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A review of the effects of mindfulness meditation on chronic pain in older adults

Gregory H. Jacks

Pepperdine University

Graduate School of Education and Psychology

A REVIEW OF THE EFFECTS OF MINDFULNESS MEDITATION ON CHRONIC PAIN IN OLDER ADULTS

A clinical dissertation submitted in partial satisfaction

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Doctor of Psychology

by

Gregory H. Jacks

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Natasha Thapar-Olmos, Ph.D. - Dissertation Chairperson

This clinical dissertation, written by

Gregory H. Jacks

under the guidance of a Faculty Committee and approved by its members, has been submitted to and accepted by the Graduate Faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF PSYCHOLOGY

Doctoral Committee:

Natasha Thapar-Olmos, Ph.D., Chairperson

Lou Cozolino, Ph.D.

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DEDICATION

This review is for my mom who has inspired me to research older adults with chronic pain. Thank you for caring for me and schlepping me around throughout my life. Hopefully this work can serve a testament to my love for you and my belief in your future *wellness*. I could not have completed this dissertation without the help of my incredible partner Nikki. Your love, patience, and intelligence are the cornerstones of my life and I most likely would never graduate without you. I am so lucky to share every day with you and plan to do so for the rest of my life.

This review is for my father who taught me how to laugh and take life less seriously. You only enjoyed your older adult life for a month but you lived it fully, just like everything else you did.

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I also want to thank Dr. Aaron Aviera, Dr. Thema Bryant, Dr Jacquline Johnson, Dr. Kandice Timmons, Dr. Humberto Hernandez, Dr. John Huang, Dr. Linda Mona, and Dr. Judy Prince for supervising me through my training years and helping me grow into a psychologist.

VITA

Gregory H. Jacks M.A.
gregory.jacks@pepperdine.edu

EDUCATION:

Pepperdine University, Graduate School of Education and Psychology
Anticipated: May 2023
Los Angeles, California,
Doctor of Psychology in Clinical Psychology
GPA: 3.9
Dissertation: A Review of the Mechanisms of Mindfulness Meditation Which Manage Chronic Pain In Older Adults
● Proposed: September 2021
Clinical Comprehensive Examination: Completed September 2020
● Passed with Distinction

Pepperdine University, Graduate School of Education and Psychology
May 2018
Los Angeles, California
Master of Arts in Psychology
GPA: 4.0
Master's Thesis: Grief and Relief: The Implications of Diagnosis

New York University, The Gallatin School of Individualized Study
May 2012
New York, New York,
Bachelor of Arts in Psychology of Music
GPA: 3.83—Graduated Cum Laude; Dean's List 2009 - 2012

LANGUAGES:
Spanish- Conversational

CLINICAL EXPERIENCE:

Cal State University Long Beach Counseling and Psychological Services (CSULB CAPS) August 2022- Present
Long Beach, CA
Pre-Doctoral Internship
Supervisors: Judy Prince PsyD, Elizabeth Sullivan PsyD, Abby Bradecich PsyD ● Conducted weekly individual brief therapy for undergraduate and graduate students presented with mood, adjustment, trauma, and interpersonal concerns.
● Conducted weekly scheduled intake appointments
● Provided weekly walk-in crisis services
● Conducted weekly process group
● Created a chronic pain process group based on mindfulness principles

● Provided outreach services and presentation with campus partners on mental health topics
● Provided individual supervision to other trainees
● Attended individual and group supervision
● Attended outreach, supervision, and diversity seminars
● Advocated with university administrators to increase accessibility of CAPS offices for students and staff with disabilities

Veterans Affairs (VA) Long Beach Health Care System August 2021-August 2022
Long Beach, CA
Practicum Student
Program for Traumatic Stress (Combat PTSD)
Supervisor: John Huang PhD
● Conducted weekly individual therapy using ACT, CPT, and mind/body interventions for veterans diagnosed with combat-related PTSD in an outpatient setting
● Assessed PTSD and mood symptomatology using PCL-5 and PHQ-9 to track treatment progress
● Co-lead weekly therapy groups including a PTSD skills group, CPT group, relaxation and stress management, mindfulness meditation, and drum circle
● Helped monitor comorbid conditions such as substance and health conditions by referring clients out to the interdisciplinary VA staff
● Attended weekly individual and group supervision
● Attended weekly EBP training seminar
● Attended weekly practicum seminar on working with veterans
● Conducted structured risk assessments

Spinal Cord Injury (SCI)
Supervisor: David Kerner PhD
● Conducted weekly therapy using ACT, relational, and mindfulness interventions with veterans with spinal cord injuries in an outpatient setting
● Conducted weekly psychosocial assessments for veterans across multiple states as part of an annual review program for disabled veterans to receive services
● Coordinated with social workers and interdisciplinary staff across multiple VAs to increase access to care and diversity of services for veterans on my caseload
● Led weekly Spirituality therapy group for all faiths
● Attended weekly individual and group supervision
● Attended weekly rounds in SCI hospital with interdisciplinary team
● Attended weekly EBP training seminar
● Attended weekly practicum seminar on working with veterans
● Conducted structured risk assessments

Cerritos College Student Health Psychological Services August 2020- May 2021
Norwalk, CA
Practicum Student
Supervisor: Humberto Hernandez PhD
● Conducted weekly therapy with college students
● Created and led weekly therapy groups including a mindfulness-based stress reduction (MBSR) psychoeducational group.
● Provided routine outreach presentations regarding the mental health services at

Cerritos College and stress reduction techniques.
● Referred clients to continuing services and connect them with resources provided by the college
● Attended weekly group supervision.
● Conducted risk assessments

Union Rescue Mission: Jerry Butler/Pepperdine Mental Health Clinic
September 2018- June 2021
Los Angeles, CA
Practicum Student
Supervisors: Aaron Aviera PhD/Thema Bryant-Davis PhD
● Conducted intake with clients to address substance use disorders, persistent depressive disorder, schizotypal personality disorder, posttraumatic stress disorder, and other diagnoses
● Conducted weekly individual therapy with a population experiencing homelessness in a residential treatment facility
● Provided individual peer supervision for first and second year PsyD students
● Attended weekly supervision of supervision
● Advocated for clients with their chaplains and help clients access medical services and support groups on Skid Row when necessary
● Incorporated baseline and follow-up assessments to monitor therapeutic goal progress
● Led weekly mindfulness meditation groups

Job Corps Los Angeles September 2019- January 2021
Los Angeles, CA
Practicum Student
Supervisors: Jacquelyn Johnson PsyD/Kandice Timmons PsyD
● Conducted weekly therapy with transitional aged youth from low SES backgrounds
● Provided weekly outreach presentations in order to inform new students about mental health services available at Job Corps
● Provided bi-annual outreach presentations to Job Corps staff on mental health topics such as suicide prevention.
● Created and led skills-based groups including, mindfulness/coping techniques, thoughts/feelings identification, and conflict resolution.
● Conducted risk assessments to assess for suicidality and homicidality
● Provided individual psychoeducation to clients regarding suicide, loss, coping skills, mindfulness, and responses to trauma
● Conducted neuropsychological assessments, wrote corresponding reports, and communicated results of testing to clients

Non-Practicum Clinical Experiences
Our House September 2017 – May 2018
Valley Village, CA
Volunteer, Grief Group Leader
Supervisor: Dolly Phillips
● Led 10-week grief support group for middle and high schoolers
● Fostered a safe space for students to talk about their grief and connect with their peers
● Lead various activities and assignments to help maintain memories of lost loved ones
● Helped modify curriculum to accommodate blind students

● Facilitated deeper investigation of emotions by prompting students to provide advice to one another

The Painted Turtle July 2012 – July 2017
Summer camp for children with significant medical concerns
Lake Hughes, CA and Los Angeles, CA
Volunteer, Camp Counselor
Supervisor: Kiley Wolff
● Helped create an open environment for children and teenagers who typically are inhibited by their disabilities
● Guided campers with various medical conditions and disabilities at a specialized summer camp
● Mentored campers during daily activities and teach them coping skills for everyday life
● Brought camp activities to children in hospitals to make their stay more pleasant

PRESENTATIONS:
Confines of Masculinity for Men in Fraternal Organizations
January 2023
California State University, Long Beach- Greek Life
● Presented at Kappa Sigma chapter meeting to 20+ active brothers
● Discussed limitations of traditional masculinity relating to emotional experience and expression
● Conducted experiential activity exploring masculinity

Mindfulness: Practice and Teaching
November 2022
California State University, Long Beach- Beach Buddies
● Presented to "Beach Buddies" peer mental health advocates on the individual practice of mindfulness
● Discussed incorporating mindfulness to peer advocacy
● Led 10 minute mindfulness activity

Anti-Racism and Mindful Meditation
November 2021
2021 Conference of the Association for Contemplative Mind in Higher Education
● Presented on the application of mindfulness to promote anti-racism
● Discussed Dr. Howard Stevenson's CLCBE model for mindful racial stress coping
● Led mindfulness/grounding activity

Anti-Racism and Mindful Meditation
May 2021
Pepperdine Graduate School of Education and Psychology
● Provided experiential presentation to Pepperdine PsyD Faculty and Students during our Anti-Racism Learning Day
● Discussed Dr. Howard Stevenson's CLCBE model for mindful racial stress coping
● Led mindfulness/grounding activity
Mindful Meditation/Stress Management presentation
November 2020

Cerritos College
● Provided presentation to Cerritos College students on managing stress
● Disseminated psychoeducation on Autonomic Nervous System using Dan Siegel's hand model of the brain
● Discussed mind-body connection and how to regulate breathing

Suicide Prevention Presentation
December 2019
Job Corps Los Angeles
● Provided two presentations to the entire staff of Job Corps Los Angeles on warning signs of suicidal behavior
● Discussed how to approach, listen to, and persuade individuals with active suicidal ideation
● Informed staff on how to coordinate care for students experiencing a crisis

Trauma-Informed Care Presentation
October 2018
The Union Rescue Mission
● Provided a presentation to the Chaplains and Coordinators at the Union Rescue Mission on how to integrate Trauma-Informed Care Presentation
● Provided psychoeducation on the limbic system using Dan Siegal's hand model of the brain
● Discussed how trauma affects the autonomic nervous system

RESEARCH EXPERIENCE:

New York University – Center for Language and Music (CLAM)
November 2011-April 2012
New York, NY
Research Assistant
Supervisor: Gary Marcus, PhD
● Studied how early exposure to different musical conventions can create culturally bilingual children
● Observed that children raised in eastern cultures easily comprehend both eastern and western musical conventions
● Created stimuli by transposing songs into digital format to provide the lab with a more interactive way to manipulate stimuli
● Accumulated and organized data in Excel to monitor trends in results and streamline retrieval

LEADERSHIP EXPERIENCE

Steering Committee September 2018-August 2021
Los Angeles, CA
Pepperdine University, GSEP, Student Government Association (SGA)
● Provide constructive feedback to administration and faculty members about the program, demands on students, and ways to help improve students' experiences
● Participate in monthly meetings to address the concerns and feedback of students, student government committees and various activities to advance the training and self-care of students
● Organize the end of semester celebrations, coordinate financing, and facilitation of departmental events

PROFESSIONAL CERTIFICATIONS:
Trauma-Focused Cognitive-Behavioral Therapy October 2019
TF-CBT Web

PROFESSIONAL AFFILIATIONS
Los Angeles County Psychological Association 2017- Present
Student member
Psi Chi International Honor Society in Psychology 2018

ASSESSMENT PROFICIENCIES
● Alcohol Use Disorders Identification Test (AUDIT)
● Beck Depression Inventory-II (BDI-II)
● Beery-Buktenica Developmental Test of Visual-Motor Integration, 6th Edition (VMI-6) ● Bender-Visual-Motor Gestalt Test, Second Edition (Bender-Gestalt II)
● Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)
● Columbia-Suicide Severity Rating Scale (C-SSRS)
● Conners Continuous Performance Test, 2nd edition (CPT)
● Controlled Oral Word Association Test (COWAT)
● Drug Abuse Screening Test (DAST-10)
● Mini Mental Status Exam (MMSE)
● Millon Clinical Multiaxial Inventory- Fourth Edition (MCMI-IV)
● Minnesota Multiphasic Personality Inventory, Second edition (MMPI-2)
● Montreal Cognitive Assessment (MoCA)
● NEO Personality Inventory-Revised (NEO PI-R)
● Patient Health Questionnaire-9 (PHQ-9)
● PTSD (Post Traumatic Stress Disorder) Checklist-Civilian Version (PCL-5)
● PTSD Checklist-Military Version for DSM-5 (PCL-5)
● Rey Auditory Verbal Learning Test (RAVLT)
● Rorschach Ink Blot Test
● Rotter Incomplete Sentence Blank (RISB)
● Thematic Apperception Test (TAT)
● Trail Making Test, Parts A & B (TMT: Parts A & B)
● Wechsler Intelligence Scale for Adults 4th Edition (WAIS-IV)
● Wide Range Achievement Test- Fifth Edition (WRAT-5)

ABSTRACT

Pain is a biopsychosocial phenomenon, which draws from physiological responses as well as cultural and social context and mental states. Pain is most frequently treated through surgical and pharmacological interventions, which can be costly and time-consuming, especially when treating chronic pain. Older adults suffer from chronic pain at a higher rate than the rest of the population, and more accessible interventions are desperately needed to help manage the experience of chronic pain. Mindfulness meditation is increasingly being utilized for management of pain due to evidence of its effectiveness, cheaper cost, and ability to be practiced outside of medical facilities. Prior research studies looked at the effectiveness of using mindfulness meditation to manage chronic pain, but a limited number have focused on older adults. This systematic review was conducted to examine the benefits of mindful meditation in managing chronic pain in older adults. Eight studies were included and narrative synthesis was used to demonstrate that while mindful meditation does not appear to reduce pain intensity, it may help manage chronic pain in older adults by changing the relationship to pain, which in turn may reduce functional impairment and negative emotions, and improve quality of life. Clinical applications are discussed.

Keywords: chronic pain, older adults, mindfulness

Chapter 1: Introduction

There is a small irony when quantifying the individual components of how mindfulness works considering that they are all the same thing. Traditional meditation is done with no purpose but to become aware of the present moment, non judgmentally (Kabat-Zinn & Hanh, 2009). For the purpose of this review, the author examines the effects of mindfulness associated with chronic pain in older adults.

According to a 2011 Institute of Medicine report, pain impacts over 100 million Americans and is the primary reason for patients seeking care through the medical system (Institute of Medicine, 2011; Vos et al., 2012). Older adults, those over the age of 65 years, experience pain at a higher rate than younger age demographics and has been shown to impact 25-50% of older adults who live independently (also known as community-dwelling older adults; Arneric et al., 2014; Steultjens et al., 2004). Pain in older adults has far reaching consequences, impacting the lives of those who experience the pain directly, their families who provide emotional and other support, and the professionals involved in their medical care (Arneric et al., 2014). As life expectancy increases due to advances in health care and nutrition and the large Baby Boomer generation enters old age, it's projected that by 2030 geriatric adults will make up 21% of the US population, up from 15% in 2019 (Arneric et al., 2014; Nasser, 2021). As older adults are more likely to experience pain than younger adults, and an increasingly large sector of the population becomes older adults, an estimated 17.5-35 million older adults in the USA will be living with pain each year. Many interventions exist for treating pain but most rely on medication and can be costly. Due to this oncoming wave of pain and the shortcomings of quality of life associated with pain, additional interventions are needed (Keefe et al., 1987). One such intervention is mindfulness meditation, a technique that instructs individuals to observe sensations rather than react to them (Kabat-Zinn & Hanh, 2009). More specifically, mindfulness meditation has been described as a process of bringing a certain quality of attention to moment-

by-moment experience and has good evidence for addressing pain-related concerns (Kabat-Zinn & Hanh, 2009).

Since its origins in Asia roughly 3000 years ago, meditation has spread and increased in popularity and is now used by people across the globe to help manage conditions such as depression, stress, and chronic pain, as well as increasing general well-being (Kabat-Zinn, 1982; Kabat-Zinn et al., 1985). Mindfulness meditation has been reliably demonstrated to help manage pain without the need for more commonly used medical interventions such as opioids, which can have serious side effects such as addiction (Baller & Ross, 2017; Dimidjian & Segal, 2015). Despite its age, the components of mindfulness meditation which alleviate pain symptoms are not fully understood (Kabat-Zinn & Hanh, 2009; Lutz et al., 2013). However, the literature suggests that mindfulness impacts our physiology, brains, and the way we interpret sensations and emotions, all of which play a role in the perception of pain. (Bishop, 2002, Kabat-Zinn, 1982, Lutz et al., 2013; Zeidan et al., 2011). Despite research clearly supporting the effectiveness of mindfulness meditation in mitigating chronic pain, limited research exists as to efficacy in geriatric populations.

Chronic Pain

Pain is a universal phenomenon among humans, and as a result, definitions may vary. Raja et al. (2020, p. 1977) define pain as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage." This definition is limited to the biological experience of pain and does not include pain from emotional or psychological causes. Pain has multiple components: sensory, affective, and cognitive evaluative (Melzack & Wall, 1965; Morone et al. 2008a). In order to understand the pervasive effects of pain, each component must be understood individually.

In general, the physical experience of pain occurs in response to a potentially harmful sensation and activates internal or external detectors of pain, which communicate to the central

nervous system (Baller, & Ross, 2017; Hoffert, 1989; Jessell & Kelly, 1991; Walloch, 1998). The response is separated into a fast and slow track in order to react appropriately to the painful stimuli (Baller & Ross, 2017; Walloch, 1998). On the fast track, the spinal cord circumvents the brain and rapidly sends information back to the nerves activated by the source of the stimulus in order to rapidly avoid the pain source. (Baller & Ross, 2017; Walloch, 1998). On the slower track, the pain sensation is communicated to the brain to be understood and processed on a higher level prior to responding more adaptively (Baller & Ross, 2017; Walloch, 1998).

In addition to the biological processing of pain, an affective response is coupled with this experience. Affective states traditionally associated with pain such as stress, fear, tension, and depression generally have negative associations (Fernandez & Turk, 1992, 1994). These negative associations are societally and culturally bound, whereas some cultures encourage an explicit demonstration of emotions when feeling pain; others value restraint and stoicism (Peacock & Patel, 2008). For example, indigenous Australians do not perceive back pain as a health problem and will typically not seek medical treatment, display pain behavior, or report symptoms (unless they are specifically asked; Peacock & Patel, 2008). Thus, an individual's experience of their mood can influence the way they perceive their world and the stimuli they encounter, which can influence their perception of pain (Kabat-Zinn & Hanh, 2009; Kabat-Zinn et al., 1985). Individuals predisposed to focus on negative stimuli, such as people with depression, may focus more on their pain, yielding a greater subjective experience of the pain stimuli (Walloch, 1998).

Chronic and acute pain differ. Acute pain occurs in response to a discrete harmful stimulus as a warning to the body to avoid further harm, such as touching a hot stove, and is usually felt for a short time. (Arneric et al., 2014; Ferelle, 1991). A functioning pain response allows one to avoid long-term damage and prepares them for a survival response (ex: fight or flight;Baller & Ross, 2017). In contrast, chronic pain is a condition that is felt for longer than three months, continues beyond normative healing time, and is not always related to a painful

stimulus (Arneric et al., 2014; Baller & Ross, 2017; Ferelle, 1991; Ickowicz et al., 2002; Walloch, 1998). As opposed to acute pain, chronic pain is felt after an initial injury has healed or without any identifiable pain stimulus at all and no longer serves an adaptive or functional purpose (Arneric et al., 2014; Baller & Ross, 2017). Chronic pain is one of the most common medical conditions in the United States, affecting 116 million adults as of 2011; this is more than heart disease, diabetes, and cancer combined (Day, 2017; Domenichiello & Ramsden, 2019). While the mechanisms which lead to the development of chronic pain are not entirely understood, it is thought to result from an improperly functioning biological system that has become rewired during the recovery process of an initial injury, leading pain-sensing neurons to fire when there is no stimulus (Baller & Ross, 2017). After an injury, the pain receptors in the body can confuse innocuous stimuli, such as light physical sensations or emotional sensations such as anxiety, as severe pain (Baller & Ross, 2017).

Research on chronic pain often separates chronic pain into two categories, cancer pain and non-cancer pain (Turk et al., 2011). Cancer pain is the pain felt resulting from having and treating cancer, while non-cancer pain is a broad category that is typically classified based on the pain's neurophysiology, anatomy, cause, or body system involved (Turk et al., 2011). As of 2013, the most common conditions causing chronic pain are lower back pain (28%), migraine or severe headache pain (14%), and neck pain (14%;Day, 2017). Other conditions which can result in the development of non-cancer chronic pain include osteoarthritis, vertebral fracture/compression, inflammatory arthropathy, peripheral neuropathy, and fibromyalgia (Lazkani et al., 2015; Turk et al., 2011).

Chronic pain typically results in physical suffering, which impacts psychological, social, and professional functioning. As such, chronic pain is a biopsychosocial illness where patients cannot distinguish between adaptive pain and functionally useless pain brought upon by dysregulated learning (Baller & Ross, 2017). This pain can result in psychological problems such as anxiety, flooding of thoughts, and avoidant behaviors, resulting in further physical,

social, and professional suffering and impediments and overall lower quality of life (Baller & Ross, 2017). Due to its long-term nature, among other stressors, chronic pain can lead to significant medical, social, and economic consequences and more considerable health care costs (Hilton et al., 2016).

Treating Chronic Pain

Treating pain is a difficult task. Managing chronic pain is a more nuanced challenge. Because the source of acute pain typically can be identified quickly, it can also be managed and treated quickly. Due to the many barriers to entry in the US, such as the cost of insurance and access to multimodal treatment, those with chronic pain are typically given general pain treatment such as opioids rather than comprehensive, specific treatment (Baller & Ross, 2017).

The most common approach to managing chronic pain is by using medication (American Geriatrics Society [AGS], 2009). Estimates show that 18% of older Americans use analgesics regularly, and that of those who endorsed regular medication use, 45% had seen three or more doctors in the past five years (Cooner & Amorosi, 1997). The two major classes of pain relievers used in the treatment of pain are nonopioid and opioid analgesics. The major classes of nonopioid analgesics include acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), antidepressants, and anticonvulsants (AGS, 2009; Arneric, 2014; Baller & Ross, 2017). These medications have demonstrated benefits for those suffering from chronic pain , especially when combined with other non-pharmacological techniques such as physical therapy, education from medical professionals, psychotherapies such as Acceptance and Commitment Therapy (ACT), Cognitive Behavioral Therapy (CBT), and mindfulness meditation (AGS, 2009; Kabat-Zinn & Hanh, 2009).

Acetaminophen is typically the first step for treating pain considering its minimal short-term side effects relative to other medications, but it is less effective and can result in renal toxicity if taken over long periods (AGS, 2009). Older adults are more susceptible to adverse

side effects from NSAIDs, which can lead to hospitalization (AGS, 2009). Other medications such as antidepressants and anticonvulsants were not developed for treating chronic pain but are often helpful when used alone or in conjunction with traditional pain relief medication (AGS, 2009). Similar to NSAIDs, side effects, such as nausea, diarrhea, anxiety/shakiness, somnolence, and agitation, from these classes of medications can be worse for older adult populations who need to be monitored closely by doctors while taking them (AGS, 2009). Other medications such as corticosteroids, muscle relaxants, and benzodiazepines have been used to manage chronic pain despite limited efficacy, and can also lead to serious toxicity and have higher abuse potential (AGS, 2009).

