Mindfulness and Neurologic Conditions

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Objectives

• Identify the most common cognitive, behavioral and emotional sequelae of neurologic conditions such as acquired brain injury (ABI)

• Identify underlying cognitive functions thought to be affected by mindfulness meditation (MM)

• Understand current findings on benefits of MM for individuals with neurologic conditions
Neurologic Conditions

• **Acquired Brain Injury (ABI)** refers to injury to the brain that occurs after birth and is not related to a congenital or degenerative disease.
  – Traumatic Brain Injury
  – Stroke
  – Anoxic Injury
  – Infections to the brain/encephalopathy
  – Immune-mediated disease
  – Toxic exposure

• **Degenerative Disease**
  – Alzheimer’s Disease
  – Parkinson’s Disease
Symptoms of neurologic conditions

• Traumatic brain injury: depends on severity. Injury is often diffuse. Can include
  – confusion/post-traumatic amnesia, memory impairment, attention/executive function deficits, mood lability/agitation, motor/mobility impairment

• Stroke: depends on location. Can include
  – aphasia, memory impairment, attention/executive function impairment, depression/mood lability, hemiparesis

• Degenerative disease/dementia
  – memory impairment, attention/executive function impairment, visuoperceptual deficits, mood lability/confusion/agitation
Neurologic conditions

• Common features
  – impaired attention
  – impaired memory
  – impaired executive functioning
  – mood lability

• Increased psychosocial stressors
  – change in functioning, self-concept, life roles
  – dependency on others
  – family stressors
What is Mindfulness?

- Defined as “self-regulation of attention so that it is maintained on immediate experience... adopting...an orientation...characterized by curiosity, openness, and acceptance” (Bishop et al., 2004)

- Non-judgmental attention and awareness
  - Turn off auto-pilot and break out of the drift
  - Actual experience vs. interpretation / elaboration
The practice of mindfulness

• Formal Practice Examples
  – Mindful Breathing
  – Body Scan

• Informal Practice Examples
  – Mindful Walking
  – Mindful Eating
  – Mindfulness in Daily Life
How Might Mindfulness Help Individuals with Neurologic Conditions?

• Improves stress response
• Improves mood and overall well-being
• Improves attention/cognition
• Strengthens overall brain health
Mindfulness and Stress Response

• Stress Buffering Hypothesis (Creswell & Lindsay, 2014)
  – Mindfulness alters appraisal of stimuli as stressful → decreases stress-reactivity cortical responses
  – Thought to explain impact on health outcomes
Stress Buffering Hypothesis
(Creswell & Lindsay, 2014)

- Blue = Regulatory pathways activated by mindfulness
- Red = Stress-reactivity pathways decreased by mindfulness
How Might Mindfulness Help Individuals with Neurologic Conditions?

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Mindfulness and Mood

- Mindfulness-based therapies (MBTs) have been used to treat a variety of psychological conditions:
  - ADHD, Aggression, Autism, Bipolar disorder, Depression, Anxiety, Eating disorders, OCD, PTSD, Personality disorders, Substance abuse

- Meta-analysis found MBTs for clinical and non-clinical populations effective in treating a variety of psychological issues, especially anxiety, depression, and stress (Hofmann et al., 2010; Khoury et al., 2013)
Mindfulness and Mood
(for review, see Keng, Smoski, & Robins, 2011)

- MBSR found to improve:
  - Positive affect, empathy, self compassion, satisfaction with life, and quality of life

- Adapted intervention found similar improvements for individuals with TBI (Azula et al., 2012)
Mindfulness and Physical Health

• MBSR has been investigated in a wide range of health conditions (for reviews, see Greeson, 2009; Keng et al., 2011)
  – Cancer
  – Fibromyalgia
  – Multiple sclerosis
  – Psoriasis
  – Diabetes
  – Rheumatoid arthritis
  – Chronic pain
  – Asthma / Respiratory
  – Hypertension
  – Myocardial ischemia
  – Weight control
  – Irritable bowel syndrome
  – Insomnia
  – Headaches
  – HIV
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Mindfulness and Cognition

• Mindfulness associated with EF (Oberle et al., 2011)
  – Self-regulation of attention
  – Inhibition of mind wandering, irrelevant interference, or elaboration
  – Frees resources within WM
Mindfulness and Cognition

