

Sleep Hygiene

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PROTOCOL NAME

Sleep hygiene.

GROSS INDICATION

Sleep hygiene is indicated for patients who engage in habits, consume substances, and/or set up sleep environments that are not conducive to initiating or maintaining sleep.

SPECIFIC INDICATION

To date, there is no evidence to suggest that this form of therapy is differentially effective for one or another type of insomnia (psychophysiologic vs idiopathic vs paradoxical insomnia) or for any of the phenotypes/subtypes of insomnia (initial vs middle vs late insomnia). This said, it stands to reason that sleep hygiene factors are an important precipitating or perpetuating factor for “inadequate sleep hygiene insomnia” and, conversely, are of little relevance for “idiopathic insomnia”.

CONTRAINDICATIONS

While it is generally held that sleep hygiene is a benign intervention for which there are no contraindications, it may be that specific rules, in specific patients, may not be carried out safely. For example:

- physical activity may not be possible for patients with physical limitations;
- evening snacking may not be appropriate for patients with GERD or other disorders that require restrictive diets;
- rapid smoking cessation in heavy smokers may prove to be as deleterious to sleep as smoking itself;

- the use of white noise or ear plugs may not be possible for patients who serve as caregivers;
- fully light-attenuating the sleep environment may not be ideal for elderly patients who are at risk for disorientation and/or falls.

RATIONALE FOR INTERVENTION

Although the earliest systematic reference to sleep hygiene was made by Kleitman [1], who in 1939 reviewed evidence regarding factors such as sleep duration, bedtime rituals, sleep surface, ambient temperature, sleep satiety, and body position, his work was discursive and bears little resemblance to the list of dos and don'ts that exist today as sleep hygiene instructions. Peter Hauri [2] is thought to have been the first person to codify the various sleep hygiene imperatives, and summarizes them thus:

Sleep Hygiene Education is intended to provide information about lifestyle (diet, exercise, substance use) and environmental factors (light, noise, temperature) that may interfere with or promote better sleep. Sleep hygiene also may include general sleep-facilitating recommendations, such as allowing enough time to relax before bedtime, and information about the benefits of maintaining a regular sleep schedule.

The role, and perhaps the relevance, of sleep hygiene have varied with time. Decades ago, prior to the widespread dissemination of sleep hygiene instructions, it is entirely plausible that some insomnias were precipitated and perpetuated by poor sleep hygiene. That is, it is entirely plausible that patients seeking clinical help might have reported that they were, for example, drinking three cups of coffee, eating heavy meals, and/or engaging in strenuous exercise before bed. In such cases, altering these behaviors might have resolved the sleep complaint. In the present era, this seems less likely. More often than not patients, long before they seek professional help, are already aware of sleep hygiene and have addressed their most egregious infractions. In fact, it is far more likely that patients have always practiced moderately good sleep hygiene and, following the development of chronic insomnia, simply fail to see the relevance of minor sleep hygiene infractions as disease/disorder moderators (as opposed to causal factors). In the present era, the rationale for sleep hygiene has less to do with fixing the problem and more to do with (1) optimizing clinical outcomes, and (2) making the patient less vulnerable to relapse or recurrence. In the case of the former, good sleep hygiene might be the difference between a patient being able to achieve 6 hours and 45 minutes or 7 hours of sleep, as opposed to 6 hours and 30 minutes if they were still engaging in poor sleep habits. In the case of the latter, addressing each sleep hygiene infraction may serve to decrease the patient's overall vulnerability to relapse and/or recurrence by decreasing their predisposition for insomnia.

STEP BY STEP DESCRIPTION OF PROCEDURES

Procedures

As surprising as it may be, there is a variety of approaches to the delivery of sleep hygiene, the most common being the provision of sleep hygiene instructions as a one-page handout. A second approach is (with or without a handout) to review all the sleep hygiene instructions with the patient using a didactic or Socratic approach. A third approach includes using a paper and pencil instrument to assess (1) the extent to which sleep hygiene issues are operational and (2) which issues in particular are relevant.

