

## Mindfulness-Based Stress Reduction and Chronic Pain

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### **PICO Question:**

For people with chronic pain, how does MBSR (mindfulness-based stress reduction) compared to standard treatment, affect the patient's experience of pain?

### **Clinical Scenario**

#### **Condition/Problem**

Chronic Pain is characterized by pain lasting more than 12 weeks, and can last for months or even years. There is a tendency for the condition to worsen with time and it is widely thought to be a disease resulting from nerve changes. There are many possible reasons that cause pain including initial acute injury and ongoing illnesses (e.g. autoimmune disorders, spinal stenosis, slipped/bulging discs, migraines, osteoarthritis, diabetic neuropathy, Sciatica, and Fibromyalgia) (National Institutes of Health, 2011). Specific autoimmune disorders that cause pain are Rheumatoid Arthritis (RA), Multiple Sclerosis (MS), and Lupus. Residual problems that can occur are fatigue, sleep disturbances, decreased appetite, mood changes, and depression/despair (Vann, 2009). Pain is associated with a decrease in functional mobility due to changes in a person's flexibility, strength, and stamina (National Institutes of Health, 2011).

#### **Incidence/Prevalence:**

Statistics show that 4 in 10 American adults suffer from chronic pain. More Americans have pain-related issues than diabetes, heart disease, and cancer combined. It is also the most common cause of long-term disability (Partners, 2016).

#### **Impact of the Problem on Occupational Performance**

Due to the symptoms associated with chronic pain and the pain itself, many areas of occupational performance are affected. ADLs, IADLs, sleep, work and leisure are all affected because of the difficulties with depression, fatigue, mood changes, and a decreased appetite. Other occupations that are impacted due the pain experienced are grooming, upper extremity and lower extremity dressing, and meal prep. When the pain becomes severe, all areas of the body are affected impacting all day-to-day tasks.

#### **Intervention Description**

There are several interventions that could be used to manage chronic pain. This scenario is focused on mindful-based stress reduction (MBSR). MBSR is a mindful technique designed to help an individual

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change their behavior, in particular building a person's self-control and self-efficacy. A critical aspect of mindfulness is to take an emotional response to a stressful situation and make that emotion manageable (Baer, 2014). MBSR can be used with chronic pain in order to help an individual cope with stress, illness, and their pain.

A typical schedule for MBSR is constructed to be an eight-week course with weekly classes (total of eight classes) that are each two and half hours long; one all-day course during one the weekend between the sixth and seventh class; and 45-60 minutes of meditation each day at home. Prior to the classes, a two-hour orientation is required (See Appendix 1) (UMass Medical Center, 2017).

The theory behind MBSR is that every person has their own emotional attachment to a stressful situation, making the intervention individualized to each person. To be able to effectively manage their emotions in a stressful situation, a person should practice mindfulness with every opportunity that arises (Baer, 2014).

### **OT Theoretical Basis**

Mindfulness meditation has been studied in a variety of fields and has been shown to have a wide array of applications and positive effects. The theoretical basis behind the use of mindfulness meditation involves three components: attention, intention and attitude. The belief is that by intentionally focusing attention with a neutral or non-judgmental attitude, a change in perspective can occur. The individual focuses attention on an object, a sound, or the body and practices disregarding distracting thoughts in a process called conflict monitoring (Kabat-Zinn, 1982).

Studies in neuroimaging have been conducted to determine the effect of meditation on the brain and it is believed that meditation enhances the activity of the anterior cingulate cortex, which is important in executive function. This area of the brain has been shown to be activated when distractions occur while an individual is meditating, suggesting its role in redirecting attention to meditation. Analysis of brain size has shown that individuals who are experienced meditators have increased cortical thickness of the dorsal portion of anterior cingulate cortex (Holzel et al, 2011).