Opioid use became prevalent in the United States due to their effectiveness for pain relief, incentivization of medical providers to write large amounts of prescriptions, and dissemination of misleading information regarding the addictive properties of opioids (Walters, 2019). Despite the popularity and effectiveness of opioids to treat chronic pain, the risk of dependency and adverse consequences make them a less universally positive option. In 2019, almost 247,000 people in the US died from prescription opioid-related overdoses, a rate that has quadrupled from 1999 to 2019 (Center for Disease Control [CDC], 2020). Furthermore, a 2014 Center for Disease Control and Prevention (CDC) report found that nearly two million Americans were dependent on or abusing prescription opioids (CDC, 2016). This problem is exacerbated in older adults due to polypharmacy and lack of research on the interactions and pharmacokinetics (Green, 2017; Thürmann, 2020). Opioids are also associated with specific adverse outcomes related to older adults, such as chronic constipation, balance and dizziness issues (which can increase the risk of falls), testosterone deficiency, disorientation, and somnolence (Molton & Terrill, 2014).

Multiple randomized controlled trials (RCTs) have shown that opioids provide pain relief for a range of chronic pain-related illnesses (Dworkin et al., 2007; Rauck et al., 2006). Opioids have demonstrated effectiveness in improvements in functional impairment and pain severity

when compared with placebo (Turk et al., 2011). However, the European Federation of Neurological Societies Task Force and the Neuropathic Pain Special Interest Group of the International Association for the Study of Pain recommend that opioids are only prescribed as first-line treatment in specific circumstances and otherwise as a second or third-line treatment approach (Turk et al., 2011).

Injection therapy is a non-medication option for treating chronic pain and involves nerve blocks that seek to reduce inflammation, interrupt neurological pain signals, and/or remove neurons that send pain signals (Turk et al., 2011). While there is significant evidence that injection therapy such as epidural steroid injections helps some conditions, they are more helpful with other pain approaches than standalone treatment (Turk et al., 2011). In addition, there are risks for rare but serious side effects such as meningitis, cauda equina syndrome, and paraplegia, which must be considered when using this technique (Turk et al., 2011).

Surgery is commonly used to help treat chronic pain, especially back pain. One systematic review on lumbar fusion surgery for lower back pain revealed a significant reduction in pain versus the control group (33% vs. 7%; Turk et al., 2011). Unfortunately, these benefits were not often sustained over four and a half years following surgery, where 41% reported no change or a worsened QoL (Turk et al., 2011). Research has also shown that many spinal surgeries result in high complication rates and repeat procedures (Turk et al., 2011). While some individuals will benefit from surgery, there is no ability to tell who will have complications and who will not (Turk et al., 2011).

Physical approaches to chronic pain such as exercise and physical therapy have yielded promising results as alternative treatments. Exercise can decrease pain and improve functionality, but the results have been small (< 30% for pain reduction and < 20% for functional improvement; Turk et al., 2011). In addition, there have been no formal conclusions regarding which exercise type should be used (Turk et al., 2011). The effectiveness of these approaches

is difficult to study because, most times, they are part of a multimodal treatment approach, and thus their individual effectiveness cannot be determined (Turk et al., 2011).

CBT is considered a first-line psychosocial treatment approach for chronic pain due to its efficacy in multiple RCTs, meta analyses, and systematic reviews (Day, 2017). CBT has been shown to help individuals by addressing the automatic thoughts regarding the severity of their pain and the long-term consequences (Baller & Ross, 2017). When individuals catastrophize their perception of pain's intense and debilitating nature, their subjective perception of pain increases (Day, 2017). To combat this, CBT helps individuals reframe pain thoughts more objectively and decatastrophize their future experience of pain (Day, 2017). Without this reframe, these negative emotional states typically affect individuals' work and social lives, creating a positive feedback loop of negative emotion and subsequently increasing pain levels (Baller & Ross, 2017). In addition to decreasing the subjective experience of pain, CBT has been shown to lower levels of helplessness, hopelessness, depression, and anxiety in chronic pain sufferers (Baller & Ross, 2017). CBT has been shown to have the greatest impact when part of a comprehensive treatment approach which also includes physical therapy, socialization, medication, and relaxation techniques (Baller & Ross, 2017).

While many nonpharmacological techniques such as those listed above have demonstrated results in isolation, especially when physicians also provided education on chronic pain, their effectiveness is maximized through simultaneous medication administration (Baller & Ross, 2017).

Cost of Chronic Pain

Chronic pain management is a large component of the healthcare industry and has been reported as one of the most common complaints during doctor's visits (Day, 2017; Ferelle, 1991). As of 2004, pain was the presenting problem for an estimated 80% of doctor's visits (Day, 2017). A 2010 report estimated the cost of managing chronic pain in the United States as

between $560-635 billion annually in both operational costs and lost productivity (Lazkani et al., 2015). In terms of isolated health care costs without the associated lost productivity, chronic pain costs the USA $261-$300 billion annually and is expected to increase as more individuals enter older adulthood (Gaskin & Richard, 2012). This cost is greater than heart disease, diabetes, and cancer combined (Gaskin & Richard, 2012). Studies estimate costs could increase anywhere from 47%-129% in upcoming years (Lazkani et al., 2015). This increase may be an underestimation of future expenses in the US (Lazkani et al., 2015).

Chronic Pain in Older Adults

Pain is a particularly pervasive condition for older adults and has been shown to affect 20%-50% of community-dwelling older adults (Connelly, 1998; Ferelle, 1991). Anywhere between 45% to 80% of residents in nursing homes were dealing with pain (Connelly, 1998). Similar to those in other age ranges, pain issues in older adults have been linked to depression, decreased socialization, sleep disturbance, impaired mobility, and increased health care costs and utilization. (Arneric et al., 2014; Ferelle, 1991). While these sequelae are distressing to all age ranges, they present a more dramatic effect on older adults because of risks of gait disturbances, falls, retarded rehabilitation, cognitive dysfunction, and malnutrition (Ferelle, 1991). Because managing pain for older adults is so energy and time-consuming, dealing with the pain can affect quality of life and quality of care (Ferelle, 1991).

Research has shown that older age is a risk factor for chronic pain and the conditions that cause it, such as low back pain (Tsang et al., 2008). Compared to the general adult population, older adults have a higher prevalence rate of chronic pain (Domenichiello & Ramsden, 2019). Operationalizing and assessing chronic pain in research studies can be difficult due to various factors, including how individuals feel about sharing personal data due to psychological and cultural reasons (Ickowicz et al., 2002). Chronic pain conditions most commonly seen in older adults often involve musculoskeletal disorders such as back pain, neck pain, and unspecified joint pain (Domenichiello & Ramsden, 2019; Ickowicz et al., 2002). Older

adults with chronic pain have an increased likelihood of having decreased rates of socialization and rehabilitation and increased rates of functional impairment, depression, anxiety, falls, use and cost of healthcare, and disturbance of sleep and appetite (Ickowicz et al., 2002).

Chronic Pain and Mood Disorders in Older Adults

Chronic pain's pervasive effects in older adults can increase the risk of mood disorders (Molton & Terrill, 2014). Significant depression rates for the general older adult population vary between two and four percent; rates of depression in older adults with persistent pain are estimated between 19%-28%which is also reflected in a higher level of suicidal ideation (Almeida et al. 2012; Molton & Terrill, 2014). The relationship between depression and pain may be cyclical, where pain increases lead to lower levels of autonomy and socialization, which in turn increases levels of depression (Molton & Terrill, 2014). Many older adults with comorbid persistent pain and depressed mood receive little to no mental health resources (Molton & Terrill, 2014). The comorbidity of mood disorders and persistent pain in older adults intensifies the need for quality pain management techniques.

Chronic pain and depression have a relationship in which each increases the risk of the other (Piardi, 2020). Mood disorders are associated with rumination, which focuses on internal sensations, which can increase distress associated with pain (Carvalho et al., 2021). Depressive behavior can induce hyperalgesia, which may increase the sensation of chronic pain (Piardi et al., 2020). Chronic pain may also lead to increased stress and anxiety levels, increasing the risk of developing hyperalgesia (Baller & Ross, 2017; Fernandez & Turk, 1992, 1994; Piardi et al., 2020). All of these factors create a positive feedback loop in which depression, stress, and chronic pain increase.

Treating Chronic Pain in Older Adults

Despite the large number of older adults suffering from chronic pain, medical prescribers are ill-equipped on appropriate prescribing protocols for this population (Arneric et al., 2014;

Domenichiello & Ramsden, 2019; Ickowicz et al., 2002). According to a study from 1991, in many of the most widely used texts on geriatric medicine, little to no space was devoted to pain management (Ferelle, 1991). While textbooks may have updated their sections on geriatric medicine, many doctors were trained using outdated texts (Ickowicz et al., 2002). The lack of precise information available is problematic because medication is the most common intervention for helping older adults manage chronic pain (AGS, 2009). Research has shown that polypharmacy can be dangerous in older adults because it increases risk of adverse drug reactions, drug interactions, hospitalizations from falls, and even death (Thürmann, 2020). In addition, polypharmacy often involves significant costs to individuals and the health care system due to the purchase of multiple medications (Domenichiello & Ramsden, 2019).

Older adults are typically treated by researchers and the medical profession as a homogeneous group, despite significant within-group differences such as age, gender, race, and other biopsychosocial factors. As such, prevailing research on chronic pain interventions may not be accurate or applicable to all individuals. In many cases, older adults are excluded entirely from research on medications for chronic pain, resulting in prescriptions given without knowing the efficacy or risks of the medicines (Paeck et al., 2014). As a result, current prescribing methodology for chronic pain in older adults can create further complications such as insufficient pain management and increased side effects (AGS, 2009; Domenichiello & Ramsden, 2019). In addition, due to the lack of older adults in pain medication research, both the positive and negative consequences of pain medications are largely unknown. Studies report that 75% of older adults with pain in community-dwelling settings were not provided with pain relieving treatment, and 40%-80% of those receiving some sort of treatment reported insufficient relief (AGS, 2009; Arneric et al., 2014) .

The prevalence of pharmacological based interventions and lack of research have resulted in considerable safety concerns for older adults using medication to manage chronic pain (AGS, 2009). Often, when doctors prescribe medication to older adults, they do not

consider critical data such as body mass and weight as they often would with the general adult population (Arneric et al., 2014). In addition, pain treatment is made more difficult in older adult populations due to the prevalence of physical and mental disabilities such as dementia and sensory impairments (Connelly, 1998). While medication compliance in older adults is typically higher than among adults, older adults are less willing to take medication prescribed for pain, and when they do, they often take lower doses and less frequently than prescribed (Molton & Terrill, 2014). In addition, due to age-related cognitive decline, many older adults struggle to remember the appropriate routines of polypharmacy which increases the potential for hazardous interactions or missed doses (Tomlinson et al., 2020).

Problems With Current Methods of Pain Treatment

Assessment of chronic pain is a difficult task in the general population and more complex with older adults. Current research shows that the most accurate and reliable way to assess pain intensity and quality is patient report (AGS, 2009). Older adults often present issues with this subjective reporting system for many reasons, including cognitive impairment, shame associated with pain, or cultural reasons (Ickowicz et al., 2002). An example of this is that some older adults will deny feeling pain but may admit to feeling “discomfort,” “hurting,” or “aching” (Ickowicz et al., 2002). For this reason, those assessing pain must consider the individual's presentation, handicaps, and culture, as well as potentially incorporating collateral reports from family members or caregivers (Ickowicz et al., 2002).

An additional problem with the most popular methods of intervention is the lack of healthcare autonomy. Many patients' only options when managing chronic pain are to see their primary care physician or physiotherapist, and due to the insurance system in the United States, they may not have a choice in who they see (Boyers et al., 2013). When individuals are pushed through the healthcare system, they often end up on a path towards long-term pharmacological options, with subsequent long-term consequences (Boyers et al., 2013). With this in mind, it is essential to provide patients options regarding their pain management to increase their sense of

autonomy and potential compliance with healthcare regimens. In addition to increased independence, patient choice can also reduce barriers to care, including lack of transportation and financial limitations (Molton & Terrill, 2014). Introducing self-management options may empower individuals to manage their condition, improving their experiences of pain, quality of life, and mood (Boyers et al., 2013).

Mindfulness Meditation

Mindfulness meditation is rooted in the Buddhist tradition of meditation, which can be traced back to Hindu traditions of Vedantism in India around 1500 BCE (Schopen & Freeman, 1991). While meditation is rooted in Buddhist spiritual tradition, its secularized adaptation is predominantly practiced in the West (Walloch, 1998). Traditional meditation and its secular adaptation are done with no purpose but to become aware of the present moment, non judgmentally (Kabat-Zinn & Hanh, 2009). Psychologists have harnessed the benefits of mindful meditation using mindfulness-based interventions (MBIs) or mindfulness-based programs (MBPs;Crane et al., 2017). The earliest MBI developed and studied was mindfulness-based stress reduction (MBSR), started by Jon Kabat-Zinn at the University of Massachusetts Medical Center (Kabat-Zinn & Hanh, 2009). Other MBI's have become integrated into psychological practices such as ACT, which combines the wisdom from mindfulness meditation with cognitive therapy (Dimidjian & Segal, 2015; McCracken & Jones, 2012). Studies have shown that regular meditation practice has led to a decrease in depression scores, improvement of quality of life, and decreased need for analgesic use (Turk et al., 2002).

The concept of mindfulness meditation has expanded so much into the mental health field and beyond that the definition of what a "true" MBP is can become blurry. The "first generation" of MBPs includes MBSR as well as MBCT, which both involve formal mindful meditation as a core component of the intervention (Crane et al., 2017). These two MBIs have the most empirical evidence to back up their efficacy and represent the gold standard in the field of mindfulness meditation (Crane et al., 2017). Other practices that have evolved from these

interventions do not require formal meditation, such as ACT and Dialectical Behavioral Therapy (DBT), and are still evidence-based practices for a variety of mood concerns (Crane et al., 2017).

Mindfulness-Based Therapies

Jon Kabat-Zinn synthesized his knowledge of mindfulness meditation into MBSR, which aims to use mindfulness meditation to help train individuals to observe the moment-to-moment experience of body sensations, emotions, and thoughts with equanimity (Kabat-Zinn & Hanh, 2009). In this process, individuals change their relationship to these experiences (thoughts, pain sensations, etc.) from identifying with them to noticing their impermanence and transient nature (Day, 2017). Traditional MBSR is an eight-week, secular, group program developed using the principles mentioned above to help people cope with depression, stress, anxiety, and pain by combining psychoeducation with both informal and formal meditation practices (Day, 2017). The primary psychoeducation portions help teach participants about the physiology and psychology of the human stress response as well as how to use mindfulness meditation to respond to stress and pain (Kabat-Zinn & Hanh, 2009). The meditative components of MBSR include body scan meditations, seated meditations, mindful hatha yoga, and mindful walking (Kabat-Zinn & Hanh, 2009). All of the meditation elements of MBSR use breathing as an anchor to the present moment, which may be compassionately returned to when the mind begins to drift (Kabat-Zinn & Hanh, 2009). Participants practice meditation using pre-recorded audio files for 45 minutes each day (Day, 2017). In addition, participants bring mindful awareness into their daily tasks, such as eating, driving, etc., to take their practice beyond when they formally sit for meditation (Kabat-Zinn & Hanh, 2009).

MBSR has shown statistically significant improvement in functioning in psychological well-being and standardized measures of physical health for a range of chronic pain conditions (Day, 2017). In comparing MBSR to standard care, MBSR has shown improvement immediately

post-treatment and at follow-up in QoL, pain coping, mood, anxiety, pain interference, and affect (Day, 2017). The effect sizes for pain intensity reduction in chronic pain with MBSR have a range comparable to those seen with CBT and other psychosocial interventions (Day, 2017).

Mindfulness-Based Cognitive Therapy (MBCT) integrates the focus on cognitions from CBT, emphasizing body sensations and emotions from MBSR (Day, 2017). MBCT posits that CBT's focus on changing negative automatic thoughts is not as important as changing the individual's relationship to their thoughts (Day, 2017). This shift allows individuals to see their thoughts not as the truth or reflection of their identity but rather as mere mental events (Day, 2017). The mindful component of MBSR helps shift CBT's emphasis on changing an individual's thoughts to changing their relationship to all thoughts as merely mental events rather than some sort of truth (Day, 2017). MBSR's influence on MBCT can also be seen in how the treatment targets thoughts and how individuals relate to their emotions and body sensations (Day, 2017). Another crucial component of MBSR included in MBCT is the perspective of self-compassion, acceptance, and kindness which is brought to the process of this shifting relationship (Day, 2017). MBCT is an eight-week structured program with weekly sessions and is traditionally conducted in groups but can be done individually (Day, 2017). It uses the same mindfulness meditation exercises as MBSR (yoga, sitting meditation, and body scan) in addition to psychoeducation on CBT skills (Day, 2017). It also includes daily homework exercises of guided mindfulness meditation practices and cognitive-based homework (Day, 2017).

ACT was developed by psychologist Steven C. Hayes, and is a type of CBT (Hayes et al., 2006). ACT is based on the model of psychological flexibility and is made up of six components which fall into two overlapping and interrelated categories (Hayes et al., 2006). The first category is mindfulness and acceptance process and is made up of acceptance, being with the present moment, cognitive defusion, and self as context (Hayes et al., 2006). The second category is commitment and behavior change processes and includes values, committed action, self as context, and being present (Hayes et al., 2006). ACT aims to increase psychological

flexibility so that individuals stop trying to change or avoid their problems and learn how to coexist with them in order to move towards their values (Haan & McCracken, 2014). With regards to treating chronic pain, ACT encourages patients to change their relationship to their pain rather than extinguish it (Haan & McCracken, 2014). Many ACT trials will include exercises modeled on formal meditation (ex: leaves on a stream) to help patients mindfully observe and accept their pain (Haan & McCracken, 2014).

Mindfulness for Pain/Chronic Pain

The cognitive evaluative component of pain describes how pain perception derives from both the physiological sensation and subjective evaluation of pain. Research has shown that humans are not accurate reporters of their past experiences of pain (Redelmeier et al., 2003). In one study, when individuals rated their pain after a procedure, the rating had less to do with the overall intensity or duration of the pain, but rather with the greatest moment of pain and the pain level when the procedure finished (Redelmeier et al., 2003). This study shows that thoughts about pain after it occurs can color the perception of a painful experience, even if it is not the same as what a person would report on a moment-by-moment basis.

Societally, pain typically has negative associations, and as a result, individuals are encouraged to minimize their experience of it. In Western culture, pain has become synonymous with suffering, while in fact, suffering is only one of many potential responses to feeling pain (Kabat-Zinn & Hanh, 2009). While pain has a negative social stigma, it is a vital mechanism for survival. Because pain is associated with suffering, and suffering is generally regarded as frightening, the cognition of pain is often thought of as suffering. Even though pain helps prevent humans from extensive bodily harm, the association of pain and suffering can amplify the experience of pain. When less intense pain becomes cognitively associated with suffering, the sensation will be amplified and experienced as a more intense pain (Kabat-Zinn & Hanh, 2009). Thus, the way a person thinks about their pain plays a role in how they feel their pain.

Mindfulness is a viable alternative to analgesics due to how the practice changes an individual's relationship to the pain they are experiencing (Kabat-Zinn, 1982). It has been shown that those who practice meditation are able to reduce fear when anticipating pain and that this is reflected in the structures of the brain (Lutz et al., 2013). In addition, individuals who received relatively brief training in mindfulness meditation rated the unpleasantness and intensity of pain lower than before they received the training, which also was mirrored in changes to their brains (Zeidan et al., 2011). What was observed across all these studies was not that individuals felt less pain but rather that their relationship to pain changed. As their brains became more accustomed to meditation, their attachment to the suffering associated with pain diminished (Kabat-Zinn, 1982; Lutz et al., 2013; Zeidan et al., 2011). So while the pain signals coming into the brain may not be diminished, the cognitive and emotional experience of pain, such as suffering and sadness, are (Kabat-Zinn, 1982).

Chapter 2: Rationale and Primary Aim

Due to the high costs of the healthcare system in the United States, it is important to find pain management techniques that are cost-effective, easy to disseminate, and can be practiced outside the sphere of traditional healthcare settings. It is also important to provide alternatives to the most commonly used pain management techniques of pharmacological and surgical interventions due to their levels of risk in the older adult community (Turk et al., 2011). Finally, it is important to find pain management techniques that provide older adults with a sense of agency in their treatment where they are personally implementing change rather than being subjected to it. This will benefit the older adults who are struggling with chronic pain and provide doctors, mental health specialists, and healthcare systems with an option that is less expensive, risky, and complicated to conduct. While literature reviews have covered MBI's effects on individuals with chronic pain, no specific review has yet to uniquely address older adults. In addition, no studies have examined the relationship between MBCT and older adults with chronic pain. This gap in this understanding demonstrates a need for further research on MBIs in older adults with chronic pain.

This systematic review was conducted to examine the benefits of mindful meditation in managing chronic pain for older adults.

Chapter 3: Method

Systematic Review Approach

Due to limited research on using mindfulness meditation with this age group for chronic pain management, both quantitative and qualitative studies were included to cover the breadth of data available. An integrative systematic review with narrative synthesis was conducted due to the inclusion of both quantitative and qualitative data. The design and methods of this study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P) model.

Eligibility Criteria

Inclusion Criteria

Source Eligibility Criteria. Studies included in this review were original studies published in peer-reviewed journals in any country as long as they were published in the English language. Because the literature began specifically focusing on mindfulness meditation as a way to manage chronic pain in older adults in 2004, only studies published on or after this date were considered.

Study Eligibility Criteria. Any study in which MBIs are used to help older adults heal from chronic pain was assessed for inclusion. To be included in the current literature review, studies must have involved older adults (aged 65+) who were struggling with non-cancer-related chronic pain. Studies on MBIs for chronic pain were considered if they follow the format of MBSR, MBCT, or ACT. Studies that use modifications of the traditional MBSR, MBCT, OR ACT format were included if they include a formal mindful meditation component.

Exclusion Criteria

Following other systematic reviews, participants with cognitive impairments such as dementia were excluded (Hadjistavropoulos et al., 2014). Studies that assess cancer-related chronic pain were excluded due to differences in perception of pain, type of pain treatment, intensity and duration of pain, and risk factors and origin (Park & Hughes, 2012).

Search, Screening, and Selection Processes

Information Sources

Eligible studies were searched from the following databases: PsycInfo, and Pubmed/Medline. Any published systematic reviews that incorporated the constructs of interest in the current review were screened for articles that may have been missed in earlier searches.

Search Terms

A list of search terms was compiled for use in finding appropriate studies for literature review inclusion (Appendix A). For each search term, a list of synonyms was developed to increase the strength of the search capacity for each database. The primary search terms were separated into three categories with related subcategories and synonyms in parenthesis: (a) Chronic pain ("chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain"), (b) Mindful meditation (mindful* or meditat* or "MBSR" or "MBCT"), and (c) Older adults ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+").

Selection of Studies

Each search term and corresponding synonyms were grouped and provided with an identification (ID) number (Appendix B). The Search Plan (Appendix B) documents the type of search, sources or databases used, the combination of search IDs, a list of the search term syntax or instructions, the fields of the articles searched, and any specifiers that were included in the search. The results of the various combinations of searches were documented in the Search Documentation Record (Appendix C) to capture the individual search syntax entered when collecting research articles. The data entered for each search includes the search date, an ID for this individual search, type of search, database used, search term IDs used, search syntax, fields searched, and search specifiers such as year published restrictions and publication type restrictions. Finally, the Search Documentation Record displays how many articles were found from each search.

