Insomnia

Meena Khan, MD
Assistant Professor
Director, Sleep Medicine Fellowship Program
Department of Internal Medicine and Neurology
The Ohio State University Wexner Medical Center

Objectives

- **Describe the epidemiology and health implications of chronic insomnia**
- **Describe the psychological characteristic of those with chronic insomnia**
- **Describe the behavioral and environmental factors that perpetuate chronic insomnia**

Insomnia

- **Persistent difficulty with sleep initiation, duration, consolidation, or quality that occurs despite adequate opportunity and circumstances for sleep and results in some type of daytime impairment**

Insomnia

- **Common sleep disturbance**
  - **75% have had a sleep problem**
  - **50% had one symptom of insomnia over the previous year**
  - **1/3 reported nightly symptom**
- **Underreported and under treated**
  - **5% of pts with insomnia seek medical treatment**
  - **26% mention it to physicians during visits for other complaints**

National sleep foundation 2005 sleep in America poll

Insomnia

- **Short term Insomnia Disorder**
  - **Difficulty initiating sleep, maintaining sleep, and/or waking up earlier than desired with symptoms (fatigue, attention, impaired performance, mood disorders)**
  - **Not due to inadequate opportunity**
  - **Occurs for less than 3 months**

International Classification of Sleep Disorders: Third edition

Insomnia

- **Chronic Insomnia Disorder**
  - **Difficulty initiating sleep, maintaining sleep, and/or waking up earlier than desired with symptoms (fatigue, attention, impaired performance, mood disorders)**
  - **Not due to inadequate opportunity**
  - **Occurs at least 3 times a week for at least 3 months.**

International Classification of Sleep Disorders: Third edition

Chronic insomnia and quality of life

- Correlated with increased morbidity:
  - Decreased quality of life
  - Increased mental health symptoms
  - Absenteeism from work
  - Decreased work productivity
  - Increased use of medical resources and economic burden.

Qual Life Res 2009; 18 (4) 415-22
Sleep 2007;30(2) 213-8
Sleep 2007; 30 (3) 263-73

Chronic insomnia and medical illness

- Associated with:
  - Increased reports of heart disease
  - High blood pressure
  - Chronic pain
  - Development of depression and anxiety

Sleep 2007;30(2) 213-8
Sleep 2007; 30 (3) 263-73

Chronic insomnia and diabetes

- Subjective reports of disturbed sleep have been shown to be associated with development of diabetes independent of other risk factors in cross-sectional and prospective studies as well as meta-analysis studies
- Fragmented sleep supported by actigraphy has been associated with higher fasting glucose and higher fasting insulin levels in diabetics

Kowall et al; Sleep Med 2016;21 (35-41)
Hung et al: Canadian J of Diab 2012;36(95-99)
Knutson et al : Diabetes Care 2011; 34(5) 1171-6

Chronic insomnia and hypertension

- Development of hypertension
  - Prospective studies show positive association but results are conflicting
  - Meta-analysis studies do support an association between insomnia and the development of hypertension independent of other risk factors
  - Increased systolic blood pressure during sleep and decrease in the natural dipping of blood pressure during sleep has been demonstrated in insomniacs

Sleep 2009; 32(1) 65-72
Hypertension 2012; 60 (4) 929-35
Currr Pharm Des 2013; 19 (13) 2409-19
Sleep 2009; 32(6) 760-6

Chronic insomnia and cardiovascular disease

- **Prospective studies show an association with cardiovascular disease and mortality as well as incident myocardial infarction independent of other risk factors**

- **Inconsistent results warranting more research but enough to raise concern of the effects insomnia has on one's health**

