending support to the expectation that the variables of sleep, health and homelessness are likely related. A study investigating these factors could illuminate the problem of homelessness, the conditions experienced by the homeless, and most importantly, the necessity of addressing such conditions to improve the lives of an estimated 2.3 – 3.5 million homeless Americans (Poverty, 2007).

The results of the study indicate a high frequency of physical and mental health problems among the persons sampled, with 46.9% reporting major medical problems and 43.8% reporting mental illness diagnoses. For the GHQ-12 measure, other studies have found mean scores of 11 – 12 typical and scores greater than a mean of 15 are considered evidence of psychological distress (University of Otago Wellington, 2006). The average score on the GHQ-12 in this sample was 15.22, but some scores were as high as 31, suggesting some severe psychological problems and distress for a significant portion of the sample.

The participants also reported evidence of significant sleep disturbance. Participants reported an average of 6.28 hours of sleep per night, with some persons reporting as few as 3.5 hours/night. This is substantially lower than the 7-8 hours recommended by the National Sleep Foundation (Meisler, 1998). For the PSQI measure, a global score greater than 5 indicates clinically significant sleep disturbance (Buysse, Reynolds III, Monk, Berman, & Kupfer, 1989).

For this study, 71.9% of the sample scored higher than 5; in fact, the average score was 7.88 and the maximum score was 21, which is a clear indication that many homeless individuals in this sample were sleep deprived.

The researcher found a number of statistically significant correlations implying that feelings of safety and comfort in a particular sleep location decrease with the quality of the sleep location, or the degree of homelessness (i.e. participants generally reported feeling less safe sleeping outside than in a shelter). Additionally, the observed relationships support the sleep—health connection previously discussed. Among these is an indication that sleep location comfort correlates with ratings of daily diet, and the GHQ measure for mental health correlates with subjective sleep quality (PSQI component 1) and daytime dysfunction (PSQI component 6). Sleep disturbances also correlated with the presence of major medical problems and daily diet, and daytime dysfunction (PSQI component 7) correlated with daily physical activity. Among all the correlations, perhaps the most noteworthy one is between the duration of time the individual had been experiencing homelessness and the presence of sleep disturbance (PSQI component 5). This association supports the hypothesis that the level of sleep disturbance increases with the degree of homelessness. These associations are supported by the fact that these results were obtained primarily from currently homeless persons (71.9% of the sample), and also from some (12.5%) who were currently housed, but had been unhoused in the past.

No significant associations between the degree of homelessness and the severity of health problems were found in the current study. This is likely the result of one of the limitations of the study; despite having high correlations, the small sample size generated lower power and consequently less ability to note significant effects. Among the other limitations of the study included the demographics of the participants, who were primarily white males. This lack of

diversity does not represent the homeless population as a whole, but rather a small segment of it. Furthermore, all participants were sampled from the Ecclesia Ministries community in Boston. The spiritual nature of the community and the involvement of the participants in it raise a question of potential differences between these homeless persons and those who are less involved and more isolated. Additionally, the interviews were conducted during the summer and primarily assessed the individuals' conditions during the past month. However, conditions for the homeless tend to vary by the season, and a person who sleeps outside during the summer might experience very different outdoor conditions, or seek out shelters, during the winter. Collectively, these factors may reduce the validity and generalizability of the study.

Future research should continue to study sleeping habits and sleep disturbance in the homeless population, using larger and more diverse sample sizes to generate more conclusive findings. The function of sleep should not be underestimated in terms of its significance for health. As a mediating factor, and if properly addressed, the improvement of sleep could potentially alleviate health problems among the homeless. Comparing sleep conditions between different locations, such as in shelters and outdoors, could be valuable for understanding the specific difficulties the homeless experience in this domain. Once this is understood, more effective measures may be taken for addressing sleep disturbance within the population. On a related note, this study, like many others, focused on urban homelessness. Homelessness outside of urban settings is understudied. A new concentration on rural homelessness could provide valuable information on how homelessness is experienced in rural settings, and how sleep and health problems are manifested in different conditions. Finally, interventions to improve sleep and decrease mental and physical health burden are warranted in this population.