The Screening and Selection Record form (Appendix D) is a spreadsheet which documents screened articles and if they were included in the review for data extraction. The criteria for this screening included the author, year of publication, title of the article, database/source, inclusionary criteria, and exclusionary criteria. To ensure quality in the screening and selection process, the author and a research assistant (RA) used the software Rayyan to detect duplicates and conduct the first of three screening phases (Ouzzani et al., 2016). In the first phase, the title, abstract, and keywords for each study were screened for fit. If any article did not meet the criteria, it was excluded from further processing. The second phase screened the text in full to see if it satisfied the inclusion and exclusion criteria. To aid in this process, the software Covidence was used (Covidence systematic review software, 2023). If a study did not meet these criteria, the article was excluded from further processing. The third phase included the final screening for a fit of use in the study and documented a secondary/confirmatory decision, final decision, final decision date, and any notes about this decision. The dissertation chairperson reviewed and screened three randomly selected studies for appropriate use of the inclusion and exclusion criteria and confirmed the initial decision. A PRISMA-based flowchart (Appendix E) followed the completion of the screening and selection process.

Data Collection and Extraction

The Data Collection and Extraction Form (Appendix F) recorded relevant study variables. The variables noted in this form are described below.

Study Documentation and Identification

In the first section of the Data Collection and Extraction form, the following variables are outlined: document ID#, authors and year, and full document title. Each study was assigned a unique name based on the study's first author and publication date. These documents each have a study ID made up of a four-digit code. The code's numbering system started at 5,000

and continued in consecutive one-digit intervals until every study had a unique document identifier.

Design Characteristics and Methodological Features

The second section included: the country in which the study was conducted, aim of study, method of study, study design, any post treatment follow up and delay to follow-up, and population location.

Intervention Information

The third section included the individual variables associated with the intervention of each study reviewed. These variables included: inclusion criteria, exclusion criteria, number of participants at start of study, number of participants at end of study, type of intervention (MBSR, MBCT or ACT), any variables associated with the research and the type of measure that was used, intervention description, control type, control description, independent variable, dependent variables, and outcome measures.

Participant Information

The section captured the individual characteristics of the participants in each study. These variables include: age: mean (SD), gender, ethnicity, education, income, marital status, religion, type of chronic pain (back pain, arthritis, etc.), other pain notes if specified, pain duration, medications, and comorbid diagnoses.

Key Results

The tenth section captured all of the key findings found by the researchers. Eight placeholders were included to document each key finding.

Conclusions and Follow-up

The final section collected variables concerning: key conclusions of study authors, study author's recommendations for future research, researcher's take-aways: general or implications for practice, salient study limitations (to inform quality appraisal).

Quality Appraisal

To examine the relevance and trustworthiness of studies included in the review, a quality appraisal was conducted. This process was conducted using a quality appraisal form (Appendix G) for each selected study, which documented: (a) the methodology, (b) the specific design/inquiry approach, (c) strength of literature foundation and rationale for study, (d) clarity and specificity of research aims/objectives/questions, (e) quality of research design or methodological approach, (f) sample selection and characteristics, (g) data collection tools, (h) data collection process, (i) analysis and presentation of data, (j) discussion of study limitations, and (k) consideration of culture and diversity. Items “c” through “k” were rated on a numerical scale from zero to three, where three is strong, two is good/adequate, one is weak, zero is missing. Any items deemed not applicable were marked with N/A. Following the summation of these scores, section “l” provided an overall numerical rating of the study from one to three, where all threes equal exemplary, mostly threes equal strong, mostly twos equal good/adequate, and mostly ones equal weak.

Chapter 4: Results

Study Selection Results

A total of 2,473 publications were identified from two electronic databases. Initially 743 articles were detected by the Rayyan software as duplicates and 222 articles were marked as ineligible and removed from the set leaving 1,508 articles (Ouzzani et al., 2016). The preliminary review of titles and abstracts found that 1,298 studies were excluded because they did not fit the inclusion criteria. Following this, 151 studies were removed from the set following a full text review, resulting in eight studies remaining (see Appendix E).

Characteristics of Included studies

The studies were conducted across three continents (North America, Europe, and Oceania). The majority of the studies were conducted in the United States (62.5%). It is important to note that all of these studies took place in Westernized cultures. All studies were published between the years 2008 and 2020; two studies were published in 2008, 2009, and 2016, respectively and one study each in 2018 and 2020. The majority of the studies were quantitative (62.5%), but also included qualitative and mixed methods studies. The majority of the studies utilized a randomized control trial (RCT) methodology (62.5%), and the remaining studies were case studies (*N* = 2), and a focus group (*N* = 1). Three of the included studies used ACT as the experimental intervention (two case studies and one RCT). The ACT studies included a total of 103 participants (Alonso-Fernandez et al., 2016, *N* = 101; Campbell et al., 2020; *N* = 1; Lunde & Nordhus, 2009, *N* = 1). Only one of the three included is purely ACT (Campbell et al., 2020), while the other two also included CBT and Selective Optimization with Compensation (SOC), which is a model developed to help successful aging (Alonso-Fernandez et al., 2016). The other five studies all used MBSR as the experimental intervention (three quantitative and two qualitative). A total of 354 participants completed quantitative studies using MBSR (Morone et al., 2016, *N* = 282; Morone et al., 2008a, *N* = 37, and Morone et al., 2009, *N* = 35), and a further 52 participants completed qualitative studies (Luiggi-Hernandez et al., 2018,

N = 27; Morone et al., 2008b, *N* = 25). The qualitative studies captured a larger range of data which tended to support the study's hypothesis, which is typical for qualitative studies (Bergen & Labonté, 2020). It should be noted that no studies were found which used MBCT and met the eligibility criteria. A comprehensive review of the characteristics included in this review are reported in Appendix F.

Characteristics of Study Participants

The total number of participants across all studies selected for this narrative review was 509. In accordance with the inclusion criteria, all participants were older adults (65+) and the mean age ranged from 70-82 years. The majority of participants were female identified, aligning with research indicating females have greater longevity than males (Austad & Bartke, 2015). All studies included both male and female participants with the exception of the case studies, of which one was male and the other female. No studies included individuals that identified as transgender or non-binary. In each study, the majority or all of the participants identified as White (70%-100%). For more information on these demographics please refer to Appendix F.

Participants across studies reported the following types of chronic pain: musculoskeletal, lower back pain (LBP), arthritis, fibromyalgia, spinal stenosis, knee pain, shoulder pain, chronic headaches, disc herniation, failed back surgery, scoliosis, spondylolisthesis, osteoporosis, and other non-defined chronic pain. Participants reported using a variety of medications including: opioids, NSAIDs, antidepressants, immunosuppressants, and analgesics. Only some listed specific names of medications such as acetaminophen, tramadol, paracetamol, and cortisone.

Study Measures

Across the studies a variety of quantitative measures were used to gather data. These measures aimed to assess a variety of outcomes including depression, pain experience, functional impairment, and quality of life. Multiple studies also used clinical interviews or diary entries as part of their outcome data (Campbell et al., 2020; Luiggi-Hernandez et al., 2018; Morone et al., 2008b). The measures are described below in order to provide context to the

findings of these studies.

- *Roland Morris Disability Questionnaire (RMDQ):* Three studies used the Roland Morris Disability Questionnaire (RMDQ), which measures disability with 24 yes/no questions about back pain and physical function (Morone et al., 2009). Lower scores indicate less disability. Cronbach's alpha is 0.93 and test–retest correlation is 0.73–0.91 (Morone et al., 2016).
- *Short-Form McGill Pain Questionnaire (SF-MPQ):* The Short-Form McGill Pain Questionnaire (SF-MPQ) was used in four studies and measures pain intensity. The scale is made up of two parts, the first has fifteen questions which are answered using a four point likert scale to measure physical and emotional components of pain. The second part includes a Visual Analogue Scale (VAS) and a Present Pain Intensity (PPI) inventory. The VAS is a line where no pain is marked on the left and worst possible pain is marked on the right. The respondent is asked to make an x on the line to indicate what the current level of pain they are experiencing. The PPI asks the respondent to indicate their current pain level on a scale from no pain (0) to excruciating (5). Lower scores indicate lower levels of pain, and this measure is shown to have a Cronbach's alpha of 0.906 (Adelmanesh et al., 2012).
- *Numeric Rating Scale (NRS):* The Numeric Rating Scale is a 21 point scale that measures self report of pain using boxes that range from 0 to 21. The scale was found to have high construct validity ranging from 0.86-0.95 and high test-retest reliability (r = 0.96; Chibnall & Raymond, 2001).
- *Chronic Pain Self-Efficacy Scale: (CP-SES):* The Chronic Pain Self-Efficacy Scale measures self-efficacy and has three subscales: pain self efficacy (PSE), function self-efficacy, and coping self-efficacy. Each question is answered on a ten-point Likert scale from very uncertain (10) to very certain (100; Anderson et al., 1995). Lower scores indicate lower self-efficacy. The Cronbach's alpha among older adults with CLBP is 0.87

(Morone et al., 2016)

● *Short Form 36 (SF-36):* The SF-36 measures self-efficacy and quality of life which includes 8 scale scores and two summary scores (mental health and physical health). Lower scores on the measure indicate lower self-efficacy and quality of life, and this measure is reliable for use with older adults with a Chronbach's alpha of 0.80-0.92 (Brazier et al., 1992).

● *Brief Older People's Quality of Life (OPQOL-Brief):* One study used the OPQOL-Brief to assess quality of life in older adults. This measure has 22 questions and has demonstrated high reliability with a Chronbach's alpha of 0.86 for use with older adults (Campbell et al., 2020).

● *Brief Pain Inventory (BPI):* The Brief Pain Inventory, which evaluates pain across 11 items (Alonso-Fernandez et al., 2016). Four items measure pain severity current, maximum, minimum, and average pain over the past week and seven items measure pain interference using the VAS. lower scores indicate less pain interference. The Spanish version of the BPI has a Chronbach's alpha of 0.89 and test-retest reliability of 0.77 (Alonso-Fernandez et al., 2016). The BPI is often used with older adults and is considered an accurate measure with this population (Gagliese, 2001). The study in this review utilized the Spanish-language version.

● *Mindful Attention Awareness Scale (MAAS):* The Mindful Attention Awareness Scale to assess mindfulness which measures awareness of the present moment and awareness in daily life. Lower scores indicate lower levels of mindfulness. This measure has 15 questions and has demonstrated an internal consistency (alpha) of 0.82. This study has not been validated with older adults (González-Blanch et al., 2022).

● *Beck Depression Inventory (BDI-II):* The Beck Depression Inventory (BDI-II; Beck, 1996) depression. Lower scores indicate lower levels of depression. The measure consists of 21 items and has a Chronbac's alpha of 0.85 and was highly correlated (r =

.71) with the Geriatric Depression Scale (Segal et al., 2008).

● *Pittsburgh Sleep Quality Index (PSQI):* The Pittsburgh Sleep Quality Index (PSQI) Measures general sleep disturbances (Buysse et al., 1989). Lower scores indicate lower sleep quality. It contains 15 multiple-choice questions and has demonstrated a Cronbach's alpha of 0.83 (Buysse et al., 1989).

● *Geriatric Depression Scale Short Form (GDS-Short Form):* The Geriatric Depression Scale short form (GDS-Short Form) measures depression. It is suitable for use regardless of health status and when mild/moderate cognitive impairment may exist. This scale has been used extensively in the assessment of older adults and has a Cronbach's *α* of 0.86 with this population (Brown & Schinka, 2005).

● *Rapid Assessment of Physical Activity (RAPA):* The Rapid Assessment of Physical Activity (RAPA) is a measure of current physical activity for older adults. The RAPA is a nine item questionnaire which was normed on adults older than 50 years old (Topolski et al., 2006). It has demonstrated validity and reliability for use with older adults but no specifics on this were reported (Topolski et al., 2006).

Quality Appraisal

The quality appraisal results showed that two studies were scored as "exemplary," two as "strong," three as "good," and one as "adequate." None of the included studies were rated as poor. For more information, please see Appendix G.

Major Themes Across Selected Studies

Change in Actual Experience of Pain

The present review found that in five out of eight studies (two quantitative, one mixed methods, and two qualitative), participants reported minor changes in the subjective experience of pain, and these changes were rarely statistically significant (Campbell et al., 2020; Morone et al., 2008a, 2009).

One study which utilized the BPI did not demonstrate a statistically significant reduction

in pain (Alonso-Fernández et al., 2016). Three studies utilized the RMDQ to assess subjective pain (Morone et al., 2008a, 2009, 2016) but only Morone et al., (2016) showed a statistically significant reduction effect (p = .01). Specifically, they found statistically significant decreases in pain for the intervention group when compared to the control group in both the eight week and six month follow ups for the measures of current pain felt and most severe pain felt. The differences in average pain felt did not show significant results when comparing the control and intervention groups (Morone et al., 2016).

In a mixed methods case study which did not utilize a subjective-pain outcome measure, the participant reported feeling a decrease in the frequency and intensity of pain when asked directly by the interviewer (Campbell et al., 2020). The two qualitative studies examined found participants describe a wide range in felt pain, ranging from no pain decrease, pain decrease only during meditation, and sustained pain relief, but did not utilize any objective measures to quantitate this pain (Luiggi-Hernandez et al., 2018; Morone et al., 2008b). Some quotes gathered showed meditation's direct influence on pain, such as "by using meditation I have been able to reduce the feeling of pain" (Morone et al., 2008a, p. 318).

Change in Relationship With Pain

Changes in the relationship an individual experienced with their pain was conceptualized in multiple ways by researchers, but a consistent theme across several of the studies was that this change was meaningful to the participants. Of the eight studies included in this review, five (two quantitative, one mixed methods, and two qualitative) provided evidence of participants changing their attitudes toward pain over the course of the studies, which allowed the participants to experience pain more mindfully and engage with pain in a less biased manner (Campbell et al., 2020; Luiggi-Hernandez et al., 2018; Morone et al., 2009, 2016). Three studies did not include an outcome measure to specifically quantify participants' change in their relationship to pain making it difficult to assess whether this change occurred (Campbell et al., 2020; Morone et al., 2009, 2016). Instead, participants described change in pain manifesting as

increased cognitive flexibility around pain. One qualitative study showed participants discussed an ability to defuse from thoughts of pain, where they could notice the presence of pain sensations without attaching any identity to it (Morone et al., 2008b).

Three studies (two RCTs and one a case study) demonstrated a shift in the subject's relationship with pain measured by the CPAQ (Alonso-Fernández et al., 2016; Lunde & Nordhus, 2009; Morone et al., 2008a). The case study report indicated that while the *intensity* of the participant's pain remained the same on the SF-MPQ at eight weeks and six months, the CPAQ indicated a clinically significant change in the *quality* of the pain experienced (Lunde & Nordhus, 2009). In both RCTs participants using the CPAQ endorsed a statistically significant increase in chronic pain acceptance compared to control (Alonso-Fernández et al., 2016; Morone et al., 2008a). Only one of these studies reported effect sizes which were large (Alonso-Fernández et al., 2016).

Qualitative reports also indicated participants experienced a change in relationship to pain. Fear of pain was reported to have decreased following mindfulness interventions, along with other negatively valenced emotions (Luiggi-Hernandez et al., 2018.) The decrease in negative emotions about future pain decreased the subject's levels of stress, something that would in turn decrease the subjective pain sensed . One subject reported "the pain is still with me however, it just doesn't feel as intense as it was," demonstrating an awareness of the pain without causing distress (Morone, et al., 2008b, p. 848). Another shared a similar sentiment: The pain is still there... But I have learned to just...relax, breathe...And it's just not that important [anymore]...It's not going to go away...but I move [it] into the background. And it's back there somewhere, but that's okay. I can deal with that now (Luiggi-Hernandez et al., 2018, p 2144).

Participants were able to move toward the pain which decreased avoidance of the present moment (Luiggi-Hernandez et al., 2018). The participant in one case study reported shifting from trying to control or avoid her pain to accepting the sensations without judgment which allowed her to move toward her pain and see how it was influenced by stress (Lunde &

Nordhus, 2009). In another study, participants reported that willingness to engage with pain rather than avoid it helped them feel a greater sense of freedom and less fear of the future (Alonso-Fernández et al., 2016). They described changes in their perception of pain such that they no longer thought of their pain as something that was too big to confront.

Changes in Quality of Life

Across five studies, a number of constructs identified contributed to improvements in quality of life including: change in relationship to pain, increase in activities of daily living (ADLs), sleep, engagement in relationships, and self concept. Quality of life was measured in all three of Morone et al.'s studies (2008a, 2009, 2016) with the RAND SF-36 Health Status Inventory. The Morone et al. (2016) study found a small increase in experienced quality of life that was maintained over time when comparing the mindfulness intervention group to the control group. This change decreased at eight week follow up and increased again at four months but was consistently improved from baseline measurement. However, these changes did not reach statistical significance at any time point (Morone et al., 2016). In Morone et al.'s (2008a) quantitative assessment, quality of life improved post-study and at three month follow-up, but also failed to reach statistical significance. Lunde and Nordhus, (2009) used the OPQOL-Brief to indicate quality of life, and whilst scores improved following the intervention, no statistical significance was reached for those differences (Campbell et al., 2020). Alonso-Fernández et al. (2016) also failed to reach statistical significance in an assessment (BPI Pain interference subscale) of enjoyment of life, relations with other people, and sleep, all underperformed compared to control. While the overall scores in the measures of quality of life did not find statistically significant improvements, areas of quality of life did find promising results which may have made meaningful difference in the lives of the individuals in the studies.

A key component of quality of life includes sleep, and the participants in three studies discussed experiencing better sleep which left them feeling well rested and better able to allocate their energy to the present moment (Lunde & Nordhus, 2009; Morone et al., 2008a,

2008b). One study measured changes in sleep using the PSQI, and the participant's score decreased by more than half; however, no statistical analysis was performed on this change (Lunde & Nordhus, 2009). Despite this, the participant in this case study reported that she no longer needed her sleep medication, a sentiment which was also found in a quantitative study which reported that 48% of participants reduced medicine for sleep or pain (Morone et al., 2008a). The participants in this study also reported improvements in their sleep quality as a result of the intervention (Morone et al., 2008a). Themes of the qualitative reports included: decreased sleep latency, increased sleep quality, and increased ability to go back to sleep after waking in the night (Morone et al., 2008b).

Changes in Functional Impairment

The change in relationship to pain allowed for increased functioning in behaviors such as engagement with activities of daily living (Luiggi-Hernandez et al., 2018;, Lunde & Nordhus, 2009; Morone et al., 2008a, 2008b). Seven of the studies (four quantitative, one mixed methods, and two qualitative) reported small to medium decreases in functional impairment. A study using the BPI found a statistically significant increase in both the general activity levels and walking ability scales with medium effect sizes (Alonso-Fernández et al., 2016). A case study using the RAPA indicated improvements in the subject's score, but they were minimal and no statistical analysis was performed (Campbell et al., 2020). A case study demonstrated a greater willingness to engage in activities regardless of pain as measured by the CPAQ's activity engagement scale at post treatment that was sustained through follow up (Lunde & Nordhaus (2009). While there was a decrease in pain-related disability across studies, only one study showed statistically significant results (Morone et al., 2008a). The increase in acceptance of pain and decrease in anticipatory fear increased the subject's openness to engage in previously feared activities (Campbell et al., 2020; Lunde & Nordhus, 2009).

Three studies measured changes in functioning using the RMDQ (Morone et al., 2008a, 2009, 2016). Only one study demonstrated a statistically significant change compared to control

when adjusting for the two follow up periods (8 weeks and 6 months), but showed small effect sizes (Morone et al., 2016). A different study using the RMDQ demonstrated small effect sizes and results did not reach statistical significance for the intervention group when compared to the control group (Morone et al., 2009). The authors postulated that this was the result of a ceiling effect considering the participants were functioning at a high level, respectively, for older adults with chronic pain at baseline (Morone et al., 2009). The third study did not find statistically a significant reduction on the RMDQ nor did it have a large effect size (Morone et al., 2008a). Contrary to these findings, the same study used the SF-36 Physical Function Scale (PFS) to also assess for functional impairment, which demonstrated statistically significant changes from baseline to follow-up with a medium effect size (Morone et al., 2008a). Due to the small sample size in this study and increased variability in the control group data as compared to the intervention group, Morone et al. (2008a) encouraged the effect sizes to be interpreted with caution. They also provided no interpretation for the difference between the RMDQ and the SF-36 PFS. The other study which used the SF-36 demonstrated that self efficacy increased in a statistically significant way and maintained at four month follow-up (Morone et al., 2009).

Qualitative studies showed a similar improvement when examining functional impairment. One study described participants experiencing a decrease in fear of pain which led to increased engagement in ADLs (Luigg-Hernandez et al, 2018). Participants reported that this was made possible by attending to the present moment rather than the fear of future pain (Morone et al., 2008). Participants also reported being less focused on the sensation of pain, and as a result, could focus more on the tasks they were engaged in (Morone et al., 2008b). The increased awareness of the present moment also manifested in the participants moving towards it, rather than avoiding it. This resulted in patients coming to understand their limitations in the moment rather than predicting ahead of time and avoiding engagement in ADLs (Morone et al., 2008b). As a result, participants were better able to engage in ADLs without needing to stop because of overexertion (Morone et al., 2008b). Participants were able to create a

relationship to their pain which increased their sense of autonomy and agency (Luiggi-Hernandez et al., 2018). Qualitative reports stated that decrease in anticipation and significance of pain led to subjective decreased dependency on pain medication (Morone et al., 2008a).

Participants reported making fewer decisions based on pain and were able to develop a relation to it, integrating it into their lives (Luiggi-Hernandez et al., 2018). Another study discussed that the participants were better able to focus on signals of desired task rather than noise of pain (Morone et al., 2008b). As a result, participants reported increased willingness to engage in hobbies and increased overall sense of wellbeing (Morone et al., 2008b). While the participants were less attached to their pain, they reported feeling better able to notice when they were at their limit and did not push themselves into increasing levels of pain (Luiggi-Hernandez et al., 2018). By not pushing themselves past their ability, they saw an increase in long term functionality which led to a decrease in functional impairment (Luiggi-Hernandez et al., 2018). Counterintuitively, the heightened awareness of pain sensation also led to behavior change, "I learned to stop when the pain starts up" which indicates awareness of limitations and potential increased willingness to participate in activities before these limitations are reached (Morone et al., 2008b).

The SF-36 was also used to measure self-efficacy in two studies (Morone et al., 2009, 2016). One study showed statistically significant improvement in self efficacy which was maintained at the four month follow up (Morone et al., 2009). Statistically significant improvement on the SF-36 measuring energy and emotional problems reported at intervention completion for the intervention group when compared to the control group; however, these results did not maintain significance at the four month follow up (Morone et al., 2009). Participants in another study showed increased levels of self-efficacy, which predicts desire to engage with ADLs, at initial follow-up and the increases were not maintained at further follow-up assessments (Morone et al., 2016).

Changes in Depression and Anxiety Symptoms

Multiple measures were used to assess depression and anxiety, including the BDI, GDS, PASS, and the SF-36. One case study used the BDI to measure depression, and did not show statistically significant reductions in depression symptomatology, a result which may have been influenced by the subject scoring low on her pre-treatment BDI (Lunde & Nordhaus, 2009).

Two studies, a case study and an RCT used the GDS to measure depression. The case study demonstrated a significant decrease in depression and suggested meaningful clinical change (Campbell et al., 2020). The RCT study found a statistically significant reduction in depressive symptoms on the GDS and improvement of mood on the BPI's Pain Interference component (Alonso-Fernández et al., 2016). It should be noted that both the GDS and the BPI showed the same small effect sizes (Alonso-Fernández et al., 2016). The same study indicated a statistically significant reduction with medium effect sizes in anxiety symptoms on the PASS Anxiety and catastrophizing scale (Alonso-Fernández et al., 2016).

Another study used the "emotional problems" component of the SF-36 to assess for depression and anxiety (Morone et al., 2016). The intervention group demonstrated significant improvements relative to the control group, but they were not clinically meaningful (Morone et al., 2016). The authors propose that this was because both control and intervention groups had low scores at baseline, leaving little room for meaningful improvement (Morone et al., 2016). One qualitative study (Morone et al., 2008a) showed a change in subject's outlook which made them see the world more positively. The participants also discussed feeling more present with their pain and activities which helped reduce anticipatory stress and increase relaxation and serenity (Morone et al., 2008b).

