PAIN MANAGEMENT & VIRTUAL REALITY

Nailesh Singh, MD
Director of Education
Associate Professor
University of California, Davis

DISCLOSURES

• No relevant financial disclosures
• Discussion of off label uses of devices (Virtual Reality)

• Materials that are included in this course may include interventions and modalities that are beyond the authorized practice of mental health professionals. As a licensed professional, you are responsible for reviewing the scope of practice, including activities that are defined in law as beyond the boundaries of practice in accordance with and in compliance with your profession standards.

OBJECTIVES

• Learn about the association between mental health (MH) and chronic pain.
• Understand the unique role that opioids play in those with MH issues and pain.
• Learn about non-medication based treatments such as interventional therapies.
• Discuss applications of virtual reality in MH treatment and pain management.
MENTAL HEALTH AND PAIN

- Depression (60.8% and 33.8% for severe depression, Rayner 2016)
- Anxiety (33.5%, McWilliams 2003)
- Substance use/substance use disorder
  - Opioid use disorder (41.8% had pain prior to OUD, Hser 2017)
  - Alcohol use (13%, Saunders 2012)
  - Sedative/hypnotic use (39%, Saunders 2012)
- Personality disorder (51-59%, Fishbain 1994 and Polatin 1993)
- PTSD (10-50%, Sharp and Harvey 2001 and Brennstuhl 2015)
- Somatic symptom disorder (Katz 2015)
- Panic disorders (7.3-36.5%, Castro 2009)

RISK FACTORS FOR CHRONIC PAIN

- Mental health diagnosis
- High levels of self-reported pain
- Certain surgeries
- Sleep disorder
- Poor coping skills
  - Pain catastrophizing, pain related anxiety and fear of pain, helplessness (Keefe 2004)
- Hx. of trauma or childhood abuse experiences (Leisner 2014 and Brennstuhl 2015)

Figure 1. Prevalence of mood disorders high among pain patients. "Patients with pain, depression, and anxiety experienced the greatest pain severity (P < 0.001), poor mental health (P < 0.001), and poor physical health-related quality of life (P < 0.001)." Based on reference 2.
SUICIDE AND CHRONIC PAIN

- Risk is at least doubled in those with chronic pain and mental health disorders
- Prevalence of suicide attempts between 5-14%
- Prevalence of suicidal ideation 20%
- Risk factors:
  - Type, intensity, duration of pain
  - Insomnia
  - Helplessness, hopelessness
  - Desire to escape from pain
  - Pain catastrophizing and avoidance
  - Lack of pain coping skills

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MENTAL HEALTH, PAIN AND OPIOIDS

- 2015: 91.8 million US adults (37.8%) on opioid medications (US population in 2015= 321 million)
- 12.5% misuse opioids while 16.7% reported a prescription opioid use disorder
RISK FACTORS

- Misuse and abuse more common in:
  - Uninsured
  - Unemployed
  - Low income
  - Poor health
  - More ER utilization
  - Major depression
  - Suicidal ideation
  - Anxiety (50% screen + for opioid misuse)

Adult Users of Nonmedical Prescription Opioids Are More Likely Than Nonusers To Consider Suicide Both persistent and former users reported suicidal ideation at significantly higher rates than individuals who had never used a nonprescribed opioid medication.


OVERDOSE AND PAIN

- Retrospective cohort review of those with mental health diagnosis and non-cancer opioid use (2009-2012)
- Overdose rate of 0.67%
- Higher for those with depression/BENZO use, >100 mg oral morphine equivalents
- 20% less risk of overdose for patients on long term antidepressants

WHY?

