Women & Sleep
What can we do to address their unique needs?

Andrea Ramberg, BA, CCSH, RPSGT
Learning Objectives

- Identify the unique sleep needs of women
- Address the different hormone/physical changes a woman goes through and how it could alter their sleep
- Discover information that will help us educate both those in the medical field and the community on the importance of sleep for women
Second Shift

• John P. Robinson, a University of Maryland researcher, found in a 1985 study of 5,000 men and women that American women with children under 5 do an average of 22.5 hours of housework a week and those with children over 5 do 19.9 hours weekly.
• For every two hours women spent on housework, men spent only one, Robinson's survey indicated.
• In 1975 the ratio was 3 to 1.
Many working mothers do not get paid when they take time off to care for sick children

Working mothers’ options when child is sick and has to stay home:
- Spouse/Partner/Child’s Father Misses Work 4%
- Can Call Someone Else 15%
- Share w/Spouse/Partner Equally 33%
- Must Miss Work 40%
- Other 6%

When women must miss work to care for sick children:
- Are Paid 44%
- Do Not Get Paid 56%

NOTE: Among women ages 18-64 employed full-time or part-time, who have children younger than 18. “Other” includes child can stay home alone, or mother can work from home.
Mothers considerably more likely to manage children’s health than fathers

<table>
<thead>
<tr>
<th>Share of mothers and fathers reporting who usually:</th>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make decisions about selecting children's doctor</td>
<td>79%  8%  16%  2%</td>
<td>22%  40%  34%  3%</td>
</tr>
<tr>
<td>Takes children for doctor's appointments</td>
<td>77%  5%  15%  3%</td>
<td>24%  37%  34%  3%</td>
</tr>
<tr>
<td>Assures children receive doctor recommended care</td>
<td>77%  2%  19%  1%</td>
<td>19%  33%  43%  4%</td>
</tr>
<tr>
<td>Take care of sick child*</td>
<td>40%  4%  34%  21%</td>
<td>10%  28%  45%  15%</td>
</tr>
</tbody>
</table>

NOTE: Among women and men ages 18-64 who have children under age 18 in household.
*For “take care of sick child,” data are among women and men ages 18-64 who have children under age 18 in household and are employed outside the home; on this indicator, respondent indicates that respondent must miss work; Other includes other people can take care of child, child can stay home alone, or respondent can work from home.
## Working Mothers and Career Advancement

% with children under age 18 who say being a working mother/father makes it ... to advance in job or career

<table>
<thead>
<tr>
<th></th>
<th>Harder</th>
<th>Easier</th>
<th>No difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working mothers</td>
<td>51</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>Working fathers</td>
<td>16</td>
<td>10</td>
<td>72</td>
</tr>
</tbody>
</table>

Notes: Based on adults who are working or have ever worked and have children younger than 18 (n=528). Voluntary responses of “Depends” and “Don’t know/Refused” not shown.
Source: Pew Research Center survey Oct. 7-27, 2013, N=2,002

---

## Mothers, More than Fathers, Experience Career Interruptions

% saying they have ... in order to care for a child or family member

<table>
<thead>
<tr>
<th></th>
<th>Fathers</th>
<th>Mothers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced work hours</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>Taken a significant amount of time off</td>
<td>24</td>
<td>39</td>
</tr>
<tr>
<td>Quit job</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>Turned down a promotion</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

Notes: Based on those who have ever worked, “Fathers” and “mothers” include those with children of any age, including adult children (n=1,254).
Source: Pew Research Center survey Oct. 7-27, 2013, N=2,002

---

U.S. Women More Likely Than Men to Put Off Medical Treatment

Women are potentially more likely to report having delayed medical care because they are more likely than men to be caring for children, and thus may have a greater likelihood of answering on behalf of other household members.

Women more likely to call ambulances for male relatives but not themselves

- Total of 7,582 patients were included.
- Diagnosed with ST-elevation myocardial infarction (STEMI) - can be fatal if not treated on an emergency basis of stent placement within 90 minutes or less.
- Results of the study showed that 45% of patients received treatment within the recommended time but there were fewer women among these.

• Mariusz Gąsior MD, PhD: “One of the reasons women are less likely than men to be treated within the recommended time period is because they take longer to call an ambulance when they have symptoms – this is especially true for younger women. In addition, ECG results for younger women are less often sent to the heart attack center, which is recommended to speed up treatment.”