The “handout” approach is not recommended for several reasons. First, it is likely that the patient has already been exposed to sleep hygiene in this manner. Had it been effective, no further treatment would be required. Second, to the extent that sleep hygiene is effective, its potency may have less to do with the facts themselves and more to do with the patient’s increased understanding of sleep–wake regulation and how to use this knowledge to promote adherence to both the sleep hygiene rules and the other components of CBT-I. Third, to the extent that monotherapy with sleep hygiene is *ineffective*, there is the risk that the patient and/or clinician may generalize this treatment failure to CBT-I. That is, many view sleep hygiene as one and the same as CBT-I, and when sleep hygiene is found to be ineffective the conclusions are that (1) behavior therapy isn’t effective, and (2) the only recourse is medical treatment.

The other extreme (*vis-à-vis* approaches to the delivery of sleep hygiene) is to devote a whole session to this component of CBT-I, where considerable amounts of time are dedicated to explaining the general concept (strengths and limitations), the various imperatives, the rationales for the imperatives, the applicability of the rules to the individual patient, and the interventions’ relevance for therapy in general and for relapse prevention in specific. The whole session approach usually contains the following steps.

Step 1. Explain the concept of sleep hygiene, emphasizing that these factors are:

- not likely to be causal;
- likely contribute to the development of insomnia;
- (when addressed) may allow for an augmentation of clinical gains;
- (when addressed) may have prophylactic value re. recurrence.

Step 2. Have the patient read each imperative, pausing between the rules to allow the therapist to elaborate.

Step 3. Have the therapist address:

- the relevance of the rule for the patient;
- the underlying concept and related science;
- the specific plan for the patient.

The manner in which sleep hygiene is introduced will vary with the style of each clinician. Our preferred approach to covering the core points is exemplified by the dialogue below.

Therapist: Before we go over the list of rules, I would like to discuss the ways in which changes you make with regard to these rules can be useful for you. My guess is that you have already seen some of these rules elsewhere. Rules about diet, exercise, caffeine – Yes?

Patient: Oh yeah, I've gone over that stuff plenty, and then my mother kept telling me to drink warm milk before bed.

Therapist: And did any of that ever make a difference for you.

Patient: Nope – my sleep (or lack thereof) never seems to change.

Therapist: Well I am going to give you the same list, and if you change rule (4) tonight my guess is that it is not going to help. In fact we have data that says that using sleep hygiene alone to fix your sleep is unlikely to work.

Patient: Then why should we bother to go over it?

Therapist: I am glad you asked that question. As I have said, I think that changes here can be useful, but perhaps not in the way that you are thinking. To begin with, your sleep habits are not terrible; in fact, they are pretty decent. I do think you are doing some things that could be done differently, but I will bet now that none of these small infractions of the sleep hygiene rules has caused your sleep problem. Do you remember what we said was probably a contributing factor to your insomnia?

Patient: Yes; it was when my company was laying off some workers and I wasn't sure if I was going to be next.

Therapist: Right, that was the start. It was not likely the coffee you were drinking or the fact that you are not much of an exerciser. Nevertheless, what we can say about those factors is that perhaps they made you more vulnerable to a sleep problem to begin with. I like to think of each of these factors as if they are rungs in a ladder of arousability and that with each rung you climb – that is, rule you break – you increase your vulnerability to a sleep problem.

Patient: You mean if I had been exercising and drinking less coffee at the time of the layoffs that I wouldn't have had insomnia?

Therapist: I suppose that is possible, but it's also possible that it would have happened anyway. As we talked about: once you started having bad nights you began to get very frustrated about your sleeplessness and began going to bed earlier in order to compensate. As we discussed, this set up a vicious cycle of insomnia that you found near impossible to escape.

Under these circumstances, with all that worry and frustration about sleep, and constantly falling asleep on the couch after dinner, does it seem likely that stopping that decaf cup of coffee in the afternoon was going to make a difference?

Patient: I guess not.

