Objectives:

1. Discuss why sleep is a critical component of health and wellness
2. Discuss how sleep impacts the proper function of various body systems and functions that impact patient outcomes in physical therapy
3. Select and implement appropriate screening tools for the most common sleep disorders
4. Incorporate strategies into practice to promote clients’ sleep health

Sleep is a Critical Piece of Health & Wellness

- Humans spend about a third of their lives sleeping
- Sleep is a critical period of recovery that supports cardiovascular, neurologic, and other life functions
- Quality sleep is beginning to be recognized as a positive health behavior
- Recommended to consider sleep as another vital sign (Reeve & Bailes, 2010)

Poor Sleep is a Public Health Problem

- 50-70 million adults in the US experience chronic sleep disturbances (Cohen & Altevogt, 2006)
- 62% experience a sleep problem several nights a week (National Sleep Foundation, 2005)
- Prevalence of sleep disorders and chronic sleep insufficiency is likely higher as it is estimated that up to 90% of sleep issues remain undiagnosed and untreated (Cohen & Altevogt, 2006)
- Costs associated with insomnia are over $100 billion per year due to health care costs, accidents, and decreased work (Wickwire et al, 2015)
- Center for Disease Control and Prevention has deemed insufficient sleep to be a public health problem
Adoption of population health priorities "to guide [APTA's] work in the areas of prevention, wellness, fitness, health promotion, and management of disease and disability." (RC-11-15)

The priorities are:
- Active living
- Injury prevention
- Secondary prevention in chronic disease and disability management
- Physical Therapists provide education, behavioral strategies, patient advocacy, referral opportunities, and identification of supportive resources after screening for the following additional USPHS health priorities: stress management, smoking cessation, sleep health, nutrition optimization, weight management, alcohol moderation and substance-free-living, violence-free-living, and adherence to health care recommendations.

Impact of Sleep on the Body:
- Proper function of body:
  - Immune function
  - Tissue healing
  - Pain modulation
  - Cardiovascular health
  - Cognitive function
  - Learning and memory

Impact of Sleep on Health:
- Chronic sleep loss associated with development of chronic conditions:
  - Depression and Anxiety
  - Diabetes
  - Obesity
  - Cardiovascular disease
  - Alzheimer’s Disease
- Associated with higher risk of mortality
- Opportunity for prevention!

So What Do I Do?
- Regularly screen patients by asking questions about sleep disruption, sleep quality, and perceived sleep issues
- Further assessment using a questionnaire if warranted
- Results from the questionnaires(s) may warrant referral to sleep specialist and further assessment using polysomnography (PSG)

Common Sleep Disorders in Adults:
1. Insomnia—difficulty falling asleep, maintaining sleep, or waking up too early at least 3 nights/week for past 3 months and impacts daytime functioning
   - 50% of adults experience occasional bouts of insomnia
   - Chronic insomnia occurs in 10% of US population (Committee on Sleep Medicine and Research, 2006)
2. Sleep Apnea—periods of pauses in breathing or shallow breathing
   - affects at least 25 million adults in the U.S (American Academy of Sleep Medicine, 2014)
   - 80% of people with moderate to severe OSA are undiagnosed (American Academy of Sleep Medicine, 2015)
3. Restless Leg Syndrome—persistent and overwhelming urge to move the legs while resting and typically presents with unpleasant sensations. Movement typically provides temporary relief
   - neurologic condition occurring in 5-10% of adults
   - Answer of “yes” to the question “When you try to relax in the evening or sleep at night, do you ever have unpleasant, restless feelings in your legs that can be relieved by walking or movement?” had 100% sensitivity and 96.8% specificity for the diagnosis of RLS (Ferri et al. 2007)
Screening Questions

1. How much sleep do you typically get?
2. Do you feel well rested when you wake up?
3. Is your condition impacting your sleep? If so, how?
4. How would you rate your sleep quality?
5. Does being sleepy during the day interfere with your daily function?
6. Do you have difficulty falling asleep, difficulty returning to sleep if you wake up in the middle of the night, or difficulty with waking up too early (possible indicator of insomnia if lasts longer than 3 months)?
7. Do you snore loudly or frequently? Has anyone observed you stop breathing while you sleep (possible indicator of OSA)?
8. When you try to relax in the evening or sleep at night, do you ever have unpleasant, restless feelings in your legs that can be relieved by walking or movement? (Ferri et al. 2007)

• answer of "yes" had 100% sensitivity and 96.8% specificity for the diagnosis of RLS

