Why Is The Prevalence of Insomnia Exploding, And What Can Be Done About It?

Barbara Phillips, MD, MSPH, FCCP

Feb 25, 2017
Disclosures

Leadership position
- American College of Chest Physicians
- National Board of Respiratory Care

Honorarium
- CHEST Review, CCM International
- American Thoracic Society
- Temple Clinic Baylor
- NIH
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Why is the Prevalence of Insomnia Skyrocketing?

- Increased focus on mental and physical health, including sleep
- Misinformation, especially confusion about sleep deprivation vs insomnia
- Increasing prevalence of chronic disease
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Logged Sleep

7h 21min
ASLEEP

11:09 PM - 7:17 AM
4 mins awake (3x)
43 mins restless (17x)

SLEEP PATTERN
11:09 PM
Dec 13
7:17 AM
OFF THE CUFF

By Dave Riddle, RRT, CPFT

THE SLEEP LAB

THE CAN'T SLEEP LAB
Why is the Prevalence of Insomnia Skyrocketing?

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- Misinformation, especially confusion about sleep deprivation vs insomnia
- Increasing prevalence of chronic disease
Insomnia Vs Sleep Deprivation

A 24-year old internal medicine resident who is married and the mother of a 2 year-old

Gets up at 06:30

Works and mothers all day

Goes to bed about midnight

(Except when on call)

She gets about 6 ½ hours of sleep a night
Insomnia Vs Sleep Deprivation

A 58 year old women, who is married and whose husband has retired
Gets up at 08:30
Goes to church, reads, plays bridge
Goes to bed about 10:00
Sleeps until 1:30
Is “up and down” the rest of the night
Finally gets out of bed about 08:30
Sometimes naps
She gets about 6 ½ hours of sleep a night
Who’s at Risk?
Short Sleep Duration Increases Risk, Especially for Younger People

Impaired performance in house officers

Increased risk of crash

Maybe cardiovascular disease
Insomnia Is Not Sleep Deprivation

Insomnia diagnosis assumes adequate opportunity to sleep

Sleep deprivation
- Adequate ability to sleep
- Inadequate opportunity
- Generally sleepy

Insomnia patients
- Inadequate ability to sleep
- Adequate opportunity
- Generally NOT sleepy, though may report fatigue
Sleepiness in residents is equivalent to that found in patients with serious sleep disorders. Mustafa and Strohl, unpublished data. Papp, 2002
Dysfunctional Beliefs About Sleep (DBAS) (Palagini L Sleep Med 2016)

- The Ford Insomnia Response to Stress Test (FIRST) and many other measures of insomnia correlate with DBAS.
- DBAS are actually promulgated by clinicians, the lay press and well-meaning (or industry-funded) organizations.
- What ARE dysfunctional beliefs about sleep? (Morin CM Sleep 2007)
  - Misconceptions about the cause of insomnia (“result of chemical imbalance”)
  - Misattribution or amplification of effects of insomnia on health (“chronic insomnia may have serious effects on my health.”)
  - Unrealistic sleep expectations (“I must get 8 hours of sleep to feel refreshed and function well the next day”)
  - Loss of control/predictability about sleep (“When I sleep poorly one night, it will disturb my sleep schedule for the whole week.”)
  - Faulty beliefs about sleep practices (“When I have trouble sleeping, I should stay in bed and try harder.”)
A new study published in the International Journal of Obesity found that middle-aged women who suffer from sleep disorders are more likely to have problems with their weight than their peers who get the recommended eight hours a night. Although there are studies that have established the link between weight gain and sleep, these findings suggest that sleep problems preceded weight gain in the subjects.

The researchers at the University of Helsinki looked into the sleeping habits and weights of around 7,300 adults aged between 40 and 60 over a seven-year period and found that around one in three of the 5,700 women participating in the study with frequent sleep problems gained at least 11 pounds in weight over the course of the study. In comparison, just one in five of those women who slept well through the night gained as much weight.

Lead researcher Peppe Lystialainen told Reuters Health that this correlation could be down to the fact that sleep disorders could affect the chemicals that dictate appetite. The link in the women persisted even when the investigators accounted for a number of factors that can affect both sleep quality and weight gain – including participants’ body weight at the study’s start, their exercise habits and their general physical and mental health.

The study concluded that sleep problems likely contribute to weight gain which means that sleep problems need to be taken into account when trying to prevent and manage weight gain and obesity.

Average: Your rating:
INSOMNIA

Does Insomnia Kill?
Barbara Phillips, MD, MSPH; David M. Mannino, MD

Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Internal Medicine, University of Kentucky College of Medicine, Lexington, KY

Study Objectives: We investigated the prevalence and hazard ratios for insomnia complaints in a large cohort of middle-aged men and women.

