

Utilization and efficacy of an Internet intervention for insomnia among adults age 55 and older

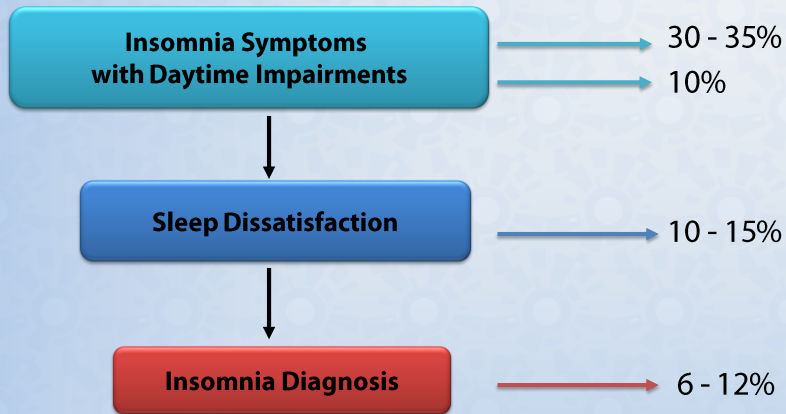


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Katie Stone², & Charles Morin³

Frances P. Thorndike
Disclosure



Prevalence of Insomnia



Insomnia is age-related and more prevalent in women and primary care patients.

Léger et al. Sleep Med 2010; 11:987-98; Morin et al. Sleep Med 2006; 7:123-30; Ohayon MM, Reynolds, CF. Sleep Med 2009; 10:952-60; Ohayon. MM. Sleep Med Rev 2002; 6:97-111; Janson-Frojmark, M, Linton SJ. Sleep 2008;31:881-86.

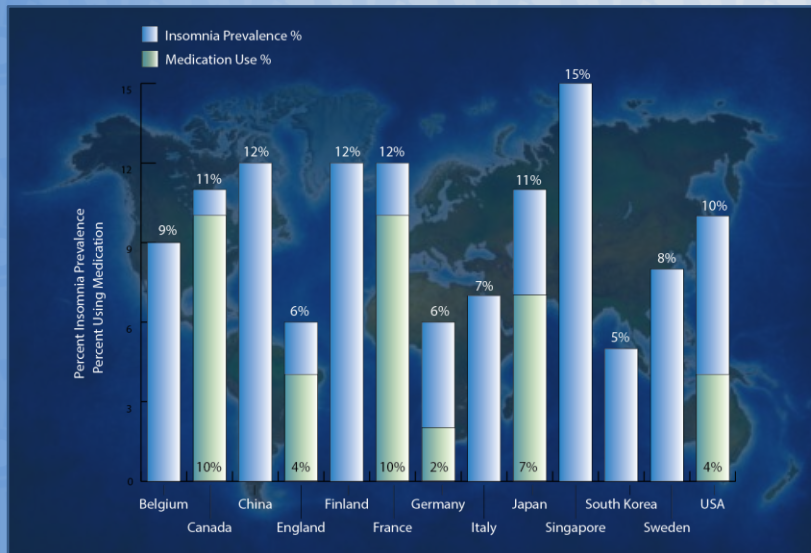
Insomnia in Older Adults

- More prevalent among older adults
- More severe among older adults
- Related to quality of life
- A health risk factor for
 - depression
 - anxiety
 - substance abuse and
 - suicide

Age group	% Prevalence	
	Men	Women
20-29	6 %	12 %
30-39	22 %	12 %
40-49	11 %	20 %
50-59	10 %	21 %
60-69	9 %	17 %
70-79	23 %	26 %
> 80	23 %	41 %

Prevalence of insomnia by age and gender

Prevalence of Insomnia



Current State of Evidence on Insomnia Therapies

- Two treatments endorsed for chronic insomnia:
 - Cognitive Behavioral Therapy
 - FDA-Approved Benzodiazepine Receptor Agonists (at least for short-term use)
- All other treatments NOT endorsed due to limited evidence of efficacy and/or safety concerns:
 - Complementary and alternative preparations
 - Antihistamines (OTC and prescription)
 - Antidepressants
 - Antipsychotics