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Appendix

Demographics Questionnaire

1. Age: _____
2. Sex: Male Female
3. Ethnicity: American Indian or Alaskan Native Asian-American Black or African American Native Hawaiian or Other Pacific Islander White Latino/a
   Other (not listed): _____
4. Marital Status: Single Married Widowed Divorced
5. Do you have any children? Yes No
6. Birth place: _____
7. How long have you been in the Boston area? _____
8. How much longer do you expect to be in the Boston area? _____
9. To what year did you complete school? 5th grade or less 6th grade 7th grade 8th grade 9th grade 10th grade 11th grade 12th grade Some college Associate's degree Bachelor's degree
10. Are you currently employed (job or self-employed)? Yes No
11. Are you currently receiving some other form of financial assistance (Food Stamps, unemployment or worker's compensation, disability etc.)? Yes No
12. Do you belong to a health plan or have any health insurance such as Blue Cross/Blue Shield, Medicaid or other insurance? Yes No
13. In general, would you say your health is:
    a. Excellent b. Very good c. Good d. Fair e. Poor
14. Do you have any major medical problems (diabetes, heart disease, respiratory illness, etc.)
    Yes No If so, please list: _____
15. Do you have any other conditions that limit your physical activity on a day-to-day basis?
    Yes No If so, please list: _____
16. Have you ever been diagnosed with any form of mental illness (depression, schizophrenia, bipolar disorder, etc.)?
    Yes No If so, please list: _____
17. How would you rate your daily diet/food intake?
    a. Excellent b. Very good c. Good d. Fair e. Poor
18. How would you rate your daily level of physical activity?
    a. Excellent b. Very good c. Good d. Fair e. Poor

19. Where have you slept the most often in the past month?
    a. Your own house/apartment b. House/apartment of someone you know c. Hotel
    d. Shelter e. Outside f. Other (please list): _____
20. How would you rate the level of safety of your sleep location in the past month?
    a. Excellent b. Very good c. Good d. Fair e. Poor
21. How would you rate the level of comfort of your sleep location in the past month?
    a. Excellent b. Very good c. Good d. Fair e. Poor
22. About how many nights in the past month have you slept in a shelter?

    _____
23. Are you currently unhoused? Yes No
    a. If Yes, for how many days (or weeks or years) have you been unhoused?

       _____
    b. If Yes, have you been unhoused other times in the past (if so, how many times, and for how long each time?)

       _____
    c. If No, have you ever been unhoused in the past? If so, how many times, and for how long each time?

       _____

GHQ-12 Questionnaire

I would like to know if you have any medical complaints, and how your health has been in general, *over the past few weeks.* Have you recently…

1. Been able to concentrate on whatever you are doing?
   More so than usual
   Same as usual
   Less so than usual
   Much less than usual

2. Lost much sleep over worry?
   Not at all
   No more than usual
   Rather more than usual
   Much more than usual

3. Felt that you were playing a useful part in things?
   More so than usual
   Same as usual
   Less so than usual
   Much less than usual

4. Felt capable of making decisions about things?
   Not at all
   No more than usual
   Rather more than usual
   Much more than usual

5. Felt constantly under stress?
   Not at all
   No more than usual
   Rather more than usual
   Much more than usual

6. Felt that you could not overcome your difficulties?
   Not at all
   No more than usual
   Rather more than usual
   Much more than usual

7. Been able to enjoy your normal day-to-day activities?
   More so than usual
   Same as usual
   Less so than usual
   Much less than usual

8. Been able to face up to your problems?
   More so than usual
   Same as usual
   Less so than usual
   Much less than usual

9. Been feeling unhappy and depressed?
   Not at all
   No more than usual
   Rather more than usual
   Much more than usual

10. Been losing confidence in yourself?
    Not at all
    No more than usual
    Rather more than usual
    Much more than usual

11. Been thinking of yourself as a worthless person?
    Not at all
    No more than usual
    Rather more than usual
    Much more than usual

12. Been feeling reasonably happy, all things considered?
    More so than usual
    Same as usual
    Less so than usual
    Much less than usual

Pittsburgh Sleep Quality Index Modified Questionnaire

1. During the past month, what time have you gone to bed?
   BED TIME _____ AM/PM
   BED TIME _____ AM/PM (if more than 1 consistent bed time)
   BED TIME _____ AM/PM (if more than 2 consistent bed times)

