



Growing Old Does Not Mean Sleeping Poorly

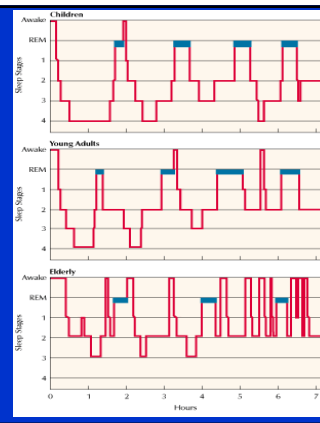
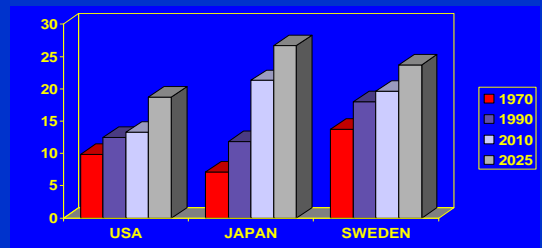
Michael V. Vitiello, PhD

Professor of Psychiatry & Behavioral Sciences,
 Medicine (Gerontology & Geriatrics),
 and Biobehavioral Nursing & Health Systems,
 Associate Director, Northwest Geriatric Education Center
 University of Washington, Seattle WA

Presentation Objectives

- Provide a brief overview of the causes of sleep disturbance in older adults.
- Dispel several myths about sleep and aging.
- Provide evidence that growing older does not mean sleeping poorly.

Estimated Percents of National Populations 65 Years or Older (1970 TO 2025)



Sleep Architectural Changes From Childhood Through Young Adults to the Healthy Elderly:

- Increased time to fall asleep.
- Increased nighttime wakefulness.
- Decreased depth of sleep.

Causes of Sleep Disturbance in Aging

- **Age-related sleep change**
 - Changes in homeostatic sleep drive and circadian rhythm for wakefulness
- **Co-morbid medical and psychiatric illnesses**
 - E.g.; Pain, Depression, etc.
- **Primary sleep disorders**
 - E.g.; Sleep Apnea, Restless Legs, etc.
- **Poor sleep hygiene**
 - Learned behaviors, environmental factors, etc.
- **Any combination of the above**

Myths About Sleep and Aging

- **Older adults typically complain about poor sleep.**
- **As individuals age they can expect their sleep to grow progressively worse over time.**
- **Most sleep disruption seen with aging is the result of the aging process, per se.**
- **Daytime sleep-related complaints and napping are related to nighttime sleep complaints.**
- **Insomnia is typically secondary to co-morbid illnesses.**

Myths About Sleep and Aging

- **Older adults typically complain about poor sleep.**

Age-Related Changes in Sleep Quality

- **While epidemiological studies typically report that 40-50% of the elderly complain about significant and chronic sleep disturbance...**
- **It is important to remember that 50-60% of older adults do not complain.**
- **Yet the evidence is clear that the sleep of these non-complainers has changed significantly with advancing age.**

Age-Related Changes in Sleep Quality

- **Sleep changes occur even in “optimally aging”, non-complaining older adults.**
- **150 healthy non-complaining older adults were studied:**
 - Objective sleep measures were significantly changed relative to that of younger adults.
 - Significant proportions of both women (33%) and men (16%), had subjective sleep quality scores suggestive of sleep disturbance.

Vitiello et al. *J Psychosom Res*, 2004.

Implications of Age-Related Sleep Changes

- **Many older adults, despite having significantly disturbed objective sleep quality, apparently adapt their perception of what is “acceptable” sleep and therefore do not complain.**
 - Vitiello et al. *J Psychosom Res*, 2004
 - Buysse et al. *Sleep*, 1991.

Myths About Sleep and Aging

- As individuals age they can expect their sleep to grow progressively worse over time.
- Most sleep disruption seen with aging is the result of the aging process, per se.

What is Normative Sleep for Older Adults?

Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: Developing normative sleep values across the human lifespan.

Ohayon, Carskadon, Guilleminault and Vitiello.

Sleep; 27(7): 1255-73, 2004.

Meta-analysis Methods

- Scientific bibliographic databases searched:
 - Peer reviewed and published 1960 - 2003.
 - "Sleep" + "normal", "normative" or "healthy".
- 4000+ published articles identified and screened.
 - Non-clinical participants \geq five years old.
 - Reporting appropriate all-night PSG variables.
 - Data presented numerically.
- 585 reports passed this screen.