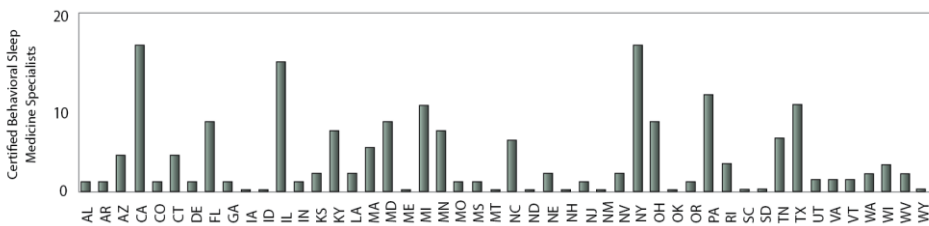
NIH State-of-the-Science Conference Statement on Manifestations and Management of Chronic Insomnia in Adults (2005).

Summary of CBT Evidence

- **Benefits**
 - 80% of patients benefit from CBT
 - 50%-60% symptom reductions (SOL, WASO)
 - 40% remission and 60% response rates (ISI)
 - Sleep changes well sustained over time
- **Indications**
 - Persistent insomnia, both primary and comorbid
 - Younger and older adults
 - Singly or as augmentation therapy to hypnotics
- **Limitations**
 - Access

30 Million US Adults with Chronic Insomnia

1 Certified Behavior Sleep Medicine Specialist Provider
for every 470,000 adults reporting insufficient sleep.



185 Total Certified Behavior Sleep Medicine Specialists Nationwide*

* American Board of Sleep Medicine <http://www.absm.org/BSMSpecialists.aspx>

Medical Help Seeking on the Internet

		% of <i>adults</i> who go online	% of <i>internet users</i> who look online for health information	% of <i>all adults</i> who look online for health information
	Total	81%	72%	59%
	Age			
a	18-29	95 ^{bcd}	76 ^d	72 ^{cd}
b	30-49	89 ^{cd}	75 ^d	67 ^{cd}
c	50-64	77 ^d	71 ^d	54 ^d
d	65+	52	58	30

Source: Pew Internet Health Survey, Aug 7 – Sep 6, 2012

Note: Columns marked with a superscript letter indicate a statistically significant difference between that row and the row designated by that superscript letter.

Internet-delivered treatment

NIMH National RCT: *Insomnia with comorbidities*

Inclusion Criteria:

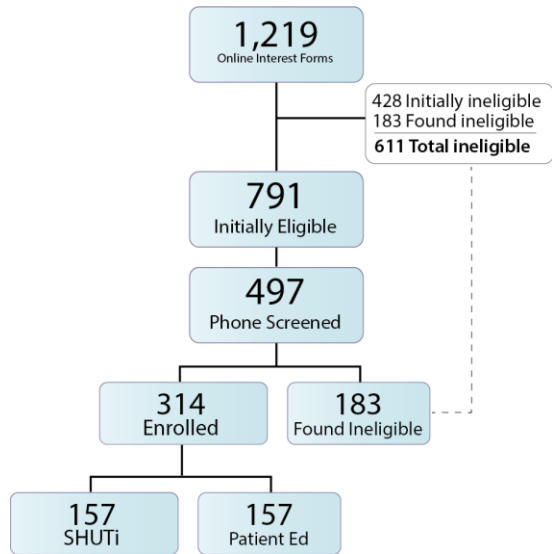
- Age: 21- 65 years old
- Difficulties falling and/or staying asleep (sleep onset latency, early morning awakening, and/or wake after sleep onset greater than 30 minutes)
- Sleep difficulties ≥ 3 nights/week
- TST ≤ 6.5 hours
- Sleep difficulties persisting > 6 months
- At least one daytime problem due to poor sleep: Fatigue, performance impairment, or mood disturbance
- Significant impairment in social or occupational functioning or marked distress
- Internet access