Design: The Atherosclerosis Risk in Communities Study is a prospective study of cardiovascular disease. Using multivariate regression analysis, we predicted the likelihood of endorsing the insomnia complaints by age, sex, alcohol intake, smoking, diabetes, heart disease, menopausal status, use of hypnotics, hypertension, depressive symptoms, education level, body mass index, respiratory symptoms, and pulmonary function status. We predicted the hazard ratios (HR) of death at 6.3 ± 1.1 year by endorsement of insomnia complaints and by hypnotic use controlling for covariates.

Setting: North American communities.

Participants: 13563 participants aged 45 to 69 years at baseline.

Interventions: None.

Measurements and Results: The prevalence of insomnia complaints in this cohort was 23%. Predictors of insomnia complaints were female sex (odds ratio [OR] 0.56, 95% confidence interval [CI] 0.45-0.70 for men), annual family income below $50,000 (OR 1.23, CI 1.09-1.40), age 40 to 49 years (OR 1.29, CI 1.11-1.50), depressive symptoms (OR 5.05, CI 4.60-5.55), heart disease (OR 1.89, CI 1.67-2.14), severe airflow obstruction (OR 1.61, CI 1.17-2.22), pulmonary symptoms (OR 1.71, CI 1.5-1.95), and restrictive lung disease (OR 1.27, CI 1.10-1.47). After controlling for covariates, insomnia complaints were not associated with an increased risk for death (OR 1.01, CI 0.85-1.21), nor was the use of hypnotics (OR 1.38, CI 0.90-2.13).

Conclusions: In this cohort, the prevalence of insomnia complaints was 23%. After controlling for confounders, neither insomnia complaints nor hypnotic use predicted increased mortality over 6.3 years.

Keywords: Sleeping pills, lifestyle, nonrestorative sleep, benzodiazepines, sleep continuity, depression, women, aging, ARIC

Citation: Phillips B; Mannino DM. Does insomnia kill? SLEEP 2005;28(8):965-971.
<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>OR (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female gender (vs. male)</td>
<td>1.7 (1.42-2.22)</td>
</tr>
<tr>
<td>Annual income: &lt; $50,000</td>
<td>1.23 (1.09,1.40)</td>
</tr>
<tr>
<td>Depression</td>
<td>5.05 (4.60-5.55)</td>
</tr>
<tr>
<td>Heart disease</td>
<td>1.89 (1.67-2.14)</td>
</tr>
<tr>
<td>Severe airflow obstruction</td>
<td>1.61 (1.17-2.22)</td>
</tr>
<tr>
<td>Pulmonary symptoms</td>
<td>1.71 (1.5-1.95)</td>
</tr>
<tr>
<td>Restrictive lung disease</td>
<td>1.27 (1.10-1.47)</td>
</tr>
</tbody>
</table>
Why is the Prevalence of Insomnia Skyrocketing?

- Increased focus on mental and physical health, including sleep
- Misinformation, especially confusion about sleep deprivation vs insomnia
- Increasing prevalence of chronic disease
Prevalence of Insomnia in Chronic Medical Conditions

Insomnia and Illness

![Graph showing the relationship between the prevalence of insomnia (%) and the number of medical disorders. The graph indicates an increasing trend in insomnia prevalence as the number of medical disorders increases.]
INSOMNIA ACROSS THE LIFE SPAN

Ohayon MM, Sleep 1997
Insomniacs Are More Likely to Smoke

Current smokers have statistically significantly increased difficulty falling asleep (former smokers had reduced DFA {Phillips B, Mannino D, JCSM 2005})

Current smokers have reduced TST, increased SL and more N1 sleep than non or former smokers (Zhang L Am J Epidemiol 2006)
## Hypnotic Use and Correlates

*(Vozoris NT Sleep 2011, n=134,072)*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Adjusted OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Gender</td>
<td>1.4</td>
</tr>
<tr>
<td>Smoker</td>
<td>Former 1.42</td>
</tr>
<tr>
<td></td>
<td>Current 1.61</td>
</tr>
<tr>
<td>Mood disorder</td>
<td>3.46</td>
</tr>
<tr>
<td>Anxiety disorder</td>
<td>1.82</td>
</tr>
</tbody>
</table>
Insomniacs Are More Likely to Be Obese (Vozoris NT Sleep 2011, n=134,072)
My take?

The prevalence of insomnia is increasing because of increased emphasis on sleep, misinformation/misattribution, and increased chronic mental and physical illness/aging.

