Sleep and Sleep Disorders in the Older Adults

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Sleep in Normal Aging

• Sleep in normal aging is defined as those representative sleep characteristics occurring in the presumed non-demented population older than 70 years.
• Age-dependent changes that directly influence the structure and quality of sleep may simply be manifestations normal ontogenetic change.
Normal Sleep and Normal Aging

- The biological clock resides in the brain
- It helps regulate when we feel sleepy and when we are alert
- It works in tandem with light and dark, and our body temperature and hormones

Health and Environment Affect Our Sleep

With age, we become more sensitive to:
- Hormonal Changes
- Physiological Conditions
- Environmental Conditions
  - Light
  - Noise
  - Temperature
Structural Changes in Sleep: *Normal or Abnormal?*

- Normal aging must be viewed in counterpoint to pathological aging.
- Some of changes may be related to
  - Mental and physical health status
  - Situational categories (institutionalisation)
  - Personal categories (lyfestyle and individual differences)

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Structural Changes in Sleep

*Mental and Physical Health Status*

- Recent hospitalisation, limitation of physical function;
- Self-perception of health;
- Joint pain and stiffness;
- Emphysema, a history of stroke or heart disease;
- Depression and anxiety
Structural Changes in Sleep

Mental and Physical Health Status

- Sleep-related respiratory disturbance (SRRD)
  - Refers to episodes of apnoea and hypopnoea that suppress the deeper stages of sleep
- Periodic leg movements (PLM)
  - Involuntary limb movements that can occur in all stages of sleep but tend to predominate in the lighter stages (stages 1 and 2)
- Dementia

Structural Changes in Sleep

Lifestyle and Individual Differences

- Diet, exercise, sleeping habits – daytime napping and excessive time spent in bed
- Personality profiles – elevated levels of anxiety and neuroticism
- Hereditary predispositions
Sleep Problems/Disorders
Prevalent Among Older Persons

<table>
<thead>
<tr>
<th>SYMPTOMS OF SLEEP PROBLEMS BY AGE</th>
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<tbody>
<tr>
<td>Symptoms: a few nights a week or more</td>
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<tr>
<td>Insomnia</td>
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<tr>
<td>Snoring</td>
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<tr>
<td>Sleep Apnea</td>
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<tr>
<td>Restless Legs Syndrome (RLS)</td>
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Sleep Disorders in the Older Adults

- Insomnia
- Hypersomnia
- Excessive motor activity
Sleep Disorders in the Older Adults

- Age per se does not cause sleep problems
- Sleep patterns change, sleep needs do not change
- Decreased sleep consolidation
  - Less sleep efficiency
  - Less NREM III-IV
- Increased daytime sleep
  - More napping
  - Phase advance/Polyphasic ultradian rhythm

Structural Changes in Sleep

*Continuity of Sleep*

- The sleep of older people is characterized by more frequent “shifts” from one sleep stage to another and more frequent intra sleep arousals.
- Brief periods of EEG wakefulness (alpha activity) during the sleep tend to become more frequent and longer in duration in later life.
- Transient arousals (2-15 second bursts of alpha activity) indicative of sleep fragmentation are more frequent and relate to daytime sleepiness.
The Sleep Cycle in Adults

![Graph showing the sleep cycle stages over 8 hours of sleep.](image)

Structural Changes in Sleep

*Duration of Sleep*

- The total time spent asleep declines with age.
- The frequency and duration of intra sleep arousals increase.
- Sleep efficiency decreases.
- Nocturnal sleep loss is partially compensated by daytime naps.
Normal Sleep and Normal Aging: 
Sleep Efficiency

Changes with age

![Graph showing changes in sleep efficiency with age for men and women.](image)

Normal Sleep and Normal Aging: 
Less Deep Sleep

![Diagram showing sleep stages across different life stages.](image)
Structural Changes in Sleep

Nature of Sleep Disturbances in Dementia

- Decreased sleep consolidation
  - Increased duration and frequency of awakenings
  - Less sleep efficiency
  - Less NREM III-IV and REM sleep
- Increased daytime napping
  - More evening naps
  - Decreased sleep duration
  - Early awakening daytime sleep
Nature of Sleep Disturbances in Dementia

• Phase advance
  – Feel sleepy before
  – Wake up earlier
• Neuronal cell loss suprachiasmatic nucleus (SCN)
• Loss of zeitgebers