Guidance on Additional Screening

Further screening for the risk of a sleep disorder may be warranted:
- If, despite sleeping for 7-8 hours each night, an individual reports:
  - does not feel well rested upon awaking
  - rates his sleep quality as poor
  - reports sleepiness interferes with daytime activities
  - reason for seeking PT services is not contributing to sleep disruption,
- If the individual answers "yes" to the general questions that probe for the risk of chronic insomnia, sleep apnea, or restless legs syndrome

Screening Tools:

- Insomnia Severity Index (ISI) (Bastien et al. 2001)
  - consists of 7 questions each rated on a 5-point Likert from 0-4 scale with 0 = "no problem" to 4 = "very severe problem"
  - The range is 0-28, with ≥10 suggesting clinical insomnia with 86.1% sensitivity and 87.7% specificity (Morin et al. 2011)
  - Consider if the patient’s current condition (i.e., recent surgery or painful condition) may be contributing to insomnia symptoms and whether treatment of the underlying condition will resolve the complaints of insomnia

- STOP-Bang questionnaire (Chung et al. 2008)
  - Screen patients for risk of obstructive sleep apnea (OSA)
  - Consists of eight questions and is scored based on Yes/No answers.
  - If three or more items are answered "yes", the person is at elevated risk for OSA and should undergo further assessment
  - Sensitivity ranges 83.6-100% depending on the severity of OSA with higher sensitivity observed in individuals with more severe OSA (Chung et al. 2008)
  - Negative predictive value ranges 46-90% increasing with severity of OSA (Nagappa et al. 2015)

General Questionnaires:

- Pittsburgh Sleep Quality Index (Buysse et al. 1989)
  - Consists of 19-items with global score ranging 0-21
  - > 5 is sensitive (89.6%) and specific (86.5%) to identify individuals with "poor" sleep quality from individuals with "good" sleep quality
  - meta-analysis indicates the PSQI has strong reliability and validity in non-clinical and clinical samples (Molloy et al. 2016)
- Epworth Sleepiness Scale (Johns, 1991)
  - Consists of 8 questions indicating chance of dozing during various activities, with 0 being "would never doze" to 3 being "high change of dozing."
  - ≥10 (range 0-24) indicates excessive daytime sleepiness

- Sleep Hygiene Index (Morin et al. 2006)
  - Consists of 13 items scored on 5-point Likert scale from 0="Never" to 4="Always"
  - Higher scores indicate more maladaptive sleep hygiene
Promoting Sleep Health:
- Go to sleep and wake up at the same time every day. This will help set natural biological clock. Consider scheduling activities to increase regularity of schedule.
- Exposure to bright natural light when first wake up is also helpful to set natural biological clock.
- Use the bed for only sleep and sexual activity to help train the brain that if you are in bed, you should be sleeping. Do not eat, work, or watch TV in bed.
- Leave bed if unable to fall asleep within 20 minutes and return when sleepy.

Promoting Sleep Health
- Develop a relaxing bedtime routine
  - Encourage individual to find what works for them
  - Warm bath, reading a book, meditation, mindfulness, stretching, yoga, progressive muscle relaxation, abdominal breathing, imagery
  - Avoid stimulating activities right before bedtime, including watching TV or discussing a stressful topic
  - Blue light emitted from electronics disrupts sleep

Promoting Sleep Health
- Exercise regularly (preferably moderate to vigorous)
  - Meta-analysis indicates acute and chronic exercise has a moderate positive benefit on sleep characteristics by increasing slow wave sleep and total sleep time and decreasing sleep onset latency (Kubitz et al. 1996)
  - Systematic review by Yang et al (2012)
    - 6 trials with 305 participants of middle-aged and older adults with sleep problems (5 moderate intensity aerobic; 1 high intensity resistance)
    - Exercise groups had improved sleep quality, reduced sleep latency, and reduced medication use
    - Exercise could be alternative or complementary method for sleep problems
  - Older individuals who are less active, have higher physical function, and have poorer sleep quality appear to benefit the most from exercise to improve sleep (Kubitz et al. 2017)

Promoting Sleep Health
- Avoid moderate to vigorous exercise at least 2-3 hours before bedtime. Exercising immediately before bedtime can be stimulating making it harder to fall asleep
  - Increase in body temperature close to bedtime may interfere with the natural decline in body temperature that occurs in the evening and as sleep mechanisms are initiated (Kubitz et al. 1996; Driver and Taylor, 2000)
  - Sleep interference by late-night exercise may depend on several factors, including individual’s level of fitness and if has a sleep issue or not (Youngstedt et al. 1994)
  - According to the 2013 Sleep in America poll, there were no differences in sleep outcomes between individuals who performed vigorous or moderate activity < 4 hours of bedtime and those who performed vigorous or moderate activity > 4 hours before bedtime (National Sleep Foundation, 2013)
  - Recommendation is “exercise is good, regardless of time of day.” Recommendation should be considered on an individual basis.

