Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults

Webinar, Washington, DC, March 13, 2015

Webinar Panel

Steven M. Albert, PhD
Professor and Chair
Department of Behavioral and Community Health Sciences
Graduate School of Public Health
University of Pittsburgh

Michael V. Vitiello, PhD
Professor
Center for Research on Management of Sleep Disturbances
Northwest Geriatric Education Center
University of Washington

Thomas Roth, MD
Director of Research and Division Head
Sleep Disorders and Research Center
Henry Ford Health System

Quick Audience Poll
Webinar Agenda

- Aging and sleep disturbance
- Current state of OTC therapeutics for sleep disturbance
- Pharmacist perspective on OTC sleep aids: gaps in therapies and clinical practice

Objectives

- Increase understanding of sleep health and OTC sleep aid use in older adults (ages 65 years and older)
- Identify opportunities for promoting safe and effective use of OTC sleep aids among older adults

Origin of Webinar

- National Summit II: OTC Sleep Aids and Sleep Health: Research, Education, Advocacy June 2014
- GSA Symposium and Congressional Briefing November 2014
- White Paper Update: Sleep Health and Appropriate Use of OTC Sleep Aids in Older Adults; Web-based educational modules November 2014
- Webinar March 2015
Population-Based Life Course Estimates of Poor Sleep Health: BRFSS 2006

Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults

Understanding Older Drivers: An Examination of Medical Conditions, Medication Use, and Travel Behavior

April 2015

Table 2. Self-Report of Effectiveness of Each Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Perceived Effectiveness</th>
<th>Perceived Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
<tr>
<td>Perceived effectiveness</td>
<td>Mean ± Standard Deviation</td>
<td>Mean ± Standard Deviation</td>
</tr>
</tbody>
</table>

0-4: 0=maximum effectiveness; n=242; mean age 73 years

Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults
Sleep Health Among Older Adults: Many Unknowns

- Prevalence of sleep disturbance (vs. insomnia)
  - Relation to age, medical status, daily environment
- How older adults use OTC products to treat sleep disturbance
  - Relative to Rx and non-pharmacologic therapies
- Efficacy of OTC therapies
- Role of pharmacists in counseling and product choice
Why Is Sleep Important?

- 50 million to 70 million Americans have a chronic sleep disorder (IOM 2006)
- 28% of adults report frequent insufficient sleep; 4.7% report falling asleep driving in the past 30 days (CDC 2008, 2010)
- Sleep disorders and deprivation are associated with many deleterious health consequences (IOM 2006)
- Annual direct (medical) and indirect (accidents, lost productivity, etc.) costs total hundreds of billions of dollars (IOM 2006)

Sleep, Circadian Rhythms, and Health

Sleep disorders:
- Insomnia
- Sleep apnea
- Restless legs
- Narcolepsy

Aging:
- Circadian disruption
- Behavioral lifestyle
- Work schedules
- Physical activity level

Sleep Deficiency
- Genetic predisposition
- Appetite
- Inflammation
- Heart, lung functions
- Obesity
- Diabetes
- Heart disease
- Lung disease
- Mood disorders
- Neurologic disorders

Circadian Dysfunction
- Health
- SAFETY and PRODUCTIVITY
- Cognitive performance

Possible Underlying Causes of Sleep Disturbance and Insomnia Symptoms

Common Conditions
- Altered Sleep Regulation & Circadian Rhythms
- Difficulty Initiating & Maintaining Sleep
- Sleep Loss

Medical, Neurologic, & Psychiatric Conditions
- Chronic Pain
- Pulmonary Disease
- Depression

Psychosocial Factors
- Late-Life Stressors
- Sleep Apnea
- Restless Legs
Similarities Between Sleep Loss and Aging

Function
- Glucose tolerance
- Insulin sensitivity
- C-reactive protein
- Cardiac sympathetic activity
- Plasma norepinephrine
- Evening cortisol levels
- Plasma TSH levels
- Plasma leptin levels
- Mood
- Vigilance
- Subjective alertness
- Cognitive function

Sleep Loss Aging

Sleep Disturbances Increase With Age

Large-scale community survey of non-institutionalized American adults, ages 18 to 79 years old

