

# Cannabinoids and Health

Module 7

Lecture 6: Cannabis and Sleep

# Medical Cannabis for Sleep

- Sleep is commonly cited as a reason for medical cannabis use
- Advertised widely in popular media - but does it work?
- National Academy of Sciences report found moderate evidence suggestion cannabinoids can be helpful.

**CONCLUSION 4-19** There is moderate evidence that cannabinoids, primarily nabiximols, are an effective treatment to improve short-term sleep outcomes in individuals with sleep disturbance associated with obstructive sleep apnea syndrome, fibromyalgia, chronic pain, and multiple sclerosis.

# The Endocannabinoid System and the Circadian Sleep–Wake Cycle

- ECS is involved regulation of circadian sleep–wake cycle
  - maintenance and promotion of sleep
- ECS may be link between circadian regulation systems in the brain (i.e., superchiasmatic nucleus) and behavioral/physiological processes (e.g., sleep)
- lack of normal sleep causes dysregulation within the ECS
- elevation in the ECS at the receptor level is involved in recovery of sleep after non-normal sleep

# Cannabis and Sleep

- Research on the impact of cannabis on sleep started in the 1970s and included a number of studies examining polysomnography-based sleep
- Initial work suggested cannabis may have short-term benefit on sleep (reduce sleep latency)
- Initial work examining specific cannabinoids suggests a potential therapeutic effect of high-dose CBD combined with low-dose THC for sleep.

# Cannabinoids and the Sleep–Wake Cycle

- Recent research suggests sleep outcomes depend on:
  - type and ratio of cannabinoids (THC, CBD, others?)
  - dosage
  - timing of administration
  - route of administration
- Current research focusing on self-reported sleep
- Examining potential therapeutic impact of cannabinoids for sleep



# CBD and Sleep

- CBD has differential effects on sleep based on dose
- Low-dose CBD does not improve sleep
- High-dose CBD does improve sleep
  - In people with insomnia, 160 mg/day of CBD increased total sleep time and decreased frequency of nighttime arousals



References: Nicholson et al., 2004, *Psychopharmacology*; Zuardi 2008, *Rev Bras Psiquiatr*  
Carlini & Cunha, 1981, *J Clin Pharmacol*

# Cannabinoids and Insomnia/Sleep Quality

- Increase in total percentage of sleep in rats after administration of medium to high doses of CBD
- CBD blocks anxiety-induced REM sleep suppression; no effect on NREM sleep
- CBD may impact sleep via decreasing anxiety
- CBD may decrease stage 3 sleep when used with THC
- THC decreases sleep latency
- Contradictory findings in whole-plant cannabis users
  - Not surprising given heterogeneity of cannabinoids and terpenes in flower

# Cannabis and Obstructive Sleep Apnea

- Rat models: endocannabinoids and cannabinoids modulate respiration during sleep
  - reduced apnea events
- Cannabinoids may suppress the serotonin-mediated symptoms of OSA
- Human research:
  - endocannabinoids may protect brain from sleep apnea
  - synthetic THC (dronabinol) also associated with improvement in apneas
- OSA is qualifying condition in MN but medical community came out strongly against it, citing lack of evidence

References: Carley et al., 2002, *Sleep*; Jumpertz et al., 2010 *Exp Clin Endocrinol Diabetes*; Farabi et al, 2014 *J Clin Sleep Med*



# Cannabis and Nightmares

- Veterans use cannabis for PTSD, including nightmares
- Significant area of research interest given prevalence of nightmares in combat PTSD
- Controlled trials among larger, more diverse samples with long-term follow-up are needed

# Other Important Effects of Improving Sleep

- Using cannabis to improve sleep can indirectly improve outcomes related to other conditions that are associated with or exacerbated by compromised sleep:
  - Chronic or acute pain (pain tolerance, pain sensitivity, etc)
  - Anxiety, PTSD
  - Opioid use disorder, potentially other addictive disorders (e.g., alcohol use disorder)
  - Likewise, if cannabis alleviate symptoms of these disorders, it may also increase sleep

# How to Use Cannabis for Sleep

- Recommendation for medical patients who want to try cannabis for sleep
  - “start low and go slow” with products that contain THC
  - Combine higher doses of CBD with lower doses of THC
  - Use lowest dose of THC possible to achieve desired effect (to reduce tolerance and withdrawal)
  - Do not combine with alcohol or other medications
- Additional research needed to determine how/if cannabis should be prescribed for sleep
  - Lots of claims made by the cannabis industry
  - But we don’t have the science to support them yet

# Conclusions

- Preliminary research suggests CBD may have therapeutic potential for insomnia
- THC may decrease sleep latency but could impair sleep quality long-term
- Evidence suggests usefulness of high CBD combined with low THC
- Cannabinoids may improve sleep in chronic pain patients, PTSD patients, and others
  - Do cannabinoids have an indirect effect by improving sleep?
  - Or does sleep improve secondary to improvements in other symptoms?
  - Or both?