Circulation 2014;129 (7) 737-46
Sleep 2010; 33 (6) 739-44

Chronic Insomnia

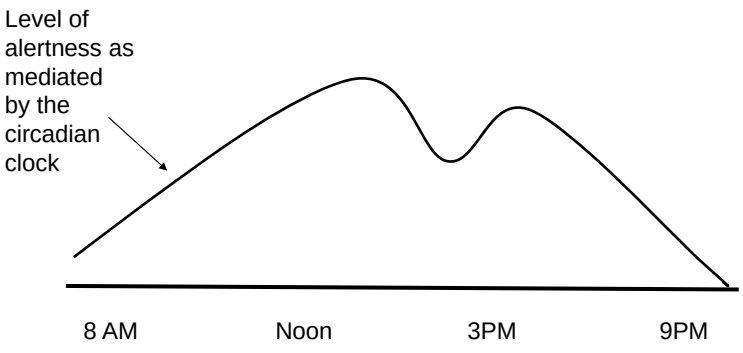
- **Why does one develop insomnia??**

Two Process Model of Sleep

- **Two primary driving forces for sleep**
  - **Circadian drive**
    - **“Biological clock” in the suprachiasmatic nucleus of the hypothalamus that determines alertness**
  - **Homeostatic drive for sleep**
    - **Amount of sleep debt a person incurs throughout the day**

Circadian clock

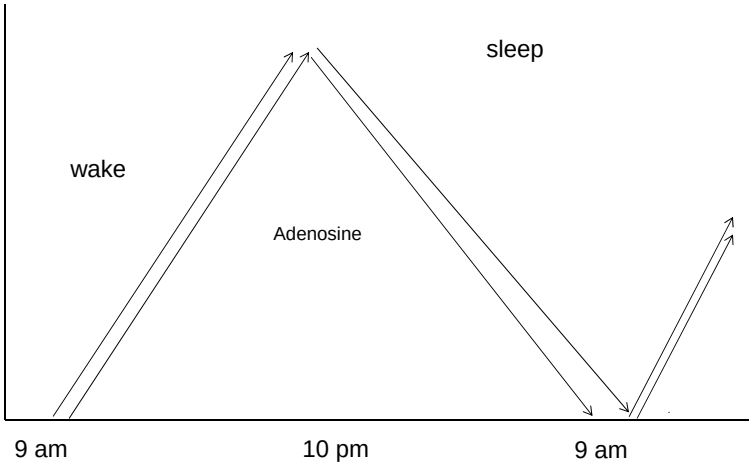
- Natural times of high and low alertness that is set by the circadian clock



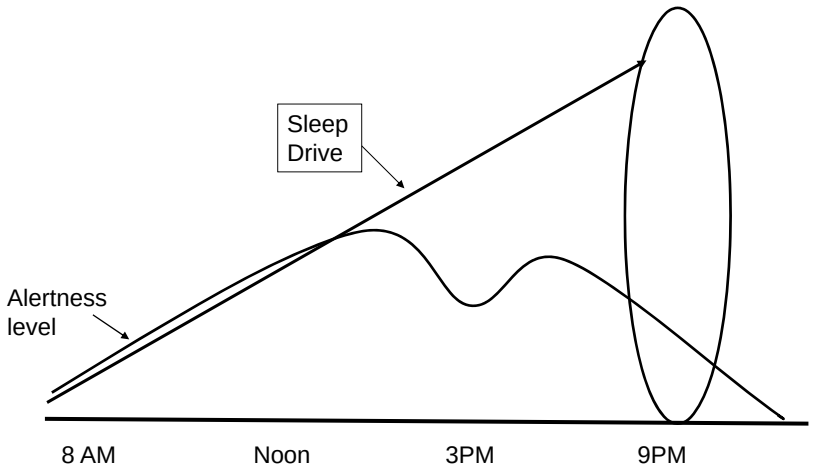
Zeitgebers

- **In order to keep our sleep/ wake cycles in a 24 hour cycle, we need to entrain our circadian clock to fit with our environmental schedule**
- **Environmental factors that entrain the circadian clock are called zeitgebers**
  - **Photic light- strong zeitgeber**
  - **Feeding schedule**
  - **Activity**
  - **Social cues**

Homeostatic drive for sleep



Ideal time for sleep



Interaction between circadian cycle and homeostatic sleep drive

- **The ideal sleep time is when the alertness level is low and the sleep drive is high.**
- **Sleep efficiency is impaired if we try to sleep at “alert clock times” and/or when our sleep drive is low.**