Most studies of the “consequences” of insomnia (or of sleeping pills!) do not control for lifestyle, medical or psychiatric conditions, or the effects of hypnotics themselves.

Insomniacs tend to be unhealthy and older.
What Can be Done about it?

- NOT chronic sleeping pills
- CBT
- Treat the underlying disease, if possible
- Reassure!
Hypnotics and Survival in Women
(Mallon, Sleep Med 2009)

Fig. 2. Survival in women using hypnotics sometimes or regularly compared to women not using hypnotics. (—) No hypnotic usage; (---) Hypnotic usage sometimes; (----) Regular hypnotic usage.
Fig. 1. Survival in men using hypnotics sometimes or regularly compared to men not using hypnotics. (—) No hypnotic usage; (-----) Hypnotic usage sometimes; (——) Regular hypnotic usage.
Hypnotic Use and Death
Kripke BMJ Open, 2012

EFFECTS on SURVIVAL

FRACTION SURVIVING

YEARS of OBSERVATION

age 18-55: no hypnotic N=13039
age 55-65: no hypnotic N=4049
age 65-75: no hypnotic N=3641
age >75: no hypnotic N=2945
age 18-55: had hypnotic N=5807
age 50-65: had hypnotic N=1758
age 65-75: had hypnotic N=1477
age >75: had hypnotic N=1489
## Hypnotics and Crash

**Gustavsen I, Sleep Medicine, 2008**

<table>
<thead>
<tr>
<th>Hypnotic</th>
<th>Zopiclone</th>
<th>Zolpidem</th>
<th>Nitrazepam</th>
<th>Flunitrazepam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number crashes</td>
<td>129</td>
<td>21</td>
<td>27</td>
<td>18</td>
</tr>
<tr>
<td>Standardized Incidence Ratio for Crash</td>
<td>2.3*</td>
<td>2.2*</td>
<td>2.7*</td>
<td>4.0*</td>
</tr>
</tbody>
</table>
Figure 1. Zolpidem-Related Emergency Department (ED) Visits Involving Adverse Reactions, by Year: 2005 to 2010

* The difference between 2005 and 2010 is statistically significant at the .05 level.

Hypnotics increase the risk of adverse psycho-motor events in people over 60.

<table>
<thead>
<tr>
<th>Study</th>
<th>All treatments (n/N)</th>
<th>Control (n/N)</th>
<th>Odds ratio (95% CI)</th>
<th>Weight (%)</th>
<th>Odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive adverse effects (all treatments vs placebo)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caldwell et al[39]</td>
<td>0/30</td>
<td>0/27</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Eille et al[33]</td>
<td>0/29</td>
<td>0/15</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Mourret et al[40]</td>
<td>0/10</td>
<td>0/10</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Roth et al[41]</td>
<td>0/20</td>
<td>0/10</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Lachnit et al[27]</td>
<td>3/20</td>
<td>0/46</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Meuleman et al[30]</td>
<td>4/28</td>
<td>0/14</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Roger et al[36]</td>
<td>3/221</td>
<td>0/221</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Klimm et al[26]</td>
<td>10/72</td>
<td>0/74</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Dehlin et al[21]</td>
<td>2/52</td>
<td>2/40</td>
<td></td>
<td></td>
<td>Not estimable</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>530</td>
<td>481</td>
<td></td>
<td>100.00</td>
<td>4.78 (1.47 to 15.47)</td>
</tr>
<tr>
<td>Total events:</td>
<td>26 (all treatments), 2 (control)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for heterogeneity: $\chi^2=5.58$, df=5, $P=0.35$, $I^2=10.4%$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test for overall effect: $z=2.61$, $P=0.009$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Psychomotor adverse effects (all treatments vs placebo) |
|---------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Caldwell et al[39]  | 0/27              | 0/30             |                  |                 | Not estimable    |
| Eille et al[33]     | 0/1               | 0/1              |                  |                 | Not estimable    |
| Mourret et al[40]   | 0/10              | 0/10             |                  |                 | Not estimable    |
| Roth et al[41]      | 0/20              | 0/10             |                  |                 | Not estimable    |
| Meuleman et al[30]  | 1/14              | 0/14             |                  |                 | Not estimable    |
| Klimm et al[26]     | 1/72              | 0/72             |                  |                 | Not estimable    |
| Lachnit et al[27]   | 4/20              | 0/46             |                  |                 | Not estimable    |
| Bayer et al[20]     | 5/61              | 0/28             |                  |                 | Not estimable    |
| Roger et al[36]     | 5/221             | 0/221            |                  |                 | Not estimable    |
| Dehlin et al[21]    | 1/26              | 2/26             |                  |                 | Not estimable    |
| Dehlin et al[22]    | 14/102            | 3/102            |                  |                 | Not estimable    |
| Leppik et al[28]    | 23/251            | 9/84             |                  |                 | Not estimable    |
| Subtotal (95% CI)   | 873               | 668              |                  | 100.00         | 2.25 (0.93 to 5.41) |
| Total events:       | 59 (all treatments), 17 (control) |              |                  |            |                     |
| Test for heterogeneity: $\chi^2=14.00$, df=8, $P=0.08$, $I^2=42.8\%$ |
| Test for overall effect: $z=1.80$, $P=0.07$ |
My take?