NIMH National RCT: *Insomnia with comorbidities*

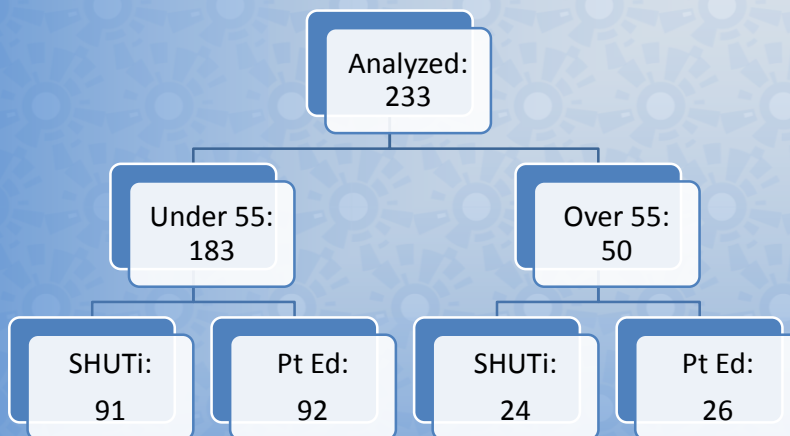
Exclusion Criteria:


- Presence of other untreated sleep disorders
- Bipolar Disorder, Severe Depression, High Suicide Risk, or Substance Abuse
- Physical illness that is degenerative and/or progressive (e.g., dementia)
- Non-stabilized medication regimen
- Starting psychological treatment within past 3 months
- Currently in psychological treatment for sleep problems
- Responsibilities (work, family) prevents a sleep window sometime within 8pm – 10am
- Shift work, including night shift
- Pregnancy

National RCT: Preliminary Results



Analysis Design





SHUTi Home

Congratulations! You have completed the necessary Assessment diaries at this time.

You will be contacted to complete the next Assessment (both an online Questionnaire and Sleep Diaries) about 6 months from when you began the research study. These Assessments help us learn how the program is working for you.

Click the Insomnia Education button below to continue to use the site as much as you would like.

Insomnia Education

Although you no longer need to enter Sleep Diaries into SHUTi, you can continue to keep diaries using a paper diary by clicking the Print button below. You can also print additional instructions on completing your Diaries by clicking the button below.

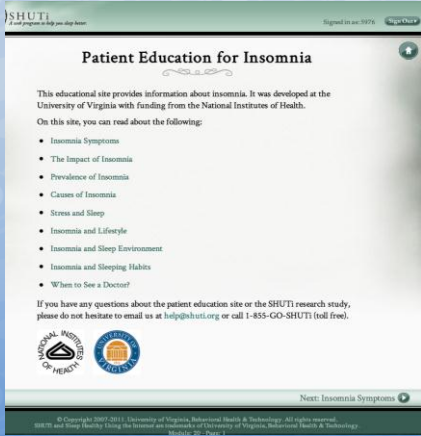
[Print Sleep Diary Instructions](#) [Print Sleep Diary Form](#)

[Print](#) [Print](#)

[CONTACT US](#) [DISCLAIMER](#)

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Patient Ed





Insomnia Education

This educational site provides information about insomnia. It was developed at the University of Virginia with funding from the National Institutes of Health.

On this site, you can read about the following:


- Insomnia Symptoms
- The Impact of Insomnia
- Prevalence of Insomnia
- Causes of Insomnia
- Stress and Sleep
- Insomnia and Lifestyle
- Insomnia and Sleep Environment
- Insomnia and Sleeping Habits
- When to See a Doctor?

If you have any questions about the patient education site or the SHUTi research study, please do not hesitate to email us at help@shuti.org or call 1-855-GO-SHUTi (toll free).

Next: [Insomnia Symptoms](#)

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Insomnia and Lifestyle

Sleep is affected by a variety of lifestyle factors. The main lifestyle factors that are known to disrupt sleep are caffeine, nicotine, alcohol, diet, and exercise. All of these, except alcohol, stimulate the brain and promote wakefulness or interrupt sleep. And alcohol, which acts as a depressant to the brain, often causes wakefulness after its initial effect wears off.

