



# Sleep Hygiene

## The Science of Resilience

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## Definition

Sleep hygiene can broadly be defined as the practices and environmental factors that promote good sleep quality and duration. Some key definitions from the literature:

- “A term that describes modifiable parent and child practices that promote good sleep quality, allow sufficient sleep duration, and prevent daytime sleepiness. Sleep hygiene practices cover a number of domains, including the sleep environment, sleep routine, and daytime activities” (Mindell et al., 2008).
- “Sleep hygiene refers to the general rules of behavioural practices and environmental factors that are consistent with good quality sleep. When defined broadly, it includes guidelines for general health practices (e.g., diet, exercise, substance use), environmental factors (e.g., light, temperature, noise), as well as sleep-related behavioural practices (e.g., regularity of sleep schedule, pre-sleep activities, efforts to try to sleep)” (Yang et al., p. 148).

In the U.S., the National Sleep Foundation recommends that good sleep hygiene includes a consistent sleep schedule for bedtimes, wake times, and nap times (for young children) and a predictable set of pre-sleep activities (bedtime routine). They also recommend that children fall asleep independently, and studies of American children have found that parental presence when falling asleep was associated with more waking during the night (Mindell et al., 2008). However, there are cultural differences in sleep practices. For example, in Italy, Australia, and Portugal, parents reported a high incidence of involvement, staying with their children until they fall asleep, while this bedtime practice was less common in Swedish and US children (Giannotti & Cortesi, 2009). In rural areas of Gambia, young children sleep with their mothers and older children sleep with a parent, another adult relative, or other siblings. In Uganda, children less than 5 years share a bed with their parents. Mayan children in Guatemala fall asleep in someone’s arm or when their parents go to bed, falling asleep when they are ready without bedtime rituals such as lullabies, stories, or toys. (Morelli et al., 1992). While parental presence and bedtime routines vary by culture, the influence of technology appears to have a somewhat consistent effect as watching TV and playing video games were associated with prolonged sleep latency and less sleep overall in American, Italian, Japanese, Sudanese, Indian and Brazilian children (Giannotti & Cortesi, 2009).

Good sleep hygiene covers many areas, from controllable behaviour to environmental factors. The most commonly cited practice is consistent bedtimes and wake times (Bartel et al., 2015; Brown et al., 2002; Halal & Nunes, 2014; Mindle et al., 2008; Wong et al., 2018; Yang et al., 2010) but again, this is cultural sensitive (Giannotti & Cortesi, 2009). In a meta-analysis of sleep studies focused on adolescents, Bartel et al. (2015) also found some support for the

relationship between rarely using one's bed for things other than sleep, relaxing before bed, and a positive family environment in American, Australian, and German samples. There is some mixed support for the relationship between exercise and sleep (Brown et al., 2002).

Poor sleep hygiene is often characterized by computer, mobile phone, video game, or TV use before bed, negative family environment, tobacco use, evening light, and caffeine consumption (Bartel et al., 2015; Mindle et al., 2008). In some cultural contexts, parent presence while falling asleep is also considered poor sleep hygiene (Mindle et al., 2008; Giannotti & Cortesi, 2009).

## Relationship to Resilience

The association between good sleep hygiene and resilience has been shown in multiple cultural contexts and ages. For example, Mastin et al. (2018) found that poor sleep hygiene was significantly associated with lower resilience in students and faculty at an American university. Doi et al. (2017) found that regular bedtimes correlated significantly with higher scores for resilience in first grade children (aged 6 to 7) in Adachi City, Tokyo.

The association between sleep and resilience has also been found in specific subsets of the population such as professional dancers in-training, U.S. military personnel, and children of alcoholics. In a sample of professional dancers in training, with a mean age of 21 in Spain, Arinaga (2018) found that those with poor self-reported sleep quality or who reported sleeping less than 7 hours a night showed a higher risk of having low resilience. In a large sample of U.S. military personnel, the majority of whom were male and Caucasian, the relationship between the most resilient group and hours of sleep constituted a U-shaped curve, where those with shorter and longer sleep times had less resilient outcomes (Seeling et al., 2016). The authors hypothesized that the association between longer sleep duration and less resilient outcomes could be due to underlying disorders, such as depression, which were not measured. As well, it's important to note that the resilient outcomes in this study were fairly specific to the military sample and consisted of: self-rated health, less work days lost due to illness or injury, higher likelihood of deployment, completion of service term, and fewer outpatient medical visits or hospitalization. In a study of children of alcoholics, Wong et al. (2018) found that regular bedtimes and wake times and the absence of sleep difficulties in childhood predicted better self-regulation as adolescents, which in turn, decreased the odds of developing an alcohol disorder diagnosis or substance-related problem in adulthood. Furthermore, good childhood sleep behaviours had a significant positive relationship with the latent resilience construct in adulthood; this relationship was not mediated by self-regulation in adolescence and found in both children of alcoholics and controls. The resilience construct in this study was composed of an absence of depressive symptoms, work satisfaction, and relationships satisfaction.