Chapter 5: Discussion

The current review found that the evidence for mindfulness meditation's ability to manage chronic pain in older adults is mixed. From a Western medical perspective, which focuses on the reduction of subjective pain felt, there were few studies in this review that demonstrated decreases in subjective pain among older adults with chronic pain, most of which did not obtain statistical significance (Alonso-Fernandez et al., 2016; Campbell et al., 2020; Morone et al., 2008a, 2009). The three studies which used qualitative data found mixed results in reduction of pain which ranged from short to long term reductions (Campbell et al., 2020; Luiggi-Hernandez et al., 2018; Morone et al., 2008b). While the mindfulness techniques used in the included studies do not appear to guarantee a decrease in the subjective experience of the pain felt by participants, their benefit appears to focus on helping participants change their relationship to pain (Hann & McCracken, 2014; Zeidan et al., 2011).

Whilst subjective pain was not consistently reduced, authors reported the following outcomes were most likely to change following a mindfulness protocol: five studies found a change in relationship to pain, five found a change in functioning, four found a change in mood and anxiety, and seven found a change in quality of life. While all of these are important when understanding the benefits of mindfulness, they are also universal constructs which manifest regardless of age, suggesting that the identified components do not uniquely affect older adults/perhaps other variables should be observed. This makes sense when considering the core components of mindfulness meditation, acceptance, curiosity, non judgment, compassion, and patience, are universal and not linked to one specific population or condition (Morone & Grecco, 2014). As previously mentioned, the benefits of practicing mindfulness are interdependent and parts of a larger whole, so are the changes in pain and functioning as a result of practicing mindfulness. It appears that the benefits seen in the participants, such as improved psychological symptoms, sleep, quality, and quality of life not only contribute to an

improved relationship with pain, but also rely on one another to do so. This is reminiscent of the traditional Buddhist understandings of oneness and interconnectedness.

By changing the relationship to the pain experienced, the participants were able to engage with their pain, and therefore their lives, in a more practical and realistic way which again, harkens back to the interconnectedness of mindfulness (Alonso-Fernández et al., 2016). Both ACT and MBSR espouse that only through acceptance of the present moment, can an individual change their experience of suffering (Campbell et al., 2020; Kabat-Zinn & Hanh, 2009). Participants' acceptance of their pain reduced their reliance on typical strategies, such as avoiding the present moment, resulting in an increased sense of capacity (Luiggi-Hernandez et al., 2018; Morone, et al., 2008b). Acceptance of pain also led to a decrease in stress and fear of the future and increased valued action and self efficacy (Alonso-Fernández et al., 2016; Luiggi-Hernandez et al., 2018; Morone, et al., 2008b). The ability to stay with the present moment increased the subject's recognition of their limitations and prevented them from harming themselves (Lunde & Nordhus, 2009). Older adults are more likely to injure themselves during ADLs so a greater awareness of limitations is crucial for this population (Ickowicz et al., 2002). Greater awareness of physical limitations is important when considering the previously mentioned hypothesis of increased pain threshold in older adults (Domenichiello & Ramsdena, 2019). If an older adult's higher pain threshold prevents them from noticing protective, acute pain they are at a higher risk of injuring themselves (Domenichiello & Ramsdena, 2019). The changed relationship between the participants and their pain allowed them to engage in previously feared activities. Because participants were able to experience the present moment more fully, they were not as afraid of how pain could potentially affect them, leading to valued action (Luiggi-Hernandez et al., 2018; Morone et al., 2008b). Decreased activity engagement has been shown as a lifestyle factor for modulating increased mortality with older adults suffering from chronic pain (Domenichiello & Ramsdena, 2019). Therefore, the more interventions which increase this population's functional performance may lead to an increased

life expectancy. As is often encouraged in ACT and CBT therapy, greater engagement in activities helps older adults stop catastrophizing and ruminating and therefore helps decrease depression and anxiety (Day, 2017; Turk et al., 2002).

As mentioned in the background of this review, psychological functioning can influence the perception of pain (Walloch, 1998). As predicted, the studies documented a decrease in mood and anxiety symptoms as a result of mindful meditation interventions (Alonso-Fernández et al., 2016; Morone et al., 2008a, 2016). Employing mindfulness involves a greater emphasis on the present moment, which decreases catastrophizing and rumination, which in turn, decreases mood and anxiety symptoms (Turk et al., 2002). This decrease in psychological stress, combined with a better relationship to pain, and greater engagement in activities, fostered an increased quality of life.

Limitations and Future Directions

There are a few important limitations that affect the generalizability of this review. There is little information regarding the community support, such as family or loved ones, (only four studies included marital status) of the participants. The research has shown how important it is for older adults to receive community support in their pain management routine, and to exclude this data leaves a gap in the applicability of this data (Ickowicz et al., 2002). From a geographical perspective, all of the research was conducted in westernized countries on majority White participants. This leaves out the majority of the world's population and recreates a major problem in western research.

Of the four studies which included Asian-identified participants, none included the specific cultural demographics of the individuals. Considering how meditation came from Eastern culture, the absence of participants from Eastern cultures leaves out important information. Would individuals who are culturally familiar with meditation have shown different results than these participants who possibly were learning about it for the first time? As mindfulness becomes more popular and integrated into Western culture and a new generation

enters the older adult range, will future results differ from the ones included in this study? Because this research is focused on westernized countries and was conducted by westernized researchers, the focus on individualistic conceptualizations of culture and pain limit what was observed and valued. Conceptualizations of pain may have differed for individuals who come from more collectivist cultural philosophies.

Due to the difficulty of working with individuals experiencing cognitive decline, the majority of studies (including the current one) exclude these individuals from study samples. This is problematic when studying geriatric populations, considering a significant portion of older adults experience cognitive decline in some form (Cravello et al., 2019). The current author also chose to exclude papers from the current review which included individuals suffering from chronic pain as a result of cancer. This is a result of the trend in pain research to divide studies on whether they focus on cancer-related or non-cancer-related chronic pain (Park & Hughes, 2012). A problem with this exclusion is that cancer is one of the largest instigators of chronic pain in older adults and leaves a significant hole in the research (Turk et al., 2011). Because cancer is so multifaceted, it would be difficult to isolate chronic pain from the overall experience of having cancer. However, future studies should examine the impact of mindfulness on individuals with cancer as it may help both pain acceptance and acceptance of mortality. It is apparent from the limited number of studies included in this review that there is a dearth of research on this subject. The paucity of research in this field limits the scope of this narrative synthesis.

Due to the absence of unique findings specific to older adults when using mindfulness meditation to manage chronic pain, further research is needed in order to fully understand the impact and potential for positive change for this population. Findings examined in the current study were mixed, which was in contrast to studies done with younger participants (youth, adults) which demonstrated a more consistent and robust reduction in pain as a result of mindfulness interventions (Alonso-Fernández et al., 2016). Future studies with a larger number

of participants could provide additional evidence to make findings with older adults more straight-forward. Future research also needs to investigate the heterogeneity of the age groups within older adults. The studies in this review viewed all older adults as a monolith, which negates the research demonstrating the changes in pain and pharmacodynamics as humans move past 65 years (Green, 2017; Thürmann, 2020). As indicated in the limitations section, future research on the impact of mindfulness in older adults should also include older adults with cognitive decline and older adults diagnosed with various cancers, as these represent a significant portion of those reaching older adulthood. A literature review from 2018 discussed how mindfulness meditation, including MBSR, can be adapted to individuals with Alzheimer's to manage the disease's progression, as well as the stress associated with it (Russell-Williams et al., 2018). This indicates that adaptations to mindfulness meditation are available to individuals with neurocognitive decline and can be integrated into the research on chronic pain.

While all of the included ACT studies involved an experiential mindfulness meditation component, none of them parsed apart what results stemmed from the meditation vs. what came from the psychoeducation/cognitive restructuring component of the intervention. This makes it difficult to draw direct conclusions regarding which results are pertinent to the aims of this literature review. When looking at the core components of ACT discussed in the hexaflex, some of them are direct verbalizations of mindfulness, while others are more interpretations. For example, cognitive defusion, self as context, acceptance, and contact with the present moment, are all elements of mindfulness mindfulness meditation. Values and committed action are not specifically discussed in an MBSR program and more representative of CBT. Future research would benefit from attempting to separate out the mindfulness components and CBT components from ACT so that they may be observed more objectively. This could come with a modification of ACT which only provides psychoeducation on cognitive defusion, self as context, acceptance, and contact with the present moment compared to a control group which teaches traditional ACT. Finally, as previously mentioned, no studies included in this review used MBCT

because none met eligibility requirements. Researchers should be encouraged to conduct studies using MBCT and older adults considering the paucity of research using this modality.

Practitioner Recommendations

The findings of this study suggest that mindful meditation can help manage chronic pain in older adults and the author encourages those who work with older adults to implement this in their practice. This recommendation is also applicable to family members, spiritual leaders, community leaders, and anyone else who has regular contact with older adults.

Due to the multifaceted nature of improvement seen in the results, instructors of mindfulness practices should emphasize the interconnectedness of healing. It appears that the benefits seen outside of pain reduction, such as improved psychological symptoms, sleep, quality, and quality of life not only contribute to an improved relationship with pain, but are all symbiotic parts of healing. Therefore, if possible, mindfulness should be introduced not as a pain reduction method but rather as an all encompassing practice. In the spirit of mindfulness, there should be an open minded, non-judgmental observation of what happens as one moves through the intervention. By applying this perspective, and conceptualizing interventions beyond pain reduction, participants may find results that are idiosyncratic to them. Reducing the barriers to observing change may help cultivate more open mindedness considering that mindfulness has been shown to improve cognitive flexibility in older adults (Alexander et al., 1989).

As previously mentioned, assessing pain in older adults may not be as straightforward as it is with other age groups due to limits of self report, shame associated with pain, or cultural reasons (Ickowicz et al., 2002). This highlights the importance of bringing in collateral reports when observing change so that cultural and subjective considerations can be incorporated into the teaching of the practice. Also, when considering the high rates of isolation observed in older adult populations, incorporating social or familial support into the treatment may help improve compliance and quality of life. By making meditation a community practice, beyond the weekly groups where it is often taught, there is an opportunity for community healing. In addition, the

community aspect may increase compliance of meditation practice expected outside the groups and magnify results.

It may show greater results to expand the mindfulness interventions in ACT and MBSR and incorporate community and spirituality to create a connection to a larger sense of self. Spirituality is not limited to Buddhism or other organized religious practice but is expansive and could incorporate the interconnected nature of humans with their surroundings. For Judeo-Christian religions, there is an often neglected history of meditation that was popular in these traditions in the past. To integrate mindfulness into older adults' lives, practitioners should attempt to meet participants where they are rather than the other way around. It is known that older adults have, on average, higher levels of engagement with religion than other age groups, so practitioners may find ways to incorporate meditation and religion. This could be done by teaching clergy to learn mindfulness interventions and provide them at their places of worship. By having the mindfulness at a place where older adults already congregate, there is less need for older adults to travel. By reducing the need to move, practitioners can mitigate the mobility difficulties that come with older adults suffering from chronic pain. If an individual already has established trust with an institution, place, or person, that institution should be capitalized on to develop buy-in.

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APPENDIX A

List Of Search Terms

Search Term ID#	Primary Term	Synonyms/ Alternate Forms
01	Chronic pain	"chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain"
02	Mindfulness	mindful* or meditat* or "MBSR" or "MBCT" or ACT or "acceptance and commitment therapy""
03	Older adults	"older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+"

APPENDIX B

Search Plan

Search Type	Databases or Sources	Search Term ID(s)	Search Syntax or Instructions	Fields to Search	Specifiers
Electronic Database	PsycINFO, Pubmed	01	"chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain"	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English
Electronic Database	PsycINFO, Pubmed	02	mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy"	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English
Electronic Database	PsycINFO, Pubmed	03	"older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+"	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English
Electronic Database	PsycINFO, Pubmed	01, 03	("chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain") And ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English
Electronic Database	PsycINFO, Pubmed	01, 02,	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" Or "MBCT" or "ACT" or "acceptance")	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English
Electronic Database	PsycINFO, Pubmed	02, 03	(mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance") And ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English
Electronic Database	PsycINFO, Pubmed	01,02,03	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" Or "MBCT" or "ACT" or "acceptance") AND ("older adults" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English

Search Type	Databases or Sources	Search Term ID(s)	Search Syntax or Instructions	Fields to Search	Specifiers
Electronic Database	PsycINFO, Pubmed	01,02	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" Or "MBCT" or ACT or "acceptance") AND ("older adults" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	*Type: Peer-reviewed articles only *Years: After 2004 *Language: English *Age: 65 +

Note. Includes Electronic databases, registries, journal TOCs, Reference lists from articles/books, resource lists from organizations, etc.

APPENDIX C

Search Documentation Record

Search Date	FULL SEARCH ID#	TYPE OF SEARCH	DATABASE/SOURCE	5EARCH TERM ID#s	SEARCH SYNTAX OR OTHER GUIDELINES FOR THE SEARCH	FIELDS SEARCHED	SEARCH SPECIFIER: Years	SEARCH SPECIFIER: Publication Type	# of Records
5/16/2022	110	Electronic Database	PsycInfo	01	"chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain"	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	26,614
7/31/2022	111	Electronic Database	PsycInfo	02	mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy"	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	61,536
5/16/2022	112	Electronic Database	PsycInfo	03	"older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+"	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	217,725
	113	Electronic Database	PsycInfo	01, 03	("chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain") And ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	2,384
7/31/2022	103	Electronic Database	PsycInfo	01, 02,	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy"")	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	965
7/31/2022	114	Electronic Database	PsycInfo	02, 03	(mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy") And ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	4,581

Search Date	FULL SEARCH ID#	TYPE OF SEARCH	DATABASE/SOURCE	SEARCH TERM ID#s	SEARCH SYNTAX OR OTHER GUIDELINES FOR THE SEARCH	FIELDS SEARCHED	SEARCH SPECIFIER: Years	SEARCH SPECIFIER: Publication Type	# of Records
7/31/2022	101	Electronic Database	PsycInfo	01, 02, 03	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy"") AND ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English	65
5/11/2022	103	Electronic Database	PsycInfo	01, 02,	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" Or "MBCT")	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English *Age: Aged (65 yrs & older)	117
5/16/2022	115	Electronic Database	PsycInfo	02,03	(mindful* or meditat* or "MBSR" or "MBCT") And ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	After 2004	*Type: Peer-reviewed articles only * Language: English *Age: Aged (65 yrs & older)	1,218
5/16/2022	105	Electronic Database	Pubmed	01	"chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain"	Title, Keywords, Abstract	After 2004	*Language: English	146,930
7/31/2022	106	Electronic Database	Pubmed	02	mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy"	Title, Keywords, Abstract	After 2004	*Language: English	259,630
5/16/2022	107	Electronic Database	Pubmed	03	"older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+"	Title, Keywords, Abstract	After 2004	*Language: English	4,313,162
5/16/2022	108	Electronic Database	Pubmed	01, 03	("chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain" AND ((english[Filter]) AND (2004:2022[pdat]));"older adult*" or	Title, Keywords, Abstract	After 2004	*Language: English	57591

Search Date	FULL SEARCH ID#	TYPE OF SEARCH	DATABASE/SOURCE	5EARCH TERM ID#s	SEARCH SYNTAX OR OTHER GUIDELINES FOR THE SEARCH	FIELDS SEARCHED	SEARCH SPECIFIER: Years	SEARCH SPECIFIER: Publication Type	# of Records
					elderly or geriatric* or aging or senio* or old or "aged 65" or "65+" AND ((english[Filter]) AND (2004:2023[pdat])))				
7/31/2022	104	Electronic Database	Pubmed	01, 02,	("chronic pain" OR "persistent pain" or "long term pain" or "complex pain" or "pain management" OR "pain relief" OR "pain control" OR "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" Or "MBCT")	Title, Keywords, Abstract	After 2004	* Language: English	2129
7/31/2022	109	Electronic Database	Pubmed	02, 03	(mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy") AND ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	After 2004	*Language: English	56593
71/2022	102	Electronic Database	Pubmed	01, 02, 03	(("chronic pain" or "persistent pain" or "long term pain" or "complex pain" or "pain management" or "pain relief" or "pain control" or "pain reduction" or analgesia or "managing pain") AND (mindful* or meditat* or "MBSR" or "MBCT" or "ACT" or "acceptance and commitment therapy")) AND ("older adult*" or elderly or geriatric* or aging or senio* or old or "aged 65" or "65+")	Title, Keywords, Abstract	After 2004	*Language: English	851

APPENDIX D

Screening and Selection Record

Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Lance M. McCracken; Olga Gutie´rrez-Martı´nez; Claire Smyth	2013	"Decentering" Reflects Psychological Flexibility in People With Chronic Pain and Correlates With Their Quality of Functioning	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Tonny Elmose Andersen1, and Henrik Bjarke Vægter	2016	A 13-Weeks Mindfulness Based Pain Management Program Improves Psychological Distress in Patients with Chronic Pain Compared with Waiting List Controls	Psycinfo	8/22/22	Y	Y	Y	Y	CBTm	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Jenny Thorsell, MS,* Anna Finnes, MS,* JoAnne Dahl, MS,PhD,* Tobias Lundgren, MS,* Maria Gybrant, MS,* Torsten Gordh, MD,PhD,w and Monica Buhrman, MSw	2011	A Comparative Study of 2 Manual-based Self-Help Interventions, Acceptance and Commitment Therapy and Applied Relaxation, for Persons With Chronic Pain	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Whitney Scott1 • Katie E. J. Hann1 • Lance M. McCracken1,2	2016	A Comprehensive Examination of Changes in Psychological Flexibility Following Acceptance and Commitment Therapy for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/ SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Kevin E. Vowles, Gail Sowden Julie Ashworth	2013	A Comprehensive Examination of the Model Underlying Acceptance and Commitment Therapy for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Morone NE; Greco CM; Moore CG; Rollman BL; Lane B; Morrow LA; Glynn NW; Weiner DK;	2016	A Mind-Body Program for Older Adults With Chronic Low Back Pain: A Randomized Clinical Trial.	Pubmed	6/22/22	Y	Y	Y	Y	Y	Y	Y	Quantitative	N	N	N	IN - 7/1	8/27/22	Y	9/10/22
Morone, Natalia E.; Rollman, Bruce L.; Moore, Charity G.; Qin, Li; Weiner, Debra K.;	2009	A mind-body program for older adults with chronic low back pain: Results of a pilot study	Psyc Info	6/22/22	Y	Y	Y	Y	Y	Y	Y	Quantitative	N	N	N	IN - 7/1	8/27/22	N	9/10/22
Mary Catherine George PhD , Arada Wongmek MD , Michelle Kaku MD , Alexandra Nmashie MD & Jessica Robinson-Papp MD	2015	A Mixed-Methods Pilot Study of Mindfulness Based Stress Reduction for HIV-Associated Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Day MA; Ward LC; Ehde	20	A Pilot Randomized	Pub	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitati	N	N		EX -	8/27/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/ SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
DM; Thorn BE; Burns J; Barnier A; Mattingley JB; Jensen MP;	19	Controlled Trial Comparing Mindfulness Meditation, Cognitive Therapy, and Mindfulness-Based Cognitive Therapy for Chronic Low Back Pain.	med									ve				7/1			
Vranceanu AM; Hageman M; Strooker J; ter Meulen D; Vrahas M; Ring D;	2015	A preliminary RCT of a mind body skills based intervention addressing mood and coping strategies in patients with acute orthopaedic trauma.	Pubmed	6/22/22	Y	Y	Y	Y	N	N	N	Quantitative	N	N		EX - 7/1	8/27/22	N	9/10/22
M. Thompson1, K.E. Vowles, G. Sowden , J. Ashworth3 , J. Levell3	2018	A qualitative analysis of patient-identified adaptive behaviour changes following interdisciplinary Acceptance and Commitment Therapy for chronic pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Brittany K. Cattanach, Beverly E. Thorn, Dawn M. Ehde, Mark P. Jensen, and Melissa A. Day	2021	A Qualitative Comparison of Mindfulness Meditation, Cognitive Therapy, and Mindfulness-Based Cognitive Therapy for Chronic Low Back Pain	Psycinfo	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Pérez-Aranda, Adrián; Feliu-Soler, Albert; Montero-Marín, Jesús; García-Campayo, Javier; Andrés-Rodríguez, Laura; Borràs, Xavier; Rozadilla-Sacanell, Antoni; Peñarrubia-Maria, Maria T.; Angarita-Osorio, Natalia; McCracken, Lance M.; Luciano, Juan V.;	2019	A randomized controlled efficacy trial of mindfulness-based stress reduction compared with an active control group and usual care for fibromyalgia: The EUDAIMON study	PsycInfo	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N		EX - 7/1	8/27/22	N	9/10/22

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Marasha de Jong, M.D., Frenk Peeters, M.D., Ph.D., Tim Gard, Ph.D., Heidi Ashih, M.D., Ph.D., Jim Doorley, BA, Rosemary Walker, B.A., Laurie Rhoades, LICSW, Ronald J. Kulich, Ph.D., Karsten D. Kueppenbender, M.D., Jonathan E. Alpert, M.D., Ph.D. , Elizabeth A. Hoge, M.D., Willoughby B. Britton, Ph.D., Sara W. Lazar, Ph.D., Maurizio Fava, M.D., and David Mischoulon, M.D., Ph.D.	2018	A Randomized Controlled Pilot Study on Mindfulness-Based Cognitive Therapy for Unipolar Depression in Patients with Chronic Pain	Pubmed	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Julie Loebach Wetherell, Niloofar Afari, Thomas Rutledge, John T. Sorrell, Jill A. Stoddard, Andrew J. Petkus, Brittany C. Solomon,	2011	A randomized, controlled trial of acceptance and commitment therapy and cognitive-behavioral	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

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David H. Lehman, Lin Liu, Ariel J. Lang , J. Hampton Atkinson		therapy for chronic pain																	
Lance M. McCracken, Ayana Sato, and Gordon J. Taylorz	2013	A Trial of a Brief Group-Based Form of Acceptance and Commitment Therapy (ACT) for Chronic Pain in General Practice: Pilot Outcome and Process Results	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Charlie N. Knowlton, Alena Kryvanos, Megan Poole, Michael Christopher, and Theresa Lafavor	2019	Acceptance and Commitment Therapy for the Treatment of Chronic Pain and Coexisting Depression: A Single-Case Study	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Karen Barban	2016	Acceptance and commitment therapy: an appropriate treatment option for older adults with chronic pain	Pubmed	8/23/22	Y	Y	Y	Y	ACT	Y	Y	Quantitative	N	N	Y	Ex - 8/22	8/27/22	N	9/10/22
Miriam Alonso-Fernandez, PhD, Almudena Lopez-Lopez, PhD, Andres Losada, PhD, Jose Luis Gonzalez, PhD, And Julie Loebach Wetherell, PhD	2016	Acceptance and Commitment Therapy and Selective Optimization with Compensation for Institutionalized Older People with Chronic Pain	Pubmed	8/22/22	Y	Y	Y	Y	ACT	Y	Y	Quantitative	N	N	N	In - 8/22/22	8/27/22	Y	9/10/22
JOANNE DAHL; KELLY G. WILSON; ANNIKA NILSSON	2004	Acceptance and Commitment Therapy and the Treatment of Persons at	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