Promoting Sleep Health
- Avoid caffeinated foods and drinks at least 4 hours before bedtime (includes most tea, coffee, chocolate, and soft drinks)
  - Check drink or food labels
  - Caffeine can cause difficulty falling asleep and increase the number of times you wake up during the night
  - Refrain from drinking alcohol or smoking at least 3 to 4 hours before bedtime
  - While alcohol may help with relaxation before bedtime, it can increase the number of times you wake up during the night and can cause you to wake up early
  - Nicotine in cigarettes acts as a stimulant that can cause difficulty falling asleep
Promoting Sleep Health:
- Avoid eating a large meal or spicy food 2-3 hours before going to bed
- Your digestive system slows down while you are sleeping which can stimulate acid secretions that cause heartburn
- A light snack may be helpful if you are hungry
- Avoid excessive liquid 2-3 hours before bedtime
- Avoid daytime napping so that you are tired at night and can fall asleep easily
- If you feel you need to take a nap, limit the nap to less than 30 minutes and avoid napping in the evening

Promoting Sleep Health:
- Make sleeping environment comfortable and relaxing
- Avoid too much light and disturbing noises
- Use ear plugs, light-blocking curtains, or an eye mask if needed
- Keep the temperature comfortable. Being too warm or cold may disturb your sleep
- Use a comfortable and supportive pillow and mattress
- Avoid un-prescribed or over-the-counter sleep aids
- Refer to sleep specialist if continue to have trouble sleeping
- May need to discuss if medications or other health conditions could be affecting sleep
- Individualized treatment options

Additional Considerations to Facilitate Sleep Health
- Appropriate positioning for sleep considering the patient’s diagnosis
- Pain is a contributing factor to poor sleep quality (Lautenbacher et al, 2006; Cole et al, 2007) so education about positioning for sleep may limit sleep disruption and improve sleep quality
- Address impaired bed mobility

Pharmacological Therapies:
- Benzodiazepines
  - Triazolam (Halcion), Estazolam, Temazepam (Restoril), Quazepam, Flurazepam
  - Not recommended to treat insomnia in older adults (2012 Beers Criteria from American Geriatrics Society)
  - Risk of developing tolerance or dependence, rebound insomnia, residual daytime sedation, cognitive impairments, motor incoordination
- Non-benzodiazepines
  - Eszopiclone (Lunesta), Zolpidem (Ambien), Zaleplon (Sonata)
  - Associated with increased risk of falls in older adults
  - Generally not recommended to treat insomnia in older adults
  - Used no more than 90 days in older adults (2012 Beers Criteria from American Geriatrics Society)
- Limited research on using off-label use of antidepressants and antipsychotics to treat insomnia so not recommended
- Emerging evidence melatonin supplements or melatonin agonists may be useful but need more support before recommended for use
  - Ramelteon (Rozerem)

Sleeping in San Antonio!!
- How best to engage patients/clients in a conversation about sleep hygiene?
- How to assess readiness to engage in change?
- How to promote the development of good, positive sleep habits that are sustainable?
- How to promote autonomy in the patient/client, hold the patient/client accountable, and build self-efficacy?

General Approach to Behavior Change
- Partner with the patient
  - Become more coach-like and less expert-like (SDT)
- Assess if patient is performing the behavior and if not, how ready he/she is to engage in behavior change (TTM)
- Tailor intervention approach to stage (TTM)
- Assess/discuss benefits and barriers (TTM)
  - Need more benefits than barriers for a person to act
  - Benefits can be the motivator
  - Collaborate to problem-solve around barriers
- Build self-efficacy (SCT)
  - THE most important construct related to behavior change
- Build autonomy (SDT)
Behavior Change Theories

**Transtheoretical Model (TTM)**
- Stages of change
- Decisional balance
- Processes of change
- Self efficacy
  
  James Prochaska

**Social Cognitive Theory (SCT)**
- Personal factors
- Behavioral factors
- Environmental factors
- Self efficacy
  
  Albert Bandura

**Self Determination Theory (SDT)**
- Autonomy
- Competence
- Relatedness
  
  Edward Deci
  
  Richard Ryan

Prerequisites for Taking Action

- Strong motivator
- Identification of the barriers
- Strategies to overcome barriers

Beginning the Conversation

- Assess sleep habits/hygiene
  - Intake questionnaire or inquire
    - Do you get 7-9 hours of quality sleep per night?
    - How much sleep do you typically get?
    - Do you feel well rested when you wake up?
    - Is your condition impacting your sleep? If so, how?
  
