Welcome to the COPE Webinar Series for Health Professionals!

January 20, 2016

Zzzz’s & lbs.
The impact of sleep on weight

Time: 12 noon – 1 PM EDT
Moderator: Lisa Darwitz, MS, RD, LDN
Program Manager
MacDonald Center for Obesity Prevention & Education

Handouts of the slides are posted at: www.villanova.edu/COPE

Welcome to the COPE Webinar Series for Health Professionals!

• Enhance Education
• Participate in Research
• Partner with agencies and organizations
• Provide Continuing Education

MacDonald Center for Obesity Prevention and Education (COPE) Goals

Zzzz’s & lbs.
The impact of sleep on weight

Objectives: The learner will be able to:
1. Explain the importance and physiology of sleep.
2. Describe the relationship between sleep quality and weight status.
3. Identify at least one sleep assessment tool, one sleep intervention, and one sleep referral/resource.

Credits: This webinar awards 1 contact hour for nurses and 1 CPEU for dietitians. Suggested CDR Learning Need Codes: 2000, 3000, 3020 and 5370; Level 2.

Notice: Villanova University College of Nursing is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center Commission on Accreditation.
Villanova University College of Nursing Continuing Education (COPE) is a Continuing Professional Education (CPE) Accredited Provider with the Commission on Dietetic Registration.

Neither the planners or presenter have any conflicts of interest to disclose.

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DISCLOSURE

Dr. Devon Golem PhD, RD, LD
Director, Didactic Program in Dietetics
Assistant Professor of Human Nutrition
New Mexico State University

Zzzz’s & lbs.
The impact of sleep on weight

Dr. Devon Golem PhD, RD, LD
Learning Objectives

• By the end of this seminar, you will be able to:
  1. Explain the importance and physiology of sleep
  2. Describe the relationship between sleep quality and weight status
  3. Identify at least one of each of the following:
     • Sleep assessment tool
     • Sleep intervention
     • Sleep resource

Sleep is Essential to Life

Sleep deprivation

- Irritability
- Cognitive impairment
- Memory lapses or loss
- Impaired moral judgement
- Severe yawning
- Hallucinations
- Symptoms similar to ADHD
- Impaired immune system
- Risk of diabetes Type 2
- Decreased reaction time and accuracy
- Tremors
- Aches

Other:
- Growth suppression
- Risk of obesity
- Decreased temperature

Circadian Rhythms

Our environment influences our sleep-wake cycle through light and temperature changes.
Sleep Architecture
• Each sleep stages occur for a few minutes at a time
• Each sleep stage is visited ~5-7 times per sleep session

Sleep recommendations and average 24-hr duration for each stage of life.

<table>
<thead>
<tr>
<th>Life Stage</th>
<th>Age</th>
<th>Recommended sleep duration</th>
<th>Actual average sleep duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborns</td>
<td>0-2 months</td>
<td>12-18 hours</td>
<td>12.8 hours *</td>
</tr>
<tr>
<td>Infants</td>
<td>3-11 months</td>
<td>14-15 hours</td>
<td>12.8 hours *</td>
</tr>
<tr>
<td>Toddlers</td>
<td>1-3 years</td>
<td>12-14 hours</td>
<td>11.7 hours *</td>
</tr>
<tr>
<td>Preschoolers</td>
<td>3-5 years</td>
<td>11-13 hours</td>
<td>10.4 hours *</td>
</tr>
<tr>
<td>School-aged children</td>
<td>5-10 years</td>
<td>10-11 hours</td>
<td>9.5 hours *</td>
</tr>
<tr>
<td>Teens</td>
<td>11-17 years</td>
<td>8.5-9.5 hours</td>
<td>7.6 hours *</td>
</tr>
<tr>
<td>Adults</td>
<td>18+ years</td>
<td>7-9 hours</td>
<td>6.5 hours *</td>
</tr>
</tbody>
</table>

Adapted from National Sleep Foundation http://sleepfoundation.org/how-sleep-works/how-much-sleep-do-we-really-need

Why aren’t we sleeping enough? Are we too...?