Caffeine

Caffeine is a stimulant and tends to keep people awake. Most people are well aware of the stimulating effects of coffee and tea and avoid it close to bedtime, but many people do not use other products that contain caffeine or realize how long caffeine stays in their system. Within three hours, only half of the caffeine is out of one's system, and for some people, it can take considerably longer. Although moderate use during the day is unlikely to affect nighttime sleep, heavy use throughout the day should be avoided, and no caffeine consumption should occur in the evening or close to bedtime.

Nicotine

Nicotine is another central nervous system stimulant and disrupts sleep like caffeine. Although smokers may feel relaxed when they smoke, the overall effect of nicotine is stimulating and incompatible with sleep (increased heart rate, blood pressure, and concentration). Heavy smoking around bedtime may also lead to conditioned awakenings at night when the person wakes up and quickly smokes a cigarette.

Alcohol

Unlike caffeine and nicotine, alcohol is a central nervous system depressant. Nonetheless, it is the substance most likely to disrupt sleep. Even though alcohol may make it easier to fall asleep, it promotes restlessness and awakes sleep when the effect of alcohol is wearing off during the night. Thus, even a moderate and socially acceptable amount of alcohol between dinner and bedtime can disrupt nighttime sleep.

Diet

Hunger or bedtime can cause wakefulness, while eating can prevent sleep. The benefit of eating before bedtime, however, depends on the timing, type, and amount of food. For example, a light snack before bed may help you to fall and stay asleep, whereas a heavy meal may disrupt sleep because the digestive system has to work overnight. Two heavy liquids near bedtime can also interrupt sleep.


Exercise

Regular aerobic exercise can improve sleep, but the benefits depend on an individual's physical fitness, the amount of energy expended, and the timing of the exercise. Exercising just before bedtime also interferes with falling and staying asleep. Conversely, physical exercise in the evening may have minimal impact on nighttime sleep because it's too far from bedtime. The best time to exercise is late afternoon or early evening.

Next: [Insomnia and Sleep Environment](#)

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Patient Ed



Insomnia Symptoms

Insomnia is a very common sleep disorder. It includes four different types:

- Problems falling asleep at bedtime.
- Problems with waking up in the middle of the night and having trouble going back to sleep.
- Problems waking up too early in the morning and not being able to get back to sleep.
- Problems with poor sleep quality and waking up feeling tired.

Some people have more than one type, and the kind of sleep problem a person has may change over time. Regardless of whether it is hard to fall asleep or stay asleep, the end result is the same: people do not get enough good sleep and fail to feel well rested and energized during the day.

Previous Next: [The Impact of Insomnia](#)

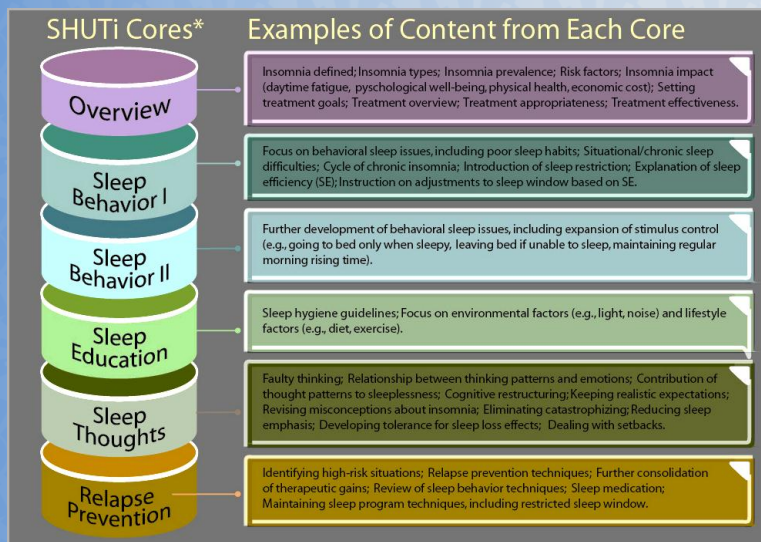
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SHUTi: Sleep Healthy Using the Internet