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		Risk for Long-Term Disability Resulting From Stress and Pain Symptoms: A Preliminary Randomized Trial																	
Kevin E. Vowlesa, Brandi C. Finka, and Lindsey L. Cohenb	2014	Acceptance and Commitment Therapy for chronic pain: A diary study of treatment process in relation to reliable change in disability	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Kevin E. Vowles, Katie Witkiewitz, Gail Sowden, and Julie Ashworthy	2014	Acceptance and Commitment Therapy for Chronic Pain: Evidence of Mediation and Clinically Significant Change Following an Abbreviated Interdisciplinary Program of Rehabilitation	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
R. K. Wicksell, M. Kemani, K. Jensen, E. Kosek, D. Kadetoff, K. Sorjonen, M. Ingvar, G. L. Olsson	2013	Acceptance and commitment therapy for fibromyalgia: A randomized controlled trial	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Claudia Chisari, Lance M. McCracken, Federico Cruciani c, Rona Moss-Morris, Whitney Scott	2015	Acceptance and Commitment Therapy for women living with Vulvodynia: A single-case experimental design study of a treatment delivered online	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

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Jenny Thorsell Cederberg & Martin Cernvall & JoAnne Dahl & Louise von Essen & Gustaf Ljungman	2015	Acceptance as a Mediator for Change in Acceptance and Commitment Therapy for Persons with Chronic Pain?	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Hugo Hesser • Vendela Zetterqvist Westin • Gerhard Andersson	2013	Acceptance as a mediator in internet-delivered acceptance and commitment therapy and cognitive behavior therapy for tinnitus	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Kara J. Blacker, James D. Herbert, Evan M. Forman, and John Kounios	2012	Acceptance- Versus Change-Based Pain Management: The Role of Psychological Acceptance	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Lance M. McCracken and Edmund Keogh	2009	Acceptance, Mindfulness, and Values-Based Action May Counteract Fear and Avoidance of Emotions in Chronic Pain: An Analysis of Anxiety Sensitivity	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Morone, Natalia E.; Greco, Carol M.;	2014	Adapting mindfulness meditation for the older adult	Psyc Info	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/27/22	N	9/10/22
Robinson-Lane SG;	2020	Adapting to chronic pain: A focused ethnography of black older adults.	Pubmed	6/22/22	Y	Y	Y	Y	N	N	Y	Quantitative	N	N	N	EX - 7/1	8/27/22	N	9/10/22
Kathryn E. Kanzler, Patricia J. Robinson, Donald D. McGeary, Jim Mintz, Lisa Smith Kilpela, Erin P. Finley, Cindy McGeary, Eliot J.	2022	Addressing chronic pain with Focused Acceptance and Commitment Therapy in integrated primary	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22

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Lopez, Dawn Velligan, Mariana Munante, Joel Tsevat, Brittany Houston, Charles W. Mathias, Jennifer Sharpe Potter and Jacqueline Pugh		care: fndings from a mixed methods pilot randomized controlled trial																	
Karp JF; Shega JW; Morone NE; Weiner DK;	2008	Advances in understanding the mechanisms and management of persistent pain in older adults.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	Y	EX - 7/1	8/27/22	N	9/10/22
Tamila Roslyakova, Marie-Anne Falco & Aurélie Gauchet	2021	An exploratory clinical trial on acceptance and commitment therapy as an adjunct to psychoeducational relaxation therapy for chronic pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Jiaxi Lin, Sarah Paganini, Lasse Sander, Marianne Lüking, David Daniel Ebert, Monica Buhrman, Gerhard Andersson, Harald Baumeister	2017	An Internet-Based Intervention for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Jon Kabat-Zinn, Ph.D.	1982	An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results	Pubmed	8/22/22	Y	Y	Y	N	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/27/22	N	9/10/22
Andréa A. G. Nes & Sandra van Dulmen & Rikard Wicksell & Egil A. Fors & Hilde Eide	2016	Analyzing Change Processes Resulting from a Smartphone Maintenance	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES / SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL - TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
		Intervention Based on Acceptance and Commitment Therapy for Women with Chronic Widespread Pain																	
Sajjad Rezaei; Sedigheh Hassanzadeh	2019	Are mindfulness skills associated with reducing kinesiophobia, pain severity, pain catastrophizing and physical disability? Results of Iranian patients with chronic musculoskeletal pain	Psycinfo	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Holger Cramer, Romy Lauche, Jennifer Daubenmier, Wolf Mehling, Arndt Bussing, Felix J. Saha, Gustav Dobos, Stephanie A. Shields	2018	Being aware of the painful body: Validation of the German Body Awareness Questionnaire and Body Responsiveness Questionnaire in patients with chronic pain	Pubmed	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Hester R. Trompetter, Floortje Mols and Gerben J. Westerhof	2019	Beyond Adaptive Mental Functioning With Pain as the Absence of Psychopathology: Prevalence and Correlates of Flourishing in Two Chronic Pain Samples	Psycinfo	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22

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Cathcart, Stuart; Galatis, Nicola; Immink, Maarten; Proeve, Michael; Petkov, John;	2014	Brief mindfulness-based therapy for chronic tension-type headache: A Randomized controlled pilot study	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/28/22	N	9/10/22
Lance M. McCracken, PhD, Megan Davies, MSc, Whitney Scott, PhD, Mery Paroli, PsyD, Stephany Harris, BAN, and Karen Sanderson, RGN	2015	Can a Psychologically Based Treatment Help People to Live with Chronic Pain When They Are Seeking a Procedure to Reduce It?	Psyc info	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Michelle E. Martinez, BA, David J. Kearney, MD, Tracy Simpson, PhD, Benjamin I. Felleman, MS, Nicole Bernardi, BS, and George Sayre, PsyD	2015	Challenges to Enrollment and Participation in Mindfulness-Based Stress Reduction Among Veterans: A Qualitative Study	Pub med	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Lin Yu, Sam Norton, Lance M. McCracken	2017	Change in "Self-as-Context" ("Perspective-taking") Occurs in Acceptance and Commitment Therapy for People with Chronic Pain and is Associated with Improved Functioning	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Lin Yu, Whitney Scott, Lance M. McCracken	2022	Change in Fatigue in Acceptance and Commitment Therapy-Based Treatment for Chronic Pain and Its Association with Enhanced Psychological	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
		Flexibility																	
John A. Baranoff & Stephanie J. Hanrahan & Anne L. J. Burke & Jason P. Connor	2015	Changes in Acceptance in a Low-Intensity, Group-Based Acceptance and Commitment Therapy (ACT) Chronic Pain Intervention	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Aisling Daly-Eichenhardt, Whitney Scott, Matthew Howard-Jones, Thaleia Nicolaous and Lance M. McCracken	2016	Changes in Sleep Problems and Psychological Flexibility following Interdisciplinary Acceptance and Commitment Therapy for Chronic Pain: An Observational Cohort Study	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Joana Costa, José Pinto-Gouveia and João Marôco	2019	Chronic pain experience on depression and physical disability: The importance of acceptance and mindfulness-based processes in a sample with rheumatoid arthritis	Psycinfo	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Linn-Heidi Lunde Inger Hilde Nordhus	2009	Combining Acceptance and Commitment Therapy and Cognitive Behavioral Therapy for the Treatment of Chronic Pain in Older Adults	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	Y	Y	Mixed	N	N	N	In - 8/22/22	8/28/22	N	9/10/22
Kevin E. Vowles, Lance M. McCracken	2010	Comparing the role of psychological flexibility	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22

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		and traditional pain management coping strategies in chronic pain treatment outcomes																	
Dowd H; Hogan MJ; McGuire BE; Davis MC; Sarma KM; Fish RA; Zautra AJ	2015	Comparison of an Online Mindfulness-based Cognitive Therapy Intervention With Online Pain Management Psychoeducation: A Randomized Controlled Study.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/28/22	N	9/10/22
Zautra AJ; Davis MC; Reich JW; Nicassario P; Tennen H; Finan P; Kratz A; Parrish B; Irwin MR;	2008	Comparison of cognitive behavioral and mindfulness meditation interventions on adaptation to rheumatoid arthritis for patients with and without history of recurrent depression.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/28/22	N	9/10/22
Cherkin DC; Sherman KJ; Balderson BH; Turner JA; Cook AJ; Stoelb B; Herman PM; Deyo RA; Hawkes RJ	2014	Comparison of complementary and alternative medicine with conventional mind-body therapies for chronic back pain: protocol for the Mind-body Approaches to Pain (MAP) randomized controlled trial.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/28/22	N	9/10/22
Meeks, Thomas W.; Jeste, Dilip V.;	2007	Complementary and alternative medicine (CAM) use in geriatric psychiatry clinics	PsycInfo	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/28/22	N	9/10/22
Rebecca Campbell, Podugu Sai Durga Vara Prasadarao, and Mary Morris	2020	Conceptualization and Management of Chronic Pain in an	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	Y	Y	Mixed	N	N	N	In - 8/22/22	8/28/22	N	9/10/22

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		Over 65 Using an ACT Lens—A Single Case Study																	
Marisa Páez-Blarrina; Carmen Luciano; Olga Gutiérrez-Martínez; Sonsoles Valdivia; Miguel Rodríguez-Valverde; Jose Ortega	2008	Coping With Pain in the Motivational Context of Values Comparison Between an Acceptance-Based and a Cognitive Control–Based Protocol	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Lance M. McCracken, Estelle Barker, Joseph Chilcot	2014	Decentering, rumination, cognitive defusion, and psychological flexibility in people with chronic pain	Psycinfo	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Catherine E. Kerr, Krishnapriya Josyula, and Ronnie Littenberg	2010	Developing an Observing Attitude: An Analysis of Meditation Diaries in an MBSR Clinical Trial	Psycinfo	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Deborah Barrett, PhD, LCSW, Carrie E. Brintz , PhD, Amanda M. Zaski, MSW, and Mark J. Edlund, MD, PhD	2021	Dialectical Pain Management: Feasibility of a Hybrid Third-Wave Cognitive Behavioral Therapy Approach for Adults Receiving Opioids for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/28/22	N	9/10/22
Wong SY;	2009	Effect of mindfulness-based stress reduction programme on pain and quality of life in chronic pain patients: a randomised controlled clinical trial.	Pubmed	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/28/22	N	9/10/22
Azadeh Choobforoushzadeh; Azra Mohammadpanah Ardakan	2019	Effect of Mindfulness-Based Therapy on Pain and Depression	Psycinfo	8/22/22	Y	Y	Y	Y	MBT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22

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		in Multiple Sclerosis Patients																	
Henriksson J; Wasara E; Rönnlund M;	2016	Effects of Eight-Week-Web-Based Mindfulness Training on Pain Intensity, Pain Acceptance, and Life Satisfaction in Individuals With Chronic Pain.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Kim E. Innes, Terry Kit Selfe, Sahiti Kandati, Sijin Wen, and Zenzi Huysmans	2018	Effects of Mantra Meditation versus Music Listening on Knee Pain, Function, and Related Outcomes in Older Adults with Knee Osteoarthritis: An Exploratory Randomized Clinical Trial (RCT)	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
la Cour, Peter; Petersen, Marian;	2015	Effects of mindfulness meditation on chronic pain: A randomized controlled trial	PsycInfo	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Marasha de Jong, Sara W. Lazar, Kiran Hug, Wolf E. Mehling, Britta K. Hölzel, Alexander T. Sack, Frenk Peeters, Heidi Ashih, David Mischoulon and Tim Gard	2016	Effects of Mindfulness-Based Cognitive Therapy on Body Awareness in Patients with Chronic Pain and Comorbid Depression	Psycinfo	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Mike K. Kemani, MS, Gunnar L. Olsson, PhD, Mats Lekander, PhD, Hugo Hesser, PhD, Erik Andersson, PhD, and Rikard K. Wicksell, PhD	2015	Efficacy and Cost-effectiveness of Acceptance and Commitment Therapy and Applied Relaxation for	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22

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		Longstanding Pain A Randomized Controlled Trial																	
Chavooshi B; Mohammadkhani P; Dolatshahee B	2016	Efficacy of Intensive Short-Term Dynamic Psychotherapy for Medically Unexplained Pain: A Pilot Three-Armed Randomized Controlled Trial Comparison with Mindfulness-Based Stress Reduction.	Pubmed	6/22/22	Y	Y	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/29/22	N	9/10/22
Hearn JH; Cotter I; Finlay KA	2019	Efficacy of Internet-Delivered Mindfulness for Improving Depression in Caregivers of People With Spinal Cord Injuries and Chronic Neuropathic Pain: A Randomized Controlled Feasibility Trial.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Seminowicz DA; Burrowes SAB; Kearson A; Zhang J; Krimmel SR; Samawi L; Furman AJ; Keaser ML; Gould NF; Magyari T; White L; Goloubeva O; Goyal M; Peterlin BL; Haythornthwaite JA;	2020	Enhanced mindfulness-based stress reduction in episodic migraine: a randomized clinical trial with magnetic resonance imaging outcomes.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	N	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Eric L. Garland; Matthew O. Howard	2018	Enhancing Natural Reward Responsiveness Among Opioid Users Predicts Chronic Pain Relief: EEG Analyses From a Trial of	Psycinfo	8/22/22	Y	Y	Y	Y	MORE	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22

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		Mindfulness-Oriented Recovery Enhancement																	
Gardner-Nix J; Backman S; Barbati J; Grummitt J;	2008	Evaluating distance education of a mindfulness-based meditation programme for chronic pain management.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Cusens B; Duggan GB; Thorne K; Burch V;	2010	Evaluation of the breathworks mindfulness-based pain management programme: effects on well-being and multiple measures of mindfulness.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Doran, Natasha J.	2014	Experiencing wellness within illness: Exploring a mindfulness-based approach to chronic back pain	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Qualitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Gardner-Nix, Jacqueline; Barbati, Julianna; Grummitt, Jessica; Pukal, Sara; Raponi Newton, Rosa;	2014	Exploring the effectiveness of a mindfulness-based chronic pain management course delivered simultaneously to on-site and off-site patients using telemedicine	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Shuanghong Chen & Beibei You & Todd Jackson	2020	Facets of Mindfulness as Predictors of Emotional Distress Among Chinese Adults with Chronic Musculoskeletal Pain	Psyc info	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Carrie E. Brintz , PhD Isabel Roth , DrPH Keturah Faurot,	2020	Feasibility and Acceptability of an	Psyc info	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22

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PA, PhD Sanjana Rao, Susan A. Gaylord, PhD		Abbreviated, Four-Week Mindfulness Program for Chronic Pain Management																	
Whitney Scott, Beth J. Guildford, James Badenoch, Elizabeth Driscoll, Joseph Chilcot, Sam Norton, Harriet I. Kemp, Ming J. Lee, ulianne Lwanga, Marta Boffito, Graeme Moyle, Frank A. Post, Lucy Campbell, Jo Josh, Paul Clift, Amanda C de C Williams, Andrew SC Rice, Lance M McCracken	2021	Feasibility randomized-controlled trial of online acceptance and commitment therapy for painful peripheral neuropathy in people living with HIV: The OPEN study	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
W. Scott, J. Chilcot, B. Guildford, A. Daly-Eichenhardt, L.M. McCracken	2018	Feasibility randomized-controlled trial of online Acceptance and Commitment Therapy for patients with complex chronic pain in the United Kingdom	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Lance M. McCracken, Jane Zhao-O'Brien	2009	General psychological acceptance and chronic pain: There is more to accept than the pain itself	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Monica Buhrman, Astrid Skoglund, Josefin Husell, Kristina Bergström, Torsten Gordh, Timo Hursti, Nina Bendelin, Tomas Furmark, Gerhard Andersson	2013	Guided internet-delivered acceptance and commitment therapy for chronic pain patients: A randomized controlled trial	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Björnsdóttir, Sigrún Vala; Arnljótsdóttir, Margrét; Tómasson, Gunnar; Triebel, Jan; Valdimarsdóttir, Unnur Anna	2016	Health-related quality of life improvements among women with chronic pain: Comparison of two	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22

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		multidisciplinary interventions																	
Morone, Natalia E.; Lynch, Cheryl S.; Greco, Carol M.; Tindle, Hilary A.; Weiner, Debra K.;	2008	I felt like a new person' The effects of mindfulness meditation on older adults with chronic pain: Qualitative narrative analysis of diary entries	Psyc Info	6/22/22	Y	Y	Y	Y	Y	Y	Y	Qualatative	N	N	N	IN - 7/1	8/29/22	N	9/10/22
Bruno Cayoun & Akeesha Simmons & Alice Shires	2017	Immediate and Lasting Chronic Pain Reduction Following a Brief Self-Implemented Mindfulness-Based Interoceptive Exposure Task: a Pilot Study	Psyc info	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Ussher M; Spatz A; Copland C; Nicolaou A; Cargill A; Amini-Tabrizi N; McCracken LM;	2014	Immediate effects of a brief mindfulness-based body scan on patients with chronic pain.	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Máire-Bríd Caseya, David Murphy, Rachel Neary, Ciaran Wade, Conor Hearty, Catherine Doodya	2019	Individuals perspectives related to acceptance, values and mindfulness following participation in an acceptance-based pain management programme	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Kathleen Dorado, Kristin L Schreiber, Alexandra Koulouris, Robert R Edwards, Vitaly Napadow and Asimina Lazaridou	2018	Interactive effects of pain catastrophizing and mindfulness on pain intensity in women with fibromyalgia	Psyc info	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Hester R. Trompetter, Ernst T. Bohlmeijer, Martine M. Veehof, Karlein M. G. Schreurs	2014	Internet-based guided self-help intervention for chronic pain based on Acceptance	Pub med	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22

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		and Commitment Therapy: A randomized controlled trial																	
Brjann Ljotsson, Ehlin Atterlof, Maria Lagerlof, Erik Andersson, Susanna Jernelov, Erik Hedman, Mike Kemani, and Rikard K. Wicksell	2013	Internet-Delivered Acceptance and Values-Based Exposure Treatment for Fibromyalgia: A Pilot Study	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Jasmine Heath Hearn, Katherine Anne Finlay	2018	Internet-delivered mindfulness for people with depression and chronic pain following spinal cord injury: a randomized, controlled feasibility trial	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Madhav Goyal, MD, MPH; Jennifer A. Haythornthwaite, PhD	2016	Is It Time to Make Mind-Body Approaches Available for Chronic Low Back Pain?	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	N/A	N	N	Y	EX - 8/22/22	8/29/22	N	9/10/22
Anna Sophia Lestoquoy, Lance D. Laird, Suzanne Mitchell, Katherine Gergen-Barnett, N. Lily Negash, Kelly McCue, Racquel Enad, Paula Gardiner	2017	Living with chronic pain: Evaluating patient experiences with a medical group visit focused on mindfulness and non-pharmacological strategies	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Hansen, Karina Ejgaard; Kesmodel, Ulrik Schiøler; Kold, Mette; Forman, Axel;	2017	Long-term effects of mindfulness-based psychological intervention for coping with pain in endometriosis: A six-year follow-up on a pilot study	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Carson JW; Keefe FJ; Lynch	20	Loving-kindness	Pub	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitati	N	N	N	EX -	8/29/22	N	9/10/22

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TR; Carson KM; Goli V; Fras AM; Thorp SR;	05	meditation for chronic low back pain: results from a pilot trial.	med									ve				7/1			
Robert Schütze, Clare Rees, Minette Preece, Mark Schütze	2009	Low mindfulness predicts pain catastrophizing in a fear-avoidance model of chronic pain	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Melissa A. Day, PhD, L. Charles Ward, PhD, Beverly E. Thorn, PhD, John Burns, PhD, Dawn M. Ehde, PhD, Amanda J. Barnier, PhD, Jason B. Mattingley, PhD, and Mark P. Jensen, PhD	2020	Mechanisms of Mindfulness Meditation, Cognitive Therapy, and Mindfulness-based Cognitive Therapy for Chronic Low Back Pain	Psycinfo	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Rozworska KA; Poulin PA; Carson A; Tasca GA; Nathan HJ;	2020	Mediators and moderators of change in mindfulness-based stress reduction for painful diabetic peripheral neuropathy.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Gardiner P; Dresner D; Barnett KG; Sadikova E; Saper R;	2014	Medical group visits: a feasibility study to manage patients with chronic pain in an underserved urban clinic.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Kratz AL; F Murphy J 3rd; Kalpakjian CZ; Chen P;	2018	Medicate or Meditate? Greater Pain Acceptance is Related to Lower Pain Medication Use in Persons With Chronic Pain and Spinal Cord Injury.	Pubmed	6/22/22	Y	Y	Y	Y	N	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Wells RE; Burch R; Paulsen	20	Meditation for	Pub	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitati	N	N	N	EX -	8/29/22	N	9/10/22

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RH; Wayne PM; Houle TT; Loder E;	14	migraines: a pilot randomized controlled trial.	med									ve				7/1			
Sorrell, Jeanne M.;	2015	Meditation for older adults: A new look at an ancient intervention for mental health	Psyc Info	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N/A	N	Y	EX - 7/1	8/29/22	N	9/10/22
Kitty Kiosklia, Kirsty Winkley, Lance M. McCrackena	2019	Might psychological flexibility processes and Acceptance and Commitment Therapy (ACT) apply in adults with painful diabetic neuropathy? A cross-sectional survey	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Morone, Natalia E.; Greco, Carol M.;	2007	Mind-body interventions for chronic pain in older adults: A structured review	Psyc Info	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/29/22	N	9/10/22
John Greg Serpa & Christine P. Bourey & Ghislene N. Adjaoute & Jessica M. Pieczynski	2020	Mindful Self-Compassion (MSC) with Veterans: a Program Evaluation	Psyc info	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Lori A. Brotto; Sophie Bergeron; Bozena Zdaniuk and Rosemary Basson	2020	Mindfulness and Cognitive Behavior Therapy for Provoked Vestibulodynia: Mediators of Treatment Outcome and Long-Term Effects	Psyc info	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Davis, Mary C.; Zautra, Alex J.; Wolf, Laurie D.; Tennen, Howard; Yeung, Ellen W.;	2015	Mindfulness and cognitive–behavioral interventions for chronic pain: Differential effects on daily pain reactivity	Psyc Info	6/22/22	Y	Y	Y	Y	N	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22

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		and stress reactivity																	
Luiggi-Hernandez, José G.; Woo, Jean; Hamm, Megan; Greco, Carol M.; Weiner, Debra K.; Morone, Natalia E.;	2018	Mindfulness for chronic low back pain: A qualitative analysis	Psyc Info	6/22/22	Y	Y	Y	Y	Y	Y	Y	Qualatative	N	N	N	IN - 7/1	8/29/22	N	9/10/22
Lush E; Salmon P; Floyd A; Studts JL; Weissbecker I; Sephton SE;	2009	Mindfulness meditation for symptom reduction in fibromyalgia: psychophysiological correlates.	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Morone NE; Greco CM; Weiner DK;	2008	Mindfulness meditation for the treatment of chronic low back pain in older adults: a randomized controlled pilot study.	Pub med	6/22/22	Y	Y	Y	Y	Y	Y	Y	Quantitative	N	N	N	IN - 7/1	8/29/22	N	9/10/22
eize-Grochowski R; Shuster G; Boursaw B; DuVal M; Murray-Krezan C; Schrader R; Smith BW; Herman CJ; Prasad A;	2015	Mindfulness meditation in older adults with postherpetic neuralgia: a randomized controlled pilot study.	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Petersen M; la Cour P;	2016	Mindfulness--What Works for Whom? Referral, Feasibility, and User Perspectives Regarding Patients with Mixed Chronic Pain.	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Melissa A. Day, MA, Beverly E. Thorn, PhD, L. Charles Ward, PhD, Nancy Rubin, PsyD, Steven D. Hickman, PsyD, Forrest Scogin, PhD, and Gary R. Kilgo, MD	2014	Mindfulness-based Cognitive Therapy for the Treatment of Headache Pain	Pub med	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Day MA; Thorn BE; Rubin NJ;	2014	Mindfulness-based cognitive therapy for the treatment of headache pain: A mixed-methods	Pub med	6/22/22	Y	Y	Y	Y	Y	N	N	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22