Lifestyle Behaviors that Reduce the Quality of Sleep

Caffeine: Sleep and daytime sleepiness

Wired at a Young Age: The Effect of Caffeine and Technology on Sleep Duration and Body Mass Index in School-Aged Children

Sleep disturbances associated with cigarette smoking

Effect of Night Smoking, Sleep Disturbance, and Their Co-Occurrence on Smoking Outcomes
Asynchronization Theory

Kohyama et al 2011

Electron Media

- TV viewing, computer game playing, and internet surfing.
- A causal relationship between media and sleep problems exists in children.
- TV viewing $\rightarrow$ irregular sleep schedules
- Later bedtime and shorter sleep duration
- Increased daytime sleepiness
- Children and adults

Contributors to Poor Sleep

- Lifestyle Behaviors
  - Caffeine consumption
  - Cigarette smoking
  - Exposure to bright lights during dark night hours
  - Exposure to electronic media
- Social and Behavioral Factors
  - Voluntary disregard for physiological cues
  - Social pressures

Sleep and Body Weight Link

Are they really associated?
Rural Iowa – Sleep Duration was negatively correlated with higher BMI

After adjusting for sex, age, educational achievement, physical job demand, household income, depressive symptoms, marital status, alcohol consumption, and snoring.

Women sleeping less had higher weight gains

<table>
<thead>
<tr>
<th>Sleep Duration, h</th>
<th>Prevalence, No. (%)</th>
<th>BMI, Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6</td>
<td>116 (11.3)</td>
<td>30.24 (0.53)</td>
</tr>
<tr>
<td>6-6.9</td>
<td>247 (25.4)</td>
<td>30.17 (0.42)</td>
</tr>
<tr>
<td>7-7.9</td>
<td>34 (34.6)</td>
<td>28.14 (0.23)</td>
</tr>
<tr>
<td>8-8.9</td>
<td>259 (24.1)</td>
<td>29.27 (0.37)</td>
</tr>
<tr>
<td>&gt;9</td>
<td>46 (4.6)</td>
<td>28.25 (0.65)</td>
</tr>
</tbody>
</table>

Weight Loss and Sleep

Experimental Studies
More weekly sleep was associated with more weight loss success

Weight and fat loss associated with improved sleep duration

Summary of Findings

Sleep – Weight

- Inverse Relationship
  - Sleep $\Rightarrow$ Weight

- Weight loss led to improved sleep

- Weight loss interventions including sleep were more successful

What mechanisms are behind this association?

- Type of food consumed
- Amount of energy consumed
- Disinhibited eating behavior
- Hormonal regulation of appetite
- Physical activity levels
- Resting Metabolic Rate (RMR)
- Total Energy Expenditure (TEE)

Increased intake with less sleep

<table>
<thead>
<tr>
<th>Nutrient intakes</th>
<th>Short sleep</th>
<th>Habitual sleep</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td>$2813.6 \pm 593.0$</td>
<td>$2517.7 \pm 593.0$</td>
<td>0.02</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>$112.2 \pm 34.7$</td>
<td>$91.5 \pm 34.7$</td>
<td>0.01</td>
</tr>
<tr>
<td>Saturated fat (g)</td>
<td>$36.8 \pm 17.8$</td>
<td>$28.1 \pm 17.8$</td>
<td>0.04</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>$402.1 \pm 166.2$</td>
<td>$344.2 \pm 166.2$</td>
<td>0.19</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>$98.0 \pm 20.9$</td>
<td>$88.1 \pm 20.9$</td>
<td>0.08</td>
</tr>
</tbody>
</table>

$^1$ All values are means $\pm$ SDs and were adjusted for body weight, phase order, and sex. $n = 26$. The data were analyzed by using mixed-effects ANOVA.

St. Onge, et al. 2011
Associations between Sleep Duration and
Leptin Levels and
Ghrelin Levels

24-hr leptin levels decrease with less sleep

What does that feel like?