2. During the past month, how long (in minutes) has it usually taken you to fall asleep?
   NUMBER OF MINUTES _____

3. During the past month, what time have you usually gotten up?
   GETTING UP TIME _____ AM/PM
   GETTING UP TIME _____ AM/PM (if more than 1)
   GETTING UP TIME _____ AM/PM (if more than 2)

4. During the past month, how many hours of actual sleep did you get on average over the course of 24 hours? (This may be different from the number of hours you spent lying down.)
   HOURS OF SLEEP _____

5. During the past month, how often have you had trouble sleeping because you…

   a. Cannot get to sleep within 30 minutes
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   b. Wake up in the middle of the night or early morning
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   c. Have to get up to use the bathroom
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   d. Cannot breathe comfortably
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   e. Cough or snore loudly
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   f. Feel too cold
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   g. Feel too hot
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   h. Had bad dreams
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   i. Have pain
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

   j. Other reason(s), please describe
   _____
   _____

How often during the past month have you had trouble sleeping because of this?
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

6. During the past month, how would you rate your sleep quality overall?
   Very good _____
   Fairly good _____
   Fairly bad _____
   Very bad _____

7. During the past month, have you taken medicine to help you sleep (prescribed or "over the counter")?
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

8. During the past month, have you had trouble staying awake while driving, eating meals or engaging in social activity?
Not during the past month ___Less than once a week ___Once or twice a week ___Three or more times a week ___

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?
   No problem at all _____
   Only a very slight problem _____
   Somewhat of a problem _____
   A very big problem _____

Table 1: Demographic characteristics of the sample

Sex	
Male	87.5%
Female	12.5%
Age	
Range	29-66
Average	48.44
Ethnic Composition	
Asian American	3.1%
African American	21.9%
White	71.9%
Other	3.1%
Marital Status	
Single	68.8%
Married	6.3%
Divorced	25%
Have had Children	43.8%
Highest Level of Education Completed	
Less than high school	29%
12^{th} grade	29%
Some college	19.4%
Associate's degree	6.5%
Bachelor's degree	9.7%
Master's degree	6.5%
Currently employed	28.1%
Receiving financial aid (i.e. food stamps)	64.5%
Have health insurance	90.6%

Table 2: Self-Reported Health Characteristics

Measure	Overall Health	Daily Diet	Daily Physical Activity
Excellent	3.1%	6.3%	15.6%
Very Good	28.1%	18.8%	15.6%
Good	40.6%	40.6%	37.5%
Fair	21.9%	31.3%	25%
Poor	6.3%	3.1%	6.3%

Table 3: Sleep Locations

Location	Percent
Your own house or apartment	25%
House or apartment of someone you know	9.4%
Hotel	0%
Shelter	37.5%
Outside	18.8%
Other	9.4%

Table 4: Level of Safety and Comfort in Sleep Locations

Measure	Safety	Comfort
Excellent	3.1%	6.3%
Very Good	28.1%	18.8%
Good	40.6%	40.6%
Fair	21.9%	31.3%
Poor	6.3%	3.1%

Table 5: PSQI Component Scores

Component	Average	Standard Deviation	Range
1: Subjective sleep quality	1.09	.73	0 – 3
2: Sleep latency	1.28	1.17	0 – 3
3: Sleep duration	1.22	1.16	0 – 3
4: Habitual sleep efficiency	1.13	1.26	0 – 3
5: Sleep disturbances	1.44	.84	0 – 3
6: Use of sleeping medication	.88	1.26	0 – 3
7: Daytime dysfunction	.84	.68	0 – 2