Finally, the relationship between resilience and sleep has also been shown following traumas. In a study of 224 U.S. military veterans who had been Vietnam prisoners of war, Segovia et al. (2013) found that self-reporting few sleep disturbances before capture and after repatriation predicted better resilience. The next highest predictor of resilience was few or no sleep disturbances after repatriation, suggesting that healthy sleeping following trauma is important for building resilience.

## Interventions

### Sleep Hygiene Education (SHE)

Sleep hygiene education (SHE) is one of the mostly widely used strategies for dealing with sleep difficulties; it can be used on its own or as part of a larger cognitive-behavioural therapy. However, the evidence on the effectiveness of this intervention alone are mixed. Brown et al. (2002) found that, while good sleep hygiene knowledge was weakly associated with good sleep hygiene practices, knowledge was not directly related to overall sleep quality. However, sleep hygiene practice was strongly associated with sleep quality. The authors suggest that the weak correlation between knowledge and practice has to do with the fact that certain aspects of sleep hygiene are more modifiable, such as consistent bedtimes and wake times, than other environmental factors. In Brown et al.'s (2002) sample of college students, they could not control certain environmental factors such as the noise levels of their dorms. Thus, sleep hygiene education may need to be tailored to the context and the factors that are within an individual's control (Brown et al., 2002; Sutton et al., 2018). As well, Yang et al. (2010) point out that sleep hygiene may not be represented with a single construct, and thus, the different domains of sleep hygiene should be evaluated and targeted by interventions separately. Additionally, there is evidence that sleep hygiene education alone is not an effective treatment for those with insomnia, and that more intensive CBT interventions aimed at physiological or cognitive arousal are necessary (Yang et al., 2010). However, in non-insomniacs, there is evidence that sleep hygiene practices produce good sleep quality (Brown et al., 2002; Yang et al., 2010).

#### ***SHE for young children (3 months to 4 years old)***

Halal and Nunes (2014) conducted a systematic review of sleep hygiene education for parents of young children and found support for the following methods:

- Extinction: parents put the child to bed at a certain time and ignore the child's cries until they fall asleep; in the morning, they ignore the child until a certain pre-determined wake time.

- Gradual extinction: parents ignore the demands of the child for specific time periods determined by the child's age; parents calm the child for short periods. This method is easier for parents to adhere to than the extinction method and shows evidence of decreased nocturnal awakenings.
- Minimal checking with systematic extinction.
- Positive routines: parents develop routines preceding bedtime comprised of peaceful and pleasurable activities.
- Programmed awakenings: parents wake the child at night, 15 to 30 minutes before the usual time of spontaneous awakening and then comfort the child back to sleep. This method showed fewer awakenings following intervention and the decrease occurred faster than in the comparison extinction group.
- Sleep remodelling: parents do not allow naps in the four to six hours before bedtime, depending on the child's age.

Sutton et al. (2018) investigated SHE with parents of children with developmental disabilities and found that practitioners need to develop a deep empathy with the parent's situation before implementing SHE. Furthermore, the SHE intervention should be tailored to individual need rather than standardised advice. For long-term sleep problems, SHE knowledge was necessary but insufficient alone to solve children's sleep difficulties.

