Growing Old Does Not Mean Sleeping Poorly: Myths and Facts about Sleep and Aging

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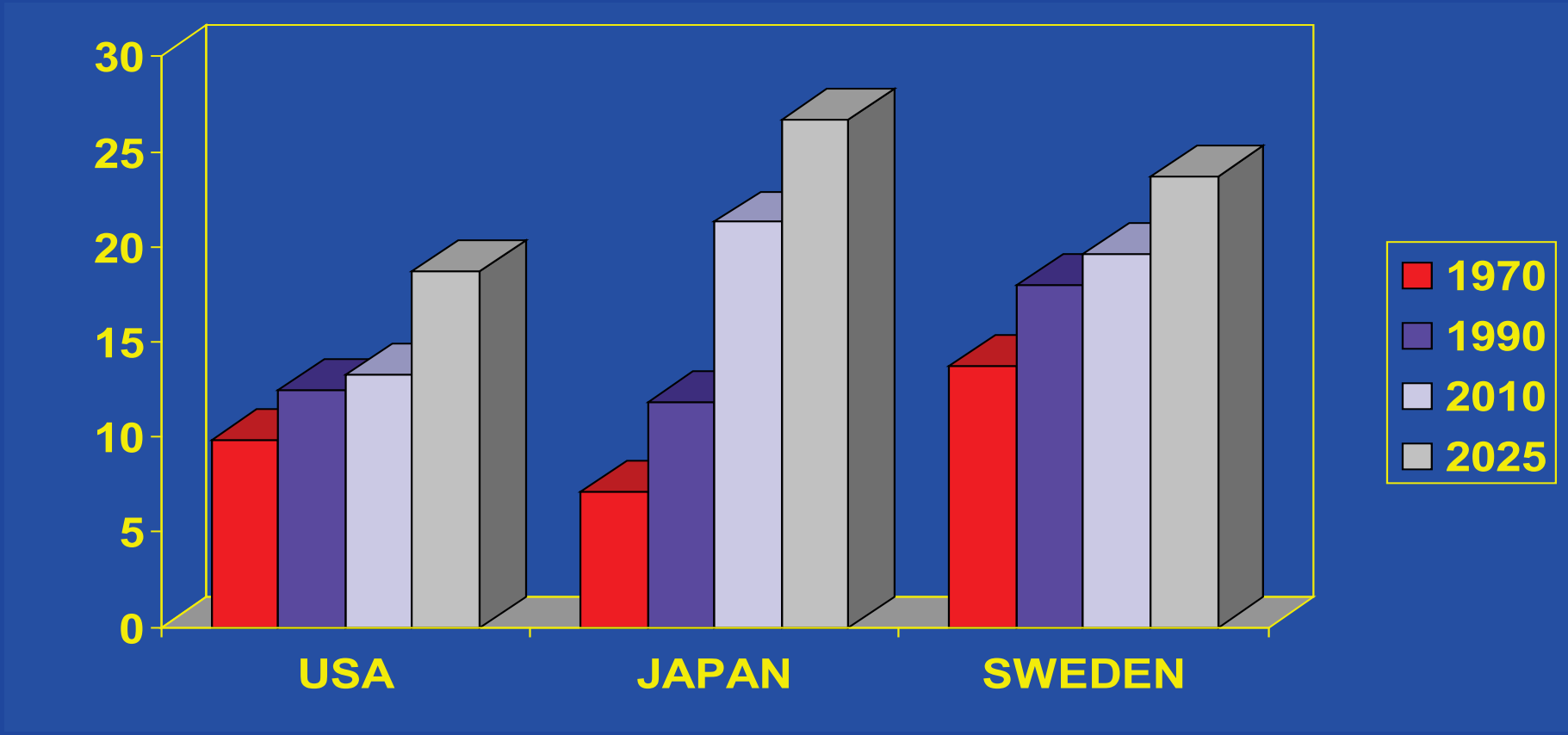
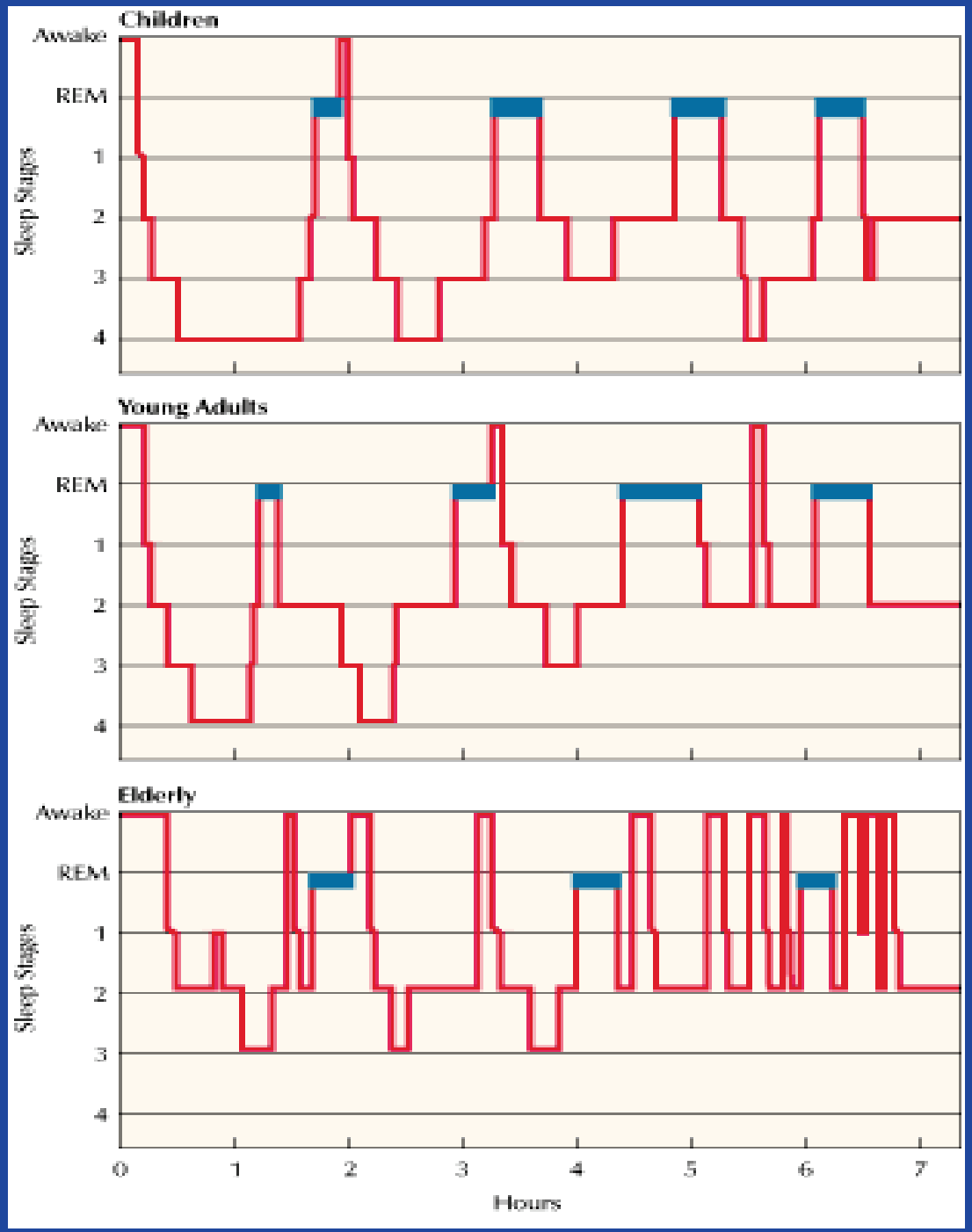
Presentation Objectives