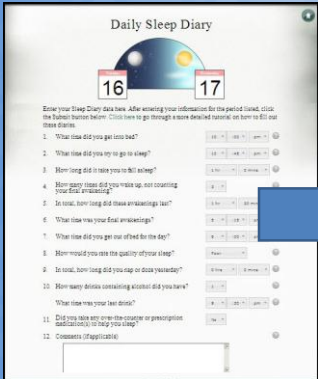
- Based on face-to-face CBT for insomnia
- Interactive, online six-week program
- Treatment components include:
 - (1) Sleep Restriction, (2) Stimulus Control, (3) Cognitive Restructuring, (4) Sleep Hygiene, and (5) Relapse Prevention
- Tailored to individual user's symptoms as entered in daily online sleep diaries
- Automated emails to promote adherence
- Fully automated → No clinician interaction



6 Weekly Cores




Diaries with feedback



Daily Sleep Diary

Enter your Sleep Diary data here. After entering your information for the period listed, click the Submit button below. Click here to go through a more detailed tutorial on how to fill out these diaries.

1. "What time did you get into bed?"
2. "What time did you try to go to sleep?"
3. "How long did it take you to fall asleep?"
4. "How many times did you wake up, not counting your final awakening?"
5. "In total, how long did these awakenings last?"
6. "What time was your final awakening?"
7. "What time did you get out of bed for the day?"
8. "How would you rate the quality of your sleep?"
9. "In total, how long did you nap or doze yesterday?"
10. "How many drinks containing alcohol did you have?"
11. "What time was your last drink?"
12. "Did you take any over-the-counter or prescription medications to help you sleep?"
13. Comments (Optional):



SHUTI
It will program to help you sleep better

Signed in as T995 [Sign Out](#)

Sleep Diary Chart

Aug 7, 2011 to Aug 13, 2011

Total Time (Hours)

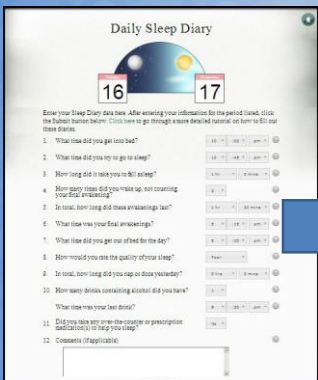
Day	Hours In Bed	Hours Asleep	Sleep Window	Sleep Efficiency
Sun	~8.5	~6.5	10:45 pm - 7:15 am	~75%
Mon	~8.5	~6.5	10:30 pm - 7:15 am	~75%
Tues	~8.5	~6.5	10:30 pm - 7:30 am	~75%
Wed	~8.5	~6.5	11:30 pm - 7:40 am	~75%
Thur	~8.5	~6.5	10:30 pm - 7:15 am	~75%
Fri	~8.5	~6.5	10:30 pm - 7:15 am	~75%
Sat	~8.5	~6.5	11:30 pm - 7:15 am	~75%

Additional details

Bed Time	Arise Time	Quality	Medication	Comments
10:45 pm	7:15 am	☾		
10:30 pm	7:15 am	☾		
10:30 pm	7:30 am	☾		
11:30 pm	7:40 am	☾		
10:30 pm	7:15 am	☾		
10:30 pm	7:15 am	☾		
11:30 pm	7:15 am	☾		

Back


Tailored Recommendations based on user symptoms



Daily Sleep Diary

Enter your Sleep Diary data here. After entering your information for the period listed, click the Submit button below. Click here to go through a more detailed tutorial on how to fill out these diaries.

1. "What time did you get into bed?"
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11. "What time was your last drink?"
12. "Did you take any over-the-counter or prescription medications to help you sleep?"
13. Comments (Optional):



SHUTI
It will program to help you sleep better

Signed in as T992 [Sign Out](#)

Time to Adjust Your Sleep Window

Your Sleep Window this past week was: 12:00 am to 6:00 am

Your Sleep Efficiency has been very good (>=85%) this past week. You have the option of increasing your Sleep Window by 30 minutes or leaving it the same. Sometimes it is better to keep a Sleep Window the same for another week or so to make sure that your Sleep Efficiency stays improved. Would you like to do?