### **Science Behind the Intervention**

Pain is composed of sensory, affective, and cognitive elements. The affective elements are important in the perception of pain, as they direct the focus and change neural function (Walloch, 1998). In mindfulness-based stress reduction (MBSR), the concept behind the change in pain perception is that the nonjudgmental awareness created through mindfulness "uncouples" the sensory component of pain from the emotional and cognitive components, thus reducing suffering and allowing for greater function (Reiner, Tibi, & Lipsitz, 2013).

Mindfulness meditation is one component of MBSR. This type of meditation has been found to result in measurable physiological changes, some of which may modulate pain. These include increases in central nervous system activity may contribute to increased sense of well-being and alertness, increased norepinephrine levels may uplift mood, increased relaxation of the body may reduce pain caused by muscle tension and also improve sleep quality, and enhanced GABAergic activity leads to an increase in endorphins, which inhibit pain transmission (Walloch, 1998).

### **Why is this intervention appropriate for OT?**

MBSR can be categorized under several types of interventions. One of the intentions of using MBSR is to reduce the distress associated with pain to allow for better functioning. Occupational therapy literature

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suggests that the perception of pain is an important component to target when managing chronic pain (Driscoll & Baker, 2016). The components of MBSR are taught to the client, and they are highly encouraged to complete mindfulness activities at home. In this light, MBSR is a training intervention. The clients are expected to develop a new skill of mindfulness that they can use in their daily lives. Hardison and Roll (2016), who are occupational therapists that conduct research on MBSR, found that that MBSR has largely positive reactions from clients and that many adopt it as an occupation. The holistic framework utilized in mindfulness matches well with the philosophy of occupational therapy, which also emphasizes the connections between all aspects of a person and their experiences. Mindfulness may also facilitate increased participation in occupation, by creating a “flow state” in its practitioners, allowing for full engagement in activities (Hardison & Roll, 2016).

### Search Summary

#### Terms in Literature Search:

Patient/client group:	Chronic pain Adults with chronic pain
Intervention:	Mindfulness Mindfulness-based stress reduction MBSR Mindfulness meditation
Comparison:	Traditional treatment Pharmacological treatment Treatment as usual Control group Wait list control group
Outcome:	Pain Pain perception Pain acceptance Quality of life Functional capability Depression Anxiety

### Search Strategy

Database	Search Items	Limits Used	Results
CINHAL	“mindfulness based stress reduction” AND “pain”	English	88
	“mindfulness based stress reduction” AND “chronic pain”	English	39
	“mindfulness” AND “chronic pain”	English	169
Clinical Key	“mindfulness based stress reduction”	English	2072
	“mindfulness based stress reduction” AND “chronic pain”	English	684
Medline	“mindfulness based stress reduction” AND “pain”	English	127
	“mindfulness based stress reduction” AND “chronic pain”	English	64
	“mindfulness” AND “chronic pain”	English	237

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### Clinical Bottom Line

There is higher-level evidence that supports the use of mindfulness-based stress reduction (MBSR) with patients who suffer from chronic pain, and qualitative studies report that patients who possess certain traits could benefit more from MBSR.

### Limitation of this CAT

The critically appraised topic has been reviewed by OT graduate students and the course instructor.

### Summary of Study Designs and Articles Retrieved

Level	Study Design/Methodology of Articles Retrieved	Total # Located	Citation (Name, Year)
1a	Systematic Reviews of Meta-analysis of Randomized Control Trials	I	(Hilton et al., 2017)
1b	Individualized Randomized Control Trials	II	(Cherkin, 2016) (Morone, 2008)
2a	Systematic reviews of cohort studies		
2b	Individualized cohort studies and low quality RCTs (PEDro <4)		
3a	Systematic review of case-control studies		
3b	Case-control studies and non-randomized control trials (quasi-experimental or clinical trials)		
4	Case-series and poor quality cohort and case-control studies		
5	Expert opinion	I	(Moore et al., 2008)