### ***SHE intervention with adolescents***

de Sousa et al. (2007) implemented a one week, school-based SHE intervention with Brazilian adolescents (mean age = 15.98). The intervention included daily, 50-minute classes for one week, in which students did activities such as an ontogeny map to discuss the modifications in the sleep-wake cycle throughout the lifespan, listened to exposition lessons on the function, nature and other characteristics of the sleep-wake cycle, completed a survey on sleepiness, concentration and memorization difficulties, and bad moods to make students aware of the problems associated with bad sleep, took part in a discussion about the causes and consequences of short sleep duration, and took a final quiz at the end of the week. As well, pamphlets were distributed and posters were hung around the school with questions and information about sleep. After the intervention, de Sousa et al. (2007) found that sleep latency decreased, naps began earlier but the duration remained the same, and the irregularity of bedtimes decreased slightly. However, no difference was observed in sleepiness or sleep quality. The authors suggest the academic and social factors adolescents experience may exert a stronger influence on their sleep schedules than the knowledge gained during the SHE intervention.

### ***SHE intervention with working women***

Chen et al. (2010) implemented a 5-week SHE program with a self-selected group of 66 working women, aged 21 to 62 (mean age = 28.8, SD = 11.5), with sleep disorders in Taiwan. Having a sleep disorder was defined as scoring a 5 or higher on the Pittsburgh Sleep Quality Index (PSQI). Each week of the intervention targeted a different area: 1) arranging a good sleep environment and habits, 2) reducing emotional stress, 3) controlling diet, alcohol consumption, and tobacco use, 4) exercising regularly, and 5) introducing alternative therapies including relaxation training, musical therapy, and aromatherapy. Chen et al. (2010) found that after the intervention, PSQI scores decreased dramatically from a mean of 9.6 at pre-test to 4.8 at post-test, below the cut off point for sleep difficulties. Furthermore, the authors found that most of the effect of the intervention came after the first three weeks, thus they recommend those three topics be used as a shortened version of the intervention. Only those participants who were not earning a living wage did not benefit after the first three weeks, suggesting that the relationship between economic security and sleep should be further investigated. It is important to recognize that participants in this study volunteered for the study in the hopes of bettering their sleep, in contrast to the adolescents in de Sousa's study who took part as part of the school curriculum. The motivation, length and intensity of this intervention, combined with the different age groups, may explain the different levels of effectiveness found for the SHE intervention in de Sousa et al's. (2007) and Chen et al's (2010) studies.

### Mindfulness-based Intervention

Mindfulness-based interventions (MBIs) may be a scalable, community-accessible intervention for sleep disturbances in the general population and insomniacs. However, evidence of their effectiveness is also mixed. Gong et al. (2016) conducted a systematic review of six randomized clinical trials (RCTs) that investigated the effect of MBIs for insomniacs. They found that, compared to wait-list control or attention control groups, MBIs significantly reduced total wake time, sleep onset latency, and PSQI scores and increased sleep quality and sleep efficiency. Total sleep time improved in the long term but not the short term. However, compared to cognitive-behavioural therapies or pharmacotherapy, MBIs did not show any distinct effect.

Winbush et al. (2007) conducted a systematic review of a specific mindfulness intervention, the mindfulness-based stress reduction (MBSR) intervention, a formalized 8-week, 150 minute-long, psycho-educational, skills-based program where information is presented about stress, cognition, and health and participants received training in several formal meditation techniques. In their review, four studies did not include control groups and found significant improvement in sleep measures following the MBSP intervention, whereas three controlled studies found no statistically significant difference between their intervention and control groups.

Black et al. (2015) conducted an RCT to compare an MBI to a sleep hygiene education (SHE) intervention for older adults with moderate sleep disturbances. The intervention studied was mindful awareness practices (MAPs) for daily living, a 2-hour, 6-session group-based course in mindfulness meditation available in-person in the LA area or online; the course included a book, guided mediation disc, and homework. The control SHE program was a 2-hour, 6-session group-based course in sleep hygiene education and included homework to match the MAPs group. The sample consisted of 49 older adults (mean aged = 66.3, SD = 7.4; 67% were women, and 84% were White). The MAPs groups showed a greater improvement on the PSQI following the intervention. Scores on measures of insomnia, fatigue, and depression showed improvement relative to the SHE group at immediate posttreatment. The MAPs intervention had an effect size of 0.79 for improvement in sleep quality.

Mindfulness interventions can be delivered as simply mindfulness training, such as in Black et al.'s (2015) study, or they can be combined with stress reduction teaching, such as the mindfulness-based stress reduction (MBSR) intervention (Winbush et al., 2007), or cognitive therapy (Gong et al., 2016).