- Provide an 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 sleep latency
- Frequent awakenings
- Increased WASO
- Decreased SWS
- Increased Stages 1 & 2
- Decreased REM

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
  - OSA, RLS, RBD, CRD, etc.
- Poor sleep hygiene
  - Learned behaviors, environmental factors, etc.
- Any combination of the above

Common Assumptions 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.
- Daytime sleep complaints are related to nighttime sleep complaints.
- Older adults typically take naps.
- Naps are related to nighttime sleep complaints.
- Insomnia is typically secondary to illness.

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.

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

- PubMed, PsycInfo and SCI searched.
- "Sleep" + "normal", "normative" or "healthy".
- 4000+ reports identified and screened.
  - Non-clinical participants ≥ five years old.
  - Reporting appropriate all-night PSG variables.
  - Data presented numerically.
  - Peer reviewed and published 1960 - 2003.
- 585 reports passed this screen.

Meta Analysis Methods

- **Additional criteria met for inclusion in the meta-analyses.**
  - **Target variables:**
    - **TST, SL, SE, WASO, REM, REML, S1, S2, SWS**
  - **Sample well described, with limitations noted.**
  - **Statistical analytic result for target variables:**
    - **Central tendency, variability and F, t or r value, etc.**
  - **Gender and age of subjects with data summarized accordingly**

Meta Analysis Methods

- Out of 585 reports 65 met all criteria.
- Representing a total of 3,577 subjects:
  - Eighteen studies assessing the sleep of children (5-18 yrs.), 1,186 subjects.
  - Forty-seven studies assessing the sleep of adults (≥ 19 yrs.), 2,391 subjects.
  - Thirty-eight studies assessing the sleep of older adults (60-102 yrs.), 1,142 subjects.

Age-Related Trends and (Effect Sizes) Across the Full 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.**
- **But for older adults (60-102 yrs):**
  - **No sleep variable showed significant change, except SE (Sleep Efficiency).**
    - **SE declined at a very slow rate of ~3% per decade.**

Implications of these Normative Findings

- **Most age-related objective sleep changes occur in the early and mid 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.
  - 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 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 healthy 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.

Myths About Sleep and Aging

Most sleep disruption seen with aging is the result of the aging process, per se.

Sleep Disturbance Co-Morbid with Illness

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

Prevalence of Sleep Complaints

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.