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		analysis comparing treatment responders and treatment non-responders.																	
Igna, Raluca; Ștefan, Simona; Onac, Ioan; Onac, Ioana; Ungur, Rodica-Ana; Szentagotai Tatar, Aurora;	2014	Mindfulness-based cognitive-behavior therapy (MCBT versus virtual reality (VR) enhanced CBT, versus treatment as usual for chronic back pain A clinical trial	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Tarun Kumar Mittal, Emma Evans, Alison Pottle, Costas Lambropoulos, Charlotte Morris, Christina Surawy, Antony Chuter, Felicia Cox, Ranil de Silva, Mark Mason, Winston Banya, Diviash Thakrar, Peter Tyrer	2022	Mindfulness-based intervention in patients with persistent pain in chest (MIPIC) of non-cardiac cause: a feasibility randomised control study	Pub med	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Nadia Hussain, MBBS, MSc, PhD1 and Amira S. A. Said, BSc Pharm, MSc, PhD1	2019	Mindfulness-Based Meditation Versus Progressive Relaxation Meditation: Impact on Chronic Pain in Older Female Patients With Diabetic Neuropathy	Pub med	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Stefan Schmidta, Sophia Gmeinera Claudia Schultzc Marc Löwerd Klaus Kuhna José Raúl Naranjoa Christina Brenneisena Thilo Hinterbergera,	2015	Mindfulness-based Stress Reduction (MBSR) as Treatment for Chronic Back Pain – an Observational Study with Assessment of Thalamocortical Dysrhythmia	Pub med	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Rosenzweig S; Greeson JM; Reibel DK; Green JS; Jasser	2010	Mindfulness-based stress reduction for chronic	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22

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SA; Beasley D;		pain conditions: variation in treatment outcomes and role of home meditation practice.																	
Esmer G; Blum J; Rulf J; Pier J;	2010	Mindfulness-based stress reduction for failed back surgery syndrome: a randomized controlled trial.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Cramer H; Haller H; Lauche R; Dobos G;	2012	Mindfulness-based stress reduction for low back pain. A systematic review.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
MAJ Carol D. Crisp, USAF NC; Marie Hastings-Tolsma, PhD, CNM, FACNM; Karen R. Jonscher, PhD	2016	Mindfulness-Based Stress Reduction for Military Women With Chronic Pelvic Pain: A Feasibility Study	Pubmed	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Cynthia Marske, DO; Samantha Shah, MD; Aaron Chavira, DO; Caleb Hedberg, DO, MPH; Raelin Fullmer, DO; Christopher James Clark, OMS IV; Olivia Pipitone, MPH; Paulina Kaiser, DPH	2020	Mindfulness-Based Stress Reduction in the Management of Chronic Pain and Its Comorbid Depression	Pubmed	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22
Ardito RB; Pirro PS; Re TS; Bonapace I; Menardo V; Bruno E; Gianotti L	2017	Mindfulness-Based Stress Reduction Program on Chronic Low-Back Pain: A Study Investigating the Impact on Endocrine, Physical, and Psychologic Functioning.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
WILLIAM R. MARCHAND, MD	2012	Mindfulness-Based Stress Reduction, Mindfulness-Based	Psycinfo	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/29/22	N	9/10/22

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		Cognitive Therapy, and Zen Meditation for Depression, Anxiety, Pain, and Psychological Distress																	
Beaulac, Julie; Bailly, Matthew	2015	Mindfulness-Based Stress Reduction: Pilot study of a treatment group for patients with chronic pain in a primary care setting	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/29/22	N	9/10/22
Okvat, Heather A.; Davis, Mary C.; Mistretta, Erin G.; Mardian, Aram S.;	2022	Mindfulness-based training for women veterans with chronic pain: A retrospective study	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Maaike J. de Boer, Hannemike E. Steinhagen, Gerbrig J. Versteegen, Michel M. R. F. Struys, Robbert Sanderman	2014	Mindfulness, Acceptance and Catastrophizing in Chronic Pain	Psyc info	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Emma Louise Cassidy, Rachel Jane Atherton, Noelle Robertson, David Andrew Walsh, Raphael Gillett	2011	Mindfulness, functioning and catastrophizing after multidisciplinary pain management for chronic low back pain	Pub med	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Carvalho SA; Gillanders D; Palmeira L; Pinto-Gouveia J; Castilho P;	2018	Mindfulness, selfcompassion, and depressive symptoms in chronic pain: The role of pain acceptance.	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Felsted KF;	2010	Mindfulness, Stress, and Aging.	Pub med	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/30/22	N	9/10/22
Melissa A. Day, Beverly E. Thorn, Dawn M. Ehde, John W. Burns, Amanda Barnier,{ Jason B. Mattingley, Natasha	2019	Moderators of Mindfulness Meditation, Cognitive Therapy, and	Pub med	8/22/22	Y	Y	Y	Y	MBCT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

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Matthews, and Mark P. Jensenz		Mindfulness-Based Cognitive Therapy for Chronic Low Back Pain: A Test of the Limit, Activate, and Enhance Model																	
Semra A. Aytur, Kimberly L. Ray, Sarah K. Meier, Jenna Campbell, Barry Gendron, Noah Waller and Donald A. Robin	2021	Neural Mechanisms of Acceptance and Commitment Therapy for Chronic Pain: A Network-Based fMRI Approach	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Matthew Scott Herbert, Niloofar Afari, J.B. Robinson, Andrew Listvinsky, Mark W. Bondi, Julie Loebach Wetherell	2018	Neuropsychological Functioning and Treatment Outcomes in Acceptance and Commitment Therapy for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Morone NE;	2019	Not Just Mind Over Matter: Reviewing With Patients How Mindfulness Relieves Chronic Low Back Pain.	Pubmed	6/22/22	Y	Y	Y	Y	Y	Y	Y	N/A	N	N	Y	EX - 7/1	8/30/22	N	9/10/22
Rod K;	2015	Observing the Effects of Mindfulness-Based Meditation on Anxiety and Depression in Chronic Pain Patients.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Lilian N. Dindo & Ana Recober & Chadi A. Calarge & Bridget M. Zimmerman & Aliza Weinrib & James N. Marchman & Carolyn Turvey	2019	One-Day Acceptance and Commitment Therapy Compared to Support for Depressed Migraine Patients: a Randomized Clinical Trial	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Kitty Kioskli, MSc, Whitney Scott, PhD, Kirsty Winkley,	2020	Online Acceptance and Commitment Therapy	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

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PhD, Emma Godfrey, PhD, and Lance M. McCracken, PhD		for People with Painful Diabetic Neuropathy in the United Kingdom: A Single-Arm Feasibility Trial																	
Yael Conti, MA; Jean-Jacques Vatine, MD; Sigal Levy, PhD; Yulia Levin Meltz, MA; Sami Hamdan, PhD; Odelia Elkana, PhD	2020	Pain Catastrophizing Mediates the Association Between Mindfulness and Psychological Distress in Chronic Pain Syndrome	Pubmed	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Sheria G. Robinson-Lane, PhD, RN, and April Hazard Vallerand, PhD, RN	2017	Pain Treatment Practices of Community-Dwelling Black Older Adults	Pubmed	8/22/22	Y	Y	Y	Y	N/A	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Cho S; Heiby EM; McCracken LM; Lee SM; Moon DE;	2010	Pain-related anxiety as a mediator of the effects of mindfulness on physical and psychosocial functioning in chronic pain patients in Korea.	Pubmed	6/22/22	Y	Y	Y	Y	N	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Kevin E. Vowles, Lance M. McCracken, and Christopher Eccleston	2008	Patient Functioning and Catastrophizing in Chronic Pain: The Mediating Effects of Acceptance	Psycinfo	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Nina Bendelin, Pär Björkdahl, Mimmi Risell, Karin Zetterqvist Nelson, Björn Gerdle, Gerhard Andersson, and Monica Buhrman	2020	Patients' experiences of internet-based Acceptance and commitment therapy for chronic pain: a qualitative study	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Qualitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

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Katherine VanBuskirk, Scott Roesch, Niloofar Afari, and Julie Loebach Wetherell	2014	Physical Activity of Patients With Chronic Pain Receiving Acceptance and Commitment Therapy or Cognitive Behavioural Therapy	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Ehrenbrusthoff, Katja; Ryan, Cormac G.; Schofield, Patricia A.; Martin, Denis J.;	2012	Physical therapy management of older adults with chronic low back pain: A systematic review	Psyc Info	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/30/22	N	9/10/22
Howarth A; Riaz M; Perkins-Porras L; Smith JG; Subramaniam J; Copland C; Hurley M; Beith I; Ussher M;	2019	Pilot randomised controlled trial of a brief mindfulness-based intervention for those with persistent pain.	Pub med	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Hester R. Trompetter, Ernst T. Bohlmeijer, Sanne M. A. Lamers and Karlein M. G. Schreurs	2016	Positive Psychological Wellbeing Is Required for Online Self-Help Acceptance and Commitment Therapy for Chronic Pain to be Effective	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
David Cosio	2015	Practice-based evidence for outpatient, acceptance & commitment therapy for veterans with chronic, non-cancer pain	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Lin Yu, Lance M. McCracken, Whitney Scott	2021	Predictors of outcomes following interdisciplinary acceptance and commitment therapy for chronic pain: Profiling psychological	Psyc info	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

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		flexibility																	
Zhou J; Peng P; Xie X;	2018	Prevalence of Pain and Effects of a Brief Mindfulness-Based Intervention on Chinese Community-Dwelling Older Adults with Chronic Pain.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
M.K. Kemani, H. Hesser, G.L. Olsson, M. Lekander, R.K. Wicksell	2015	Processes of change in Acceptance and Commitment Therapy and Applied Relaxation for long-standing pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Lance M. McCracken, Olga Gutiérrez-Martínez	2011	Processes of change in psychological flexibility in an interdisciplinary group-based treatment for chronic pain based on Acceptance and Commitment Therapy	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Hester R. Trompetter, Ernst T. Bohlmeijer, Jean-Paul Fox, Karlein M.G. Schreurs	2014	Psychological flexibility and catastrophizing as associated change mechanisms during online Acceptance & Commitment Therapy for chronic pain	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Charlotte Gentili, Jenny Rickardsson, Vendela Zetterqvist, Laura E. Simons, Mats Lekander and Rikard K. Wicksell	2019	Psychological Flexibility as a Resilience Factor in Individuals With Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Rikard K. Wicksell, Gunnar L. Olsson, Steven C. Hayes	2010	Psychological flexibility as a mediator of improvement in Acceptance and	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

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		Commitment Therapy for patients with chronic pain following whiplash																	
Lance M. McCracken, Sophie C. Velleman	2009	Psychological flexibility in adults with chronic pain: A study of acceptance, mindfulness, and values-based action in primary care	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Jiaxi Lin, Laura-Isabelle Klatt	2017	Psychological flexibility mediates the effect of an online-based acceptance and commitment therapy for chronic pain: an investigation of change processes	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Heather D. Simistera, Gregg A. Tkachuk, Barbara L. Shayd, Norah Vincent, Joseph J. Pear, Ryan Q. Skrabek	2017	Randomized Controlled Trial of Online Acceptance and Commitment Therapy for Fibromyalgia	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Kenneth Ian Pakenham and Megan Fleming	2010	Relations between acceptance of multiple sclerosis and positive and negative adjustments	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Carmody, James; Baer, Ruth A.;	2008	Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program	Psyc Info	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/ SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Abhimanyu Sud, Michelle L. A. Nelson, Darren K. Cheng, Alana Armas, Kirk Foat, Michelle Greiver, Fardous Hosseiny, Joel Katz, Rahim Moineddin, Benoit H. Mulsant, Ronnie I. Newman, Leon Rivlin, Akshya Vasudev, and Ross Upshur	2020	Sahaj Samadhi Meditation versus a Health Enhancement Program for depression in chronic pain: protocol for a randomized controlled trial and implementation evaluation	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Matthew Scott Herbert, Niloofar Afari, Lin Liu, Pia Heppner, Thomas Rutledge, Kathryn Williams, Satish Eraly, Katie VanBuskirk, Cathy Nguyen, Mark Bondi, J. Hampton Atkinson, Shahrokh Golshan, Julie Loebach Wetherell	2016	Telehealth versus In-Person Acceptance and Commitment Therapy for Chronic Pain: A Randomized Non-Inferiority Trial	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Jason Lillis, PhD, J. Graham Thomas, PhD, Richard B. Lipton, MD, Lucille Rathier, PhD, Julie Roth, MD, Jelena Pavlovic, MD, Kevin C. O'Leary, MA, Dale S. Bond, PhD	2018	The Association of Changes in Pain Acceptance and Headache-Related Disability	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Lance M. McCracken, PhD, Philomena DaSilva, Beth Skillicorn, DClinPsy, and Richard Doherty, DClinPsy	2014	The Cognitive Fusion Questionnaire A Preliminary Study of Psychometric Properties and Prediction of Functioning in Chronic Pain	Pubmed	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Morone NE; Greco CM; Rollman BL; Moore CG; Lane B; Morrow L; Glynn	2012	The design and methods of the aging successfully with pain study.	Pubmed	6/22/22	Y	Y	Y	Y	Y	Y	Y	Quantative	N	N	Y	EX - 7/1	8/30/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
NW; Delaney J; Albert SM; Weiner DK;																			
Teixeira E;	2010	The effect of mindfulness meditation on painful diabetic peripheral neuropathy in adults older than 50 years.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Joseph M. Rizzo and Robert C. Schwartz	2020	The Effect of Mindfulness, Psychological Flexibility, and Emotional Intelligence on Self-Efcacy and Functional Outcomes Among Chronic Pain Clients	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Hadi Mo'tamedi, MD; Payman Rezaiemaram, MS; Abaas Tavallaie, MD	2012	The Effectiveness of a Group-Based Acceptance and Commitment Additive Therapy on Rehabilitation of Female Outpatients With Chronic Headache: Preliminary Findings Reducing 3 Dimensions of Headache Impacthead_2192	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Marnie Johnston MSocSci/PGDip Clin Psych, Prof Mary Foster PhD, Jeannette Shennan MSocSci/PGDip Clin Psych, Nicola J. Starkey PhD and Anders Johnson M.D. PhD	2010	The Effectiveness of an Acceptance and Commitment Therapy Self-Help Intervention for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

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Chavez JL; Porucznik CA; Gren LH; Guan J; Joyce E; Brodke DS; Dailey AT; Mahan MA; Hood RS; Lawrence BD; Spiker WR; Spina NT; Bisson EF	2020	The Impact of Preoperative Mindfulness-Based Stress Reduction on Postoperative Outcomes in Lumbar Spine Degenerative Disease: 3-Month and 12-Month Results of a Pilot Study.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Yi JL; Porucznik CA; Gren LH; Guan J; Joyce E; Brodke DS; Dailey AT; Mahan MA; Hood RS; Lawrence BD; Spiker WR; Spina NT; Bisson EF;	2019	The Impact of Preoperative Mindfulness-Based Stress Reduction on Postoperative Patient-Reported Pain, Disability, Quality of Life, and Prescription Opioid Use in Lumbar Spine Degenerative Disease: A Pilot Study.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	N	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Hester R. Trompetter, Ernst T. Bohlmeijer, Bianca van Baalen, Marco Kleen, Albère Köke, Michiel Reneman, and Karlein M. G. Schreurs	2014	The Psychological Inflexibility in Pain Scale (PIPS) Exploration of Psychometric Properties in a Heterogeneous Chronic Pain Sample	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Zahra Azizi, Gholamreza Jandaghi, Manijeh Firoozi, Ali Zia-Tohidi, Shahrokh Ebnerasouli	2022	The Relative Importance of Mindfulness Facets and Their Interactions: Relations to Psychological Symptoms in Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/ SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Mark P. Jensen, PhD, Beverly E. Thorn, PhD, James Carmody, PhD, Francis J. Keefe, PhD, and John W. Burns, PhD	2019	The role of cognitive content and cognitive processes in chronic pain: An important distinction?	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Adler-Neal AL; Waugh CE; Garland EL; Shaltout HA; Diz DI; Zeidan F	2020	The Role of Heart Rate Variability in Mindfulness-Based Pain Relief.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	N	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
James D. Doorley, Jonathan Greenberg, Matthew Stauder, Ana-Maria Vranceanu	2021	The Role of Mindfulness and Relaxation in Improved Sleep Quality Following a Mind–Body and Activity Program for Chronic Pain	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Lance M. McCracken , Jeremy Gauntlett-Gilbert, Kevin E. Vowles	2006	The role of mindfulness in a contextual cognitive-behavioral analysis of chronic pain-related suffering and disability	Psycinfo	8/22/22	Y	Y	Y	Y	N/A	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Hester R. Trompetter Karlein M.G. Schreurs Peter H.T.G. Heuts Miriam M. Vollenbroek-Hutten	2014	The systematic implementation of Acceptance and Commitment Therapy (ACT) in Dutch multidisciplinary chronic pain rehabilitation	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Roger Vilardaga, Ph.D., Pamela Stitzlein Davies, MS, ARNP, Kevin E. Vowles,	2020	Theoretical Grounds of Pain Tracker Self Manager: An	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

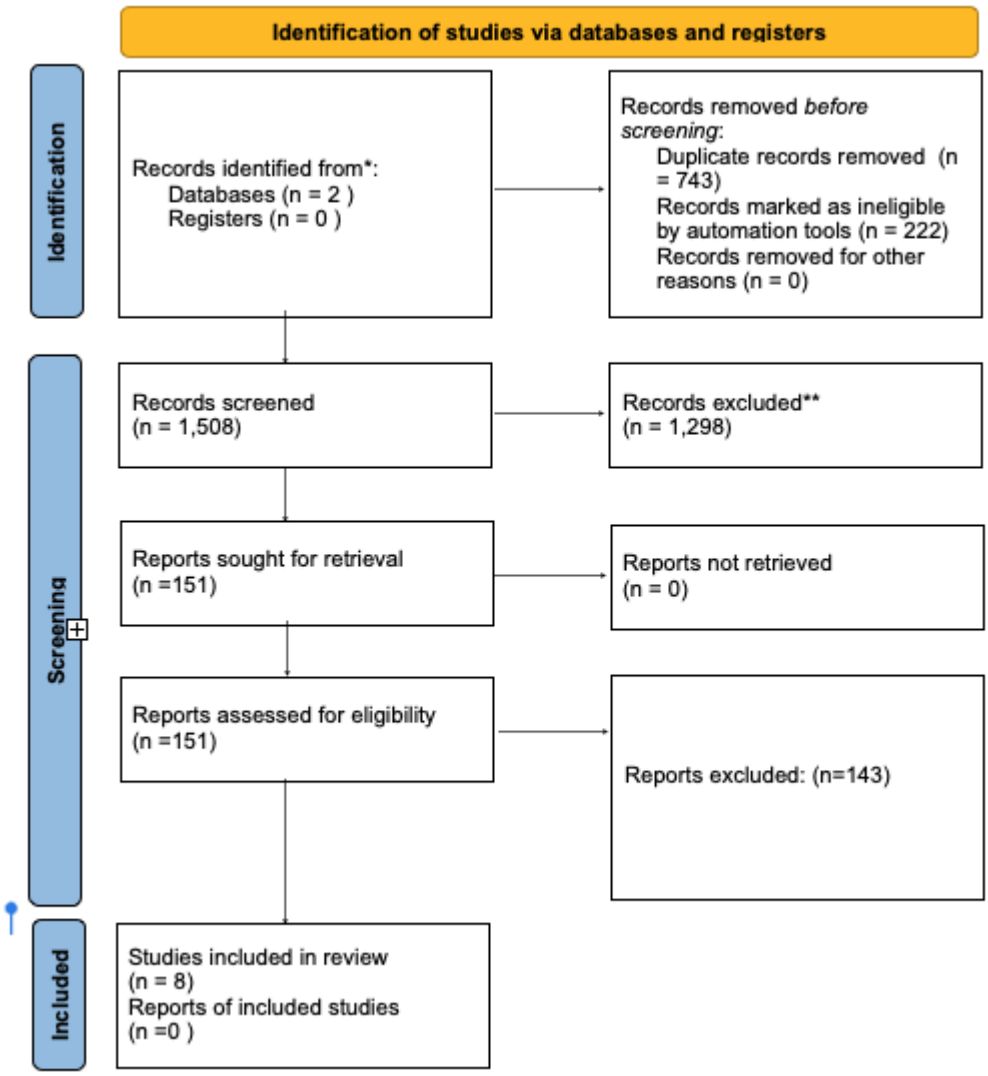
Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
Ph.D., Mark D. Sullivan, M.D., Ph.D.		Acceptance and Commitment Therapy Digital Intervention for Patients with Chronic Pain																	
Peilot B; Andréll P; Samuelsson A; Mannheimer C; Frodi A; Sundler AJ;	2014	Time to gain trust and change--experiences of attachment and mindfulness-based cognitive therapy among patients with chronic pain and psychiatric co-morbidity.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Qualitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Stefan Schmidt, Paul Grossman, Barbara Schwarzer, Susanne Jena, Johannes Naumann, Harald Walach	2010	Treating fibromyalgia with mindfulness-based stress reduction: Results from a 3-armed randomized controlled trial q	Pubmed	8/22/22	Y	Y	Y	Y	MBSR	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Whitney Scott, PhD, Aisling Daly, BA, Lin Yu, MS, and Lance M. McCracken, PhD	2017	Treatment of Chronic Pain for Adults 65 and Over: Analyses of Outcomes and Changes in Psychological Flexibility Following Interdisciplinary Acceptance and Commitment Therapy (ACT)	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	Y	Y	Quantitative	N	N	N	In - 8/22/22	8/30/22	N	9/10/22
Julia R. Craner , PhD; Eric S. Lake, MA; Kimberly A. Bancroft, PhD; Logan L.	2019	Treatment Outcomes and Mechanisms for an ACT-Based 10-Week	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/ SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
George, BS		Interdisciplinary Chronic Pain Rehabilitation Program																	
Cherkin DC; Anderson ML; Sherman KJ; Balderson BH; Cook AJ; Hansen KE; Turner JA	2017	Two-Year Follow-up of a Randomized Clinical Trial of Mindfulness-Based Stress Reduction vs Cognitive Behavioral Therapy or Usual Care for Chronic Low Back Pain.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Moore, Kirsty M.; Martin, Michelle E.;	2015	Using MBCT in a chronic pain setting: A qualitative analysis of participants' experiences	PsycInfo	6/22/22	Y	Y	Y	Y	Y	N	Y	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22
Anthony M. Harrison, Lance M. McCracken, Katherine Jones, Sam Norton & Rona Moss-Morris	2016	Using mixed methods case-series evaluation in the development of a guided self-management hybrid CBT and ACT intervention for multiple sclerosis pain	Pubmed	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Samantha C. Holmes, Alejandra Gonzalez, Philip A. Allen, and Dawn M. Johnson	2019	Utilizing Group Acceptance and Commitment Therapy (ACT) to Address Chronic Pain, Coping, and Functioning for Patients With Chiari	Psycinfo	8/22/22	Y	Y	Y	Y	ACT	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22