### Cognitive-behavioural Therapy, Sleep Hygiene Education, and Mindfulness Intervention

In a longitudinal, randomized control trial in Australia, Waloszek et al. (2015) tested the effect of a cognitive-behavioural therapy (CBT) based intervention that incorporated sleep hygiene education and mindfulness-based therapy for adolescents at risk of sleep difficulties. Based on the literature that anxious youth may be at particular risk for sleeping difficulties, Waloszek et al. (2015) implemented 7 weekly 90-minute group session supported by psycho-educational materials and at-home tasks. The intervention was tailored to the developmental challenges and opportunities of adolescence, and parents were also given information to ensure that participant's sleep improvement goals were integrated and supported by the family, showing the level of involvement that may be necessary to sleep hygiene education interventions (Sutton et al. 2018; c.f. de Sousa et al., 2007). At the two-year follow-up of this study, participants (n = 123; 60% girls, aged 12-16, mean age = 14.48) showed significant improvement on all components of the PSQI (Blake et al., 2017). As well, they showed improvement on behavioural measures of social problems, attention problems, and aggressive behaviours (Blake et al., 2017).

## Assessment

### **Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1988; Appendix A)**

The PSQI is the most widely used measures of sleep quality. It has been used with youth aged 12-16 (Waloszek et al., 2015) to young adults (Brown et al., 2002) to elderly adults, aged



55 and above (Black et al., 2015; Yang et al., 2010), in Spain (Arbinaga, 2018), Taiwan (Yang et al., 2010), the U.S. (Brown et al., 2002), and Australia (Waloszek et al., 2015). There is also a validated Chinese version (Chen et al., 2010; Yao et al., 2008).

- 19-item, self-report measure of sleep quality and sleep disturbances over a 1-month period
- Includes 7 domains of sleep: 1) subjective sleep quality, 2) sleep latency (the reported time taken to fall asleep), 3) sleep duration (the reported number of hours slept or a score on the duration scale), 4) sleep efficiency (the percentage of time slept relative to time in bed or a score on the scale), 5) sleep disturbances (the number of times the participant reports having had problems falling asleep for various reasons), 6) use of sleeping medications, and 7) daily dysfunction due to sleep (drowsiness, etc.)
- Range of 0-21, with higher scores indicating worse sleep. Scores of 5 or above indicate sleep difficulties and discriminate between “good” and “poor” sleepers (Buysse et al., 1988)
- Cronbach’s alpha from 0.81-0.85 (Arbinaga, 2018; Brown et al., 2002; Yang et al., 2010) and a test-retest reliability of 0.85 (Yang et al., 2010)
- The Chinese version of the PSQI (Yao et al., 2008) has a Cronbach’s alpha of 0.85. In Chen et al.’s (2010) study, the alpha was 0.73

### **Sleep Diaries**

Sleep Diaries are also a common tool for measuring sleep quality and may ask about things like: sleep onset latency (how long it took an individual to fall asleep), total sleep time, wake time after sleep onset, sleep efficiency, sleep quality, and total wake time.

### **Sleep Hygiene Awareness and Practice Scale (SHAPS; Lacks & Rotert, 1986)**

The SHAPS is a direct measure of sleep hygiene, however, there are few studies evaluating its psychometric properties.

- The SHAPS has two major components: the awareness section and the practice section.
  - The awareness section is further divided into two subsections; the first subsection includes 13 items that measure the respondents’ knowledge of whether certain activities (such as taking a nap or having a regularly scheduled bedtime) are beneficial, disruptive, or have no effect on sleep.
  - The second subsection of the awareness section measures respondents’ awareness of whether 18 common foods, beverages, and non-prescription drugs contain caffeine.
  - The practice section contains 19 items that ask respondents how many nights per week they engage in certain activities known to promote or inhibit sleep.

- Brown et al. (2002) used the SHAPS in their study of college students and reviewed its reliability:
  - The sleep hygiene awareness of activities subsection had acceptable internal reliability ( $\alpha = 0.78$ ) but the caffeine knowledge subsection and sleep hygiene practice section had poor internal reliability ( $\alpha = 0.55$  and  $\alpha = 0.47$ , respectively).
  - The sleep-hygiene awareness and sleep-hygiene practice sections had acceptable test-retest reliability ( $r = 0.86$ ,  $p < 0.001$  and  $r = 0.50$ ;  $p < 0.001$ )
  - The authors claim that their findings support the use of the awareness of activities subsection and the practice section, but not the caffeine awareness subsection. They suggest that the weak internal consistency of the practice section was a result of participant's habits rather than the scale's psychometric properties. That is, because of the wide variety of behaviours assessed by the practice section, participants may practice some good sleep practices and not others.