Meta-analysis Methods

- Additional criteria for inclusion in the meta-analyses:
 - Sample well described, with limitations noted:
 - Gender and age of subjects, inclusion/exclusion criteria, etc.
 - Target sleep/wake variables:
 - TST, SL, SE, WASO, REM, S1, S2, SWS
 - Adequate statistical results for target sleep/wake variables

Meta-analysis Methods

- Of 585 studies 65, representing a total of 3,577 subjects, met all data-quality criteria :
 - Eighteen studies assessed the sleep of children and adolescents (5-18 yrs), 1,186 subjects.
 - Forty-seven studies assessed the sleep of adults (\geq 19 yrs), 2,391 subjects.
 - Thirty-eight studies assessed the sleep of older adults (60-102 yrs), 1,142 subjects.

Age-Related Correlations (Effect Sizes) with Sleep/Wake Across the Adult Life Span

TST	-.76 (-.60)	SL	.16 (.27)
SE	-.82 (-.71)	S 1	.16 (.28)
SWS	-.56 (-.85)	S 2	.34 (.38)
REM	-.34 (-.46)	WASO	.75 (.89)
REML	-.68 (-.15)		

- All variables significant at $p < .0001$
- N.B. - Each Effect Size had a highly significant Q statistic

Normative Sleep Summary

- **For the full adult life-span (19-102 yrs):**
 - All nine sleep variables examined either increased or decreased significantly with age as expected.
- **However, for older adults (60-102 yrs):**
 - No sleep variable showed significant change except Sleep Efficiency.
 - SE declined at a rate of ~3% per decade.

Implications of these Normative Findings

- **Most age-related objective sleep changes occur in the early/mid adult years of life and effectively asymptote in older adults.**
 - The objective sleep quality of healthy older adults remains relatively constant from age 60 to the mid 90s.
 - Older adults who remain healthy can expect their sleep efficiency to decline very slowly.
 - This may help explain why 50-60% of older adults do not complain about their sleep.

Implications of these Normative Findings

- **This finding contradicts what has typically been held as doctrine in sleep and aging; that age-related declines in sleep are relatively constant across the adult lifespan.**
 - The term “senility” has fallen from use as we no longer assume that cognitive decline is an inevitable part of aging.
 - The assumption that aging, per se, equates with increasingly poor sleep and with sleep complaint appears to be another idea past its time.

Implications of these Normative Findings

- **However, it is important to remember that this study examined the sleep of very healthy, “optimally aging” older adults.**
- **Significant, treatable sleep disturbances clearly exist in the many older adults with significant medical and psychosocial burden, who were intentionally screened out of these analyses.**

Sleep Disturbance Co-Morbid with Illness

- **Both acute and chronic illnesses increase in frequency with age.**
- **Sleep may be adversely affected:**
 - Directly by an illness, per se.
 - And by consequences of and treatments for an illness:
 - Surgery/pain
 - Bed-rest/inactivity
 - Medications (Rx, OTC, other)
 - Dangers of polypharmacy.

Prevalence of Sleep Complaints in Older Adults

Vitiello, et al. Prevalence of Chronic Sleep Complaints and Their Relationships to Medical Conditions in the VITAL Study Cohort of 77,000 Older Adults. *Sleep* 27, A120, 2004.

	<u>SOD</u>	<u>SMD</u>	<u>EMA</u>	<u>NRS</u>	<u>EDS</u>
<u>Total</u>	17.6	33.1	26.6	26.0	13.3
<u>Men</u>	13.7	27.8	26.6	23.7	13.1
<u>Women</u>	21.2*	37.9*	26.6	28.1*	13.4

Prevalence of Common Illnesses in Older Adults

Vitiello, et al. Prevalence of Chronic Sleep Complaints and Their Relationships to Medical Conditions in the VITAL Study
Cohort of 77,000 Older Adults. *Sleep* 27, A120, 2004.