Spiegel et al 2004

Effects of Reduced Sleep on Intake

• Increased energy intake (Medelthoven, et al 2008; Brandel et al 2010; St. Ogle et al 2011; Markwald et al 2013)
• Increased intake of high-fat, high-sugar containing foods (Awad et al 2013; Weiss et al 2010, Chaput et al 2012)
• Increased alcohol intake (Baron, et al 2011)
• Increased brain stimulation in response to food stimuli (St. Ogle et al 2014; Schwab et al 2011)

Sleep Assessment & Promotion

How do healthcare professionals incorporate sleep into their work?

Include Sleep in the Plan

• Assessment
  - Determine status of sleep
  - Consider all the factors that contribute to poor sleep
  - Rule out a sleeping disorder
• Diagnosis
  - Poor sleep may be involved in the etiology of several diagnoses
• Intervene, Monitor, Evaluate
  - Sleep Hygiene
  - Referral

<table>
<thead>
<tr>
<th>Sample Questions</th>
<th>Desired Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What time do you go to bed every night and wake up every morning?</td>
<td>Consistent (even on weekends)</td>
</tr>
<tr>
<td>2. How many hours do you sleep on an average night?</td>
<td>7-9 hours of actual sleep</td>
</tr>
<tr>
<td>3. Do you have difficulty falling asleep once in bed?</td>
<td>No, usually fall asleep within 30 minutes</td>
</tr>
<tr>
<td>4. How many times do you wake each night?</td>
<td>Rarely, wake once per night</td>
</tr>
<tr>
<td>5. Do you feel refreshed upon waking in the morning?</td>
<td>Yes, no feelings of grogginess or grogginess dissipates within a few minutes</td>
</tr>
<tr>
<td>6. How often do you feel sleepy during the day?</td>
<td>Rarely</td>
</tr>
</tbody>
</table>

Golem, et al, 2014
Sleep Questionnaires

- Pittsburgh Sleep Quality Index
  - Sleep quality and disturbances in past month
  - [http://sleep.pitt.edu/research/instruments.html](http://sleep.pitt.edu/research/instruments.html)

- Epworth Sleepiness Scale
  - General measure of daytime sleepiness

Sleep Hygiene Practices

- Listen to the body
- Use bed for only *two* activities
- Prepare for sleep (~30 min. prep time)
- Dark, cool sleep environment
- Anticipate good sleep (CBT)

- No snooze button – get up when its time to get up
- Observe effects of caffeine, alcohol, and sleep aids

### Lifestyle Factor | Explanation | Recommendations
---|---|---
Caffeine consumption | Even low doses may affect sleep | Reduce or eliminate caffeine containing beverages and food consumption
Cigarette smoking | Voluntary and involuntary arousal | Teach effects of smoking on sleep, encourage cessation
Media use | Exciting media that stimulates an individual prior to bedtime | Move engaging TV programs, addictive games, and intense videos or music to earlier within the day, discourage children from viewing violent content
Bright lights during dark hours | Bright lights may attenuate physiological preparation for sleep | Dim or reduce overhead lights, turn off electronic displays 1-2 hours prior to bedtime, consider candlelight.
Relaxing activities | Stress and arousal reduction | Hot bath, soothing beverages, guided meditation, massage, deep breathing
Comfortable Environment | Enhances readiness to sleep | Noise reduction, comfortable temperature, soft lights, pleasant scents such as lavender or chamomile.
Physical Activity (PA) | Regular PA is associated with improved sleep quality | Engage in PA on a regular basis
Timing of Sleep | Consistency enhances maintenance of circadian rhythms | Keep consistent bed times (morning & night)

Resources and Referrals

- Find a local sleep colleague
  - American Academy of Sleep Medicine
  - [www.aasmnet.org](http://www.aasmnet.org)

- Find information
  - National Sleep Foundation
  - [www.sleepfoundation.org](http://www.sleepfoundation.org)
  - Sleep Research Society
  - [www.sleepresearchsociety.org](http://www.sleepresearchsociety.org)

"Take Home" Messages

- Sleep is essential
  - Important factor in our health and function

- Always assess sleep status

- Refer to a sleep specialist as necessary
Thank you!