### **Sleep Hygiene Practice Scale (SHPS; Lin et al., 2007; Appendix B)**

The SHPS is another direct measure of sleep hygiene; however, as a relatively new scale, it also lacks psychometric validation studies.

- The SHPS is a 30-item measure with four domains: 1) sleep schedule and timing, 2) arousal-related behaviours, 3) poor eating/ drinking habits prior to sleep, 4) poor sleep environment.
- Yang et al. (2010) used the SHPS in their study of adult “good sleepers” and insomniacs in Taiwan. They found Cronbach alpha scores of .70 and .58 for arousal-related behaviours, .67 and .65 for sleep environment, .72 and .70 for eating/drinking habits, and .82 and .74 for sleep scheduling in good sleepers and insomniacs, respectively.
- Similar to Brown et al. (2002) with the SHAPS, the authors claim that, given the broad aspects of sleep hygiene practices and the variation of behaviours that an individual may engage in, the alpha coefficients are within acceptable ranges.

### **Sleep Hygiene Index (SHI; Mastin et al., 2006; Appendix C)**

The SHI was created as a short measure derived from the diagnostic criteria for a diagnosis of inadequate sleep hygiene as defined in the International Classification of Sleep Disorders.

- The SHI was piloted in a sample of 632 psychology university students from a Midwest university in the U.S (alpha set: 103 males and 205 females, mean age 21.6; beta set: 125 males and 199 females, mean age 22.7).
- It is a 13-item self-administered measure.

- Cronbach's alpha = 0.66, test-retest reliability ( $r(139) = 0.71, p < 0.01$ )
- The SHI has been validated in various cultural contexts:
  - Cho et al. (2013) found acceptable internal consistencies and test-retest reliability estimates in a sample 161 clinical patients with chronic pain in Seoul, Korea.
  - Seun-Fadipe et al. (2018) found satisfactory psychometric properties in a sample of 348 Nigerian undergraduate students.
  - Anwar et al. (2019) found an adequate level of internal consistency in a sample of 204 Saudi college and university students.
  - Chehri et al. (2017) validated the Persian version of the SHI in a sample of 1280 participants from the general population.
  - Ozdemir et al. (2015) validated the Turkish version of the SHI in a community sample of 200 people and a sample of 106 patients with major depression.

### **Adolescent Sleep Hygiene Scale-Revised (ASHSr; Storfer et al., 2013)**

- The ASHSr is a self-administered measure for youth aged 12 and over.
- The revised version was piloted in a community sample of 514 adolescents at two time points, four years apart, as part of a larger study. The age range of the sample was 16-19, (mean age = 17.7; SD = 0.4; about half (49%) of the sample was male; 60% were Caucasian and 36% were African American).
- The revised version is a 24-item measure with 6 subscales: physiological, behavioural arousal, cognitive-emotional, daytime sleep, sleep environment, and sleep stability.
- The ASHSr has an internal validity of 0.84

## Other Notes

Sleep hygiene interventions, particularly sleep hygiene education (SHE), may have different effects on those who have insomnia compared to the general population. There are many possible explanations for the ineffectiveness of sleep hygiene education for insomnia. Yang et al. (2010) found that arousal-related behaviours were the only domain of the Sleep Hygiene Practice Scale correlated with insomnia severity and sleep quality in insomniacs. They suggest that sleepy hygiene education alone may not be a sufficient treatment for insomnia, rather, interventions aimed to reduce physiological or cognitive arousal (e.g., relaxation training, cognitive restructuring) and stimulus control instructions to reduce conditioned arousal with bedtime cues may be better suited to help insomniacs (Yang et al., 2010).

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## Appendix A: Pittsburgh Sleep Quality Index (PSQI)

Buysse et al. (1988)

Instructions: The following questions relate to your usual sleep habits during the past month *only*. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, when have you usually gone to bed at night?  
USUAL BEDTIME \_\_\_\_\_
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?  
NUMBER OF MINUTES \_\_\_\_\_
3. During the past month, when have you usually gotten up in the morning?  
USUAL GETTING UP TIME \_\_\_\_\_
4. During the past month, how many hours of *actual sleep* did you get at night? (This may be different than the number of hours you spent in bed.)  
HOURS OF SLEEP PER NIGHT \_\_\_\_\_

For each of the remaining questions, check the one best response. Please answer all questions.