The prevalence of insomnia is increasing because of increased emphasis on sleep, misinformation/misattribution, and increased chronic mental and physical illness/aging.

Most studies of the “consequences” of insomnia (or of sleeping pills!) do not control for lifestyle, medical or psychiatric conditions, or the effects of hypnotics themselves.

Insomniacs tend to be unhealthy.

It is unlikely that either insomnia OR sleeping pills kill, but perhaps the characteristics of patients who have insomnia/take sleeping pills chronically (an/or their prescribing physicians) are associated with poor outcomes.
What Can be Done about it?

• NOT chronic sleeping pills
• CBT
• Treat the underlying disease, if possible
• Exercise
• Reassure!
“Behavioral and cognitive-behavioral therapies (CBTs) have demonstrated efficacy in RCTs. … When these cognitive methods have been added to the behavioral methods to compose a cognitive-behavioral treatment package, it has been found to be as effective as prescription medications are for brief treatment of chronic insomnia. Moreover, there are indications that the beneficial effects of CBT, in contrast to those produced by medications, may last well beyond the termination of treatment.”
Insomnia Swat Team
Conditioned Arousal Explained

When Falling Asleep Feels the Easiest

- In Class
- At Work
- In bed actually trying to sleep

How Easy it is to Fall Asleep

- 120
- 100
- 80
- 60
- 40
- 20
- 0

Circumstance

GraphJam
I tell my patients to Google CBTi (more than 343,000 results on June 17)

Cognitive Behavioral Therapy for Insomnia - National Sleep Foundation
https://sleepfoundation.org/.../cognitive-behavioral-therapy...
Cognitive Behavioral Therapy for Insomnia. ... Cognitive Behavioral Therapy for Insomnia, often called CBT-I, is an approved method for treating insomnia without the use of sleeping pills. ... CBT is aimed at changing sleep habits and scheduling factors, as well as misconceptions about ...

CBT-i Coach on the App Store - iTunes - Apple
★★★★☆ Rating: 3.5 - 11 reviews - Free - iOS
Feb 5, 2015 - CBT-i Coach is for people who are engaged in Cognitive Behavioral Therapy for Insomnia with a health provider, or who have experienced ...

CBT
www.cbtforinsomnia.com/
CBT-I (cognitive-behavioral therapy for insomnia) is the only scientifically proven non-drug insomnia treatment. CBT-I improves sleep in 70-80% of patients, ...

CBTI | Stanford Health Care
https://stanfordhealthcare.org/medical.../cognitive-behavioral-therapy-insomnia.html
CBTI uses stimulus control, sleep condition training and conditioned arousal to improve sleep quality
CBT-i Coach
By US Department of Veterans Affairs (VA)

Open iTunes to buy and download apps.

Description
CBT-i Coach is for people who are engaged in Cognitive Behavioral Therapy for Insomnia with a health provider, who have experienced symptoms of insomnia and would like to improve their sleep habits. The app will guide you through the process of learning about sleep, developing positive sleep routines, and improving their sleep.

US Department of Veterans Affairs (VA) Web Site ➤ CBT-i Coach Support ➤ Application License Agreement ➤

What's New in Version 2.0
Graphs for healthcare providers and patients to review together for data clarity and dynamic algorithm adjustments.

Category: Health & Fitness
Updated: Feb 05, 2015
Version: 2.0
Size: 35.3 MB
Language: English
Publisher: US Department of Veterans Affairs (VA)
© US Department of Veterans Affairs

iPhone Screenshot
About ➤ CBT-i Coach ➤ Settings

Relaxation exercises are opportunities to...
Effect of a Web-Based Cognitive Behavior Therapy for Insomnia Intervention With 1-Year Follow-up A Randomized Clinical Trial

Lee M. Ritterband, PhD; Frances P. Thorndike, PhD; Karen S. Ingersoll, PhD; Holly R. Lord, PhD; Linda Gonder-Frederick, PhD; Christina Frederick, BS; Mark S. Quigg, MD, MSc; Wendy F. Cohn, PhD; Charles M. Morin, PhD

**IMPORTANCE** Although cognitive behavior therapy for insomnia (CBT-I) has been established as the first-line recommendation for the millions of adults with chronic insomnia, there is a paucity of trained clinicians to deliver this much needed treatment. Internet-delivered CBT-I has shown promise as a method to overcome this obstacle; however, the long-term effectiveness has not been proven in a representative sample with chronic insomnia.