Education

- Marek Gierlotka, MD, PhD: “More efforts are needed to improve the logistics of pre-hospital heart attack care in young women.”
  - Greater awareness should be promoted among medical staff and the general public that women, even young women, also have heart attacks.
  - Women are more likely to have atypical signs and symptoms, which may contribute to a delay in calling for medical assistance.”

Case Study

Sleep apnea more dangerous for women's hearts

• "There are known sex-specific differences in obstructive sleep apnea, in terms of risk across the lifespan and symptoms."

• "We know that obstructive sleep apnea is 2-5 times more common in men than it is in women; but when women become post-menopausal, their risk for obstructive sleep apnea actually increases."

  Reena Mera, MD, MS Cleveland Clinic

“OSA is an independent risk factor for heart disease in women, but not men.”

“Increased risk of heart failure, coronary artery disease, cardiac enlargement, and death in women with OSA.”

“This was a strong argument in favor of looking for OSA in women, who may present with more atypical symptoms and thus remain under-diagnosed.”

Harvard Women’s Health Watch...

• Medical evidence suggests that for optimum health and function, the average adult should get seven to nine hours of sleep daily. But more than 60% of women regularly fall short of that goal.

• Women often find it difficult to make up sleep lost while caring for infant children, juggling family and career, and weathering the perturbations of menopause.

Pregnant women with sleep apnea are **FOUR TIMES** more likely to suffer severe life-threatening conditions in childbirth

- Brown University researchers studied data on more than 1.5 million pregnancies
- They found the condition increased hospital stay length from 3 to 5 days
- It also increased the need for the ICU by **174%**, and risk of preeclampsia by **122%**
- Eclampsia risk (a severe preeclampsia that causes seizures) went up by **125%**
Standard Tools are Ineffective

• The Berlin Questionnaire, American Society of Anesthesiologists checklist, STOP-BANG, obstructive sleep apnea in pregnancy score by Facco et al, and the Epworth Sleepiness Scale were not useful screening tools for obstructive sleep apnea in a cohort of obese pregnant women.¹

• In a study done by Orbea, et. al. in 2018, STOP-BANG questionnaire did not reliably predict the presence and severity of OSA in midlife women.² (mean age 54 ± 6.3 years; BMI 33 ± 7.7 kg/m²)


Epworth Sleepiness Scale

- Despite widespread use, it has not been validated for use in female OSA patients and has not been shown to correlate with level of daytime sleepiness.
- Females complaining of the same level of daytime sleepiness as males still did not score higher than a 10 on the Epworth sleepiness scale.

- Possible women have a different threshold for feeling sleepy and/or complain differently than men when it comes to their sleepiness.
The Persistent Gender Bias in the Diagnosis of Obstructive Sleep Apnea

Why are Women Underdiagnosed?
By Alejandra C. Lastra, MD and Hrayr P. Attarian, MD

Why are Women Underdiagnosed?

Differences in Symptomatology

- Insomnia
- Anxiety
- Depression
- Nightmares
- Palpitations
- Unrested sleep
- Restless legs
- Fatigue
- Headache
Gender Bias

• A recent community-based study demonstrated that women, even when presenting with typical symptoms like loud snoring and EDS, were significantly less likely to be diagnosed (25% in men vs 14% in women) and treated (17% vs 11%), despite equal risks of developing hypertension and diabetes
Pathophysiology

• Women have
  • greater clustering of apneas and hypopneas during Rapid Eye Movement (REM) sleep (43.2 vs 38.5 REM AHI)
  • longer latency to sleep (21.2 vs 16.1 minutes)
  • lower sleep efficiency (81.6% vs 83.1%) than men

http://www.aegisliving.com/resource-center/reasons-behind-disrupted-sleep/
Gender differences

Study done by O’Connor, et. al (2000) of 830 patients demonstrated:

- Women have a greater clustering of events in REM

- Women much less severe in NREM, hence the diagnosis of overall milder OSA

- REM OSA disproportionally more common in women than men

- Supine OSA is disproportionally more common in men than women
Clinical Presentation

• Differences in upper airway muscle function
• During wakefulness, women have greater genioglossus activity that carries into their NREM sleep that may prevent upper airway collapse
• This protective mechanism is lost when transitioning into REM
• Could explain the differences between men and women in their severity of OSA

https://www.orlandomedicalnews.com/the-einstein-method-cms-1291
Postmenopausal women

• Postmenopausal women have significantly higher OSA severity indices such as AHI and oxyhemoglobin desaturation index than premenopausal women at same levels of obesity and the difference in AHI.