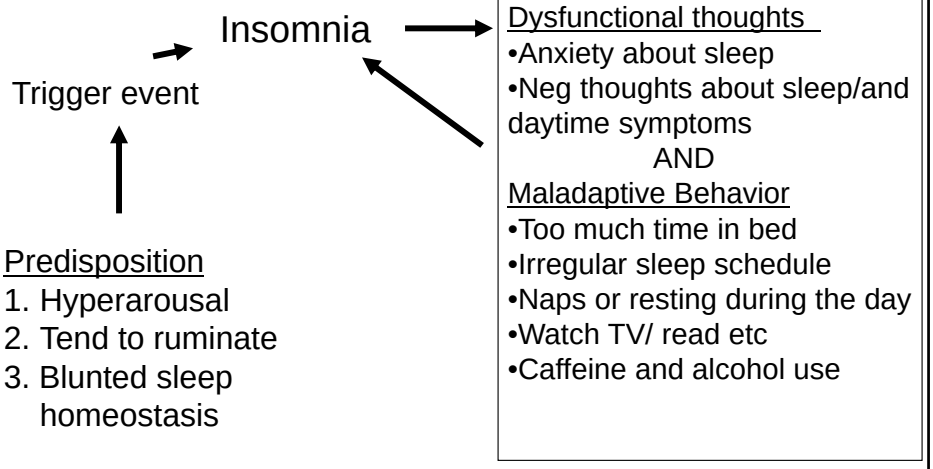
Risk Factors for insomnia

- **Female- risk 1.3 times higher than men**
- **Older age (age >65- 1.5X more likely to experience insomnia)**
- **Divorced/ separated/widowed**
- **Low economic/education**
- **Chronic medical problems**
- **Substance abuse- recovery period**

Features of chronic insomnia

- **Life and thoughts revolve around sleep and the effect of lack of sleep**
- **Sleep anticipatory anxiety about not being able to sleep**
- **Clock watch/calculate time left for sleep**
- **Feel they don't have control over their sleep**
- **Develop day and night time behaviors that are counterproductive to sleep as a way to compensate for their insomnia**

Insomnia



Evaluation of chronic insomnia

Factors that affect sleep

- Sleep environment
  - Where do they sleep?
  - Is it comfortable, quiet, and dark?
  - Do they use electronics, pets in the bed, bed partner that disturbs their sleep?
- Factors that affect circadian cycle
  - Light exposure
  - Times in and out of bed

Factors that affect sleep

- Homeostatic drive for sleep
  - Sleep/wake pattern – times in and out of bed as well as hours asleep
  - Daytime activity level
  - Are they taking naps or resting during the day
- Other factors
  - Stress
  - Medications (sedating or energizing)
  - Substance use- caffeine, alcohol, nicotine
  - Medical illness- chronic pain
  - Mood disorders- depression/anxiety

Sleep testing

- Sleep Diary
- Sleep Study
  - Not indicated for diagnosis of insomnia
  - Indications for a sleep study
    - Sleep disordered breathing
    - Sleep movement disorder
    - Central hypersomnia

Treatment

Pharmacologic

- Recommended for short term use although no medical contraindication for long term use

Cognitive Behavioral Therapy

- Cognitive therapy
  - Aimed at maladaptive thoughts about sleep
- Behavioral therapy
  - Aimed at maladaptive behaviors
    - Sleep hygiene
    - Relaxation Therapy
    - Stimulus Control
    - Sleep restriction

Insomnia

Jesse Mindel, MD
Assistant Professor
Departments of Neurology and Internal Medicine
The Ohio State University Wexner Medical Center

Targeted Approach to Insomnia Management

- **Etiologies:**
  - **Acute Insomnia**
  - **Chronic Insomnia**
  - **Primary**
  - **Secondary**

Targeted Approach to Insomnia Management

- General Guidelines:
  - Clinical assessment for comorbid sleep disorders
  - Assessment with Epworth Sleepiness Scale (ESS) or other validated tool
  - Assessment of Normal Sleep Hours and Schedule

Sharon Schutte-Rodin, M.D., Lauren Broch, Ph.D., Daniel Buysse, M.D., Cynthia Dorsey, Ph.D., and Michael Sateia, M.D.J. Clinical Guideline for the Evaluation and Management of Chronic Insomnia in Adults. Clin Sleep Med. 2008 Oct 15; 4(5): 487–504. PMCID: PMC2576317

Targeted Approach to Insomnia Management

- Goals of Treatment:
  - Fall asleep more quickly
  - Become more sleep efficient
  - Improve daytime functioning
- NOT Goals:
  - Sleep 8 hours per day

Targeted Approach to Insomnia Management

- Clinical assessment for comorbid sleep disorders
  - Obstructive Sleep Apnea
    - 30-70% OSA patients present with insomnia symptoms
    - May be more common in women
  - Other Sleep Disordered Breathing
    - COPD, Obesity Hypoventilation, Central Sleep Apnea
  - RLS/PLMD

Lack L[1], Sweetman A[2]. Diagnosis and Treatment of Insomnia Comorbid with Obstructive Sleep Apnea. Sleep Med Clin. 2016 Sep;11(3):379-88. doi: 10.1016/j.jsmc.2016.05.006.

