Sleep Takes the Wheel: How Sleep is the Physiological Driver of the Human Engine

Presented by Jeanne Sherwood, RN, CWWS
Goals & Objectives

In this session attendees will:

Gain Insight on:
- The Sleep Center’s Regulation of Body Systems
- The “Domino Effect” Impact of Sleep Deprivation on Body Systems
- Altered Human Function & Mental Processing Resulting from Sleep Deprivation

Learn strategies to:
- Proactively Assist the Body to Adjust to Altered Sleep Patterns
Sleep Deprivation Causes a Very Real Biological Impact

• **Sleep Deprivation:**
  
  • Creates a Critical and Continuous State of “INJURY” to the Body and Body Systems.
  
  • The Body’s Reaction is to Compensate and Preserve Vital Life Preserving Processes.
  
  • The Result is a Reduction in Human Performance and Function.
How Sleep Impacts the Body

The Natural Circadian Clock: SCN
Regulates Wakefulness, Sleep Drive and Multiple Body Systems
The Body’s Powerful Sleep Drive

SCN Regulation of Body Systems

- **Aorta/Heart**
  - Heart Rate
  - Palpitations
  - Immune Response

- **Liver**
  - Coagulation
  - Carbohydrate Metabolism

- **Adipose**
  - Lipid Metabolism
  - Endocrine

- **Hypothalamus**
  - Body Temperature
  - Thyroid Hormones
  - Appetite

- **Inflammation**
  - Cell Proliferation

- **Pancreas**
  - Insulin Insufficiency

- **Muscle**
  - Contraction
  - Tremors/Aches
  - Insulin Uptake Resistance

American Association of Occupational Health Nurses
Sleep Deprivation & Human Function

A Sleep Deprived Person Experiences Very Powerful Forces which lead to Decreased Function & Quality of Life:

- Fatigue, Depressed Mood, Apathy
- Cognitive Impairment, Poor Moral Judgement, Hallucinations
- Poor Memory, Difficulty Maintaining Thought
- Psychomotor Slowling, Activity Avoidance
- Irritability, Quick to Anger, Mood Changes
- Lapses in Alertness, Reduced Attention Span, ADHD Type Behaviors, Severe Yawning
- Weight Gain, Poor Digestion
- Onset of Disease Such as DM, Thyroid Disorder
- Inability to Handle Stress and Multitask
Altered Sleep Impact on Health
Focus: Altered Appetite

Ghrelin signals the Brain that it’s time to eat.

Leptin cues the brain that you are full.
Altered Sleep Impact on Health
Focus: Increased Body Fat
Health Behaviors Contributing to Health Conditions & Higher Risk:

- Poor Eating Patterns
- Smoking
- Lack of Exercise
- Alcohol Consumption
- Reduced Self-Discipline
Health Conditions often Present with Sleep Issues:

- Hypertension
- Obesity
- Heart Disease

Health Conditions Influence Sleep Quality/Quantity:

- Stress
- Pain
- Mood Disturbances
- GI Reflux
- Lung Disease
Prevalence of Coexisting Sleep Issues | Health Conditions

- Drug-resistant hypertension: 83%
- Obesity: 77%
- Congestive heart failure: 76%
- Type 2 diabetes: 72%
- Pacemakers: 59%
- Atrial fibrillation: 49%
- All hypertension*: 37%
- Coronary artery disease*: 30%

*Male subjects only

References:
1. Logan AG et al. J Hypertens 2001
2. O’Keeffe T and Patterson EJ. Obes Surg 2004
Strategies to Increase Safety: Awareness of Reduced Function

- Slower Reaction Time
- Reduced Attention Span
- Impaired Information Processing
Strategies to Increase Safety: Coping Strategies Do Not Work

- People often use methods such as *physical activity* or *dietary stimulants* to cope with sleep loss, masking their level of sleepiness.

- When a sleep deprived person sits still, performs repetitive tasks (such as driving long distances), gets bored, or lets down their coping defenses, SLEEP COMES QUICKLY.

- It is virtually impossible to fight the biological pressure to sleep

*Mitler et al., 1998, National Transportation Safety Board, 1995*
Factors that Increase Force and Power of Sleep Drive:

- Time of Day
- Time Awake + Sleep Debt
- Time on Task
Time of Day: Sleep Pressure, Circadian Wakefulness Rhythm Synchronized

Participants’ performances were tested and compared under two separate conditions:

- After staying awake for extended periods and
- After reaching a certain blood alcohol concentration (BAC).

**Being awake for 17 hours is similar to having a BAC of 0.05%**

**Being awake for 24 hours is similar to having a BAC of 0.10%**

Populations at Higher Risk for Accidents Related to Sleep Deprivation:

- Age/Gender: 16 to 29, Males
- Shift Workers
- Untreated Sleep Disorders
- Driving for Extended Time with No Break
- Medications/Alcohol

Best Practice Considerations: Awareness and Education

- Honest Assessment of Current State of Personal Sleep Health
- Maintain Sleep Health as a Priority and Essential Need
- Awareness of Warning Signs of Sleepiness
- Recognize Factors Contributing to Higher Risk for Accidents

Questions?

Presented by Jeanne Sherwood, RN, CWWS
President & Founder
WellAdvantage
jpsherwood@welladvantage.com

WellAdvantage
7543 Main Street, 2nd Floor
Sykesville, Maryland 21784
(P) 410-795-7579
(F) 410-795-7785
welladvantage.com