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

Chronic Sleep Complaints Co-Segregate with Health Burden 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
- Indigestion/GERD 21.4
- BPH* 16.8
- Depression 16.7
- Headache/Migraine 15.5
- Cancer 14.5
- CAD 9.2
- Diabetes 7.0
- Rheumatoid A. 3.9
- COPD 3.7
- Stroke 2.5
- Heart Failure 1.8
- Kidney Disease 1.0
- Cirrhosis/Liver Dis. 0.5

VITAL Logistic Regression Results

- 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 and were comparable in both men and women.

Myths About Sleep and Aging

Daytime "sleep-related" complaints are related to nighttime sleep complaints.

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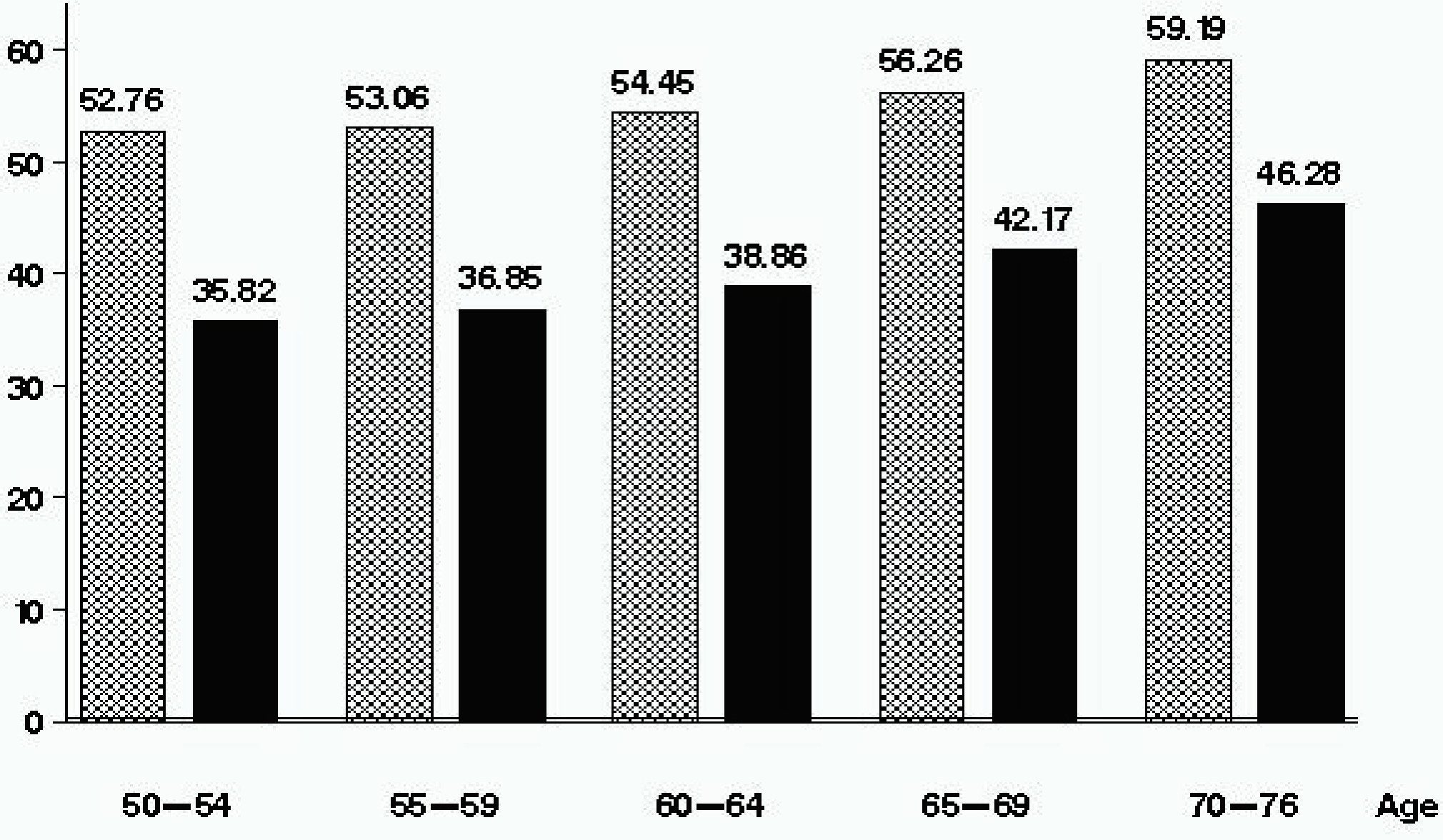
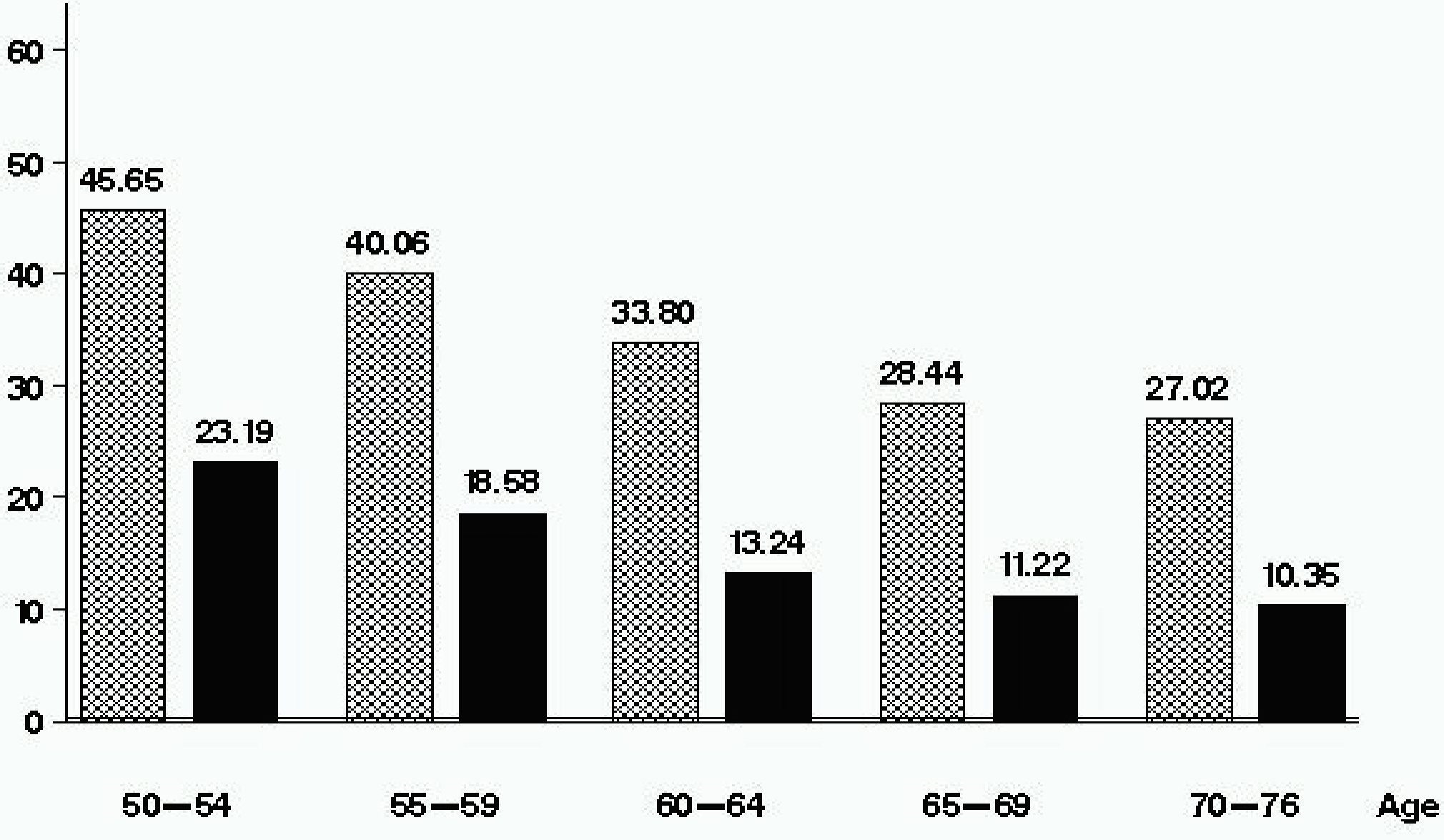
Nighttime complaints