### Studies Included

Study	(Moore & Martin, 2015)	(Cherkin et al., 2016)	(Morone, Greco, & Weiner, 2008)
<b>Design</b>	Phenomenology Qualitative study 1-group design	Randomized clinical trial	Pilot feasibility study Randomized wait-list control trial
<b>Level of Evidence</b>	Moderate-low rigor	Level 1b	Level 1b
<b>Rigor Score</b>	N/A	PEDro Score: 8	PEDro Score: 8
<b>Population</b>	Adults with chronic pain	Middle-aged adults with chronic low back pain	Older adults with chronic low back pain
<b>Intervention Investigated</b>	Mindfulness-based cognitive therapy (MBCT)	MBSR	Mindfulness-based stress reduction (MBSR)

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<b>Comparison Intervention</b>	No comparison intervention	Cognitive behavioral therapy (CBT) or treatment as usual (TAU)	Treatment as usual
<b>Dependent Variables</b>	Quality of experience of MBCT treatment	Back-pain-related functional limitations Back pain bothersomeness	Pain intensity Pain acceptance Quality of life Physical function
<b>Outcome Measures</b>	Responses from semi-structured interviews Thematic analyses results Number of patients that continued treatment	Roland Disability Questionnaire (RDQ) Back Pain Bothersomeness	McGill Pain Questionnaire Short Form Chronic Pain Acceptance Questionnaire Medical Outcomes Study Short Form-36 Health Status Inventory Roland & Morris Questionnaire Short Physical Performance Battery SF-36 Physical Function
<b>Results</b>	<ul style="list-style-type: none"> <li>• Belief in the program has an influence on patients' motivation to continue with MBCT program</li> <li>• An attitude of willingness, determination, and commitment was observed to be beneficial to pain management</li> <li>• Patients felt more equipped with tools to manage pain, which increased their self-efficacy to handle pain</li> <li>• Patients underwent a change in perspective on how they viewed themselves and their pain</li> <li>• Patients had very high initial expectations about MBCT and had difficulty accepting MBCT's limitations</li> </ul>	<ul style="list-style-type: none"> <li>• Significant improvement on RDQ (disability level) compared to TAU, but there was no significant difference between CBT and MBSR</li> <li>• MBSR and CBT resulted in greater improvement in back pain and functional limitations at 26 and 52 weeks when compared with TAU, but there was no meaningful difference between MBSR and CBT.</li> <li>• The increased effectiveness of MBSR at 26 and 52 weeks suggests that the intervention provides patients with long-lasting skills for pain management.</li> </ul>	<ul style="list-style-type: none"> <li>• Patients who received MBSR showed significant improvement in physical function, pain acceptance, and activities engagement compared to treatment as usual</li> </ul>

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	<ul style="list-style-type: none"> <li>• Patients had a difficult time finding time to practice MBCT</li> <li>• Patients who embraced an attitude of acceptance reported reduced distress</li> </ul>		
<b>Effect Size</b>	N/A	Moderate effect size on RDQ when comparing MBSR and TAU	Physical Function: 0.46 Pain Acceptance: 0.83 Activity Engagement: 0.95
<b>Conclusion</b>	Patients who meet certain criteria (listed above) may be the best candidates for MBCT as a treatment to manage chronic pain.	MBSR led to improvement in physical function and pain bothersomeness compared to TAU, suggesting that it is an effective intervention to cope with chronic pain. There were no significant differences between MBSR and CBT, suggesting that MBSR is comparable to CBT in effectiveness. Increased effectiveness of MBSR at follow up indicated that the skills are long-lasting tools for pain management.	MBSR demonstrated improvements in physical function, pain acceptance and activity engagement at 8 weeks. No significant differences were seen with these values at 8 weeks compared to 3-months, suggesting that improvements were maintained.