Therapist: I would guess that when it didn't, you not only concluded that sleep hygiene doesn't work but also that caffeine doesn't affect you.

Patient: Exactly – I figured coffee didn't make a difference to me.

Therapist: Right, but caffeine is a stimulant for you just like it is for everyone else, and must therefore be having some effect. So as we are addressing your sleep in other ways by restricting your schedule and getting you out of bed when you don't sleep, it may be useful to remove as many of those rungs in the arousal ladder as possible so that we make you less vulnerable to a sleep problem and so that the work we are already doing does not encounter any obstacles. Also once you are sleeping better, what do you think it might mean to you in the future if you have fewer poor habits or rungs in the ladder?

Patient: That I will be less arousable at night?

Therapist: Right, and therefore less prone to relapse. Now with that in mind, let's go over the list together to see what rungs are in your ladder and how we might get them out.

As noted above regarding the introduction to sleep hygiene, the method for the review of the imperatives may vary with the style of each clinician. Some may prefer a purely didactic approach (the patient reads the rule and the therapist explains the rule). Some may prefer a more Socratic approach, where, after reading the rule, the patient is queried about how the infraction might lead to poor sleep. Ultimately (and regardless of style), when adopting this approach it is important to go over each rule individually so as to (1) acknowledge or dispute its general validity, (2) ascertain its relevance for the patient, (3) explain the concepts and findings that undergird the imperative, and (4) provide for a plan to implement the relevant rules. Further, it is useful to periodically reiterate (every three to five rules) the essential message that no one rule, or even the combination of all the rules, will necessarily eliminate the insomnia. An example dialogue is provided below.

Therapist: So, having a light carbohydrate snack before bed can help to eliminate a blood sugar drop during the night which could have an impact on your sleep (e.g., cause an awakening that might otherwise not occur).

Patient: Yeah, that's not a problem for me because I never wake up hungry.

Therapist: Right. Hunger may not be *the* reason that you are waking. What may be true in your case is that your blood sugar dropping is increasing your vulnerability to waking. Just as when you noted that you don't tend to have to use the bathroom in the middle of the night. Nevertheless, with regard to increasing vulnerability, even a semi-full bladder might contribute to waking if there are enough other changes taking place in your body at the same time. Each of these factors we are discussing are the rungs in a ladder of increasing arousability. With each rung you may be getting closer to the waking threshold, even if stepping on that rung did not specifically cause you to reach, and exceed, the waking threshold.

Patient: So you are saying that changing these things together may have more of an impact on my sleep than just changing one at a time, like I have done in the past?

Therapist: Yes, exactly. Plus it is also more likely to have an impact on vulnerability if you are consistently applying these rules over time as opposed to just 1 night. If you eat the proper snack and drink less liquid tonight, do you think you will sleep better tonight?

Patient: Probably not.

Therapist: Exactly. When talking about vulnerability to sleep disruption, it is more likely that several changes made over a period of time will result in more positive benefit for you sleep ability in the future.

The final approach represents a compromise between the other two more extreme approaches. As noted above, paper and pencil instruments may be used to assess the extent to which sleep hygiene issues are operational, and which issues in particular represent problems for the patient. To our knowledge, there are three sleep hygiene assessment instruments:

1. The Sleep Hygiene Awareness and Practice Scale (Lacks and Rotert, 1986)
2. The Sleep Hygiene Self-Test (Blake and Gomez, 1998)
3. The Sleep Hygiene Index (Mastin et al., 2006).

The benefit of this approach is that it allows (1) for a quantitative assessment of this aspect of illness severity (and a measure of its change with treatment), (2) for a tailored approach to treatment (although one which can be applied systematically as part of research), and (3) (on average) for less time to be devoted to this component of treatment with, presumably, the same end results.