Author	YEAR	ABBREVIATED TITLE	DATABASES/SOURCES	TITLE, KEYWORD, AND ABSTRACT SCREEN: DECISION - DATE	FULL-TEXT SCREEN?	INCL (SO): *Published Study* in Peer Reviewed Journal	INCL (SO): *Published in English*	INCL(RV): Published after 2004	INCL (RV): MBSR or MBCT (or adaptation)	INCL(PAR): Age 65+	INCL(PAR): Chronic Pain (3+ months)	INCL (M): *Quantitative* or Qualitiative	EXCL: Cancer Related Chronic Pain	EXCL: Exclusion Dementia	EXCL: Background article?	REVIEWER DECISION - DATE	SECONDARY/ CONFIMATORY DECISION	FINAL DECISION	FINAL DECISION DATE
		Malformation: A Case Example																	
Reid MC; Ong AD; Henderson CR Jr;	2016	Why We Need Nonpharmacologic Approaches to Manage Chronic Low Back Pain in Older Adults.	Pubmed	6/22/22	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	N	N	Y	EX - 7/1	8/30/22	N	9/10/22
Ólöf Birna Kristjánsdóttir, Egil A Fors, Erlend Eide, Arnstein Finset, Sandra van Dulmen, Sigrid Hørven Wigers, Hilde Eide	2011	Written online situational feedback via mobile phone to support self-management of chronic widespread pain: a usability study of a Web-based intervention	Pubmed	8/22/22	Y	Y	Y	Y	MBI	N	Y	Quantitative	N	N	N	EX - 8/22/22	8/30/22	N	9/10/22
Yi JL; Porucznik CA; Gren LH; Guan J; Joyce E; Brodke DS; Dailey AT; Mahan MA; Hood RS; Lawrence BD; Spiker WR; Spina NT; Bisson EF;	2019	The Impact of Preoperative Mindfulness-Based Stress Reduction on Postoperative Patient-Reported Pain, Disability, Quality of Life, and Prescription Opioid Use in Lumbar Spine Degenerative Disease: A Pilot Study.	Pubmed	6/22/22	Y	Y	Y	Y	Y	N	N	Quantitative	N	N	N	EX - 7/1	8/30/22	N	9/10/22

APPENDIX E

Flow Diagram


Identification of studies via databases and registers
Identification
Records identified from*:
Databases (n = 2)
Registers (n = 0)
Records removed *before screening*:
Duplicate records removed (n = 743)
Records marked as ineligible by automation tools (n = 222)
Records removed for other reasons (n = 0)
Screening
Records screened
(n = 1,508)
Records excluded**
(n = 1,298)
Reports sought for retrieval
(n =151)
Reports not retrieved
(n = 0)
Reports assessed for eligibility
(n =151)
Reports excluded: (n=143)
Included
Studies included in review
(n = 8)
Reports of included studies
(n =0)

APPENDIX F

Data Collection and Extraction Form

Authors and year	**Miriam Alonso-Fernandez, PhD, Almudena Lopez-Lopez, PhD, Andres Losada, PhD, Jose Luis Gonzalez, PhD, and Julie Loebach Wetherell, PhD, 2016**	**Rebecca Campbell, Podugu Sai Durga Vara Prasadarao, and Mary Morris, 2021**	**Linn-Heidi Lunde & Hilde Nordhus, 2009**	**Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD;Nancy W. Glynn, PhD; Debra K. Weiner, MD, 2016**	**Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD;Nancy W. Glynn, PhD; Debra K. Weiner, MD**	**Whitney Scott, PhD, Aisling Daly, BA, Lin Yu, MSc, and Lance M. McCracken, PhD**	**Natalia E. Morone, Carol M. Greco, Debra K. Weiner, 2008**	**Natalia E. Morone, MD, MS, Bruce L. Rollman, MD, MPH, Charity G. Moore, PhD, Li Qin, PhD, and Debra K. Weiner, MD, 2009**	**Jose´ G. Luiggi-Hernandez, MPH, Jean Woo, MD, Megan Hamm, PhD, Carol M. Greco, PhD, Debra K.Weiner, MD, and Natalia E. Morone, MD, MS, 2016**
The Data Collection and Extraction Form	5000	5001	5002	5003	5004	5005	5006	5007	5008
Cite	Alonso-Fernández, Lopez, Losada, Gonzalez, & Wetherell, 2016	Campbell, Prasadaro, & Morris, 2021	Lunde & Nordhus, 2009	Morone et. al, 2016	Morone 2016	Scott 2017	Morone, Greco, & Weiner, 2008	Morone, Rollman, Moore, Quin, & Weiner, 2009	Luiggi-Hernandez, Woo, Greco, Weiner, and Morone 2018
Title	Acceptance and Commitment Therapy and Selective Optimization with Compensation for Institutionalized Older People with Chronic Pain.	Conceptualization and management of chronic pain in an over 65 using an ACT lens—A single case study	Combining acceptance and commitment therapy and cognitive behavioral therapy for the treatment of chronic pain in older adults	A Mind-Body Program for Older Adults With Chronic Low Back Pain: A Randomized Clinical Trial.	A Mind-Body Program for Older Adults With Chronic Low Back Pain: A Randomized Clinical Trial.	Treatment of chronic pain for adults 65 and over: Analyses of outcomes and changes in psychological flexibility following interdisciplinary acceptance and commitment therapy (ACT)	Mindfulness meditation for the treatment of chronic low back pain in older adults: A randomized controlled pilot study	A mind-body program for older adults with chronic low back pain: Results of a pilot study	Mindfulness for chronic low back pain: A qualitative analysis
Country	Spain	Australia	Norway	United States	United States	UK	United States	United States	United States
Study Aim	Efficacy of a combined ACT intervention with training in SOC strategies for older people with chronic musculoskeletal pain living in nursing homes -comparison with a Minimal Support (MS) condition.	The use of a single case study to illustrate the application/utility of ACT for a 72 year old male presenting w/ chronic pain and complex health conditions	Case study of using an ACT & CBT on an older adult to help manage chronic pain	To determine the effectiveness of a mind-body program at increasing function and reducing pain in older adults with chronic LBP - Abstract	To determine the effectiveness of a mind-body program at increasing function and reducing pain in older adults with chronic LBP - Abstract	to examine the effectiveness of acceptance and commitment therapy (ACT) for older adults with chronic pain. Secondarily, to examine the associations between changes on processes of psychological flexibility and treatment outcome variables ("abstract" "objective")	The primary aim of this pilot study was to assess the feasibility of recruitment and adherence to an eight-session mindfulness meditation program for community-dwelling older adultsPage 65 with CLBP. The secondary aim was to develop initial estimates of treatment effects on measures of pain, physical function and quality of life.	Determine the impact of an 8-week mindfulness meditation program on disability, psychological function, and pain severity in community-dwelling older adults with chronic low back pain, and to test the education control program for feasibility (p 1395 Abstact)	The objective of this study was to investigate dominant themes present in the experiences of older adults applying mindfulness and meditation to cope with cLBP

Authors and year	**Miriam Alonso-Fernandez, PhD, Almudena Lopez-Lopez, PhD, Andres Losada, PhD, Jose Luis Gonzalez, PhD, and Julie Loebach Wetherell, PhD, 2016**	**Rebecca Campbell, Podugu Sai Durga Vara Prasadarao, and Mary Morris, 2021**	**Linn-Heidi Lunde & Hilde Nordhus, 2009**	**Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD;Nancy W. Glynn, PhD; Debra K. Weiner, MD, 2016**	**Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD;Nancy W. Glynn, PhD; Debra K. Weiner, MD**	**Whitney Scott, PhD, Aisling Daly, BA, Lin Yu, MSc, and Lance M. McCracken, PhD**	**Natalia E. Morone, Carol M. Greco, Debra K. Weiner, 2008**	**Natalia E. Morone, MD, MS, Bruce L. Rollman, MD, MPH, Charity G. Moore, PhD, Li Qin, PhD, and Debra K. Weiner, MD, 2009**	**Jose´ G. Luiggi-Hernandez, MPH, Jean Woo, MD, Megan Hamm, PhD, Carol M. Greco, PhD, Debra K.Weiner, MD, and Natalia E. Morone, MD, MS, 2016**
Method of Study	Quantitative	Mixed Method	Quantitative	Quantitative	Quantitative	Quantitative	Quantitative	Quantitative	Qualitative
Study Design	Randomized controlled trial	Case Study	Case Study	Randomized education-controlled clinical trial	Randomized education-controlled clinical trial	Quasi-Experimental correlational study	Randomized controlled pilot study	Randomized education controlled trial	Focus Group
Initial Duration	9 weeks	8 weeks	8 sessions of 1.5 hr therapy.	8 weeks	8 weeks + 6 months (abstract)	2 or 4 weeks	8 weeks	8 weeks, 90 minute sessions	8 weeks
Follow-Up	Unspecified	N/A	N/A	6 monthly booster session		9 months	12 weeks	4 months	N/A
Population location	Nursing home	community	Outpatient clinic at a university hospital	Community	Community	Community	Community	Community	Community, had completed prior program
Inclusion criteria	Over 65; dx of chronic musculoskeletal pain for at least 6 months; ability to read and write at an adequate level of proficiency.	N/A	70 yr old married woman. Retired primary schoolteacher who retired at 64 due to pain.	≥ 65 years old, intact cognition (MMSE ≥ 24), had functional limitations d/t CLBP (Score ≥ on RMDQ), had self reported chronic pain levels occurring daily or almost daily for at least 3 months	≥ 65 years old, intact cognition (MMSE ≥ 24), had functional limitations d/t CLBP (Score ≥ on RMDQ), had self reported chronic pain levels occurring daily or almost daily for at least 3 months	≥65 (p 254 para 2) Pain for longer than 3 months, pain associated with significant levels of distress/disability, and deemed likely to benefit from the program. (p 254 "methods" "participants"). Low back pain	65 years or older; intact cognition (MMSE at least 23), CLBP, english speaking	CLBP of at least 3 mo duration and of at least moderate intensity, age at least 65, and intact cognition (MMSE equal or greater than 24)	Spoke english, 65 and older, intact cognition, functional limitations d/t clbp
Exclusion criteria	Malignant pain; dementia or severe cognitive impairment; sensory disability or series psychiatric or psychological disorder	N/A		Participation in prior mindfulness meditation program, serious underlying illness,	Participation in prior mindfulness meditation program, serious underlying illness,	Cognitive impairment and/or poorly controlled psychiatric comorbidities (p 254 "methods" "participants")	Had previously participated in a mindfulness meditation program, had two "red flags suggestive of underlying serious illness.	Non-english speaking, previous participation in MM program, serious hearing or vision impairment, medical instability from heart or lung	Cancer related pain

Authors and year	Miriam Alonso-Fernandez, PhD, Almudena Lopez-Lopez, PhD, Andres Losada, PhD, Jose Luis Gonzalez, PhD, and Julie Loebach Wetherell, PhD, 2016	Rebecca Campbell, Podugu Sai Durga Vara Prasadarao, and Mary Morris, 2021	Linn-Heidi Lunde & Hilde Nordhus, 2009	Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD;Nancy W. Glynn, PhD; Debra K. Weiner, MD, 2016	Natalia E. Morone, MD, MS; Carol M. Greco, PhD; Charity G. Moore, PhD; Bruce L. Rollman, MD, MPH; Bridget Lane, MA; Lisa A. Morrow, PhD;Nancy W. Glynn, PhD; Debra K. Weiner, MD	Whitney Scott, PhD, Aisling Daly, BA, Lin Yu, MSc, and Lance M. McCracken, PhD	Natalia E. Morone, Carol M. Greco, Debra K. Weiner, 2008	Natalia E. Morone, MD, MS, Bruce L. Rollman, MD, MPH, Charity G. Moore, PhD, Li Qin, PhD, and Debra K. Weiner, MD, 2009	Jose´ G. Luiggi-Hernandez, MPH, Jean Woo, MD, Megan Hamm, PhD, Carol M. Greco, PhD, Debra K.Weiner, MD, and Natalia E. Morone, MD, MS, 2016
				non−ambulatory, severely impaired mobility, visual or hearing impairment that interfered w/ assessments, had pain in other parts of the body more severe than the lower back or acute pain, has an acute or terminal illness, or had moderate to severe depressive symptoms (GDS ≥ 21)	non−ambulatory, severely impaired mobility, visual or hearing impairment that interfered w/ assessments, had pain in other parts of the body more severe than the lower back or acute pain, has an acute or terminal illness, or had moderate to severe depressive symptoms (GDS ≥ 21)			disease, multiple recent falls or inability to stand independently, pain caused from an acute injury within three months, and underlying red flags of serious underlying illness	
Number of Participants at Start of Study (note N of control and experimental sample if experimental design)	141 recruited; 101 Randomized	1	1	282 randomized. Control: 142 randomized to control Meditation: 140 randomized to group	282 randomized. Control: 142 randomized to control Meditation: 140 randomized to group	60 (2 week group N=22, 4 week group N=38;p 256 "Treatment Program")	37 eligible, assessed, and then randomized (Control N= 18, Experimental N=19)	40 (Control = 20, Meditation group = 20)	25
Number of Participants at End of Study (note N of control and	53	1	1	Control: 138 assessed at 8 weeks, 135 assessed at 6 months	Control: 138 assessed at 8 weeks, 135 assessed at 6 months	30 at follow up (see p 262, para 6)	25 assessed at 12 week follow-up (Control N= 13,	35 assessed 16 weeks after program completion (control = 19,	25

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experimental sample if experimental design)				Meditation: 132 assessed at 8 weeks, 118 assessed at 6 months	Meditation: 132 assessed at 8 weeks, 118 assessed at 6 months		Experimental N= 12).	meditation group = 16)	
Type of intervention (MBSR, MBCT, MBI, ACT, etc.)	SOC-ACT (Acceptance and Commitment Therapy with Selective, Optimization, and Compensation Strategies integrated)	ACT	CBT/ACT	MBSR	MBSR	ACT	MBSR	MBSR	MBSR
Intervention Description	Nine 120-minute weekly group session based on an integrative ACT/SOC model.	8 week treatment involving 8 therapy session. two of these weeks did not incorporate ACT-specific interventions.	Brief 8-session therapy (1.5hr per session), combining components from CBT for chronic pain and ACT (p 300 "course of treatment"), each session had mindfulness component	8 week MBSR program in which four mindfulness meditation methods were taught (body scan, sitting practice, walking meditation, and mindful stretching). Each session included time for mindfulness meditation and discussion of themes	8 week MBSR program in which four mindfulness meditation methods were taught (body scan, sitting practice, walking meditation, and mindful stretching). Each session included time for mindfulness meditation and discussion of themes	Group format, 90 minute sessions. Physical exercise, skills training, and education utilized to key processes of psychological flexibility (p. 256 "treatment program para 2")	Group-format weekly intervention involving body scan, sitting practice, and walking meditation, and emphasis of attitudes supporting meditation.	8 group-format sessions in which mindful meditation exercises were taught such as body scan, sitting practice, and walking meditation.	8- week MBSR program
Control Type	Education control group	N/A	N/A	Education program	Education program	N/A	Waitlist	Education Control	
Control Description	2 h educational group session about factors that can influence pain conditions and pain perception and information about SOC strategies	N/A	N/A	Health education program based on successful aging curriculum known as the Ten Keys to Healthy Aging (these do not include pain management)	Health education program based on successful aging curriculum known as the Ten Keys to Healthy Aging (these do not include pain management)	N/A	N/A	8-week health education program on a successful aging curriculum.	

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Independent Variable	ACT-SOC Intervention Program, Minimal support group (MS)	ACT Intervention	Intervention consisting of CBT and ACT Components for Chronic Pain	Disability, pain			Mindfulness Meditation	Mindfulness meditation program, education control program	Not Specified
Dependent Variables	Pain Severity, Daily Pain Interference, Depressive Symptoms, Anxiety, Catastrophizing beliefs, Selective optinization and compensation strategies (SOC), Pain Acceptance	Quality of Life, Depression, Physical Activity, Acceptance/Action, Pain	Pain Expereince, Depression, Sleep Complaints, Pain Acceptance	Disability, Pain, Quality of Life, Depression, Self-efficacy, Pain catastrophizing, Mindfulness			Pain Intensity, Pain acceptance, Qualit of life, Physical function	Disability, pain intensity, self-efficacy, quality of life, mindfulness	Not Specified
Outcome Measures	Brief Pain Inventory (BPI) - Spanish version, Brief Pain Inventory (BPI) - Spanish version, Geriatric Depression Scale (GDS) - Spanish version, Pain Anxiety Symptoms Scale - Short Form (PASS-20), Pain Catastrophizing Scale (PCS) - Spanish Version, SOC Short Form Questionnaire., Chronic Pain Acceptance Questionnaire (CPAQ)	The brief Older Persons Quality of Life (OPQOL-Brief), Geriatric Depression Scale (GDS), Rapid Assessment of Physical Activity (RAPA), Acceptance and Action Questionnaire-II, Informal measures of frequency and ratings of intensity and degree of impairment	SF-MPQ = Short Form McGill Pain Questionnaire, Beck Depression Inventory (BDI), Sleep Quality Index (PSQI), Chronic Pain Acceptance Questionnaire (CPAQ)	RMDQ, Numeric Pain Rating Scale, RAND-36 Health Status Inventory, GDS, Chronic Pain Self-Efficacy Scale, Catastrophizing scale of the Coping Strategies Questionnaire, Mindful Attention Awareness Scale (MAAS)	Disability	Pain Intensity	McGill Pain Questionnaire Short Form(MPQ-SF) // SF-36 Pain Scale, Chronic Pain Acceptance Questionnaire (CPAQ), SF-36 Status Inventory, Roland and Morris Questionnaire // Short Physical Performance Battery // SF-36	Roland and Morris Disability Questionnaire (RMDQ), Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Self-Efficacy Scale, SF-36 Health Status Inventory, Mindful Attention Awareness Scale (MAAS) // Fice Facet Mindfulness Questionnaire (FFMQ)	Not Specified
Age: Mean (SD)	82.26 (10)	Control: 74 (6) Experiimental:	Control: 74 (6) Experiimental:	69.3(4.24)	Control: 75.6(5.0)	76.6(7.1)	74(5.3)	72	70

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		75(7.2)	75(7.2)		Experimental: 74.1(6.1)				
Gender	Male: N=79 (78.6%) Female: N=22(21.4%)	Control Male: N=48 (33.8%) Control Female: N=92(66.2%) Experimental Male N=47(33.1%) Experimental Female" N=95(66.9%)	Control Male: N=48 (33.8%) Control Female: N=92(66.2%) Experimental Male N=47(33.1%) Experimental Female" N=95(66.9%)	Male: N=23(38.3%) Female N=37(61.7%)	Control Male: N=7 Control Female N=11 Experimental Make N=9 Experimental Female N=10	Males N=10 Females N=15	Males N=13 (48.1%) Females N=14 (51.9%)	Males N=1 (100%)	Female N=1 (100%)
Ethnicity	White	Control Black N=38 (26.8) Experimental Black N=42 (30%) Control White N=101 (71.1%) Experimental White N=98 (70%) Other Control N=0 (0%) Other Experiemental N=3 (2.1%)	Control Black N=38 (26.8) Experimental Black N=42 (30%) Control White N=101 (71.1%) Experimental White N=98 (70%) Other Control N=0 (0%) Other Experiemental N=3 (2.1%)	Asian N=2 (3.3%) Black N=5 (8.3%) White N=53(88.3%)	Control Asian N=1 Experimental Asian N=1Contol Black N=1 Experimental Black N=1 Control White N=16 Experimental N=17	Black N=7 White N=18	Asian N=2(7.4%) Black N=1(3.7%) White N=24(88.9%)	White N=1(100%)	White
Education	Less than primary control N=14 Less than primary experiemental N=13, primary control N=17, primary experiemental N=12, high school control N=3, high school experimental N=3, college control N=0, college experimental N=6	High school or less control N=34 high school or less experimental N=35, some college control N=49, some college experimental N=59, college graduate control N=59), college graduate experimental N=46)	High school or less control N=34 high school or less experimental N=35, some college control N=49, some college experimental N=59, college graduate control N=59), college graduate experimental N=46)	Years of Education: Mean13.4 (3.61)	Control High school N=5, Experimental High school N=5, Control technical school N=3, Experimental technical school N=2, Control some college N=2, Experimental some college N=3, Control college grad N=4, Experimental college grad N=6, Control Masters N=4, Experimental Masters N=3	Primary Education N=2, High school N=4, some college N=10, college grad N=4, masters N=5	High school N=5, technical school N=4, some college N=4, college grad N=8, Masters N=6	Completed high school through secondary certificate through Form 4 (roughly, sophomore year of high school).	Not Mentioned

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Other pain notes if specified in experimental study	Not Specified		Also acupuncture, physiotherapy, and osteopathy	MMSE Score (Mean ± SD): Control - 28.4 ± 1.7 Experimental - 28.3 ± 1.7 Cumulative Illness Rating Scale Score (Mean ± SD): Control - 3.2 ± 1.8 Experimental - 3.4 ± 2.1 GDS Score (Mean ± SD) Control - 6.0 ± 4.3 Experimental - 5.7 ± 4.3	MMSE Score (Mean ± SD): Control - 28.4 ± 1.7 Experimental - 28.3 ± 1.7 Cumulative Illness Rating Scale Score (Mean ± SD): Control - 3.2 ± 1.8 Experimental - 3.4 ± 2.1 GDS Score (Mean ± SD) Control - 6.0 ± 4.3 Experimental - 5.7 ± 4.3		Use of CAM (complementary/alternative medicine) in last year: Control (Yes=10 No =10) Experimental (Yes = 8, No = 9)		
Pain Duration	Control Mean=25.43 yeaes (20.26), Expermental mean 21.3 years (20.81)	> 3 months	8 years	Control Mean=183(160.3) months, experimental mean 137(156.5) months		Mean: 166 months Range: 31-592 (range reported given high variability)	Not specified	Control 11.1(13.7) experimental 9.4(18.1)- not specified in months or years	Mean 142 months
Medications	Opiod control N=8(23.5%), opiods experimental N=3(10%), NSAID control N=9(27%), NSAID experimental N=8(26.7%), antidepressant control N=10(29.4%), antidepressant experimental N=8(26.7%)	Immunosuppressants	NSAID, paracetamol, cortisone treatment	Not specified		-	Opiods control N=3, opiods experimetnal N=4, other analgesis control N=12, other analgesic experimetnal N=13, none control N=3, none experimetnal N=2	Opionds control N=5, opiods experimental N=3, other analgesics control N=24, other analgesiscs experimental N=19, none control N=2, none experimetnal N=2	Opiods N=1, NSAID N=5, acetomiophin N=3, tramadol N=2
Comorbid Diagnoses	Not specified	Major organ transplant, diabetes, cardiovascular issues, stroke	Not Specified	Not specified		-	Not Specified	Not Specified	Not Specified

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		(in 2017), skin lesions/"cancers", depression, emphysema d/t smoking.							
Key Result 1	The data showed a significant increase in chronic pain acceptance between pretreatment and post-treatment for participants in the ACT-SOC group, whereas no significant differences were found for the MS group	QOL measure increased from 47-57 over the course of treatment. Week 8 saw a decline back to 48, which the authors hypothesize is d/t challenging life circumstances during that week (p. 226 " Outcome").	At pretreatment, Mrs. R's total score on the SF-MPQ was 26, indicating a moderate-to-severe level of pain. At the end of treatment, her total score was reduced by 10 points (16), which is a clinically significant change. At follow-up, the total score had dropped to 10. (p. 303, "assessment of progress" para 2).	Compared with the control group, participants in the intervention group improved an additional −1.1 points on the RMDQ at 8weeks and −0.4 points at 6 months (overall group × time interaction, P= .01). The effect of the intervention on function was not significantly modified by age, race, educational level, or sex.	Compared with the control group, participants in the intervention group improved an additional −1.1 points on the RMDQ at 8weeks and −0.4 points at 6 months (overall group × time interaction, P= .01). The effect of the intervention on function was not significantly modified by age, race, educational level, or sex.	No significant between-group differences in outcome measures found between 2-week and 4-week groups. Closest was cognitive fusion at follow up (p = .11;p 257 "results" "between groups differences")	CPAQ- chronic pain acceptance-total score improved for meditation group (reaching significance at .008) and worsened for control group.	Disability (per RMDQ) and pain (per SF-MPQ and SF-36 Pain scale) improved in expected direction for meditation group. Disability improved for the control group, but pain did not. Improvement in disability was maintained at 4 months for the meditation group, but not for control group. Disability and pain improvements did not reach statistical significance.	Participants mentioned that they felt a change in their pain. the pain being dissipated or decreased greatly when they started using mindfulness meditation. However, temporality of the pain in relation to mindfulness seemed to be a recurring topic as some participants never felt relief, some participants felt it for very limited amounts of time while others mentioned the pain relief lasting a long time (some mentioned it lasting for months), and some participants mentioned no longer feeling pain at all
Key Result 2	although the ACT-SOC group maintained the	AAQ-II were consistently low across all 8 weeks,	Results on the SF-MPQ indicate a change in Mrs.	Participants in the interventi	Participants in the interventi	At pre-treatment: All	Activities engagement subscale improvement	Both groups improved in self efficacy. Meditation	N/A

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	use of strategies for compensating for losses during the study, the MS group decreased their use of these strategies. These results suggest that ACT-SOC group participants were successful in making changes in their environment to ensure their participation in valued activities.	indicating good acceptance and action (p. 226, "outcome")	R's experience of the quality of pain, whereas her experience of pain intensity remained unchanged (p. 303, "assessment of progress" para 2)	on group significantly improved over time on the current and most severe NRS pain measures for the past week compared with those in the control group, with an additional −1.8– and −1.0–point improvement by 6 months, respectively. This improvement corresponded to effect sizes between groups at 8 weeks and 6 months of −0.33 and −0.19, respectively. Differences on the average NRS pain measure	on group significantly improved over time on the current and most severe NRS pain measures for the past week compared with those in the control group, with an additional −1.8– and −1.0–point improvement by 6 months, respectively. This improvement corresponded to effect sizes between groups at 8 weeks and 6 months of −0.33 and −0.19, respectively. Differences on the average NRS pain measure	psychological flexibility process variables (except decentering) were significantly correlated with depression and mental health in the expected direction. (Table 3, p 258) Committed action and general acceptance significantly correlated with social functioning (Table 3) Pain acceptance, committed action, and general acceptance significantly correlated with physical functioning (Table 3) Pain acceptance significantly correlated with pain intensity (table 3)	reached significance for meditation group (.004)	group continued to improve at 4 month follow up as compared to control. Self-efficacy improvement reached statistical significance for meditation group at the end of 8 weeks, but not at 4 month follow-up (even though there was a trend of consistent improvement).	