[No Change](#) [Increase Sleep Window](#)

Your maximum number of hours to sleep each night for this week: 6 hrs 0 mins

It is time to set your Sleep Window. First, select your Arising Time if you think a change is necessary. However, it is usually best to keep the same Arising Time because this helps regulate your biological clock and keep it in line with your sleep-wake rhythm. SHUTI will then show you your Sleep Window for this week.

Once you are comfortable with the Bedtime and Arising Time, click the Next button. You can print your Sleep Window at the end of this Core.

Select your Arising Time (optional)	Your Sleep Window for this week
6:00 - 10:00 - am	Bedtime: 12:00 am Arising Time: 6:00 am

Previous Next

SHUTi
A web program to help you sleep better

November 1, 2012

HOME
CORES
DIARIES
MY STUFF

MY SLEEP WINDOW
Bedtime: 11:50 pm
Arising Time: 5:50 am
(can't adjust sleep window yet)

ALERTS
Diaries:
Cores:

Cores

These are the six Core units for the SHUTi program. During the first week, you should complete the Overview Core. A new Core then becomes available one week after completing the previous Core. This gives you time to practice the techniques learned in each Core before moving on to the next one. Previously completed Cores can be reviewed at any time.

Overview REVIEW
Sleep Behavior 1 REVIEW
Sleep Behavior 2 REVIEW
Education REVIEW
Problem Prevention REVIEW