• Preliminary evidence shows mindfulness training improves cognitive fx (for a review, see Chiesa et al., 2011)

• Specifically Mindfulness improves:
  – Attention
    • Orienting of attention (Jha et al., 2007)
    • Sustained attention (Polak, 2009; Semple, 2010; Zeidan et al., 2010)
    • Selective attention (Jensen et al., 2012)
    • Attention switching (Heeren et al., 2009; Zylowska et al., 2008)
  – Working memory capacity (Chambers et al., 2008; Mrazek et al., 2013; Zeidan et al., 2010)
Mindfulness and Cognition

• Mindfulness also improves:
  – Memory specificity (Hargus et al., 2010; Heeren et al., 2009)
  – Executive functioning
    • Verbal fluency (Heeren et al., 2009; Zeidan et al., 2010)
    • Response inhibition (Heeren et al., 2009; Sahdra et al., 2011; Semple, 2010; Zylowska et al., 2008)
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Mindfulness and Structural Neurologic Changes

• MBSR found to increase gray matter (Singh et al., 2013)
  – Areas involved in attention, learning and memory, emotion regulation, perspective taking (Holzel et al., 2010)
  – This increase found to positively correlate with increase in personal well-being (Singleton et al., 2014)
  – Thicker gray matter in areas related to pain sensitivity \( \rightarrow \) reduced pain sensitivity (Grant et al., 2010)

• Mindfulness meditation protective
  – Less decrease in gray matter with age (Luders et al., 2015)
Mindfulness and Functional Neurologic Changes

• EEGs:
  – ↑ in alpha and theta activity (Chiesa & Serretti, 2010)
  – Changes in Gamma activity (Berkovich-Ohana et al., 2012)

• Neuroimaging:
  – Activates prefrontal cortex (PFC) and anterior cingulate cortex (ACC) (Chiesa & Serretti, 2010)
  – Decreased activation in the amygdala and parahippocampal gyrus (Berkovich-Ohana et al., 2012)
Mindfulness and Neurologic Conditions

• Current research on MBT used to target mood and overall well-being in TBI:
  – Improved depression (for a review, see Ozen et al., 2016)
  – Improved fatigue (for a review, see Ulrichsen et al., 2016)
  – Improved QOL (Bédard et al. 2003)
Mindfulness and Neurologic Conditions

• Pilot study of MBSR for chronic mTBI/Postconcussive Syndrome (Azulay et al. 2013)
  – Post–acute brain injury rehab
    • n = 22; time post-injury 7+ months
  – 10 wk MBSR enhanced for TBI
  – Results:
    • Improved QOL and self-efficacy
    • Enhanced attention and working memory
Mindfulness and Neurologic Conditions

• Pilot study of MBSR for Treatment of Veterans with PTSD and mTBI (Cole et al. 2015)
  – VA patients with comorbid PTSD and mTBI
    • n = 9; time post-injury 12+ months
  – Traditional 8 wk MBSR
  – Results:
    • Improved PTSD symptoms
    • Enhanced attention
Mindfulness and Neurologic Conditions

• MBI following stroke (for reviews, see Lawrence et al., 2013; Lazaridou et al., 2013)
  – Overall results show positive improvements in cognition and mood, and reductions in stress

• MBI for patients w/ MS (for review, see Simpson et al., 2014)
  – Overall results show positive improvements in QOL, as well as mental and physical health

• MBI for patients w/ Parkinson’s Disease
  – Overall (Cash et al., 2016)
  – Structural brain changes following MBI (Pickut et al., 2013)
Mindfulness Resources

• For more information, visit:
  – http://www.mindfulnet.org/
  – Center for Mindfulness: http://www.umassmed.edu/CFM/

• Access to mindfulness exercises:
  – http://www.freemindfulness.org/
  – http://marc.ucla.edu/body.cfm?id=22
  – https://www.tarabrach.com/guided-meditations/
  – http://www.innerhealthstudio.com/meditation-scripts.html
  – http://health.ucsd.edu/specialties/mindfulness/programs/mbsr/Pages/audio.aspx
  – http://www.mindfulnesscds.com/

• Free online MBSR course:


References


References


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Thank you!