Daytime complaints



Myths About Sleep and Aging

Older adults typically take naps.

Naps are related to nighttime sleep complaints.

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

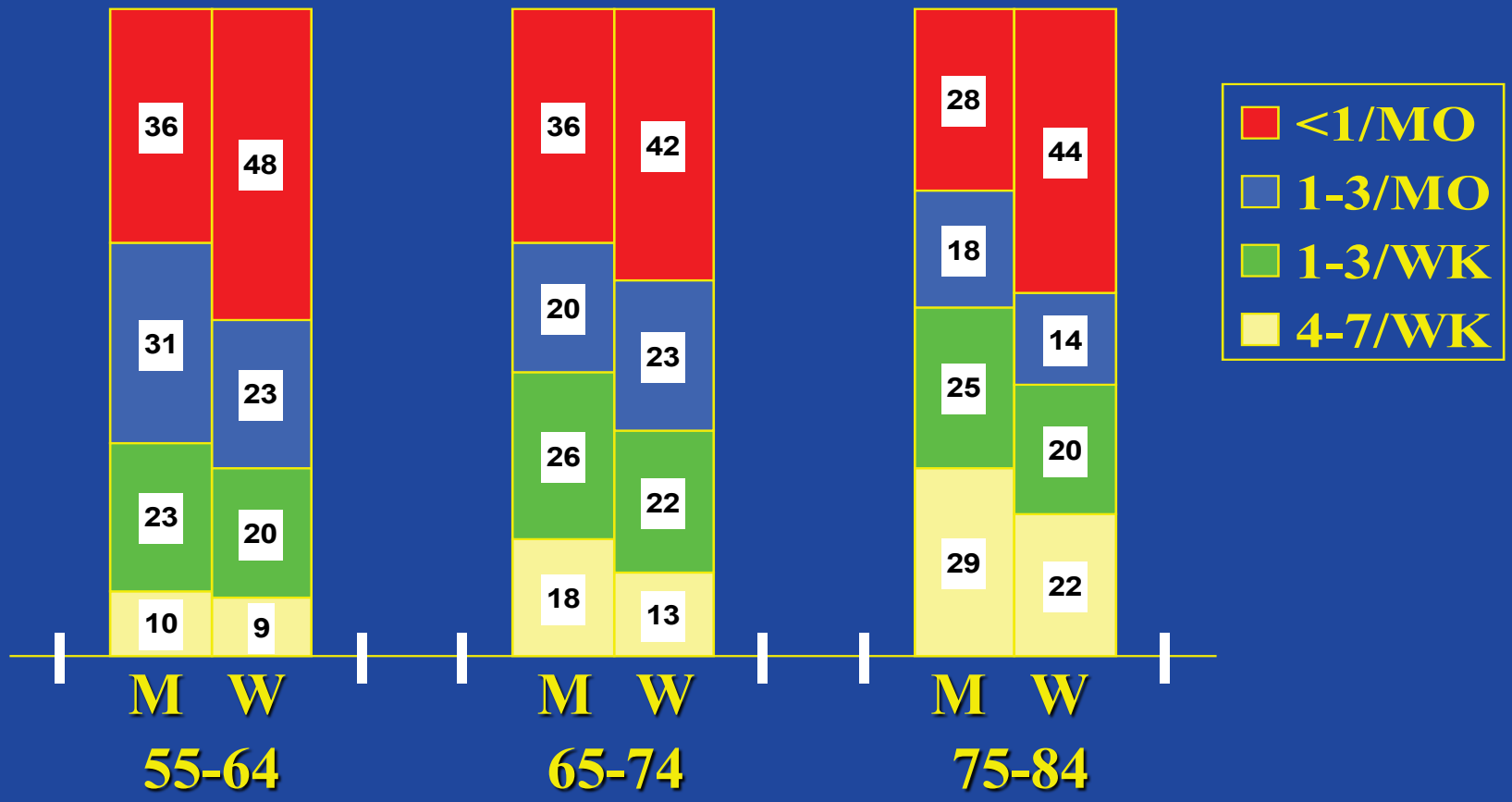
Foley, Vitiello, Bliwise, et al.

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



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.

Insomnia - a Disorder not a Symptom

- Relative consistency of insomnia symptoms and consequences across co-morbid disorders.
- Course of insomnia does not consistently co-vary with the co-morbid disorder.
- Insomnia responds to different types of treatment than the co-morbid disorder.
- Insomnia responds to the same types of treatment across different co-morbid disorders.
- Insomnia poses common risk for development of and poor outcome in different disorders.

Harvey *Clinical Psychology Reviews* 2001

Sleep and Pain - Directionality

- Three recent studies have examined the day-to-day predictive relationships between sleep and pain in chronic pain populations:
  - Counter-intuitively, these studies report that, while measures of nighttime sleep quality predicted next day pain, pre-sleep pain did not predict subsequent sleep quality.
    - Lewandowski et al. *Pain* 151:220-225, 2010.
    - Tang et al. *Sleep* 35(5):675-687, 2012.
    - Buchanan et al. *J Clin Sleep Med* 2014 (accepted, 04/30/14)

Cognitive Behavioral Therapy for Insomnia Improves Sleep and Decreases Pain in Older Adults with Co-morbid Insomnia and Osteoarthritis

Michael V. Vitiello, Bruce D. Rybarczyk,

Michael Von Korff and Edward J. Stepanski

Journal of Clinical Sleep Medicine 5(4): 355-362, 2009.