**OBJECTIVE** To evaluate a web-based, automated CBT-I intervention to improve insomnia in the short term (9 weeks) and long term (1 year).
What Can be Done about it?

- NOT chronic sleeping pills
- CBT
- Treat the underlying disease, if possible
- Reassure!
Pulmonary Rehab Improves Sleep In COPD (Soler X, COPD 2013)

- Exercise is known to promote and to consolidate sleep.
- In this study of 64 patients with severe COPD (FEV1% 53), 8 weeks of pulmonary rehab improved Pittsburgh Sleep Quality Index (PSQI) and Health-related Quality of Life (HRQoL).
Insomnia and OSA

Insomnia and sleep-disordered breathing co-exist frequently (22-54%) (Al-Jawder SE Sleep Breath 2012)

OSA typically is associated with sleep maintenance problems.

Risks for insomnia in OSA are older age, female gender, chronic medication use.
Patients with OSA and insomnia were evaluated before and 2 years after starting CPAP.

Middle-of-the-night awakening was the most prevalent kind of insomnia, and improved significantly among PAP users (59% to 30%).

Sleep-onset insomnia was not affected by CPAP.

Early morning awakening was more likely to improve in those who were not adherent.

Sleep-onset and early morning insomnia strongly predicted predicted CPAP non-adherence.
What Can be Done about it?

• NOT chronic sleeping pills
• CBT
• Treat the underlying disease, if possible
• Exercise
• Reassurance.
Exercise and Insomnia

- Multiple studies have demonstrated that exercise is associated with improvement in insomnia symptoms (guilleminaut C 1995; Passos GS
Original Article

Does nighttime exercise really disturb sleep? Results from the 2013 National Sleep Foundation Sleep in America Poll

Matthew P. Buman a,*, Barbara A. Phillips b, Shawn D. Youngstedt c,d, Christopher E. Kline e, Max Hirshkowitz f

a School of Nutrition and Health Promotion, Arizona State University, Phoenix, AZ 85004, United States
b Division of Pulmonary, Critical Care and Sleep Medicine, University of Kentucky College of Medicine, Lexington, KY 40536, United States
c Department of Exercise Science, University of South Carolina, WJB Dorn VA Medical Center, Columbia, SC 29208, United States
d Department of Psychology, University of South Carolina, WJB Dorn VA Medical Center, Columbia, SC 29208, United States
e Department of Psychiatry, University of Pittsburgh School of Medicine, Pittsburgh, PA 15213, United States
f Sleep Center, Michael E. DeBakey Veterans Affairs Medical Center and Department of Medicine, Baylor College of Medicine, Houston, TX 77030, United States
First, Do No Harm

“There is nothing that will keep you awake at night like believing that being awake at night will kill you. This may be the implicit message that well-intended practitioners transmit with intense focus on sleep symptoms and aggressive efforts to increase satisfaction with sleep.”

Pandy S, Phillips B. Sleep Med 2015
Michael Jackson
(1958-2009)
First, Do No Harm

- CBT challenges cognitive hyperarousal by addressing maladaptive thoughts and unrealistic expectations.
- When we anxiously query patients about sleep complaints and undertake aggressive efforts to improve these symptoms by whatever means necessary, we are doing the opposite of reducing the cognitive hyperarousal that perpetuates and exacerbates insomnia.
- This is probably another reason that prescriptions for sleeping pills are skyrocketing.
Great moments in evolution
My take/Summary

The prevalence of insomnia is increasing because of increased emphasis on sleep, misinformation/misattribution, and increased chronic mental and physical illness/aging.

Most studies of the “consequences” of insomnia (or of sleeping pills!) do not control for lifestyle, medical or psychiatric conditions, or the effects of hypnotics themselves. Insomniacs tend to be unhealthy.

It is unlikely that either insomnia OR sleeping pills kill, but perhaps the characteristics of patients who have insomnia/take sleeping pills chronically (an/or their prescribing physicians) are associated with poor outcomes.
My take/Summary

Chronic use of sleeping pills for chronic insomnia likely does more harm than good,

CBT is the specific treatment of choice for chronic insomnia

Treating the underlying disease may be beneficial.

Reassurance and management of expectations are possibly useful interventions, by helping to reduce cognitive hyperarousal.