Targeted Approach to Insomnia Management

- Assessment for Excessive Sleepiness
  - Epworth Sleepiness Scale
    - Most validated sleep tool
  - Clinical Questions
    - Daytime Naps
    - Drowsy Driving

Targeted Approach to Insomnia Management

- **Assessment of Normal Sleep Hours and Schedule**
  - **Is Sleep Time Consistent**
    - **Circadian Dysfunction**
  - **Normal Work Hours**
    - **Shift Workers**
  - **Sleep Distractions**
    - **Children**
    - **Kids**
    - **Bed Partner(s)**

Targeted Approach to Insomnia Management: Sleep Hygiene is recommended for all types of insomnia

1. **Avoid napping during the day. It can disturb the normal pattern of sleep and wakefulness.**
2. **Avoid stimulants such as caffeine, nicotine, and alcohol too close to bedtime. While alcohol is well known to speed the onset of sleep, it disrupts sleep in the second half as the body begins to metabolize the alcohol, causing arousal.**

https://sleepfoundation.org/ask-the-expert/sleep-hygiene

Targeted Approach to Insomnia Management: Sleep Hygiene is recommended for all types of insomnia

3. Exercise can promote good sleep. Vigorous exercise should be taken in the morning or late afternoon. A relaxing exercise, like yoga, can be done before bed to help initiate a restful night's sleep.
4. Food can be disruptive right before sleep. Stay away from large meals close to bedtime. Also dietary changes can cause sleep problems, if someone is struggling with a sleep problem, it's not a good time to start experimenting with spicy dishes. And, remember, chocolate has caffeine.
5. Ensure adequate exposure to natural light. This is particularly important for older people who may not venture outside frequently. Light exposure helps maintain a healthy sleep-wake cycle.

Targeted Approach to Insomnia Management: Sleep Hygiene is recommended for all types of insomnia

6. Establish a regular relaxing bedtime routine. Try to avoid emotionally upsetting conversations and activities before trying to go to sleep. Don't dwell on, or bring your problems to bed.
7. Associate your bed with sleep. It's not a good idea to use your bed to watch TV, listen to the radio, or read.
8. Make sure that the sleep environment is pleasant and

What is the likely cause?

- **Did it develop under a stressful situation?**
  - **Psychophysiologic Insomnia**
- **Has the patient had it his/her whole life?**
  - **Primary Insomnia**
- **Is the patient sleepy?**
  - **Secondary Insomnia**

Targeted Therapy

- **Primary Insomnia:**
  - **Dysfunctional Beliefs about Sleep**
- **Psychophysiologic Insomnia:**
  - **Psychological:**
    - **Cognitive**
  - **Physiological:**
    - **Not comfortable**
    - **Tension or Pain**

Targeted Approach to Insomnia Management

- **Behavioral Therapy for Insomnia**
  - **Recommended for Acute as well as Chronic Insomnia Types**
  - **Should be used in combination with pharmacologic therapies**

Behavioral Therapy for Insomnia

- **Benefits (as compared to pharmacologic therapies)**
  - **Cheap**
  - **Safe**
  - **Has long-term benefits**

Behavioral Therapies for Insomnia

- Sleep Hygiene
- Sleep Restriction Therapy
- Relaxation Therapy
- Stimulus-Control Therapy

Stimulus Control Therapy

- To associate temporal and environmental stimuli with rapid sleep onset
  - Only go to bed when sleepy
  - Get out of bed when unable to sleep
    - 15 minutes
  - No doing activities other than sleep in bed
  - Maintain Regular wake time
  - Avoid daytime napping