Study Design

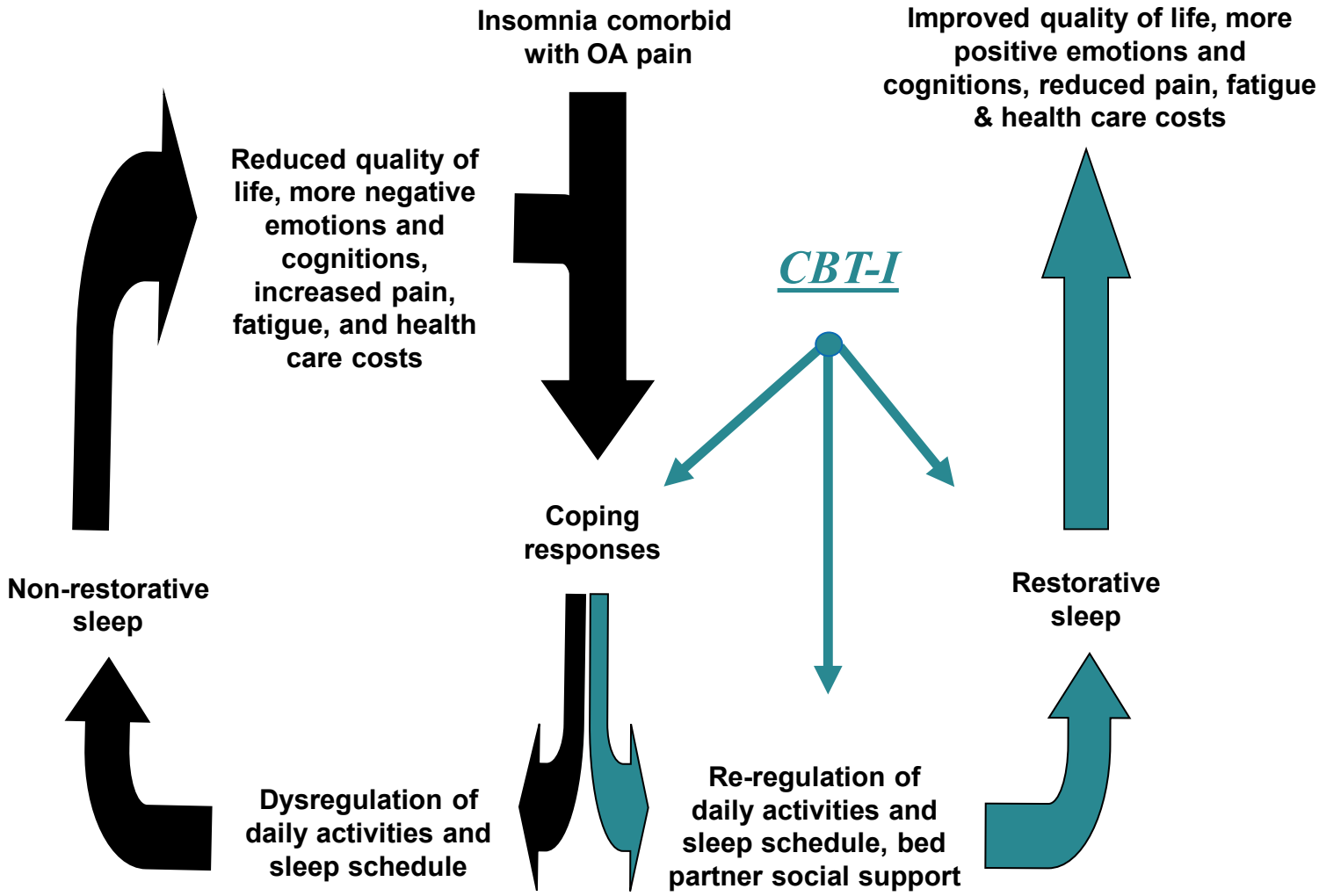
- Subjects meeting diagnostic criteria for co-morbid OA and chronic insomnia were randomized to either:
  - Standard CBT-I (Eight 2-hour sessions).
    - Morin 1993 (plus relaxation training).
  - Stress Management and Wellness (SMW) intervention.
- Neither intervention specifically mentioned pain management; although 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

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

Vitiello, et al., *J of Clin Sleep Med.* 2009; 5(4): 355-362.