Nature of Sleep Disturbances in Dementia

• Changes in sleep regulation:
  – Homeostatic
  – Circadian
• Aetiology of physiologic changes
  – Cell loss in sleep/wake circadian centres
  – Decreased cerebral metabolism
  – Decreased melatonin levels
  – Disrupted circadian and homeostatic sleep regulation
Structural Changes in Sleep in Dementia

Nature of Sleep Disturbances in Dementia

- Natural history of sleep disturbances and their behavioural correlates in dementia are not well understood
- Sleep disturbances associated with increased memory and functional impairment
- Sleep disturbances are more severe in more demented patients
- No prospective longitudinal studies on course and progression of sleep problems in dementia
Changes in Sleep Behaviour in Dementia

- More time in bed, sleeping less than usual
- Trouble getting the patient out of bed
- A day/night reversal of sleep pattern
- Nightmares upon awakening
- Sleep environment and hygiene play a major role

Sundowning Agitation

- Reduced ability to maintain attention to external stimuli
- Disorganised thinking and speech
- Agitation, wandering, repetitious physical behaviours
- Perceptual disturbances (illusions, hallucinations)
- Emotional disturbances (fear, anger)
Sundowning Agitation

• Delirium-like symptoms most prevalent in the late afternoon to early evening
• Medication toxicity, infection, electrolytic disturbance or environmental triggers can all contribute to sundowning
• Partial arousal from REM sleep linked to episodes of increased night-time confusion and agitation

Correlations of Sleep Disturbances in Dementia

• Poor health
• Disability
• Depression/isolation
• Neurological disorders
• Medications
Consequences of Sleep Disturbances in Dementia

- Decreased vigilance/condition
- Decreased mood
- Accidents/injuries
- Self medication/alcohol

Moderators of Sleep Disturbances in Dementia

- Adjustable external factors:
  - Uncomfortable sleeping conditions
  - Irregular arousal or bed-times
  - Daytime naps
  - Lack of physical activity
  - Unrealistic expectations of sleep quality
Moderators of Sleep Disturbances in Dementia

- Medical disorders (pain, reflux, immobility, breathing disturbances, congestive heart failure, nocturia)
- Psychiatric disorders (depression, anxiety)
- Psycho-social problems
- Neurological disorders (Parkinson, stroke)

Moderators of Sleep Disturbance in Dementia

- Obstructive Sleep Apnoea Syndrome
- Restless legs syndrome
- REM Sleep Behaviour Disorder
- Medication/alcohol
Treatment Options

Factors Specific to the Older Adults

- Increased prevalence of co-morbid medical and psychiatric illnesses
- Polypharmacy
- Altered pharmaodynamic and pharmacokinetics
- Impact of various psychosocial and environmental variables that the elderly are faced with

Treatment Options

Factors Specific to the Older Adults

- Optimal treatment of underlying medical and psychiatric conditions, including underlying sleep disorders (OSAS, RLS)
- Importance of polysomnography
Treatment Options

Diet and Lifestyle

• Napping < 1 h (early afternoon)
• Restricted time in bed
• Constant wake-up rhythm
• Daily physical activity
• Bright light exposure during the day
• Restricted use of coffee, alcohol, chocolate, nicotine
• Regular meals

Treatment Options

Non-pharmacological Treatment

• Sleep hygiene
• Regular physical exercise and social activities to preserve entrainment of circadian rhythm
• Behavioural therapy
• Bright light therapy
• Withdrawal from benzodiazepines
Treatment Options

Non-pharmacological Treatment

• Sleep hygiene – strategies designed to counter the psychosocial and environmental variables contributing to insomnia:
  – Decreased isolation
  – Increased social, recreational and physical activity
  – Attention to basis sleep environment factors
  – Attention to patient-self medication with alcohol and caffeine

• Physical exercise may increase SWS by causing a rise in body temperature
• The improvement of sleep as result of physical activity is not associated with adverse effects
• May lead to an improvement of mood, performance, daytime energy and quality of life
Treatment Options

Physical Exercise

- Arthritis
- Chronic Insomnia
- COPD
- Chronic Renal Failure
- Congestive Heart Failure
- Coronary Artery Disease
- Depression
- Hypertension
- Obesity
- Osteoporosis
- Peripheral Vascular Disease
- Venous Stasis Disease

Why older adults aren’t more active

[Chart showing various factors affecting older adults' activity levels]

- Time Constraints
- Health
- Family, Children
- Motivation
- Satisfied as Is
- Lack of Access

[Legend: □ All Less Active ■ Age 60+]
Why aren’t older adults more physically active?