Relaxation Therapy

- **Address both physical and mental components of sleep**
- **Should be practiced during the daytime**
  - **Physical Technique:**
    - **Progressive Muscle Relaxation**
  - **Mental Technique:**
    - **Guided Imagery**
    - **Mindfulness**
    - **Meditation**

Sleep Restriction Therapy

- **Theory:**
  - **You WILL have trouble falling asleep**
  - **With less sleep opportunity you WILL become more tired**
  - **The homeostatic drive WILL build up and you WILL fall asleep more quickly**
  - **With less sleep opportunity you WILL become more efficient**

Sleep Restriction Therapy

- **Practice:**
  - **Determine normal sleep pattern**
  - **Reduce overall sleep opportunity**
  - **Maintain strict wake-up time**
  - **Patient 'Buy-In'**
  - **Slip-Ups**

Pharmacologic Approach to Insomnia

- **Medication Properties:**
  - **Absorb Rapidly**
  - **Peak Concentration Rapidly**
  - **Wear off Rapidly**
    - **Onset versus Maintenance**
  - **No morning side effects**
  - **No nocturnal adverse effects**

Pharmacologic Approach to Insomnia

- **Goals of Medication:**
  - **Fall Asleep More Quickly**
  - **Increase Sleep Efficiency**
  - **Increase Sleep Time?**

Pharmacologic Approach to Insomnia

- **Benefits of Medications**
  - **Work Fast**
  - **Available everywhere**
  - **Covered by Insurance**

Gregory M. Asnis [1,2,*], Manju Thomas [2] and Margaret A. Henderson [2]
Pharmacotherapy Treatment Options for Insomnia: A Primer for Clinicians. ***Int. J. Mol. Sci.*** **2016, *17*(1), 50**

Special Situations….

- Avoid use of sleep medications in patients who are excessively sleepy
- Dose adjustments in aging population
- Short vs Long

Insomnia Medications

- Barbiturates
- Benzodiazepines
- BZD Receptor Agonists
- Melatonin Agonist
- TCA
- Orexin Antagonist
- Other Antidepressants
- OTC Medications

Insomnia Medications

- **Barbiturates:**
  - **Butalbital, Chloral Hydrate, Secobarbital**
- **Problems:**
  - **Tolerance**
  - **Dependence**
  - **Safety**

Insomnia Medications

- **Benzodiazepines:**
  - **Replaced barbiturates in 1970s**
  - **Still with potential for dependence and rebound**
    - **Improved safety overall**
  - **FDA Approved:**
    - **Temazepam, Flurazepam, Quazepam, Triazolam, Estazolam**
    - **Temazepam (Restoril) most used**
      - **7.5, 15, 30mg**

Insomnia Medications

- **BZD Receptor Agonists:**
  - **Created to improve upon Benzodiazepines**
    - **Improved safety over Benzodiazepines**
  - **FDA Approved 1993**
    - **'Z-Drugs'**
  - **Zolpidem (Ambien, Intermezzo)**
  - **Eszopiclone (Lunesta)**
  - **Zaleplon (Sonata)**

  - **Main Concern: Parasomnias**

Insomnia Medications

Sleep Onset Insomnia:

-Zolpidem, zaleplon, eszopiclone

Sleep Maintenance Insomnia:

-Zolpidem CR, Zolpidem Mist, Eszopiclone (2-3mg)

Insomnia Medications

- **Melatonin Receptor Agonist:**
  - **Ramelteon**
  - **Promotes drowsiness via MT1**
  - **May improve circadian function via MT2**
  - **Not Scheduled medication**
  - **Excellent Safety Profile**
  - **Efficacy?**

Insomnia Medications

- **Tricyclic Antidepressant:**
  - **Doxepin (Silenor)**
    - **Initially used in depression at 100-300mg/day**
    - **Used 3-6mg for insomnia**
  - **Excellent safety profile**
  - **Not scheduled medication**
  - **Better for sleep maintenance**

Insomnia Medications

- **Orexin Antagonist**
  - **FDA approved 2014**
  - **Belsomra**
  - **Orexin 1 and 2**
  - **Long Half life, may cause drowsiness**
  - **Efficacy?**

Insomnia Medications

- **Off-Label:**
  - **Trazodone**
    - **Best evidence in patients with comorbid depression**
  - **Quetiapine**
  - **OTC Medications**