  **Tip**
  - Refrain from asking “why” questions – make people defensive
  
  **Goal**
  - Open the door to further exploration
  - Build a collaborative relationship with the patient/client

Asses Readiness to Change

- Use a readiness ruler or 1-10 scale
  - How ready are you, today, to change your sleeping hygiene or habits? (1 = not ready, 10 = ready today)
  
  If 7 or more, the patient/client is ready to act
  - Proceed to next step
  
  If 4-6, ask the patient/client
  - Why aren’t you a 2 or 3? (They’ll tell you the benefits of better sleep)
  - What would it take for you to be an 8 or 9 (They’ll tell you the barriers)
  
  Focus on reducing barriers until the patient is ready

If patient is a 1-3
  - Educate about benefits of quality sleep
  - Provide education/information resources
  - Patient not ready to take action – focus on another health habit

Decisional Balance (Benefits/Barriers)

- Ask the patient/client to write down all of the benefits of getting better sleep
  - Use a note card and put the note card in a place that can be reviewed several times a day
  - If they can’t identify 3-5, educate
  - Identify what’s important to the patient (a value) that will improve or be enhanced by better sleep (motivator)

- Find out what the barriers of quality sleep are
  - Real barriers (no control over)
  - Excuses
  - Barriers they have control over (if you can identify a strong enough benefit, the barrier goes away) (not getting to bed early enough)

Build Self Efficacy

- Baby steps
  - Create small, achievable, but challenging goals
  - Might have to start with thinking goals or research goals

- Physiological states
  - Educate patient/client to be mindful of how it feels to get better sleep
  - Discuss prior times in life when they slept well

- Verbal persuasion
  - Assist patients/clients to be persuaded
  - Praise and encourage

- Vicarious experiences
  - Is there a person in their life who has good sleep hygiene?
Build Self Efficacy

- Mastery experiences
  - Set goals (important, achievable, challenging)
  - Trial and learn (experiment!)
- Other ideas for improving self efficacy?
- Remember – self efficacy is behavior and situationally specific!

Build Autonomy

- Intrinsic vs. extrinsic motivation
  - Doing because you (the PT or PTA) want them to do it is not intrinsic!
  - If you don’t convert extrinsic motivation to intrinsic, the behavior likely won’t be sustained
- Allow patient/client to make decisions and give them choices (don’t apply external controls)
- Provide relevant information and meaningful rationale for change

Case Study 1: Individual s/p TKR

Mrs. Young is a 67 year old female who reports being very active over the years. She worked as a first grade teacher until she retired 2 years ago, but she continues to volunteer in the classroom and occasionally substitute teaches, “but otherwise I don’t have much of a schedule since I retired”. She went skiing with her family 6 months ago and fell and twisted her right knee. An x-ray and MRI after the injury indicated there was no fracture or ligament tear, but evidence of severe cartilage degeneration. She underwent a right TKR one week ago. She has swelling and pain in her right knee and some drainage from the incision, but is taking ibuprofen and using ice to help with the pain and swelling. She reports sleeping in the downstairs bedroom so she does not have to go up the flight of stairs to her bedroom. “It takes me a long time and I’m afraid I am going to fall.” Rates R knee pain currently as 4/10 with sitting, at worst 8/10 with walking and going up stairs, and at best 3/10 after taking meds and using ice. She reports her goals for therapy are “to get rid of this walker, be able to sleep in my own bed, and be able to walk without pain.”

Case Study 2: Individual with MS

Margery is a 40 year-old sales representative for a pharmaceutical company. Ten years ago she was diagnosed with relapsing-remitting multiple sclerosis. She was recently referred to outpatient physical therapy after a recent relapse that resulted in residual numbness in both legs, and to a lesser extent in her right (dominant) arm. She reports an increase in near falls and an increase in fatigue but contributes the fatigue in part to her demanding job, long commute, and difficulty sleeping. Margery is otherwise healthy and would like to get back to jogging 2-3 times per week and playing tennis twice each month.

Discussion/Q&A