• Hypogonadism predisposes to depression (Wainwright, 2011).
• Long term and high opioid opioids → hypogonadism → depression and other mood changes.
• Treatment options:
  • Discontinue or decrease opioids
  • Supplement testosterone
  • Opioid induced hyperalgesia

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PSYCHOLOGICAL THERAPIES FOR PAIN

• CBT - first line for back pain, headache, arthritis, and fibromyalgia
• Biofeedback - chronic MSK pain, arthritis, and headache
  - Effective as some medications
  - More effective when combined with medications

PSYCHOLOGICAL THERAPIES FOR PAIN

• Mindfulness - greater acceptance of pain, improved QOL, less disability, pain catastrophizing, disability, fatigue, anxiety, feeling in control, self-efficacy
  - Effective for headaches
• MBSR
• Mindfulness based CBT
• Brief mindfulness

Factors associated with success
• Self efficacy
• Pain coping strategies
• Readiness to change
• Acceptance
• Early intervention
  - Telephone and internet based
  - Caregiver assisted
  - Exposure based protocol

INTERVENTIONAL THERAPIES FOR PAIN

• Neuraxial injections
• Sympathetic blocks
• Joint injections
• Lidocaine or Ketamine IV
• Capsaicin patch
• Implanted therapies
• Virtual reality...

STERIODS FOR PAIN

• Anxiety or anxious symptoms
• Depression
• Mania
• Homicidal ideation
• Treatment:
  • Family/psychological support
  • Anti-psychotic/mood stabilizer

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VIRTUAL REALITY FOR PAIN

• Definition (dictionary): the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment.

VIRTUAL REALITY

• Full immersion: all the senses
• Augmented reality: most of the senses
• Interact with virtual objects: video game aspect
• Head and gaze tracking system
• Block users' view of outside world
• Formatted to limit motion sickness
• Varied offerings
• Relatively inexpensive
• Modified headsets: MRI, water resistant
• Promotes self efficacy
MECHANISMS

- Decreases activity in the anterior cingulate cortex, insula, thalamus, and primary and secondary somatosensory cortex (S1 and S2).

Gate Control Theory
- Attention Theory-limited capacity for attention
- Multiple Resources Theory-sensory systems function independently
- Intercortical modulation-between signaling pathways of pain matrix through all senses and attention, emotion, memory

Why is VR more effective than video gaming, TV distraction, audio only distraction?

USES FOR VIRTUAL REALITY

- Procedure related pain/Distraction
- Adjunct to psychological therapy
- Education
PROCEDURE RELATED PAIN

• Burn units for wound changes
• 35-50% reduction in pain in adult burn patients (Hoffman 2011)
• Opioids + VR improved pain more than opioids alone (Hoffman 2007) in healthy volunteers exposed to experimental thermal pain

54 pediatric burn patients reported 27-44% decrease in pain during physical therapy sessions with an increase in "fun".

Pharmacological therapy, No VR
Pharmacological therapy + VR

VR FOR TRIGGER POINT INJECTIONS

• OUTCOMES: pain relief, impression of change, anxiety
  • "Surprisingly pleasant"
  • "Not much anxiety and stress"
  • "Now I need to take a vacation"
  • "Can I keep this on..."
VR FOR CHRONIC PAIN

- VR for chronic pain patients
- N= 30 patients
- 100% reported pain reduction
- 33% decrease in pain post-session
- 66% decrease in pain intra-session


VR FOR PSYCHOLOGICAL TREATMENTS

- Phobia treatments
  - Social phobia
  - Arachnophobia
  - Agoraphobia
  - PTSD
  - Aviophobia
  - Public Speaking
  - Meditation


COMPLICATIONS & ISSUES

- Side effects are low
  - Headaches
  - Nausea
  - Dizziness
  - Motion sickness
  - Adjuvants to medications
  - Re-experiencing of trauma?
  - Too advanced for older generations?
CONCLUSIONS

• Mental health disorders are associated with pain, opioid use, misuse, and abuse.
• Treating mental health disorders may need multimodal approach.
• Virtual reality is an effective and emerging tool for treating mental health disorders, acute pain, and chronic pain.

THANK YOU!

Questions?