Table 6: Correlations with Spearman's Rho

Spearman's Rho		Currently Unhoused	Sleep Location Comfort	Sleep Location Safety	Major Medical Problem	Daily Diet	Daily Physical Activity
Currently Unhoused	Correlation Coefficient	1.000	-.578**	-.436*	-.109	.016	.114
	Sig. (2-tailed)	.	.001	.013	.553	.931	.536
	N	32	32	32	32	32	32
Sleep Location Comfort	Correlation Coefficient	-.578**	1.000	.816**	.096	.353*	-.060
	Sig. (2-tailed)	.001	.	.000	.603	.048	.743
	N	32	32	32	32	32	32
Sleep Location Safety	Correlation Coefficient	-.436*	.816**	1.000	.167	.266	-.195
	Sig. (2-tailed)	.013	.000	.	.362	.142	.285
	N	32	32	32	32	32	32
Major Medical Problem	Correlation Coefficient	-.109	.096	.167	1.000	-.290	-.409*
	Sig. (2-tailed)	.553	.603	.362	.	.107	.020
	N	32	32	32	32	32	32
Daily Diet	Correlation Coefficient	.016	.353*	.266	-.290	1.000	.279
	Sig. (2-tailed)	.931	.048	.142	.107	.	.123
	N	32	32	32	32	32	32
Daily Physical Activity	Correlation Coefficient	.114	-.060	-.195	-.409*	.279	1.000
	Sig. (2-tailed)	.536	.743	.285	.020	.123	.
	N	32	32	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 7: Pearson Correlations