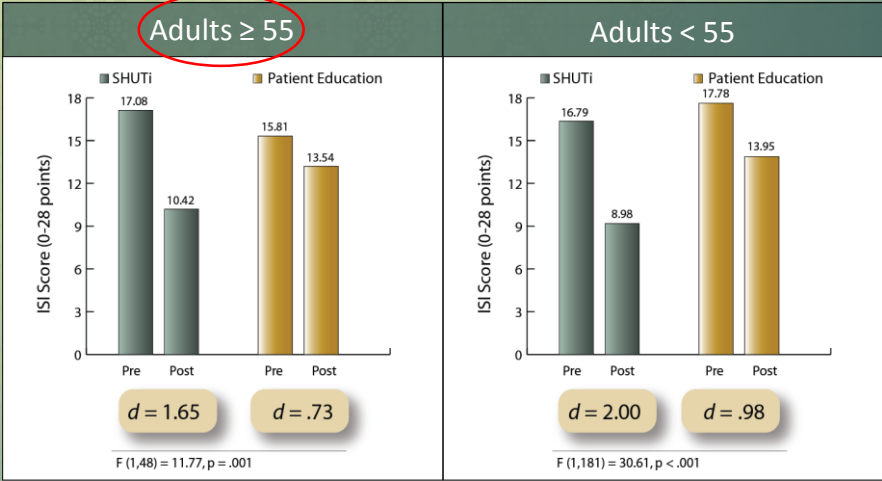
TERMS OF USE PRIVACY POLICY

Bobbie's Story
Introduction

Introduction

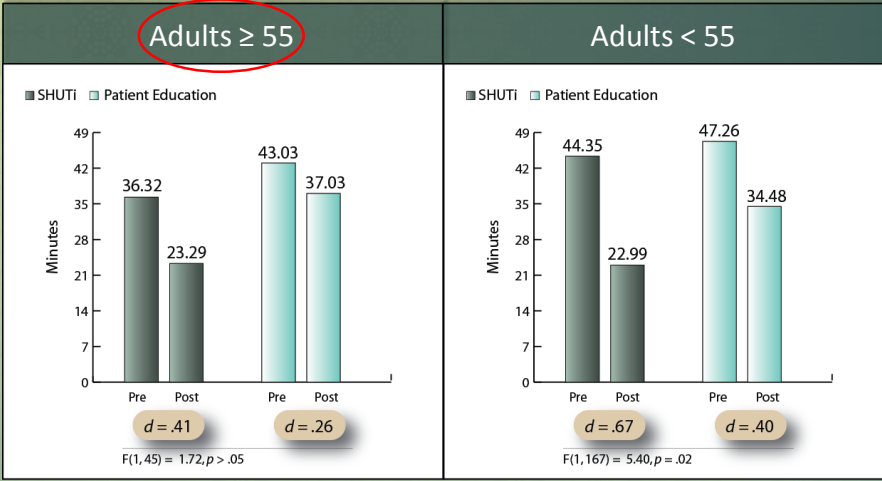
Sample	
<p>55 and OLDER</p> <p>Age:</p> <ul style="list-style-type: none"> • Mean of 59.52 years <p>Gender:</p> <ul style="list-style-type: none"> • 77.0% female <p>Race:</p> <ul style="list-style-type: none"> • 90% Caucasian • 95% non-Hispanic <p>Sleep difficulties:</p> <ul style="list-style-type: none"> • Mean of 15.2 years 	<p>UNDER 55</p> <p>Age:</p> <ul style="list-style-type: none"> • Mean of 38.84 years <p>Gender:</p> <ul style="list-style-type: none"> • 72.6% female <p>Race:</p> <ul style="list-style-type: none"> • 83% Caucasian • 95% non-Hispanic <p>Sleep difficulties:</p> <ul style="list-style-type: none"> • Mean of 10.1 years

Insomnia Severity



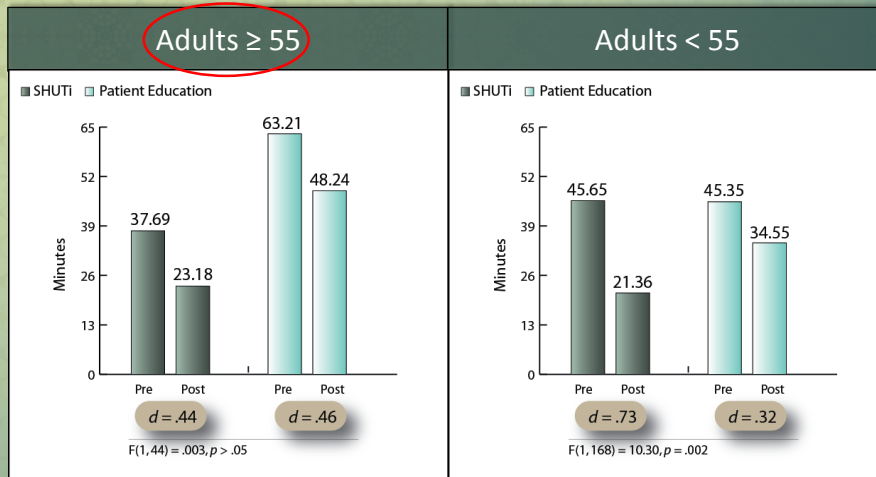
Effect Sizes
 Small = .2 | Medium = .5 | Large = .8

Sleep Onset Latency (SOL)



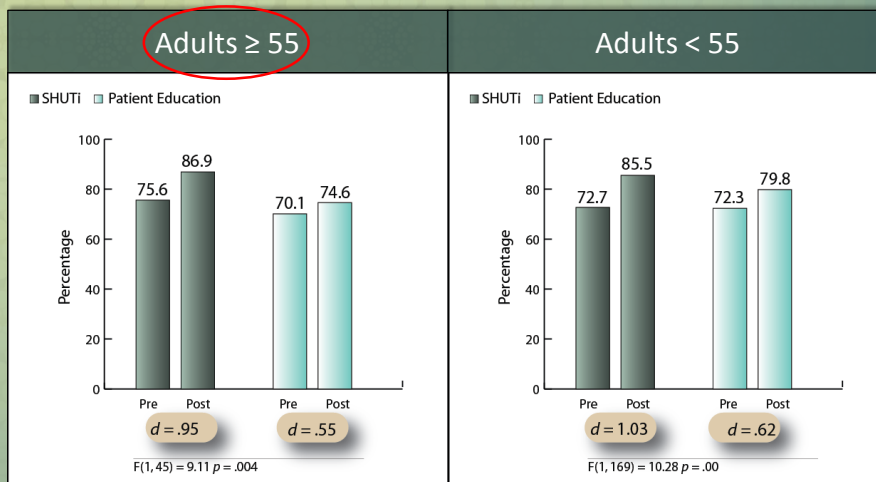
Effect Sizes
 Small = .2 | Medium = .5 | Large = .8