- CBT-I improved both immediate and long-term self-reported sleep quality in a sample of 51 older OA patients with co-morbid insomnia.
- CBT-I reduced both immediate and long-term reported pain in these patients, without specifically addressing pain management.
- Improving sleep quality in older OA patients with co-morbid insomnia may be "analgesic" and this finding has implications for pain management programs.

Conceptual model: Impact of CBT for Insomnia (CBT-I) in OA Patients



Common Myths about Sleep and Aging

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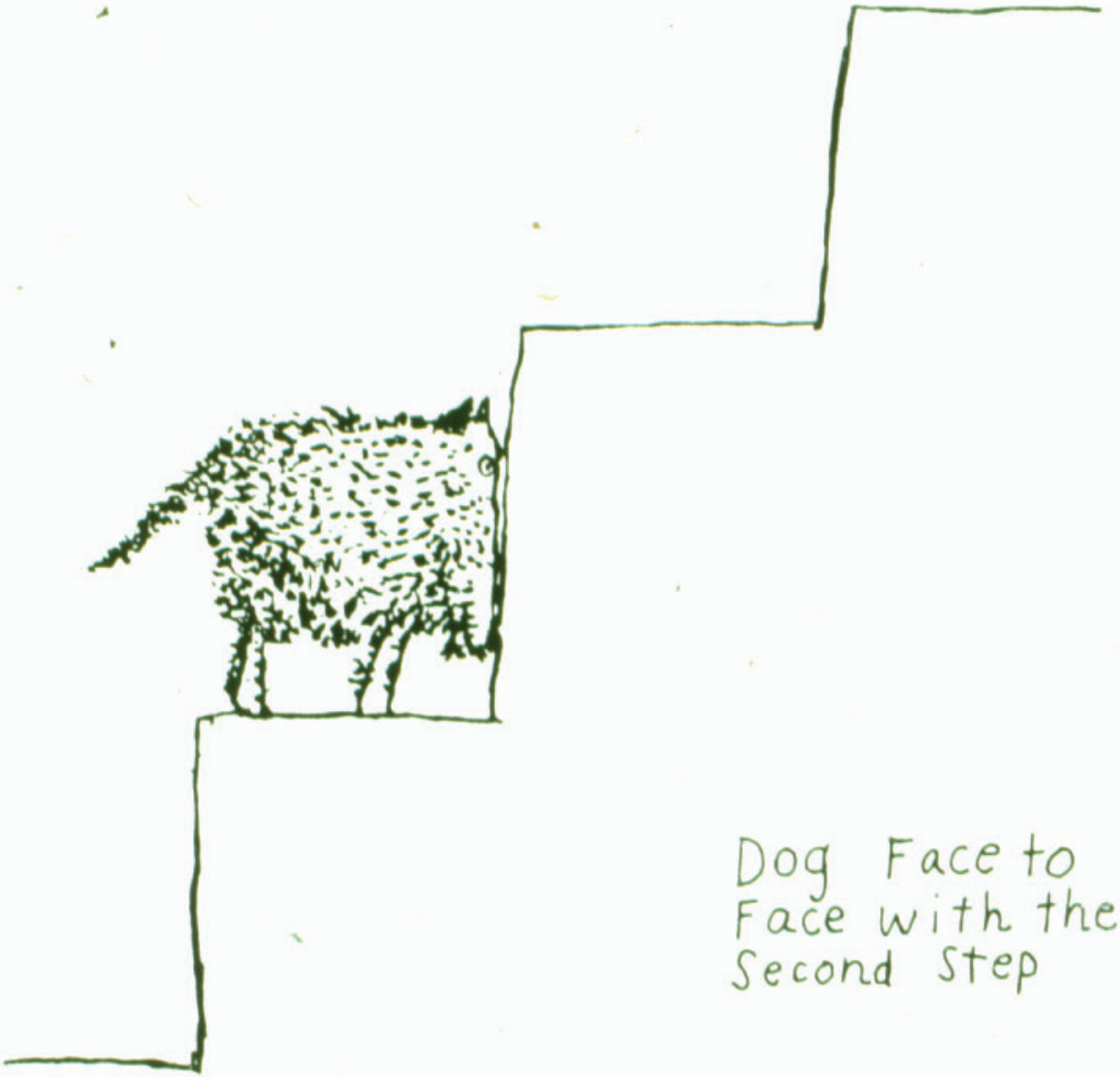
Growing Old Does Not Mean Sleeping Poorly!