		GHQ Total	Hours of Sleep	PSQI Total	PSQI Comp1	PSQI Comp2	PSQI Comp3	PSQI Comp4	PSQI Comp5
GHQ Total	Pearson Correlation	1	-.109	.318	.500**	.260	.109	-.044	.239
	Sig. (2-tailed)		.552	.077	.004	.151	.553	.810	.188
	N	32	32	32	32	32	32	32	32
Hours of Sleep	Pearson Correlation	-.109	1	-.539**	-.255	-.349	-.935**	-.723**	-.089
	Sig. (2-tailed)	.552		.001	.160	.050	.000	.000	.628
	N	32	32	32	32	32	32	32	32
PSQI Total	Pearson Correlation	.318	-.539**	1	.638**	.756**	.579**	.540**	.693**
	Sig. (2-tailed)	.077	.001		.000	.000	.001	.001	.000
	N	32	32	32	32	32	32	32	32
PSQI Comp1	Pearson Correlation	.500**	-.255	.638**	1	.456**	.355*	.056	.559**
	Sig. (2-tailed)	.004	.160	.000		.009	.046	.759	.001
	N	32	32	32	32	32	32	32	32
PSQI Comp2	Pearson Correlation	.260	-.349	.756**	.456**	1	.334	.194	.330
	Sig. (2-tailed)	.151	.050	.000	.009		.061	.288	.065
	N	32	32	32	32	32	32	32	32
PSQI Comp3	Pearson Correlation	.109	-.935**	.579**	.355*	.334	1	.709**	.197
	Sig. (2-tailed)	.553	.000	.001	.046	.061		.000	.279
	N	32	32	32	32	32	32	32	32
PSQI Comp4	Pearson Correlation	-.044	-.723**	.540**	.056	.194	.709**	1	.160
	Sig. (2-tailed)	.810	.000	.001	.759	.288	.000		.383
	N	32	32	32	32	32	32	32	32
PSQI Comp5	Pearson Correlation	.239	-.089	.693**	.559**	.330	.197	.160	1
	Sig. (2-tailed)	.188	.628	.000	.001	.065	.279	.383	
	N	32	32	32	32	32	32	32	32
PSQI Comp6	Pearson Correlation	.061	.378*	.391*	.187	.352*	-.356*	-.232	.387*
	Sig. (2-tailed)	.742	.033	.027	.306	.048	.046	.201	.028
	N	32	32	32	32	32	32	32	32
PSQI Comp7	Pearson Correlation	.411*	-.017	.447*	.225	.342	-.079	.024	.408*
	Sig. (2-tailed)	.019	.928	.010	.216	.055	.669	.898	.021
	N	32	32	32	32	32	32	32	32
Unhoused Duration	Pearson Correlation	-.038	.163	-.189	-.142	.087	-.207	-.204	-.370*
	Sig. (2-tailed)	.837	.373	.300	.439	.636	.255	.262	.037
	N	32	32	32	32	32	32	32	32
Major Medical Problem	Pearson Correlation	.084	-.048	-.232	-.225	.012	.015	-.057	-.563**
	Sig. (2-tailed)	.647	.794	.202	.216	.948	.933	.758	.001
	N	32	32	32	32	32	32	32	32
Health Rating	Pearson Correlation	.136	.100	.382*	.277	.116	.059	.161	.485**
	Sig. (2-tailed)	.460	.586	.031	.124	.527	.750	.378	.005
	N	32	32	32	32	32	32	32	32
Physical Activity	Pearson Correlation	.241	.221	-.016	.241	-.076	-.179	-.281	.245
	Sig. (2-tailed)	.184	.224	.929	.184	.680	.328	.119	.177
	N	32	32	32	32	32	32	32	32
Daily Diet	Pearson Correlation	.269	.069	.252	.362*	.013	-.013	.074	.451**
	Sig. (2-tailed)	.136	.708	.164	.042	.945	.944	.687	.010
	N	32	32	32	32	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Pearson Correlations Continued		PSQI Comp6	PSQI Comp7	Unhoused Duration	Major Medical Problem	Health	Physical Activity	Daily Diet
GHQ Total	Pearson Correlation	.061	.411*	-.038	.084	.136	.241	.269
	Sig. (2-tailed)	.742	.019	.837	.647	.460	.184	.136
	N	32	32	32	32	32	32	32
Hours of Sleep	Pearson Correlation	.378*	-.017	.163	-.048	.100	.221	.069
	Sig. (2-tailed)	.033	.928	.373	.794	.586	.224	.708
	N	32	32	32	32	32	32	32
PSQI Total	Pearson Correlation	.391	.447*	-.189	-.232	.382*	-.016	.252
	Sig. (2-tailed)	.027	.010	.300	.202	.031	.929	.164
	N	32	32	32	32	32	32	32
PSQI Comp1	Pearson Correlation	.187	.225	-.142	-.255	.277	.241	.362*
	Sig. (2-tailed)	.306	.216	.439	.216	.124	.184	.042
	N	32	32	32	32	32	32	32
PSQI Comp2	Pearson Correlation	.352*	.342	.087	.012	.116	-.076	.013
	Sig. (2-tailed)	.048	.055	.636	.948	.527	.680	.945
	N	32	32	32	32	32	32	32
PSQI Comp3	Pearson Correlation	-.356*	-.079	-.207	.015	.059	-.179	-.013
	Sig. (2-tailed)	.046	.669	.255	.933	.750	.328	.944
	N	32	32	32	32	32	32	32
PSQI Comp4	Pearson Correlation	-.232	.024	-.204	-.057	.161	-.281	.074
	Sig. (2-tailed)	.201	.898	.262	.758	.378	.119	.687
	N	32	32	32	32	32	32	32
PSQI Comp5	Pearson Correlation	.387*	.408*	-.370*	-.563**	.485**	.245	.451**
	Sig. (2-tailed)	.028	.021	.037	.001	.005	.177	.010
	N	32	32	32	32	32	32	32
PSQI Comp6	Pearson Correlation	1	.240	.001	-.195	.403*	-.031	.114
	Sig. (2-tailed)		.185	.994	.285	.022	.868	.533
	N	32	32	32	32	32	32	32
PSQI Comp7	Pearson Correlation	.240	1	.054	-.032	.050	.355*	.217
	Sig. (2-tailed)	.185		.771	.861	.785	.046	.234
	N	32	32	32	32	32	32	32
Unhoused Duration	Pearson Correlation	.001	.054	1	.252	.017	.038	.190
	Sig. (2-tailed)	.994	.771		.165	.925	.835	.298
	N	32	32	32	32	32	32	32
Major Medical Problem	Pearson Correlation	-.195	-.032	.252	1	-.335	.411*	-.273
	Sig. (2-tailed)	.285	.861	.165		.061	.019	.131
	N	32	32	32	32	32	32	32
Health Rating	Pearson Correlation	.403*	.050	.017	-.335	1	.178	.251
	Sig. (2-tailed)	.022	.785	.925	.061		.331	.167
	N	32	32	32	32	32	32	32
Physical Activity	Pearson Correlation	-.031	.355*	.038	-.411*	.178	1	.243
	Sig. (2-tailed)	.868	.046	.835	.019	.331		.180
	N	32	32	32	32	32	32	32
Daily Diet	Pearson Correlation	.114	.217	.190	-.273	.251	.243	1
	Sig. (2-tailed)	.533	.234	.298	.131	.167	.180	
	N	32	32	32	32	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).