Sleep Hygiene Rules

The actual rules for sleep hygiene vary widely from text to text. Some compendiums have dozens of rules that often include abbreviated forms of other

therapies, including stimulus control and sleep restriction procedures, chronotherapy, and phototherapy. While these treatments may be useful in their unexpurgated form, there is no evidence that these interventions as sleep hygiene rules have any effectiveness. Finally, when sleep hygiene is conducted (as it should be) as part of a multi-component treatment regimen, there is no need for this redundancy. Accordingly, it seems ideal to use *a limited set of rules including those that are not explained or detailed as part of other procedures*. What follows is a list of generally accepted rules. Following the simple imperative, a specific rationale for the rule is provided, along with caveats/considerations, and recommendations for therapist “talking points” and possible alternative approaches. The text below (imperative and rationale) is written as it would be shared with the patient.

Exercise in the Late Afternoon or Early Evening

Rationale: While it is unclear whether exercise can help you fall asleep more quickly and/or get more sleep overall, there is good evidence that aerobic exercise can deepen sleep. Deeper sleep may be more restorative, and also protective against awakenings related to noise, pain, hot flashes, etc.

Caveats/considerations: Patients who do not have an established exercise regimen, and/or who have medical issues, should be advised to proceed carefully regarding the initiation of an exercise program, ideally instituting the regimen in consultation with their primary care clinician and/or professional trainer. Timing of the exercise program is also important, as it is generally held that afternoon exercise is optimal and that exercise immediately before bed may be counter productive.

“Talking points”: The therapist may use this opportunity to address issues related to temperature regulation, the timing of sleep, and the density of slow wave sleep.

Alternative approaches: There are data to suggest that “passive heating” (aka a warm bath) taken an hour or two before bedtime may yield the same effects as aerobic exercise. This is thought to be the case because both similarly affect core body temperature and have the result of increasing slow wave sleep. If this approach is considered, the patient (and/or therapist) should discuss this possibility with the primary care clinician, as warm temperatures may make some medical conditions worse. Also, some elderly individuals may be at risk for slips and falls entering and exiting the tub.

Do Not Take Naps During the Day

Rationale: Naps are likely to increase your problems falling or staying asleep owing to their influence on the mechanisms that determine sleep timing, duration, and depth.

Caveats/considerations: Some patients, such as retirees, may have the opportunity and desire to take regular naps. While ill advised from the “night

sleep” perspective, napping may provide such patients with a boost or “second wind” for later in the day. A patient who elects to nap should be warned that occasional napping may lead to regular napping via conditioning, altered sleep–wake timing, and altered sleep homeostasis.

“Talking points”: The therapist may use this opportunity to address issues related to the two-process model of sleep–wake regulation (circadian timing and sleep homeostasis).

Alternative approaches: Allow napping given a sensible approach. Napping earlier in the day may be less impactful on night-time sleep. Further, the patient should be counseled to: (1) nap for relatively brief periods of time (30–60 minutes), and (2) delay bedtime for an amount of time equivalent to the period spent in bed during the day. For example, if the patient naps and is in bed for 60 minutes and reports sleeping 30 minutes, bedtime should be delayed by 60 minutes.

Eat a Light Snack Before Bedtime

Rationale: A snack can be helpful about 1 hour before bedtime. Carbohydrates (i.e., crackers, bread, cereal, fruit) are best for a good night’s sleep. It is a good idea to avoid chocolate or heavily sweetened foods. Such snacking may help to avoid a blood sugar drop during the night that can disrupt sleep.

Caveats/considerations: As stated earlier, this may be contraindicated in patients with GERD or other digestive disorders or patients on restricted diets.

Avoid Liquids Before Bedtime

Rationale: Liquids close to bedtime will fill your bladder and result in discomfort while you sleep, causing you to wake more frequently.

Caveats/considerations: Patients who wish to drink small amounts of liquid may do so by restricting intake to less than 6–7 ounces in the 4 hours prior to bedtime, and by making sure they void before going to bed. As stated earlier, there may be medical problems or conditions that require patients to be better hydrated, and this should supersede any sleep habit instruction. There should also be awareness of the fact that some conditions (e.g., enlarged prostate) and some medications (e.g., diuretics) may necessitate middle of the night voiding regardless of how much liquid restriction takes place.