"When the various factors that can disrupt sleep are screened out, ''successfully'' aging older adults, assuming they remain healthy, can expect to experience little further change in their sleep and are not likely to experience excessive daytime sleepiness and the concomitant need to nap regularly.

Nevertheless, the many older adults, suffer significant sleep disturbances from a variety of causes. Fortunately, our growing understanding of how sleep changes with aging and of the causes of these changes is informing ever-improving treatments for these disturbances, thereby helping to ensure that growing older does not mean sleeping poorly."

- **Vitiello. Recent Advances in Understanding Sleep and Sleep Disturbances in Older Adults. *Current Directions in Psychological Science* 18(6):316-320, 2009.**



Dog Face to
Face with the
Second Step

Evidence-Based Recommendations for the Assessment and Management of Sleep Disorders in Older Persons

HG Bloom, I Ahmed, CA Alessi, S Ancoli-Israel, DJ Buysse, MH Kryger, BA Phillips, MJ Thorpy, MV Vitiello, PC Zee

Journal of the American Geriatrics Society 57(5);561-589, 2009

Evidence-Based Recommendations

- Background and Significance, General Review of Sleep, Recommendations Development, and General Approach to Detecting Sleep Disorders in an Ambulatory Setting.
- Insomnia, Sleep Apnea, Restless Legs Syndrome, Circadian Rhythm Sleep Disorders, Parasomnias, Hypersomnias, and Sleep Disorders in Long-Term Care Settings.
- Evidence and expert-based recommendations.

Bloom et al. *JAGS* 2009

Pharmacological Treatment Approaches

- Hypnotics – Benzodiazepines
- Hypnotics – Benzodiazepines Receptor Agonists (BZRAs)
  - Zaleplon (*Sonata*)
  - Zolpidem (*Ambien, Ambien-CR**)
  - Eszopiclone (*Lunesta**)
- Melatonin agonists
  - Ramelteon (*Rozerem**)
- Antidepressants
  - Doxepin *(Silenor*)*
- Hypocretin/Orexin antagonists
  - Suvorexant (*Belsomra**)
- Others agents currently available or in development:
  - OTC - Melatonin, valerian, anti-histamines, etc.
  - Prescription – off-label anti-depressants, anti-psychotics, etc.
  - In development –5HT, GABA and Hypocretin/Orexin.