• Chronic pain/OA	48.4	• Diabetes	7.0
• Indigestion/GERD	21.4	• Rheumatoid A.	3.9
• BPH*	16.8	• COPD	3.7
• Depression	16.7	• Stroke	2.5
• Headache/Migraine	15.5	• Heart Failure	1.8
• Cancer	14.5	• Kidney Disease	1.0
• CAD	9.2	• Cirrhosis/Liver Dis.	0.5

Association of Sleep Complaints with Illness

- Most illnesses were associated with both nighttime (ORs of 1.7 – 1.0) and daytime sleep-related complaints (ORs of 2.8 – 1.1).
 - Depression (ORs of 2.8-1.7) had the strongest associations.
 - Chronic Pain/OA (ORs of 1.9-1.6) had the second strongest associations.
- Similar patterns were observed for medical burden.
- Sleep-related complaints are highly associated with co-morbid illnesses

Myths About Sleep and Aging

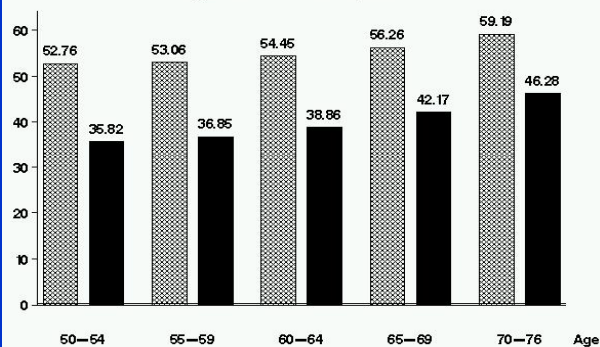
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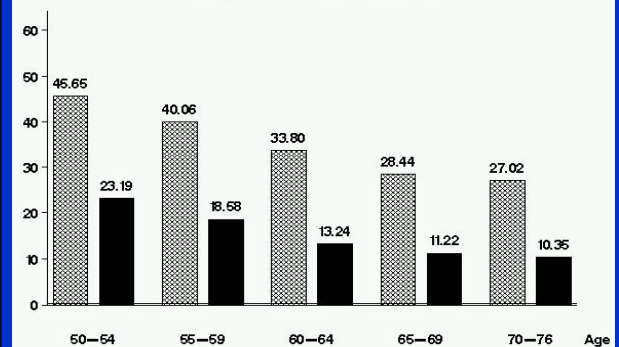
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Nighttime complaints



Daytime complaints



Frequent Napping is Associated with EDS, Depression, Pain and Nocturia in Older Adults.

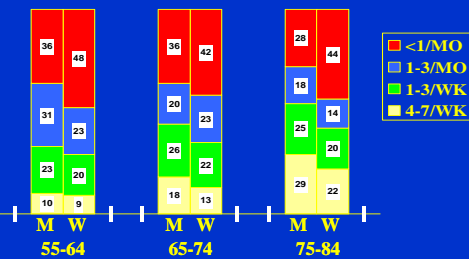
Foley, Vitiello, Bliwise, et al.

Am J Geriatric Psychiatry 15:344-350, 2007

2003 NSF Sleep in America Poll

- Funded by the National Sleep Foundation.
- Geographically representative random sample of US telephone listings.
- 26% of solicited subjects completed the 20 minute interview.
- 1,506 older (55-84 yrs) adults:
 - Community-dwelling
 - 57.5% women
- 1,417 (94%) respondents answered all the questions used in these analyses.

2003 NSF Poll - Frequency of Napping by Age and Sex



Multiple Regression Results

- Regular Napping was associated with:

– EDS	8.65	5.55-13.48	<.0001
– Depression	1.76	1.20-2.59	<.0042
– Pain	1.53	1.11-2.12	<.0104
– Nocturia	1.52	1.10-2.12	<.0133
- Stepwise regression; adjusted odds ratios, confidence limits, significance levels; final model included age and sex.

Conclusions

- Regular napping increased with age within the sample from 9 to 24%
- Regular napping was strongly associated with EDS and moderately associated with depression, pain/medical burden and nocturia.
- No sleep quality measure, other than EDS, was associated with regular napping in multiple regression models.

Myths About Sleep and Aging

- Insomnia is typically secondary to co-morbid illnesses.