Some patients, such as those on continuous positive airway pressure (CPAP), report waking in the night with a dry mouth. These patients should be encouraged to take a few sips of water in the middle of the night, perhaps even to have a small cup ready next to their bed to avoid having to get up. However, they should be dissuaded from drinking large amounts.

If patients do wake in the night with even a mild sense of bladder distension, they should be encouraged to get up and void. Attempts to go back to sleep with bladder distension are likely to fail or will result in repeated arousals.

Avoid Caffeinated Products within 6 Hours of Bedtime

Rationale: Caffeine works as a stimulant in your body and can keep you awake.

Caveats/considerations: It is unlikely that caffeine in the morning is going to have much if any impact on night-time sleep, even in the most sensitive of patients. In addition, there is some evidence that stimulants, used judiciously in the earlier part of the day, may actually provide some benefit, especially to those patients engaged in sleep restriction therapy, in that it can help them to remain more awake and alert during the day. Permission to use caffeine may actually serve to decrease patients' anxiety about not sleeping at night, and this may aid in promoting better sleep. On the other hand, the length of time before bed that caffeine should be curtailed before it is an issue will vary from patient to patient, and this is one rule that will require tailoring.

Although decaffeinated products contain much less caffeine than their caffeinated counterparts, it is possible that small amounts of caffeine in the evening, especially in the most sensitive individuals, may still serve to be an irritant to sleep onset. This is an example of how a modest infraction may serve as a predisposing factor to sleep problems even if it is not a direct cause.

Patients should be encouraged to read product labels and make sure that they are not inadvertently consuming caffeine late in the day. It can be illustrative to point out that many lighter-colored sodas and some aspirin brands contain caffeine.

Avoid Alcohol as a Hypnotic

Rationale: Although alcohol use before bedtime can help some people to fall asleep more easily, it has been shown that use of alcohol to promote sleep (i.e., larger quantities than is typical for the individual) results in more fragmented sleep, more awakenings during the night, and/or early morning awakenings.

Caveats/considerations: While some may tolerate a glass or two of wine at dinner, others may find that this makes their sleep more fitful, while still others may find that this promotes the occurrence of early morning awakenings.

Quite apart from its effect on sleep maintenance, another possible reason to curtail or eliminate alcohol consumption is that while in active behavioral treatment, one of the greatest difficulties that patients have is to remain awake until the prescribed bedtime. Drinking alcohol will only serve to make this task more difficult. So the patient may be encouraged to temporarily suspend alcohol consumption during active treatment so that they can stay awake at night.

Avoid Nicotine

Rationale: Nicotine is a stimulant, and it has been demonstrated that chronic cigarette smokers have experienced significantly improved sleep when they quit.

Caveats/considerations: It is possible that during the early stages nicotine withdrawal may actually exacerbate sleep disruption, especially in the patients who are most addicted. Patients should therefore be educated about the effects of nicotine on sleep, and then encouraged to work on sleep and smoking cessation at different times.

One thing that could be tried during active sleep treatment would be to have patients experiment with changing the times of smoking to see what changes might benefit sleep. For example, patients could be encouraged not to smoke in the middle of the night when they can't sleep, as such smoking might be training them to wake at night to smoke. A consistent change in this regard might at least alter that pattern without having to go through full smoking cessation. Further, smoking cessation techniques might aid in this process (e.g., the use of a nicotine patch) and represent a reasonable first step in smoking cessation.

Use Ear Plugs or White Noise to Mitigate Noise

Rationale: Irregular noises, even quiet ones, can be disruptive to sleep. White noise, such as the sound of a fan or humidifier, can drown out other more disruptive noises, leading to less broken sleep.

Caveats/considerations: As previously noted, caution may be needed in situations where a patient is a caregiver (e.g., for an elderly Alzheimer's parent) and may need to hear what is happening in other parts of the house. It should generally be noted that this scenario would not be ideal for a good night's sleep to begin with, and may be part of the problem.