• Myth #1: The physical decline associated with old age is a normal part of aging.

• Myth #2: Exercise is risky for persons with health problems.

Physical activity improves quality of sleep

• Decreased insomnia
• Decreases depressive symptoms
• Decreased pain
• Quality fatigue
Recommendations

- Aerobic endurance: 30 minutes most days
- Strength activities: at least twice a week
- Balance activities: at least twice a week
- Stretching activities: every day

Treatment Options

Non-pharmacological Treatment

- Behavioural therapy includes:
  - Sleep restriction therapy (limiting time in bed to the actual sleep time)
  - Stimulus control procedures (regulate the sleep-wake schedules and help subjects to re-associate the bedroom with sleep)
Treatment Options

Non-pharmacological Treatment

• Bright light effective in elderly patients with dementia in:
  – Synchronizing disturbed sleep
  – Reducing the frequency of behaviour disorders
• Absence of trial evidence for the treatment of sleep problems in “normal” older adults

Treatment Options

Withdrawal from Benzodiazepines

• Concerns as to the safety in the older adults:
  – Agitation: paradoxical reactions
  – Daytime sedation
  – Cognitive and psychomotor impairments
  – Tolerance, dependence and withdrawal
  – Reduction in REM and SWS
Treatment Options
Withdrawal from Benzodiazepines

- Use of BZDs in the older adults is more habitual
- Uneventful withdrawal obtained in many cases
- No significant increase in anxiety, agitation and sleep disturbances
- Important improvement of memory and cognitive function following discontinuation

Treatment Options
Withdrawal from Benzodiazepines

- Judicious use in selected cases:
  - Short-acting (eg. temazepam) in sleep onset insomnia
  - Medium-acting (eg. lorazepam) in sleep maintenance insomnia
  - Zopiclone, zolpidem and zaleplon – less daytime residual effects, less impairment in SWS
Treatment Options

Pharmacological Treatment

- Neuroleptics used primarily for behavioural control
- Cave restless legs syndrome due to neuroleptic-induced akathisia with evening psychomotor agitation – a potential contributor to initial insomnia or sundowning

- Zolpidem, zopiclon, lorazepam – not more than 3 weeks with caution (not every day)
- Citalopram
- Setraline
- Acetylcholinesterase inhibitors – associated with insomnia and increased dream mentation
Take Home Messages (1)

• A sound knowledge of the complexities and comorbidities affecting sleep is essential in the elderly with dementia
• A medical-psychiatric dichotomy less useful in this population
• A comprehensive approach of the subjective experience of the patient relevant to the psychologically oriented treatment
Take Home Messages (2)

- Objective measures of sleep architecture are necessary
- An accurate diagnosis taking into account the medical, psychological and environmental factors allows an effective treatment
- Since etiology is multifaceted, treatment methods should be chosen from the array of options, both pharmacological and non-pharmacological

References

- Articles:
  - Floyd JA, Medler SM, Ager JW, and Janisse JJ. Age-related changes in initiation and maintenance of sleep: a meta-analysis. *Research in Nursing and Health* (2000); 23(2): 106-117
  - Gentili A and Edinger JD. Sleep disorders in older people. *Aging* (Milano, 1999); 11(3): 137-141
References

• Articles:
  – Morin CM, Colecchi C, Stone J, Sood R, and Brink D. Behavioral and Pharmacological Therapies for Late-Life Insomnia: A Randomized Controlled Trial. *JAMA* (1999); 281: 991-999
  – Vitiello, MV. Effective Treatment of Sleep Disturbances in Older Adults. *Clinical Cornerstone* (2000); 2(5): 6-27
References

• Books:
  – Ancoli-Israel, Sonia. *All I want is a Good Night’s Sleep*. St. Louis: Mosby-Year Book, Inc, 1996

• Other:
  – NIH Consensus Development Conference
    • The Treatment of Sleep Disorders of Older People (Volume 8, Number 3), 1990