Can Snoring Affect Your Health?

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Objectives

- Define obstructive sleep apnea
- Discuss the prevalence and importance of sleep apnea
- Delineate the medical, psychological, and social consequences of sleep apnea
- Enumerate the risk factors of sleep apnea and diagnosis
- Discuss the available therapies for sleep apnea and their effectiveness
- Sleep apnea research and directions of the field
Snoring can be dangerous to your health

- A man who snores is deadly to the sleep and peace of his wife.
  - “There is snoring that goes beyond a simple murmur or light guttural sound into a deafening roar capable of climbing the walls, escaping towards the balcony, and leaping into the neighbor's bedroom, and there is nothing that anyone can do to stop it.”

- 60% of the population snores

- Snoring can be a sign of a serious sleep disorder called obstructive sleep apnea (OSA).
What is obstructive sleep apnea?

- Pauses in breathing during sleep (apneas)
- Followed by loud snoring and gasping when breathing starts
- Results in brief awakenings (arousals)
- Excessive daytime sleepiness
OSA: A public health problem

- An epidemic
- Associated to overweight and obesity
- Can be very dangerous
- Easily recognized
- There is effective therapy
## OSA: Severity index

**Apnea-hypopnea Index (AHI)**
- Number of apneas per hour of sleep

<table>
<thead>
<tr>
<th>Severity</th>
<th>Number of Apneas/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Less than 5/hr</td>
</tr>
<tr>
<td>Mild</td>
<td>5 - 19/hr</td>
</tr>
<tr>
<td>Moderate</td>
<td>20 - 29/hr</td>
</tr>
<tr>
<td>Severe</td>
<td>More than 30/hr</td>
</tr>
</tbody>
</table>
How common is OSA

In 2003, 17% of adults in the US had mild OSA or worse.

(Young et al. Excess weight and SDB. J Appl Physiol 2005;99:1592-1599)
## Prevalence of OSA in specific populations

<table>
<thead>
<tr>
<th>Population</th>
<th>Prevalence</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf war veterans</td>
<td>8.3%</td>
<td>(Peacock et al. Mil Med 1997;162(4):249-251)</td>
</tr>
<tr>
<td>HTN</td>
<td>22-48%</td>
<td>(Silverberg et al. Sleep 1997;20:794-806)</td>
</tr>
<tr>
<td>Drug resistant HTN</td>
<td>80%</td>
<td>(Logan et al. J. Hypertension 2001)</td>
</tr>
<tr>
<td>Obesity</td>
<td>51.5%</td>
<td>(Resta et al. Int J obes Relat Metab Disord 2001)</td>
</tr>
<tr>
<td>CHF</td>
<td>50%</td>
<td>(Javaheri et al. Circulation 1999)</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>45%</td>
<td>(Somers et al. ATS Pres. 2004)</td>
</tr>
<tr>
<td>The elderly</td>
<td>56-70%</td>
<td>(Ancoli-Israel et al. Sleep 1991)</td>
</tr>
<tr>
<td>Elderly African-Americans</td>
<td>2.5 x</td>
<td>(Ancoli-Israel et al. AJRCCM 1999)</td>
</tr>
<tr>
<td>Hispanics</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>
OSA: What happens when you sleep

Normal Breathing
- Airway is open
- Air flows freely to lungs

Obstructive Sleep Apnea
- Airway collapses
- Blocked air flow to lungs
OSA: Clinical consequences

Sleep Apnea
→
Sleep Fragmentation
(Hypoxia, Hypercapnia)

Excessive daytime somnolence

Cardiovascular complications

Morbidity and Mortality
I want to die like my grandfather

Peacefully in my sleep....
Not screaming and kicking like the other people in his car
Consequences: *motor vehicle accidents*

Thag Anderson becomes the first fatality as a result of falling asleep at the wheel.
Falling asleep in inappropriate situations
Consequences: changes in daytime functioning

- Lack of concentration
- Change in personality
- Depression and fatigue
- Family discord
Consequences: Heart disease

- Hypertension
- Arrhythmias
- Angina, chest pain
- Strokes
- Pulmonary hypertension
- Heart failure
- Death
OSA a risk factor for:

- The metabolic syndrome –
  - Obesity
  - Hypertension
  - Insulin resistance (pre-diabetes)
  - High cholesterol
  - Inflammation
  - Hypercoagulability

- Diabetes
Figure 3. Superimposed recordings of the electrooculogram (EOG), electroencephalogram (EEG), electromyogram (EMG), electrocardiogram (EKG), SNA, RESP, and BP during REM sleep in a patient with OSA. BP during REM, even during the lowest phases (~ 160/105 mmHg), was higher than in the awake state (130/75 mmHg). BP surges at the end of the apneic periods reached levels as high as 220/130 mmHg. EOG shows the sharp eye movements characteristic of REM sleep. Increase in muscle tone (EMG) and cessation of rapid eye movements toward the end of the apneic period indicates arousal from REM sleep (arrows).
OSA risk factors: *Obesity*