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 \_\_\_\_\_  
 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, how often have you taken medicine (prescribed or “over the counter”) to help you sleep?
- 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, how often 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 \_\_\_\_

### PSQI Scoring

Component 1 = #9 Score

Component 2 = #2 Score ( $\leq 15$  min=0; 16-30 min=1; 31-60 min=2, >60 min=3) + #5a Score (if sum is equal 0=0; 1-2=1; 3-4=2; 5-6=3)

Component 3 = #4 Score (>7=0; 6-7=1; 5-6=2; <5=3)

Component 4 = (total # of hours asleep)/(total # of hours in bed) x 100 >85%=0, 75%-84%=1, 65%-74%=2, <65%=3

Component 5 = Sum of Scores #5b to #5j (0=0; 1-9=1; 10-18=2; 19-27=3)

Component 6 = #6 Score

Component 7 = #7 Score + #8 Score (0=0; 1-2=1; 3-4=2; 5-6=3)

Add the seven component scores together: Global PSQI Score \_\_\_\_

## Appendix B: The Sleep Hygiene Practices Scale (SHPS)

Lin et al. (2007)

Instructions: The following items are descriptions of common sleep habits, daily life activities, and sleep environments. Please circle the number to indicate how often the situations fit your personal experiences.

1 = Never    2 = Rarely    3 = Occasionally    4 = sometimes    5 = Frequently    6 = Always

1. Bedtime not consistent daily
2. Get out of bed at inconsistent times
3. Stay in bed after waking up in the morning
4. Sleep in on weekends
5. Napping or resting in bed for over an hour during the day
6. Lack of exposure to outdoor light during the day
7. Lack of regular exercise
8. Unpleasant conversation prior to sleep
9. Not enough time to relax prior to sleep
10. Falling asleep with TV or music on
11. Pondering about unresolved matters while lying in bed
12. Check the time in the middle of the night
13. Doing sleep-irrelevant activities in bed (e.g., watching TV, reading, etc.)
14. Worry about not being able to fall asleep in bed
15. Worry about night-time sleep during the day
16. Vigorous exercise during the 2 hours prior to sleep
17. Drinking caffeinated drinks (e.g., coffee, tea, soda) within 4 hours prior to bedtime
18. Drinking alcohol within 2 hours prior to bedtime
19. Consuming stimulating substances (e.g., nicotine) during the 2 hours prior to bedtime
20. Going to bed hungry
21. Drinking a lot during the hour prior to sleep
22. Eating too much food during the hour prior to sleep
23. Sleep environment is either too noisy or too quiet
24. Sleep environment is either too bright or too dark
25. Sleep environment is either too humid or too dry
26. Feeling too hot or too cold during sleep
27. Poor ventilation of bedroom
28. Uncomfortable bedding and/or pillow
29. Too many sleep-unrelated items in bedroom

30. Sleep is interfered by bed partner

## Appendix C: The Sleep Hygiene Index

Mastin et al. (2006)

Please indicate how frequently you engage in the following behaviours:

Always      Frequently      Sometimes      Rarely      Never

1. I take daytime naps lasting two or more hours
2. I go to bed at different times from day to day
3. I get out of bed at different times from day to day
4. I exercise to the point of sweating within 1 hour of going to bed
5. I stay in bed longer than I should two to three times a week
6. I use alcohol, tobacco, or caffeine within 4 hours of going to bed or after going to bed
7. I do something that may wake me up before bedtime (for example: play video games, use the internet, or clean)
8. I go to bed feeling stressed, angry, upset, or nervous
9. I use my bed for things other than sleeping or sex (for example: watch television, read, eat, or study)
10. I sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets)
11. I sleep in an uncomfortable bedroom (for example: too bright, too stuffy, too hot, too cold, or too noisy)
12. I do important work before bedtime (for example: pay bills, schedule, or study)
13. I think, plan, or worry when I am in bed



For more information about R2 or to discover how you can bring the program to your organization, business or educational setting, please contact us.

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