### Synthesis Section

<p><b>PICO Question</b></p> <p><i>For people with chronic pain, how does MBSR (mindfulness-based stress reduction) compared to the standard pharmacological intervention, affect the patient's experience of pain throughout his/her lifetime?</i></p>
<p><b>Overall Conclusions</b></p> <ul style="list-style-type: none"> <li>• MBSR may be helpful in increasing physical function, pain acceptance and activity engagement in adults with chronic pain (Hilton et al., 2017).</li> <li>• Effects of MBSR interventions demonstrate positive effects that are maintained long-term (Morone, Greco, and Weiner, 2008).</li> <li>• Both MBSR and CBT demonstrate reductions in physical limitations and perception of back pain compared to usual care. No significant differences are seen between MBSR and CBT, suggesting MBSR is as effective as CBT (Cherkin et al., 2016).</li> <li>• Increased gains following the intervention for the MBSR group suggests that participants continued to practice MBSR skills after noticing positive effects (Cherkin et al., 2016).</li> </ul>

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- Qualitative studies identify how the benefits of the intervention are perceived by the client. Individuals who benefited from MBSR had an increased perception of control, noting the MBSR allowed them to acquire and develop skills and this gave them flexibility and choice to manage their own pain (Moore & Martin, 2015).

### **Boundaries**

#### Inclusion Criteria:

- MBSR-related articles (included MBCT into synthesis because we believed it represented the subjective experience)
- Adult population
- Chronic pain (low back pain and nonspecific)
- Outcome measures dealt with quality of life and functional capacities of pts

#### Exclusion Criteria:

- Small sample size

### **Implications for Practice**

- Patients with chronic pain can benefit from MBSR intervention, even if it is a small effect (Hilton et al., 2017).
- Individuals who have a positive attitude and acquire a sense of control over their pain through MBSR are more likely to reap the benefits and continue MBSR in their daily lives (Moore & Martin, 2015)
- Patients may need coaching from occupational therapists to manage expectations of the program (not going to be a quick fix) and ways to incorporate MBSR into their daily lives because some pts reported difficulty finding time to do MBSR (Moore & Martin, 2015).

## References

### Critiqued Articles

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### Related Articles (Not individually appraised)

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### Other Related Information

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Walloch, C.L. (1998). Neuro-occupation and the management of chronic pain through mindfulness meditation. *Occupational Therapy International*, 5(3), 238-248.

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### Appendix 1. MBSR Protocol (UMass Medical Center, 2017)

Week	Description
<b>Orientation</b>	Introduction to the practice of mindfulness as well as the science and evidence base for MBSR
<b>1</b>	Focuses on the overview of the course and learning context for the remainder of the week. Gain knowledge about the theory and evidence on mind-body medicine and how to apply it to each individual's life. More in-depth information on mindful eating and breathing and how to fully engage in the present moment.
<b>2</b>	Focuses on the person's perceptions, assumptions, and how he/she views the world Learn body scanning practice as person reacts to stressful situations Learn ways to change how the person perceives and responds to difficult situations to make them less stressful
<b>3</b>	Practice several mindfulness practices <ul style="list-style-type: none"> <li>• Hatha yoga</li> <li>• Sitting meditation</li> <li>• Walking meditation</li> </ul> Look at the comfort and discomfort about being in the present
<b>4</b>	Focuses on the person's concentration and expanding awareness The individual learns about psychology and physiology of stress and mindfulness strategies for stressful situations
<b>5</b>	Person begins to understand situations and unhealthy patterns that he/she repeats and how to combat them with mindfulness Apply mindfulness in how you react to a moment in relation to health and illness
<b>6</b>	Focuses on transformational coping strategies Individuals learn interpersonal mindfulness and more creative, effective ways to use interpersonal skills
<b>All-day Treatment</b>	Opportunity for person to practice MBSR in all contexts of his/her life and get him/her ready to use it when course is complete
<b>7</b>	Focuses on how the person integrates mindfulness into each aspect of his/her life Person learns how to be flexible and disciplined in mindfulness when circumstances change
<b>8</b>	Focuses on what the person learned throughout the course, additional mindfulness resources, and social supports to help people further his/her journey in mindfulness