Impact of Poor Sleep in Elderly Adults

- Difficulty sustaining attention & slowed response time
- Decreased ability to accomplish daily tasks
- Impairments in memory & concentration
- Increased consumption of health care resources
- Cardiometabolic disease risk?
- Depression risk?
- Increased risk of falls
- Shorter survival
- Inability to enjoy social relationships
- Increased incidence of pain

**Insomnia With Short Sleep Duration Is Associated With Health Outcomes**

<table>
<thead>
<tr>
<th>Health Condition</th>
<th>Associated With...</th>
<th>Sleep Duration</th>
<th>Insomnia</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension¹</td>
<td>Yes (≤ 6 hours)</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Type 2 diabetes²</td>
<td>No</td>
<td>No</td>
<td>Yes (≤ 5 hours)</td>
<td></td>
</tr>
<tr>
<td>Neuropsychological test performance³</td>
<td>Yes (≤ 6 hours)</td>
<td>5/14 tests</td>
<td>No</td>
<td>Yes 4/14 tests</td>
</tr>
<tr>
<td>Mortality⁴</td>
<td>No</td>
<td>No</td>
<td>Yes (&lt; 6 hours, Men only)</td>
<td></td>
</tr>
<tr>
<td>Cortisol⁵</td>
<td>No</td>
<td>Yes</td>
<td>Yes (SE &lt; 70%)</td>
<td></td>
</tr>
</tbody>
</table>


---

**Poor Health Impacts Prevalence of Insomnia in Older Adult Population**

![Graph showing prevalence of insomnia and any chronic sleep complaint among the healthiest and all in the population.](image)


---

**Cognitive Decline and Insomnia in Older Adults**

![Graph showing odds ratio (OR) for cognitive decline.](image)

Summary of Study of Osteoporotic Fractures: Study Results (n = 3,022)

- A 30%-40% increased risk of subsequent falls associated in older women with:
  - TST < 7 hours / night
  - SE ≤ 65%

- An increased mortality risk in older women with:
  - TST < 5 hours / night
  - SE ≤ 65%
  - >2 hour naps

After adjusting for race, age, BMI, medical conditions, depression, cognitive function, exercise, IADL, use of antidepressant or benzodiazepine.


Impact of Insomnia on Quality of Life

Axes represent subscales of the SF-36. All P values < .05 (range .000-.023).

Insomnia is Under-reported and Under-recognized

- Number of Sleep Complaints Endorsed (n=1503, age 60-100 years)
  - 69% endorsed at least one sleep problem
  - 40% endorsed ≥2 sleep problems
  - 45% endorsed symptoms of insomnia
  - BUT identified in medical chart only 19% of time

Conclusions

- Although sleep patterns change with age, it is the change in the ability to sleep and co-morbid medical and psychiatric disorders that result in most sleep complaints in older adults.
- Sleep — similar to nutrition and physical activity — is an essential part of a healthy lifestyle for all.
- A potentially modifiable risk factor for age-associated impairments in mental and physical function.

Current State of OTC Therapeutics for Sleep Disturbance

Types of Sleep Aids

- Prescription drugs
- Herbals and supplements
- Alcohol
- OTC drugs
Prescription Drugs

- Prescription sleep aids:
  - Eszopiclone (Lunesta)
  - Ramelteon (Rozerem)
  - Doxepin (Silenor)
- FDA approved for treatment of insomnia
- DSM-V diagnosis of insomnia disorder requires disturbed sleep 3 or more nights/week for a month
- No limitation on treatment duration

Herbals and Supplements

- Valerian, chamomile, melatonin, etc.
- FDA has updated the labeling laws so consumers can see herbals’ actions in the body
- Herbal labels still cannot say anything about treating specific medical conditions because they are not subject to clinical trials or to the same standards as prescription or OTC drugs
- Example labeling statement: “to promote regular sleep patterns”

Alcohol

- Frequently used as a sleep aid
- Sedative effects may lead to shortening of sleep latency
- Alcohol disrupts nighttime sleep quality and compromises nighttime respiration
- May result in residual daytime effects
OTC Agents

- Doxylamine, diphenhydramine
- FDA approved
- Not for treatment of insomnia
- Indicated for occasional sleeplessness of 2 to 3 nights

US FDA Permitted OTC Sleep Aids

- Doxylamine
  - Unisom SleepTabs, Equaline Sleep Aid, Good Sense Sleep Aid, etc.
  - Very weak H1 antagonist; H1/M1 potency ratio low to moderate
  - Pregnancy Category B
  - No published placebo-controlled trials supporting efficacy in older adults