Wake After Sleep Onset (WASO)



Effect Sizes
 Small = .2 | Medium = .5 | Large = .8

Sleep Efficiency












Effect Sizes
 Small = .2 | Medium = .5 | Large = .8

Telephone
Interview

Adherence Rates by Age

32 SHUTi: ≥ 55			111 SHUTi: < 55		
Core 0	31	97%	Core 0	105	95%
Core 1	30	94%	Core 1	100	90%
Core 2	29	91%	Core 2	92	83%
Core 3	24	75%	Core 3	80	72%
Core 4	20	63%	Core 4	71	64%
Core 5	19	59%	Core 5	69	62%
Core 6	18	56%	Core 6	57	51%

SHUTi Trials and dissemination to date

<p>NIH R34</p>  <p>2004-2009</p>	<p>NIH R01</p>  <p>2010-2015</p>	<p>SHUTi-Norse</p>  <p>2012-2014</p>
<p>UVA Cancer Center</p>  <p>2008-2010</p>	<p>"GoodNight" Depression Prevention</p>  <p>2011-2015</p>	<p>SHUTi-Danish</p>  <p>2013-2015</p>
<p>Tonic TV</p>  <p>www.tonictv.com.au</p>	<p>NHMRC "SOMNA Trial" for Depression</p>  <p>2012-2015</p>	<p>SHUTi.me</p> 

Core Completion: At a Glance

Pilot RCT

Core 0	21	95%
Core 1	21	95%
Core 2	21	95%
Core 3	21	95%
Core 4	21	95%
Core 5	20	91%
Core 6	20	91%

Cancer Pilot

Core 0	14	100%
Core 1	14	100%
Core 2	14	100%
Core 3	14	100%
Core 4	13	93%
Core 5	12	86%
Core 6	12	86%

TV + Online Form

Core 0	30	77%
Core 1	28	72%
Core 2	25	64%
Core 3	24	62%
Core 4	22	56%
Core 5	21	54%
Core 6	21	54%

RCT ≥ 55

Core 0	31	97%
Core 1	30	94%
Core 2	29	91%
Core 3	24	75%
Core 4	20	63%
Core 5	19	59%
Core 6	18	56%

RCT < 55

Core 0	105	95%
Core 1	100	90%
Core 2	92	83%
Core 3	80	72%
Core 4	71	64%
Core 5	69	62%
Core 6	57	51%

Commercial Access

Core 0	60	100%
Core 1	60	100%
Core 2	53	88%
Core 3	50	83%
Core 4	43	72%
Core 5	40	67%
Core 6	32	53%

Summary Points

Data suggests that:

- 'Older' participants can use fully-automated Internet-delivered interventions.
- 'Older' participants can achieve significant and clinically meaningful benefit from Internet-delivered interventions.
- The magnitude of the change / improvement might not be as big for 'older' participants as 'younger' participants.

Limitations

- Sample self-referred for this intervention / RCT.
- Participants were required to have Internet access.
- Age range is still restricted (need to test beyond 65+).

Thank you!

Frances Thorndike¹, Lee Ritterband¹, Holly Lord¹, Nathaniel Mason¹,
Katie Stone², & Charles Morin³

SHUTi in the News



SHUTi has been supported by Grant Numbers R34MH70805 and R01MH086758 from the National Institute of Mental Health as well as through a grant from the University of Virginia Cancer Center through the Mary Semmes Scripps Fund for Integrative Medicine.