There are many types of white-noise machines on the market that have a variety of settings. While some settings (e.g., waterfall or tropical rainforest) may provide a decent white noise, others (e.g., forest birds or thunderstorm), while being relaxing sounds, are not essentially white noises in that they are not constant and meaningless. Such sound could serve to actually disrupt sleep or at least keep the patient from sleeping as deeply.

Avoid Co-Sleeping with One's Pets

Rationale: Pets will frequently move around and/or jump on and off the bed, causing movement and noise which can be disruptive to sleep.

Caveats/considerations: There is no real caution to this, except that the therapist should expect to meet strong resistance from some patients regarding this recommendation. At times it is helpful to engage in some problem solving regarding how a patient can teach a pet to sleep alongside the bed or in another room.

Make the Sleep Environment Comfortable and Conducive to Sleep

Rationale: Make sure you have a comfortable mattress, and keep your bedroom generally cool and dark.

Caveats/considerations:

- **Bedding.** Many patients have not bought new bedding for decades. This is problematic to the extent that sleeping on worn-out pillows and mattresses may contribute to sleep disturbance by promoting levels of discomfort and/or pain that, if not precipitating frank awakenings, shallow sleep and increase one's vulnerability to awakenings. A decent rule of thumb is to replace pillows regularly (every 1–3 years) and mattresses once every one to two decades. Patients should, if able, be encouraged to invest in their sleep comfort, and counseled that such investments may, in and of themselves, yield dividends.
- **Temperature.** There is no “right temperature for sleep”, but the general rule is “sleep loves the cold”. Further, it is easier to keep the room temperature cold and to regulate the patient's own temperature by covering up with blankets than it is to keep the room warm and to find some way to cool down when feeling too hot.
- **Light.** Light attenuation in the bedroom in the morning is generally desirable, especially for those patients who are larks in their circadian pattern and tend to wake early or suffer from “terminal” insomnia.

Keep a Regular Sleep Schedule by Setting an Alarm in the Morning

Rationale: Keeping a consistent wake time will promote better circadian cycling, and setting an alarm will prevent giving your insomnia the function of waking you in the morning.

Caveats/considerations: Some patients will balk at the idea of setting a regular wake time 7 days per week. It would be worth noting that setting strict times may be more crucial during the treatment phase while trying to strengthen the circadian control of sleep and wakefulness. Once it is well established, maintaining a good schedule may not require as strict a protocol and may allow for 1 or 2 days of modest changes in wake time (sleeping in) as long as the patient is still maintaining standard wake times the rest of the week.

Some patients are also likely to resist setting an alarm, feeling that this increases their anxiety and will keep them awake. The concern is that by not setting an alarm the patient is setting up an anxious expectation about when wake time is coming, thus necessitating a lighter or more fragmented sleep so that he or she does not miss the desired wake time. Setting an alarm every morning will allow patients to become reliant on the alarm to wake them, and not their poor sleep.

“Wrapping Up”

When wrapping up, patients should be reminded that in many ways they are doing this to decrease their vulnerability to insomnia, improve the chances

of therapy working, and get the most efficient sleep that they can. As such, they can be encouraged to practice all of the sleep hygiene rules as faithfully as possible and to do so consistently, at least for the time that therapy is taking place. However, once they are sleeping well and have determined optimal amounts of sleep, then it may be possible to consider looking at some rules individually and seeing whether an experiment in which they begin again to break a specific rule results in any adverse changes to their overall sleep. For example, while patients might be advised to stop drinking alcohol during the weeks that therapy takes place, once they are sleeping well they certainly do not need to remain teetotal. Given no history of substance abuse, it may be fine to drink occasionally or even to have a glass of wine per night. Some may find their improved sleep is not appreciably changed, while others may find that even one drink may actually fragment their sleep. In the latter case, it will then be up to individual patients to decide whether or not it is worth it for them to drink. The important point is that by having eliminated the alcohol entirely, the patients will then more easily be able to tell how alcohol affects their sleep as they add this habit back into the routine. The same can be said for snacking before bed, drinking more liquid in the evening, having chocolate in the evening, etc.