US FDA Permitted OTC Sleep Aids

- Diphenhydramine
  - Nytol, Sominex, Tylenol PM, Excedrin PM, Advil PM, Unisom SleepGels, ZzzQuil, etc.
  - Very weak H1 antagonist; H1/M1 potency ratio low to moderate
  - Pregnancy Category B
  - 1 published crossover study in 20 older insomniacs:
    - Decreased only awakenings vs placebo; AEs vs placebo: dry mouth (80% vs 65%), dizziness (25% vs 10%), and headache (20% vs 5%)
Relative Selectivity x 10^4

H1 5HTT NET M1 alpha1


Diphenhydramine Specificity of Action

Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults


Diphenhydramine Pharmacokinetics and Age

Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults

Residual Effect of Diphenhydramine 50 mg on PET

Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults

Residual Sedation of Diphenhydramine 50 mg

**TABLE 4. TESTS OF NEUROLOGIC FUNCTION**

<table>
<thead>
<tr>
<th>Test Category</th>
<th>Test Name</th>
<th>Diphenhydramine 50 mg</th>
<th>Placebo</th>
<th>Opioids</th>
<th>Flores</th>
<th>Placebo</th>
<th>Opioids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Function</td>
<td>Babinski</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Sensory</td>
<td>Vibration</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognition</td>
<td>Serial 7-3</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td></td>
<td>45</td>
<td></td>
<td></td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>

*Florin indicates better score on test during week when the opiate was administered.*


Beers Criteria

**TABLE 1. 2012 AGS BEERS CRITERIA FOR POTENTIALLY INAPPROPRIATE MEDICATION USE IN OLDER ADULTS**

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Beers Criterion</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzodiazepines</td>
<td>Highly anticholinergic agents with benzodiazepine receptor activity</td>
<td>Use benzodiazepine receptor activity or metoclopramide.</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>Highly anticholinergic agents with benzodiazepine receptor activity</td>
<td>Use benzodiazepine receptor activity or metoclopramide.</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>Highly anticholinergic agents with benzodiazepine receptor activity</td>
<td>Use benzodiazepine receptor activity or metoclopramide.</td>
</tr>
<tr>
<td>Opioids</td>
<td>Highly anticholinergic agents with benzodiazepine receptor activity</td>
<td>Use benzodiazepine receptor activity or metoclopramide.</td>
</tr>
</tbody>
</table>

Conclusions

- Efficacy data for OTC sleep aids in general are not available and there are almost none for older adults
- Many older adults misuse OTC sleep aids, taking them for long periods of time
- Duration of action of diphenhydramine increases with age
- Safety concerns relate to potential residual effects and anticholinergic side effects

Pharmacist Perspective on OTC Sleep Aids: Gaps in Therapies and Clinical Practice

Review of Today’s Pharmaceutical Care

- Increase access to health care for consumers/patients
- Provide advice/direction
- Provide education/information
- Coordinate essential health information
- Manage/coordinate OTC sleep aid use with prescription medication dispensing and other pharmacist-provided patient care services
- Perform patient triage and make referrals
2013 *Pharmacy Today*  
*Over-the-Counter Product Survey*

- Pharmacists make an average of 28 OTC product recommendations per week and counsel 27 patients
- On average, 77% of patients purchase the OTC product recommended by the pharmacist
- On average, pharmacists spend 3.6 minutes with patients requesting OTC information
- After counseling patients on OTC products, most pharmacists refer them to another health care professional – Refer 73% of the time


---

**Clinical Assessment of Sleep Health**

Assessment of sleep health and use of OTC sleep medications should be part of the routine examination in all patients

- How many hours of sleep do you get, on average?
- Do you have problems falling asleep or staying asleep? How often?
- Do you feel sleepy, drowsy, or tired during the day?
- Do you take OTC medications to help you sleep?