• The prevalence of OSA between women and men decreases with age, all of which further supports an important role of sex hormones in the pathophysiology of OSA.
Hormones

• Sex hormones implication in the pathogenesis of OSA is supported by the fact that OSA is higher in postmenopausal compared to premenopausal women and postmenopausal women on hormone replacement therapy.

• Perhaps high progesterone and estrogen and low testosterone protect premenopausal women from developing OSA to a certain degree.
Insomnia

• Women more likely to experience insomnia
• Hormones a factor in such disturbances (Menses, Menopause)
• **40%** of all insomnia patients have a coexisting psychiatric condition
  • Anxiety
  • Depression

A study of 289 women found that women with OSA have a higher risk of:

<table>
<thead>
<tr>
<th>Diabetes</th>
<th>Cardiovascular Disease</th>
<th>Hypothyroidism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Reflux</td>
<td>Hyperlipidemia</td>
</tr>
</tbody>
</table>

Others studies have also confirmed higher prevalence of cardiac disease, diabetes mellitus, hypothyroidism, and asthma in women compared to men with OSA, despite milder disease severity.
Increased Risk

- An AHI ≥30 was associated with cardiovascular mortality in women.
- **2- to 3-fold increased risk** of first stroke or coronary heart disease in untreated women with OSA compared to women without OSA.
Therapy

• Adequate use of CPAP was independently associated with mortality risk reduction in women with OSA.

• Treatment with CPAP has also shown to improve quality of life (QOL) and decrease anxiety and depressive symptoms and EDS when compared to conservative treatment (sleep hygiene and weight loss counseling) in peri- and postmenopausal women with moderate-to-severe OSA.

• Daytime alertness improved in this group even when EDS (as defined by an ESS of 10 or higher) was not the presenting complaint.
CPAP is the treatment of choice, however...

1st
- a minimum of 4 hours per night is likely to be insufficient to treat REM-related obstructive sleep apneas and hypopneas and, therefore, insufficient to improve health and functional outcomes.

2nd
- Women were 1.72 times more likely to be non-adherent to CPAP therapy compared to men.

3rd
- Women are 1.2 times more likely to switch masks than men even after initial individualized mask fitting and that patients who switched masks had 7 times higher risk for stopping CPAP therapy within 1 year.

4th
- Women who are married or living with a partner, greater perceived social support, and higher relationship quality (less conflict) have been predictive of higher adherence in women.
What can we do to help?

**Increased awareness** of atypical symptoms, **low threshold to test** middle-aged women with obesity, and **development of female-specific questionnaires** may help identify women at risk.
Summary

• Some women with OSA have **different symptomatology**, underreport snoring, or present with EDS is not often captured on standardized sleepiness questionnaires.

• Women who present with typical male-associated symptoms of EDS and snoring are less likely to be evaluated and treated for OSA.

• Obstructive sleep apnea has historically been regarded as a male disease, **women have been notoriously underrepresented in clinical studies**, with about only 20% female representation in cohort from sleep clinics, and premenopausal and postmenopausal women are not generally studied separately.
Summary

• Because of significant gender bias, women with OSA still remain underdiagnosed.

• Early diagnosis and management of OSA in women is critical.

• Under diagnosis of OSA in women may be more pronounced in the milder OSA range, and at the same time women are more symptomatic at lower AHIs, potentially leaving a significant proportion untreated and consequently with lower QOL, well-being, and health status.

• Obstructive sleep apnea is truly a common disorder in women with estimated prevalence between 6% and 23% for moderate-to-severe disease.
Questions?
References


**Slide 8** Image: Gina's Blog. (n.d.). Retrieved from [https://responsiblyhealthy.ca/blog/page/2/](https://responsiblyhealthy.ca/blog/page/2/)

References cont.


**Slide 16** [https://www.dailymail.co.uk/health/article-4530384/Sleep-apnea-increases-risk-pregnancy-complications.html](https://www.dailymail.co.uk/health/article-4530384/Sleep-apnea-increases-risk-pregnancy-complications.html)


**Slide 18** Obstructive Sleep Apnea is Women: Specific Issues and Interventions Retrieved from : [https://www.hindawi.com/journals/bmri/2016/1764837/](https://www.hindawi.com/journals/bmri/2016/1764837/)
References cont.


Slides 23, 24  Gender Differences in the Polysomnographic Features of Obstructive Sleep Apnea

Slide 27  Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1978319/