- Villanova College of Nursing
- MacDonald Center for Obesity Prevention and Education
- Carol Byrd-Bredbenner, PhD, RD, FAND
- Jennifer Martin-Biggers PhD, RD
- Katherine Finn-Davis, PhD, RN
- Homestyles colleagues
- COPE Webinar Attendees

Disclosure

- No conflicts of interest to disclose
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- Baron KG, Reid KJ, Kern AS, Zee PC. Role of sleep timing in caloric intake and BMI. Obesity 2011;19(7):1374-81.
- Kohatsu ND, Tsai R, Young T, VanGilder R, Burmeister LF, Stromquist AM, Merchant JA. Sleep duration and body mass index in a rural population. Archives of Internal Medicine 2006;166(16):1701-5
- Gangwisch JE, Malaspina D, Boden-Albala B, Heymsfield SB. Inadequate sleep as a risk factor for obesity: Analyses of national population data are consistent with a causal relationship. Archives of Internal Medicine 2006;166(16):1701-5
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Sleep Disorder Category | Description | Example Diagnoses | References
--- | --- | --- | ---
Insomnia | Insufficient sleep on a nights basis often accompanied by impaired social and occupational functioning. | Mild Insomnia, Moderate Insomnia, Severe Insomnia | Baron KG, Reid KJ, Kern AS, Zee PC. Role of sleep timing in caloric intake and BMI. Obesity 2011;19(7):1374-81.
Circadian Rhythm Sleep Disorders | Sleep disorders related to the timing of sleep within the 24-hour cycle. Can be due to neurological disorders or due to voluntary disruption of sleep cycle. | Jet Lag Syndrome, Irregular Sleep-Wake Pattern, Delayed Sleep-Phase Syndrome | Vander HE, Comtois CA, Kadamath CA, Young AL. The theory that better sleep study. A pilot study to evaluate the sleep of asymptomatic obese adolescents. Sleep 2013;36(6):963-967.
Parasomnia | Abnormalities of the central nervous system that disrupt nighttime sleep. | SleepWalking, Sleep-Related Eating Disorder, Sleep Bruxism, Sleep-related eating disorders, Sleep Paralysis, Sleep-related leg cramps, Sleep-related leg pains, Sleep-related leg sensations, Sleep-related leg sensations, Sleep-related leg sensations | Vander HE, Comtois CA, Kadamath CA, Young AL. The theory that better sleep study. A pilot study to evaluate the sleep of asymptomatic obese adolescents. Sleep 2013;36(6):963-967.
Sleep-related Movement Disorders | Repeated movement of limbs or undesirable sensation in limbs leading to disruption of nighttime sleep. | Periodic Limb Movement Disorder, restless leg syndrome | Vander HE, Comtois CA, Kadamath CA, Young AL. The theory that better sleep study. A pilot study to evaluate the sleep of asymptomatic obese adolescents. Sleep 2013;36(6):963-967.

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- Everyone who has completed the webinar will be emailed a link to the evaluation.
- The email will be sent to the email address that you used to register for the webinar.
- Please complete the evaluation soon after you receive the email. The evaluation does expire after 3 weeks. Once expired, you cannot obtain a certificate.
- Once the evaluation is completed, the CE certificate will be emailed separately within 2 business days.
COPE’s February Professional Webinar

Cheryl L. Dolven MS, RD
Nutrition Consultant
CLD Nutrition, LLC

Dining for Health: Tips and Tricks Using the New FDA Menu Labeling Regulations

Date: Tuesday, February 16, 2016
Time: 12:00PM - 1:00PM EST
CE Credit: 1.0 contact hour, 1.0 CPEU

Questions and Answers!

Moderator: Lisa Dowell, MS, RD, LDN
Email: cope@villanova.edu
Web site: www.villanova.edu/COPE

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