** It takes less than 1 minute! **

---

**Investigate Causes of Sleep Disturbances/Insomnia**

- Transient 1 week; Short-term 1 to 3 weeks;  
  Chronic more than 3 weeks
- Difficulty falling asleep (life stresses, medical illness, anxiety, poor sleep habits)
- Environmental (late night exercise, meals, new surroundings, etc.)
- Caffeine, alcohol
- Medical conditions (pain, GERD, asthma, etc.)
- Medications (Rx and OTC)
- Shift work
- Circadian rhythm disorders: children/adolescents

Dlugosz CK. Practitioner’s Quick Reference to Nonprescription Drugs. 2nd ed. 2012; p.253-269.
Therapeutic Options for Occasional Sleeplessness

- Sleep hygiene practices
- Complementary therapy
  - Melatonin, valerian, others
- Pharmacologic therapy (OTC sleep aids)
  - Diphenhydramine/doxylamine products
  - Combination products with analgesics

Project Objective

- To investigate self-reported sleeplessness symptoms and problems among adults (18+ years of age) in the United States, using data from Kantar Health’s National Health and Wellness Survey (NHWS)

NHWS Method and Sample

- Data collection
  - Survey administered via the Internet since 2002
  - Data collected during Q1–Q3 2013
- Sample
  - Adults 18+ years of age
  - Sample drawn from the Internet panel maintained by Lightspeed Research and its partners
  - Invitations to participate sent to a sample stratified according to:
    - Gender
    - Age
    - Race
- Results are projected to reflect the total population using known population incidences for key subgroups
  - Weighting variables: gender, age, race/ethnicity, and education
  - From 2012 Current Population Survey (Annual Demographics File) of the U.S. Census Bureau
The Gerontological Society of America  
March 13, 2015 Webinar  

**Population With Sleeplessness Symptoms**

- 49% of adults report sleeplessness symptoms
- Among those reporting sleeplessness symptoms:
  - 45% report experiencing or diagnosed sleep difficulties/insomnia
  - 55% report no experience of sleep difficulties
  - 33% report daytime sleepiness symptoms
Current OTC/Herbal Product Use Among Adults 65+ With Sleep Difficulties/Insomnia

Sleep Health and the Appropriate Use of OTC Sleep Aids in Older Adults

Sleep Treatment Combinations

Drug Facts Label: Diphenhydramine
### Days Using OTCs Among Adults Taking DPH/DOX

<table>
<thead>
<tr>
<th>Days per Month</th>
<th>18-64 Years of Age</th>
<th>65-74 Years of Age</th>
<th>75 Years of Age and Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two weeks or less</td>
<td>79% (6.1M)</td>
<td>63% (428K)</td>
<td>53% (225K)</td>
</tr>
<tr>
<td>More than two weeks</td>
<td>21% (1.5M)</td>
<td>37% (247K)</td>
<td>47% (199K)</td>
</tr>
</tbody>
</table>

### Anticholinergic Use Among Adults With Sleeplessness Using DPH/DOX

<table>
<thead>
<tr>
<th>Age Group</th>
<th>18-64 Years of Age</th>
<th>65-74 Years of Age</th>
<th>75 Years of Age and Older</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>23% (1.7M)</td>
<td>33% (220K)</td>
<td>44% (187K)</td>
</tr>
</tbody>
</table>

### Key Findings

- NHWS data confirm observations from other studies.
- Sleeplessness symptoms are very common in U.S. adult population.
- Individuals self-report sleep difficulties in different ways—important for health care professionals to discuss with patients:
  - Assess the length of sleep difficulties and refer patients with chronic symptoms for medical followup.
- In older adults, off-label use of OTC sleep aids is observed, particularly:
  - With co-existing health conditions
  - Length of therapy use (i.e., >2 weeks)
  - Co-administration with 1+ anticholinergic
  - Co-administration with alcohol
- Opportunity for educating health care professionals on treatment and safety concerns particularly in older adults.
Contributions of Pharmacists

- Through pharmacists’ contributions, patients:
  - Will be better informed/educated
  - Will potentially avoid problems associated with these medications (e.g., decreased falls, fewer side effects)
  - Will be less likely to engage in risky medication behaviors
  - Will have better management of their condition
  - Will potentially have an improved quality of life

Thank You and Q&A

- www.geron.org/otc
  - Publications and Toolkit

Thank you!
Questions and Discussion

Emailed to attendees following the webinar:
- Webinar PowerPoint
- GSA Workgroup White Paper
- Webinar recording
Webinar Evaluation

In an effort for continual improvement, we would like to hear your thoughts. Please provide feedback by clicking the survey link at the end of the webinar.

Thank you again and we hope you enjoyed the program!