POSSIBLE MODIFICATIONS/VARIANTS

Noted above.

PROOF OF CONCEPT/SUPPORTING DATA/EVIDENCE BASE

It is generally held that sleep hygiene is not effective as a monotherapy. This common belief may be a bit of an overgeneralization from the existing facts which are more consistent with the 2006 AASM Standards of Practice Committee [3] conclusion that there is “insufficient evidence to recommend sleep hygiene as a single therapy” (p. 221).

The state of the science, with respect to sleep hygiene, is simply this:

1. There are only a few studies that evaluate the efficacy of sleep hygiene as a single treatment, and in these cases there is no standard for what sleep hygiene is (i.e., what rules are covered) or how it is administered (e.g., handout vs full session review). Thus it remains possible that some form of sleep hygiene may produce significant clinical gains.
2. The clinical gains obtained with sleep hygiene are thought to be marginal as many investigators use this intervention as a *control condition* for CBT-I randomized clinical trials. In such studies it has been reliably shown that CBT-I produces significantly greater magnitude results than does sleep hygiene. This said, it may be that sleep hygiene, when used as a control condition, utilizes such an abbreviated form of the treatment that

it is indeed akin to an inert-monitor only condition. Thus, once again, it remains possible that some form of sleep hygiene may produce reasonable clinical gains.

3. There are at least two investigations showing that patients with insomnia do not differ from good sleepers with respect to sleep hygiene infractions [4,5].

Finally, it should be noted that some, if not many, of the components of sleep hygiene are based on empirical evidence (e.g., the effects of diurnal napping on nocturnal sleep) and/or are grounded on well established theory (e.g., sleep–wake regulation as delineated in Borbely’s Two Process Model [6]). For an excellent summary of these findings, the reader is referred to Stepanski and Wyatt’s 2003 review on sleep hygiene [7]. The fact that some of the sleep hygiene rules are scientifically “well justified” suggests, once again, that sleep hygiene (given adequate coverage, a reasonable form of delivery, and the obtention of patient compliance with the rules that derive from the hard science) should produce significant clinical gains.

In sum, the most reasonable conclusion about sleep hygiene is this: it is a useful addition to a multi-component CBT-I protocol in that engaging in improved sleep hygiene may enhance outcomes or at least remove obstacles to progress.

REFERENCES

- [1] N. Kleitman, *Sleep and Wakefulness*, Chicago University Press, Chicago, IL, 1987 (original version 1939).
- [2] P.J. Hauri, *Sleep Disorders*, Upjohn, Kalamazoo, MI, 2004.
- [3] T. Morgenthaler, M. Kramer, C. Alessi, et al., Practice parameters for the psychological and behavioral treatment of insomnia: an update. *An American Academy of Sleep Medicine Report, Sleep* 29 (2006) 1415–1419.
- [4] L.A. Gellis, K.L. Lichstein, Sleep hygiene practices of good and poor sleepers in the United States: an internet-based study, *Behav. Ther.* 40 (2009) 1–9.
- [5] C.S. McCrae, M.A. Rowe, N.D. Dautovich, et al., Sleep hygiene practices in two community dwelling samples of older adults, *Sleep* 29 (2006) 1551–1560.
- [6] A.A. Borbely, A two process model of sleep regulation, *Hum. Neurobiol.* 1 (1982) 195–204.
- [7] E.J. Stepanski, J.K. Wyatt, Use of sleep hygiene in the treatment of insomnia, *Sleep Med. Rev.* 7 (2003) 215–225.

RECOMMENDED READING

- P.J. Hauri, *Case Studies in Insomnia*, Plenum Medical Book Company, New York, NY, 2003.
- V.P. Zarcone, Sleep hygiene, in: M.H. Kryger, T. Roth, W.C. Dement, (Eds.), *Principles and Practice of Sleep Medicine*, WB Saunders Company, Philadelphia, PA, 1989.

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