CBT-I Improves both Sleep and Pain in Older Adults with Co-morbid Osteoarthritis and Insomnia

Michael V. Vitiello, Bruce D. Rybarczyk,
Michael Von Korff and Edward J. Stepanski

Journal of Clinical Sleep Medicine (in press)



Cognitive-Behavioral Therapy for Insomnia (CBT-I)

- CBT-I typically consists of:
 - Sleep Hygiene
 - Sleep Logging
 - Stimulus Control Therapy*
 - Bedtime (Sleep) Restriction Therapy*
- CBT-I may also include:
 - Cognitive Restructuring
 - Relaxation Techniques

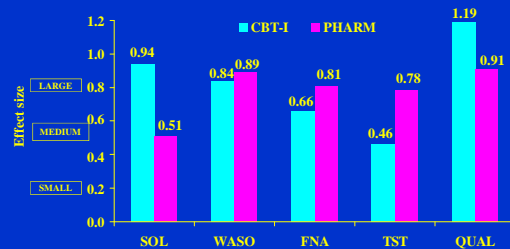
General Principles

- Know what normal, age appropriate, sleep patterns should be.
- Set regular bed and rise times.
- Explore if bedroom habits disrupt sleep.
- Develop relaxing bedtime rituals.
- Explore the usefulness of daytime naps.
- Exercise regularly and moderately.
- Spend time outdoors in natural sunlight.
- Avoid bright light during the night.

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Relative Efficacy of Cognitive-Behavioral and Pharmacological Therapies for Sleep



Morin et al 1994; Murtagh and Greenwood 1995; Nowell et al 1997; Smith et al 2002

CBT-I Improves both Sleep and Pain in Older Adults with Co-morbid Osteoarthritis and Insomnia

Michael V. Vitiello, Bruce D. Rybarczyk,
Michael Von Korff and Edward J. Stepanski

Journal of Clinical Sleep Medicine (in press)

Study Design

- Subjects meeting criteria for co-morbid OA and chronic insomnia were randomized to either:
 - Standard CBT-I (Eight 2-hour sessions).
 - Stress Management and Wellness (SMW) intervention.
- Neither intervention specifically mentioned pain management.
 - SMW contained components typically included in behavioral pain interventions:
 - Problem-solving, goal setting, cognitive approaches to reducing stress and anxiety, interpersonal skills training, and exercise enhancement

SMW (N=28)

CBT-I (N=23)

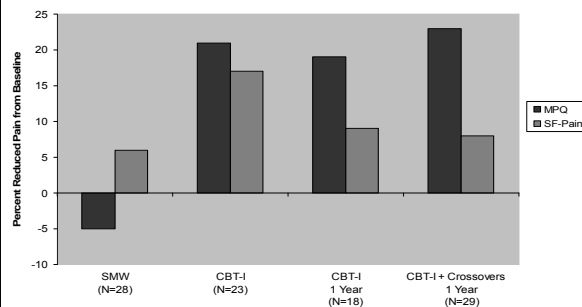
	Pre	Post	p	Pre	Post	p
TST	342 (84)	370 (71)	.059	351 (60)	372 (59)	.069
SE	70.2 (14.1)	75.2 (14.0)	.069	71.0 (12.3)	84.0 (8.1)	.000
SLAT	36.9 (27.1)	33.4 (31.0)	.360	40.4 (21.4)	23.5 (22.0)	.014
WASO	67 (45)	55 (41)	.134	62 (47)	25 (21)	.000
MPQ	11.1 (9.6)	11.6 (10.8)	.704	10.1 (9.6)	8.0 (7.1)	.221
SF-36P	59.3 (21.4)	53.1 (25.8)	.371	56.4 (19.7)	66.3 (24.3)	.010

CBT-I (N=19)

CBT-I+CO (N=29)

	Pre	One-Year	p	Pre	One Year	p
TST	361 (51)	393 (48)	.034	364 (48)	390 (56)	.16
SE	74.3 (9.3)	82.8 (6.9)	.001	74.9 (10.0)	82.8 (9.3)	.000
SLAT	35.4 (17.9)	24.0 (17.7)	.006	34.3 (22.6)	23.6 (17.8)	.001
WASO	48.1 (29.0)	28.7 (20.7)	.015	48.9 (30.2)	29.6 (24.6)	.001
MPQ	9.1 (8.8)	7.4 (7.7)	.129	9.7 (7.6)	7.3 (6.7)	.029
SF-36P	59.3 (19.8)	64.2 (23.4)	.081	59.1 (20.4)	63.8 (23.5)	.114

Improving Sleep in OA Patients with Insomnia Reduces Pain at both Post-Treatment and One-Year Follow-up



Vitiello et al. *J of Clinical Sleep Medicine*, in press.