Chronic Insomnia Treatment Strategy

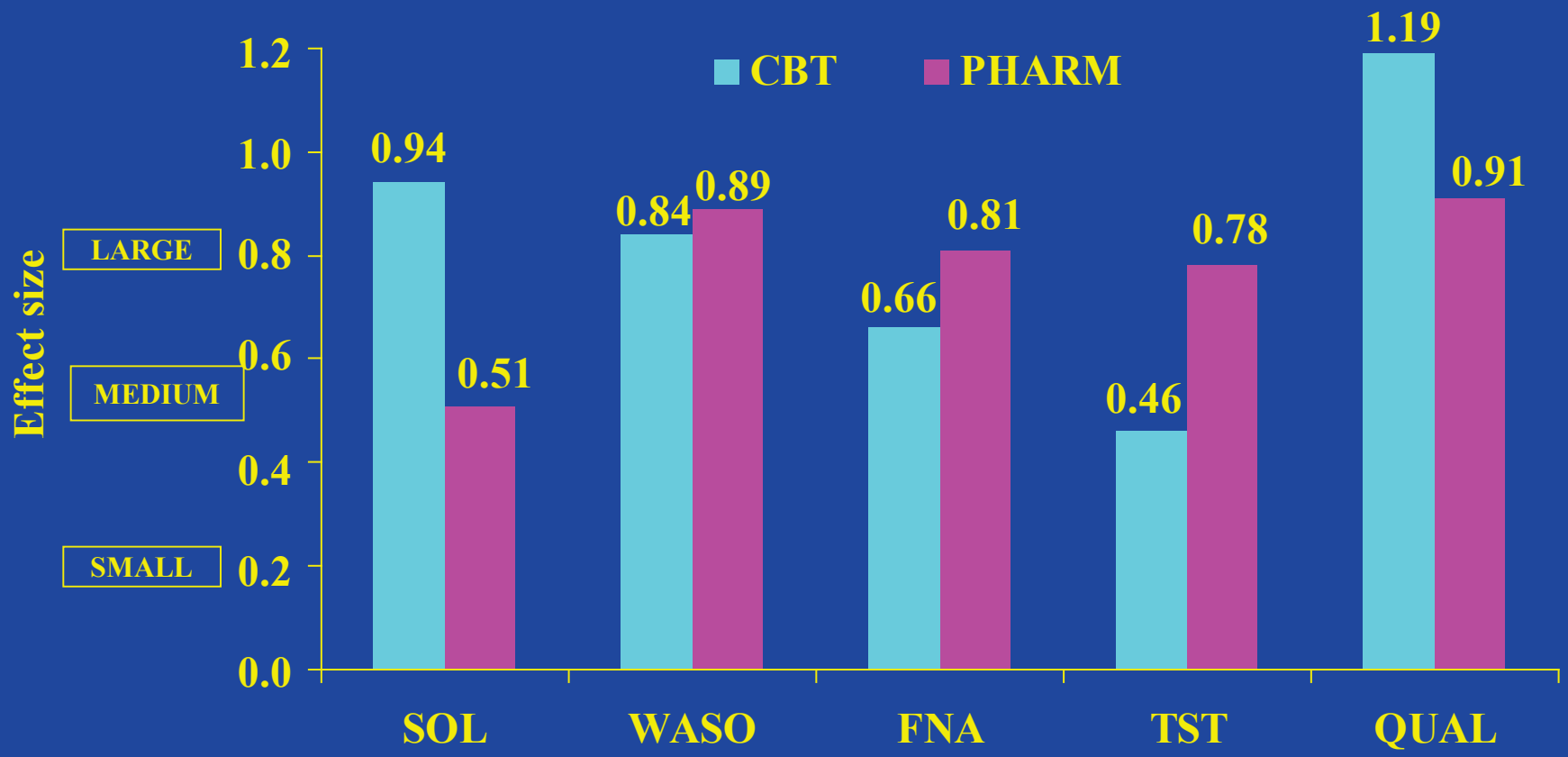
- First - Useful in almost all cases - a careful review and optimizing of a patient's sleep hygiene practices.
- Second - Use of more formal cognitive-behavioral interventions as appropriate.
- Third - Judicious use of appropriate hypnotics in association with cognitive- behavioral techniques or alone may be helpful.

NIH State-of-the-Science Conference Statement *Sleep* 2005

Cognitive-Behavioral Therapy for Insomnia (CBT-I)

- CBT-I "core" techniques:
  - Sleep Education/Good Sleep Habits/Hygiene
  - Sleep Log/Diary
  - Stimulus Control Therapy (SCT)*
  - Sleep Restriction Therapy (SRT)*
- CBT-I may also include:
  - Relaxation Techniques
  - Mindfulness
  - Cognitive Restructuring

Relative Efficacy of Cognitive-Behavioral and Pharmacological Therapies



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

Geiger-Brown, et al. Cognitive Behavioral Therapy in Persons with Comorbid Insomnia: A Meta-Analysis. Sleep Medicine Reviews 23: 54-67, 2015.

- Twenty-three studies; 1379 patients.
- CBT-I improved subjective sleep quality, with large treatment effects for the ISI and PSQI.
- Sleep diaries - 20 min reductions in sleep onset latency and wake after sleep onset, a 17 min increase in total sleep time, and a 9% in sleep efficiency.
- Treatment effects were durable up to 18 mo.
- Results of actigraphy were similar to but of smaller magnitude.

Wu, et al. Cognitive Behavioral Therapy for Insomnia Comorbid With Psychiatric and Medical Conditions: A Meta-Analysis. JAMA Intern Med.175(9):1461-72, 2015.

- Thirty-seven studies; 2189 patients.
- Cognitive behavioral therapy for insomnia is efficacious for improving insomnia symptoms and sleep parameters for patients with comorbid insomnia.
- A small to medium positive effect was found across comorbid outcomes, with larger effects on psychiatric conditions compared with medical conditions.

Cognitive Behavioral Therapy for Insomnia

- CBT-I is efficacious for insomnia in both the short and long term.
- CBT-I is efficacious not only for uncomplicated insomnia but also for insomnia co-morbid with a variety of physical and mental illnesses.
- CBT-I based improvements in sleep may also result in improvements in co-morbid illnesses.

Presentation Objectives

- Provide an 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.