- **Central obesity**
- **Neck circumference**
  - Men > 17 inches
  - Women > 16 inches
- **Obesity**
  - 41% of OSA attributable to a BMI $\geq 25 \text{ kg/m}^2$


OSA risk factors: male gender
OSA risk factors: relatives

<table>
<thead>
<tr>
<th>Relatives</th>
<th>Odds Ratio Adjusted for age, race, sex, BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Relatives</td>
<td>1.0</td>
</tr>
<tr>
<td>1 Relative</td>
<td>2.0</td>
</tr>
<tr>
<td>2 Relatives</td>
<td>3.0</td>
</tr>
<tr>
<td>3 Relatives</td>
<td>4.0</td>
</tr>
</tbody>
</table>
OSA risk factors: other factors

- Smoking
- Use of alcoholic beverages and sedatives
- Nasal obstruction
- Sinus problems and allergies

Medical illnesses:
- Hypothyroidism
- Post polio syndrome, muscular dystrophies
- Genetic disorders
Obstructive sleep apnea: *Presentation*

- Loud chronic snoring
- Excessive daytime sleepiness
- Observed periods of apnea
- Frequent nocturnal awakenings
- Having to urinate 2-5 times per night
- Waking up with heartburn, choking, short of breath
- Wake up with a headache
- Poor memory
- Daytime fatigue
- Changes in personality (impatient, easily irritated)
- Accidents
OSA: How do I know if I have it?

- Clinical suspicion
- Overnight sleep study (2 types)
  - In the laboratory
  - At your home
The sleep lab
Sleep study at home
OSA: Treatment objectives

- Reduce dangerous consequences of OSA
  - Cardiovascular consequences
  - Excessive daytime sleepiness

- Improve quality of life
OSA: *who needs treatment?*

- Abnormal sleep study (AHI > 5/hr), and
  - Excessive daytime sleepiness
  - Hypertension
  - Heart failure
  - Coronary heart disease
  - Stroke
  - Pulmonary hypertension
Obstructive sleep apnea: Treatment

- Risk counseling
  - “To drive or not to drive”
  - Poor work performance
  - Marital discord
  - Quality of life

- Treatment options:
  - Risk control
  - Medical therapy
  - Surgery
Treatment of OSA: risk control

- Weight reduction
- Avoid alcoholic beverages
- Quit smoking
- Good sleep habits
  - Regular sleep schedule
  - Sleep 8 hours per night
- Daily aerobic exercise
  - (30 minutes /day)
Treatment of OSA: *Weight reduction*

Treatment of OSA: Sleeping on your side
For patient with sleep apnea only when supine

From Ancoli-Israel, S.
All I Want is a Good Night’s Sleep, Mosby, 1995
CPAP
Most effective therapy for OSA
Treatment of OSA: jaw advancement device can be 60% as effective as CPAP
Treatment of OSA: Surgery

Uvulopalatopharyngoplasty

Effective only in very selected cases
Genioglossus advancement
Treatment for snoring
Somnoplasty
Treatments for snoring

Pillar procedure
OSA Research at UCSD

Why OSA causes hypertension

- Stimulate the sympathetic nervous system
- Low oxygen during sleep may be a factor
- Peripheral chemo-receptors may play a role
- Arousals from sleep contribute to SNS stimulation

OSA enhances coagulation of the blood

CPAP lowers blood pressure in OSA
Sleep Research at UCSD – Subjects needed

- (PI: Dimsdale) OSA and inflammatory cytokines (619) 543-3468
  - Circadian fluctuation of inflammatory cytokines
  - Effect of CPAP on cytokine levels

- (PI: Kripke) Delayed sleep phase syndrome – genetic implications (858) 534-7206

- (PI: Ayalon) OSA and brain function fMRI (858) 552-8585 ext 2643

- (PI: Loredo) Sleep-Health & Knowledge in US Hispanics
  - Telephone interview of 2,000 Hispanics and 2,000 non-Hispanic Whites
    - Knowledge about sleep and sleep disorders
    - Effects of acculturation to the US life style
    - Prevalence of sleep apnea

- UCSD-SDSU (PI: Talavera) Hispanic Community Health Study
OSA: Conclusion

- OSA is a very common disease. Most affected individuals do not know they have it.
- It is strongly associated with obesity (30% thin).
- It can be easily diagnosed.
- It can be very dangerous, causing accidents and cardiovascular disease.
- There is effective therapy.