Conclusions and Implications

- CBT-I improved both immediate and long-term self-reported sleep quality and pain in this sample of older OA patients with co-morbid insomnia.
- Improving sleep quality in older OA patients with co-morbid insomnia may be analgesic.
- This suggests that proven techniques to improve sleep should be considered for addition to existing treatment programs for pain management in OA and possibly other pain-states.

Myths About Sleep and Aging

- Older adults typically complain about poor sleep.
- As individuals age they can expect their sleep to grow progressively worse over time.
- Most sleep disruption seen with aging is the result of the aging process, per se.
- Daytime sleep-related complaints and napping are related to nighttime sleep complaints.
- Insomnia is typically secondary to co-morbid illnesses.

The Take-home Messages

- Sleep disturbances in aging commonly result from multiple causes.
- Sleep is significantly disturbed even in healthy “optimally-aging” elderly, but often does not result in complaint.
- Don’t assume that a sleep complaint in an older adult is “merely” the result of getting older.
- Don’t assume that nighttime sleep complaints are related to daytime sleep-related complaints and napping.

The Take-home Messages

- There are effective treatments for most of the sleep disturbances seen in older adults.
- When a sleep disturbance is co-morbid with illness treat both the illness and the sleep disturbance.
- Effectively treating sleep disturbance may have beneficial impact on co-morbid illness (e.g.; pain syndromes, depression).

The Take-home Messages

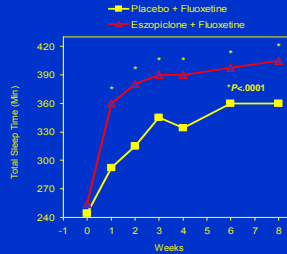
- **Growing old does not mean sleeping poorly!**



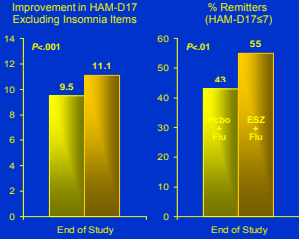
Treatment of Insomnia Co-morbid with Depression Improves Both Sleep and Depression Outcomes:

Fluoxetine + Eszopiclone versus Fluoxetine + Placebo, N=545

Significant Improvement in Sleep



Significant Effect on Depression Response



Fava et al. *Biol Psychiat*, 2006

Treatment of Insomnia Co-morbid with Depression Improves Both Sleep and Depression Outcomes:

Escitalopram + CBT-I versus Escitalopram + Control (Quasi-desensitization)

- EsCIT + CBT-I resulted in a higher rate of remission from depression (61.5%) than EsCIT + Control (33.3%).
- EsCIT + CBT-I resulted in a higher rate of remission from insomnia (50.0%) than EsCIT + Control (7.7%).

Manber et al, *SLEEP* 31(4):489-495, 2008

Sleep/Wake Principles

- **Maintain habitual bed and rise times.**
 - In particular, get up at the same time each day.
- **Restrict time in bed.**
 - Stay in bed only as long as you are asleep.
- **Explore the usefulness of napping.**
 - Remember that daytime naps may decrease nighttime sleep need.
 - Although two recent studies suggest this may not be the case: Monk et al, *Sleep*, 2001; Campbell et al, *JAGS*, 2005

Environmental Principles

- Ensure the bedroom is sufficiently dark.
- Ensure a nightlight does not illuminate the eyes while in bed.
- Minimize disturbing noise.
- Ensure bedding, temperature and airflow are consistent with good quality sleep.
- Eliminate or place bedroom clocks so that they can not be viewed from bed.

Environmental Principles

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Diet and Drug Use Principles

- Avoid rich food late in the evening.
- Explore the usefulness of a light bedtime snack.
 - Try snacking on foods that promote sleep:
 - E.g., milk, bananas, turkey, cheese.
- Avoid caffeine, alcohol and tobacco.
- Be aware that OTC and prescription medications may adversely affect sleep.

General Principles

- Know what normal, age appropriate, sleep patterns should be.
- Set regular bed and rise times.
- Explore if bedroom habits disrupt sleep.
- Develop relaxing bedtime rituals.
- Explore the usefulness of daytime naps.
- Exercise regularly and moderately.
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