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				between groups did not reach statistical significance (P=.08)	between groups did not reach statistical significance (P=.08)				
Key Result 3	results showed an increase in the use of selection strategies in the ACT-SOC group between pretreatment and post-treatment, but this increase was not due to the treatment itself because we found no differences between change in the ACT-SOC and MS groups.	GDS score showed improvement from 13 to 5 by Week 7, moving from Severe to Mild. GDS score increased to 7 in week 8, which again is likely d/t factors outside of therapy (p. 226 "outcome" para 2).	Her BDI score at pretreatment showed only minimal or no symptoms of depression, with a score of 8; at the end of treatment and at 6-month follow-up her score had dropped to 6 (p. 303, "assessment of progress" para 2)	We found that immediately after program completion, more participants in the intervention group compared with the control group achieved a 30% improvement on the current (54 of 132[40.9%] vs 34 of 138 [24.6%];P= .004) and most severe (48of 132 [36.4%] vs 30 of 138 [21.7%];P= .008) NRS pain measures for the past week. Similar differences were found at 6months for the current (52 of 117 [44.4%] vs 34 of 135[25.2%];P= .001) and most severe (42 of 117 [35.9%] vs 30 of135 [22.2%];P= .02) NRS pain measures	We found that immediately after program completion, more participants in the intervention group compared with the control group achieved a 30% improvement on the current (54 of 132[40.9%] vs 34 of 138 [24.6%];P= .004) and most severe (48of 132 [36.4%] vs 30 of 138 [21.7%];P= .008) NRS pain measures for the past week. Similar differences were found at 6months for the current (52 of 117 [44.4%] vs 34 of 135[25.2%];P= .001) and most severe (42 of 117 [35.9%] vs 30 of135 [22.2%];P= .02) NRS pain measures	From pre to post treatment, significant changes were seen in pain, physical functioning, social functioning, mental health, depression, pain acceptance, and committed action (p 258 "treatment changes on outcome and process variables)	Pain scores improved as expected for the meditation group compared to the control, though not significantly	For both mindfulness scales in the study, mindfulness levels were high for the entire sample at baseline and maintained stable for the duration of the study	N/A
Key Result 4	No changes in	Reliable	Her initial	The	The	When	Psychical	Both groups	N/A

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	loss-based selection or optimization strategies were found	change index was used to assess statistical significance of GDS score, and found that the change (a value of 3.21) suggested a meaningful clinical change (p. 226 "outcome" Para 2).	score on PSQI indicated severe sleep problems, with a score of 13. At the end of treatment her global score was 6, and she reported better sleep quality and longer total sleep time - she had also stopped taking sleep medication. (p. 303, "assessment of progress" para 2)	intervention group had a higher proportion achieving a 50% improvement at 6 months for the average (29 of 117 [24.8%]vs 18 of 135 [13.3%];P= .02) and current (41of 117 [35.0%] vs 28 of 135 [20.7%]; P= .01) but not most severe (25 of 117[21.4%] vs 17 of 135 [12.6%];P= .06) NRS pain measures	intervention group had a higher proportion achieving a 50% improvement at 6 months for the average (29 of 117 [24.8%]vs 18 of 135 [13.3%];P= .02) and current (41of 117 [35.0%] vs 28 of 135 [20.7%]; P= .01) but not most severe (25 of 117[21.4%] vs 17 of 135 [12.6%];P= .06) NRS pain measures	bonferroni corrected alpha applied, no significant changes seen from pre-treatment to follow up on any treatment outcome or process variable (p 258 "treatment changes on outcome and process variables)	function showed significant improvement for the meditation group (.03)	noted improvement in back pain symptoms. 13/16 (81%) in the meditation group noted minimally improved symptoms. 12/19 (67%) in the control group noted minimally improved symptoms	
Key Result 5	Pain intensity did not change during the study. ACT studies for chronic pain in younger and middle-aged adults have typically found changes in pain intensity, whereas this has not been true in elderly samples	RAPA scores show positive response to therapy, as John moved from 2 to 4 in weeks 6 and 7. His decline to 3 in week 8 is similarly hypothesized to be d/t extratherapeutic factors (p. 227 "outcome" para 3)	CPAQ scores at pretreatment confirmed her verbal reports of a tendency to avoid activities that cause pain and her need to be in control of thoughts, sensations, and experiences, with scores of 37 on the activity engagement subscale and 28 on pain willingness. At posttreatment, the CPAQ results showed an increase in the total score	Intervention participants reported more improvement in their back pain symptoms compared with the control participants (P< .001) At 8 weeks, 106 of 132 participants (80.3%) in the intervention program had at least minimal improvement, compared with 51 of 138 (37.0 %)in the control program. In the control	Intervention participants reported more improvement in their back pain symptoms compared with the control participants (P< .001) At 8 weeks, 106 of 132 participants (80.3%) in the intervention program had at least minimal improvement, compared with 51 of 138 (37.0 %)in the control program. In the control	Clinically significant changes (see table 5, also pg 258, "clinical significance of treatment changes) On average across the outcome measures, 54.78% of patients experienced a clinically meaningful improvement from pre-to post-treatment. At follow-up, an average of 39.8% of	Roland disability questionnaire improved for the meditation group but did not reach statistical significance.	Treatment expectancy remained high and stable throughout the study. On a scale 0-6, control started at 4.84 / meditation started at 4.63. Control finished at 4.16 / meditation finished at 4.65	N/A

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			of 77, indicating a greater willingness to engage in activities regardless of pain (p. 303, "assessment of progress" para 2)	program, 84 participants(61.0 %) reported no change and 3 (2.2 %) reported worsened symptoms. Notably, 54 participants in the intervention group (40.9%) were much or very much improved compared with 9 (6.5%) in the control group. This difference persisted at 6 months in the intervention group, with a greater number of participants reporting worsening symptoms in the control group.	program, 84 participants(61.0 %) reported no change and 3 (2.2 %) reported worsened symptoms. Notably, 54 participants in the intervention group (40.9%) were much or very much improved compared with 9 (6.5%) in the control group. This difference persisted at 6 months in the intervention group, with a greater number of participants reporting worsening symptoms in the control group.	patients reported significant improvement compared to pre-treatment			
Key Result 6	a significant decrease was found in the interference of pain with walking ability, and the decrease in the interference of pain with personal relationships was almost significant	John reported a slight decrease in the frequency of pain (from every day to most days), intensity (from 7/10 to 5/10), and degree of impairment (8/10 to 4/10).	Qualitative observations: Mrs. R reported that mindfulness exercises helped her regain calm and the pain she experienced became more bearable through practicing (p. 304 para 1) Practicing the mindfulness	Credibility and expectancy of the programs to reduce back pain was obtained at baseline, with no difference between groups	Credibility and expectancy of the programs to reduce back pain was obtained at baseline, with no difference between groups	Correlations b/t changes in treatment process and outcome variables (see pg 258 with same title, also tables 6 and 7) 1. During the pre- to post-treatment interval, improvements in general acceptance were significantly correlated with	QOL were not improved to stat. sig.	The majority of participants continued to meditate at the four month follow up. 14/16 (88%) practiced formal meditation. 15/16 (94%) practiced informal meditation.	N/A

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			skill, focusing on her breathing, prevented pain attacks that she had experienced while reading (p. 304 para 1) She described an increased awareness of the present moment in several everyday situations (p 304 para 2) She reported that she felt she had taken a big step in her valued directions and that she was now close to the life she wanted to live (p 304 para 2)			improvements in social functioning and mental health; improvements in committed action were significantly correlated with improvements in mental health and depression 2. During the pre-treatment to follow-up interval, improvements in general acceptance were significantly correlated with improvements in pain intensity, social functioning, mental health, and depression; improvements in pain acceptance were significantly correlated with improvements in pain intensity, mental health and depression			
Key Result 7	The results of this study, together with other findings, suggest that older people with chronic pain may not	N/A	At 6 month follow up...(p. 305, "Follow-up") - Presented with fewer pain attacks	The Global Health Composite and Physical Health Composite	The Global Health Composite and Physical Health Composite	Regression analysis examining change in process variables as predictors of change in	No significant difference between 8-week and 3 month scores on any measure for meditation	N/A	N/A

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	obtain the same benefits as other population groups in pain intensity from ACT		and more bearable background pain - Total score on SF MPQ dropped to 10 - Maintained regular activity level - Developed a greater awareness of the relationship between pain and stressful events - More impaired sleep than at baseline d/t family problems, but did not use sleep medications - CPAQ scores dropped, indicating a relapse in willingness to experience pain	scores of the RAND-36 Health Status Inventory by 6 months improved an additional 0.2 (−1.9 to 2.4) points and −0.01 (−1.9 to 1.8) points, respectively, for the intervention group.	scores of the RAND-36 Health Status Inventory by 6 months improved an additional 0.2 (−1.9 to 2.4) points and −0.01 (−1.9 to 1.8) points, respectively, for the intervention group.	treatment outcomes (see pg 259 and table 8 and 9) 1. Pre to post treatment change in mental health as dependent variable in first analysis: - Change in pain did not significantly predict change in MH - Changes in general acceptance and committed action significantly contributed to changes in mental health, accounting for 23% of variance - Examination of beta weights in final equation showed that committed action was the only significant unique predictor of change in mental health ($p<.05$) 2. Pre to post treatment change in social functioning as dependent variable in second analysis - change in	group.		

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						pain did not significantly predict change in SF - change in general acceptance significantly contributed to changes in SF, accounting for 12% of variance - examination of beta weights in final equation showed that general acceptance was the only significant unique predictor of change in social functioning 3. Pre to post treatment change in depression as dependent variable in third analysis - Change in pain significantly contributed to change in depression, accounting for 7% of the variance - Committed action significantly contributed to change in depression, accounting for 13% of the			

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						variance - Beta weights in final equation showed that changes in pain and committed action both uniquely contributed to change in depression 4. pre-treatment to follow up change in depression as dependent variable in final analysis - Change in pain significantly contributed to change in depression, accounting for 15% of variance - Changes in general acceptance and pain acceptance significantly contributed to change in depression, accounting for 20% of variance. - beta weights in final equation indication that general acceptance was the only significant unique predictor of			

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						change in depression		
Key Result 8	Overall, the results suggest that it is possible to improve the functioning of elderly people with chronic pain without having to reduce their subjective perception of pain	N/A	N/A	The improvement in pain self-efficacy sub scales at 8 weeks was not sustained at the 6-month assessment.	The improvement in pain self-efficacy sub scales at 8 weeks was not sustained at the 6-month assessment.		Waitlist-control participants who were later added into an MBSR program demonstrated an expected improvement on all measures, but none reached the level of statistical significance.	N/A	N/A
Key Result 9	catastrophic beliefs, rumination, and magnification of pain were reduced following the intervention, indicating that the ACT-SOC participants changed their perception of pain as something threatening and unmanageable in their lives	N/A	N/A	The intervention showed no improvement in self-reported mindfulness or depressive symptoms	The intervention showed no improvement in self-reported mindfulness or depressive symptoms		From both the intervention and crossover waitlist controls: Nineteen (76%) of the participants reported that they continued to meditate, 18 (72%) had recommended the class to others, 16 (64%) reported they could‘‘concentrate better’’ and 12 (48%) reported taking less medication for pain or sleep	N/A	N/A
Confounding variables if noted	N/A	john faced ill-health over some of the treatment weeks, notably dental problems and additional	All found on p 304 "complicating factors" - Authors note that these CAN BE complicating			Older individuals face a number of additional challenges aside from their chronic pain which		N/A	N/A

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		associated pain. His ongoing struggle with his physical health was exacerbated by his limited access to healthcare d/t his location. Another barrier would likely have been reluctance in acknowledging much of the emotional struggle, likely due to the stoicism which his generation often exhibits, along with perceived stigma attached to mental health issues.	factors, but that none of these were present in this case. - Chronic pain conditions in older adults are complex and influenced by comorbid somatic and psychiatric disorders, and older people have an increased susceptibility to chronic disabling diseases - Increased risk w/ polypharmcy in older adults - Stressful events like loss and bereavement and changes in socializing, influence the pain experience			may act as confounding variables (e.g., role transitions, widowhood, caregiving responsibilities, medical comorbidities, sociocultural biases regarding aging, etc.;p 262 para 3)			
Types of descriptive statistics used	Mean (SD) and range provided for demographic characteristics. Mean/SD provided for outcome measures. Partial eta^2 value used to demonstrate effect size in variance	Exact assessment scores	Exact scores provided for baseline/outcome measures (p. 304 table 2).	Mean/SD of sample characteristics and baseline, intervention, and follow up measures. Effect size shown on outcome measures (see p 7 table 2)	Mean/SD of sample characteristics and baseline, intervention, and follow up measures. Effect size shown on outcome measures (see p 7 table 2)	Mean/SD of sample characteristics (see Table 1+2) Mean/SD of baseline/outcome/follow up measures with effect sizes (Table 4) Correlational value between	Mean, SD, Effect Size	Mean/SD of population characteristics provided. Though provided in graphic formation, mean/SD of baseline, post treatment, and follow up measures also provided.	Mean (SD)

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						measures of patient functioning and psychological flexibility at pre-treatment, post-treatment, and follow up (tables 3, 6, and 7) Effect size provided for pre/post treatment measures, and follow up measures (table 4)			
Types of inferential statistics used	Bonferroni post-hoc adjusted significance levels provided for outcome measures. F value provided to show significance of change in mean between groups (see table 3)	Statistical significance value, P	None mentioned	All analyses conducted using intention to treat and w/ 2 sided tests of a=.05 Baseline characteristics of intervention participants vs control participants analyzed using 2-sample t-tests for continuous variables and chi-squared tests for categorical variables. Linear mixed models used to compare RMDQ score at baseline, 8-week, and 6-month	All analyses conducted using intention to treat and w/ 2 sided tests of a=.05 Baseline characteristics of intervention participants vs control participants analyzed using 2-sample t-tests for continuous variables and chi-squared tests for categorical variables. Linear mixed models used to compare RMDQ score at baseline, 8-week, and 6-month	T values translated to alpha levels to test null hypothesis (table 4) - bonferroni corrected alpha level is <0.003 (as multiple variables are being compared simultaneously) Analyses also conducted to determine the effect of individual independent variables on individual dependent	P-Value, chi square test, two-sample t-test	To analyze sample characteristics Fisher's exact test used to determine differences in demographic characteristics b/t groups, t-test used for continuous variable of age. P value of <.05 used as level of significance. Analysis of null hypothesis completed w/ generalized estimating equation models using an exchangeable variance structure, with time, treatment	N/A

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				assessments in outcome vector Controlled for repeated measures using autoregressive covariance structure and controlled for correlation among individuals within the same class cohort using random class effect Fixed effects of group, time, and interactions of group by time, and sex. Proportion of participants w/ meaningful response on RMDQ, NRS, and global impression of change analyzed using chi squared analyses	assessments in outcome vector Controlled for repeated measures using autoregressive covariance structure and controlled for correlation among individuals within the same class cohort using random class effect Fixed effects of group, time, and interactions of group by time, and sex. Proportion of participants w/ meaningful response on RMDQ, NRS, and global impression of change analyzed using chi squared analyses	variables. ΔR^2 used to demonstrate how the IV accounts for variability in DV. Alpha coefficients provided to show significance in differences.		groups, interactions term of time and treatment groups, and baseline age included as covariates.	
Key conclusion(s) of study authors relating to the study	this study suggests that a psychological treatment combining Acceptance and CommitmentTherapy and SOC strategies training may be a suitable option for people over 80	There seemed to be evidence that aspects of the ACT model boded well for this individual despite a very complex and chronic physical health status and a history of trauma (pg. 229	In this case, a combination of CBT and ACT, provided as a brief intervention of 8 weeks, was effective in producing a clinically significant change in pain experience, as well as an	We found that an 8-week mind-body program that taught mindfulness meditation methods resulted in significant improvements in short-term physical function and	We found that an 8-week mind-body program that taught mindfulness meditation methods resulted in significant improvements in short-term physical function and	Results of this study partially support the effectiveness of this treatment program with this population (p 260, para 1) The current data provide partial support for the	1. program had a beneficial effect on pain acceptance and physical function. (P 316 para 1) 2. Lower completion rate was due to factors not related to the intervention (p 316 para 4)	Both the meditation and control group improved on measures of disability, pain, and self-efficacy suggesting both programs had a beneficial effect (p1401 "discussion").	The themes that were brought up in this study shed light on the mechanism of mindfulness meditation and suggest that its impact is associated with decreasing negative emotions

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	years old with chronic musculoskeletal pain who live in nursing homes. Specifically, our findings suggest that ACT-SOC treatment improves functional capabilities, the use of adaptive strategies, the acceptance of chronic pain, emotional well-being, and can decrease pain-related beliefs of older adults.	"Treatment implications of the case"	increase in sleep quality/sleep maintenance and acceptance of pain at post treatment (p. 305 "treatment implications of the case")	long-term current and most severe pain intensity in the past week. The functional improvement was not sustained. (p 8 "conclusions")	long-term current and most severe pain intensity in the past week. The functional improvement was not sustained. (p 8 "conclusions")	contribution of improvements in psychological flexibility to improvements in treatment outcomes in older adults (p261 para 4) Data suggest that improvements in general acceptance and committed action may facilitate improvements in functioning and MH during treatment, while improvements in general acceptance following treatment may facilitate longer term improvements in depression (p 261 para 4-p262)	3. The majority of participants had continued to mediate at the 3 month follow up, suggesting that they had incorporated meditation into their daily lives (p. 317 para 2)	These improvements did not reach statistical significance.	related to chronic pain, such as fear of pain as well as reducing the significance of pain through a different perspective or change in awareness about their pain. (p. 7 "Summary") This study supports a mind-body as well as a medical approach to patients with chronic pain disorders and underscores the potential for mindfulness to not only improve pain coping skills, but to also decrease pain in-tensity and pain-related disability (p. 7 "Summary")
Recommendations or Implications for Future Research	Future research should provide more evidence about the efficacy of ACT-SOC interventions with older people suffering from chronic pain. It would also be interesting to analyze the differential	None listed	Future studies should investigate how ACT and other acceptance- and mindfulness-based approaches and CBT can be combined and tailored to suit the needs of older adults,	None explicitly provided	None explicitly provided	1. Conduct a similar study with a larger sample of older people (p 262 para 1) 2. Psychological flexibility processes showed small effect sizes, with cognitive fusion and	Using an attention-control rather than WL control. Recommends that future studies wait to cross-over the control group into the intervention until after all follow up has occurred.	1. Authors recommend a larger, well designed clinical trial due to challenges w/ heterogeneous answers (p. 1403 para 4) 2. Future studies of mind-body interventions	Further research is needed to uncover the relationship between an observing attitude and a change in pain awareness to pain intensity, pain coping, and pain dis-ability, as well as the

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	contribution to the treatment effects of the various ACT andSOC strategies through dismantling analysis using procedures such as the one recommended by Jacobson and Truax. The development of shorter treatment programs could prevent the high dropout rate and increase attendance. In addition, promoting participation of the staff in the intervention could increase the generalizability of the effects of the program; maintenance of the results of the intervention could be enhanced if the staff were able to implement the ACT-SOC strategies. More-over, the inclusion of staff in the intervention program may increase the motivation of		aiming at providing more effective treatment for the older, chronic-pain patients (p 306 para 1)			decentering inmproving the least. Authors suggest that, because this is not unique to the older population (as they compared the data of this sample with the younger individuals included in the larger study), future research is needed to enhance measurement of psychological flexibility (p 262 para 2) 3. Given the results of this study, optimizing the impact of treatment on psychological flexibility processes and patient functioning is an important goal for future research (p 263 para 1)	Measures of mindfulness such as the Kentucky Inventory of Mindfulness Skills or the Mindful Attention Awareness Scale should be included.	for chronic pain in older adults should consider a cut off for eligibility of important outcome measures such as the RMDQ (p. 1404 last sent -1405 first sent). 3. Improvement trend for Self Efficacy in meditation group is an important component of treatment response in younger CLBP patients. This deserves further exploration as it may be a mediator of treatment response (p. 1405 para 2).	relationship between pain awareness and pain significance. (p. 6 "discussion" para 8).

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	participants to adhere to the strategies and to increase attendance (p. 9, para 2)							
Researcher's Take-Aways: General or Implications for Practice		An approach that more fully caters for the extent of problems and that entails potentially less resistance (as there is no need for "challenging," "disputing," etc.) is likely to facilitate better therapeutic alliance (p. 229 "Treatment implications of the case). The extended model proposes that age-related factors contribute to the development and maintenance of chronic pain in older persons and therefore these factors should contribute to the design and application of treatment approach for older persons. (pg. 229 "Recommendations to clinicians and	When it comes to relapse prevention, this case study demonstrates the need for focusing on this aspect as part of the treatment...At follow-up, Mrs. R presented with the same symptoms of sleep problems as she had presented before treatment. By providing "booster" sessions or "booster" calls and focusing on important aspects from the treatment course, relapses like this might have been prevented or minimized (p 306 para 3)	"Our clinical trial suggests that mindful-ness has a role in the treatment of chronic LBP in the older adult.Refinement of the mindfulness program could focus on enhancing the durability of functional improvement." (p 8 "conclusions")	"Our clinical trial suggests that mindful-ness has a role in the treatment of chronic LBP in the older adult.Refinement of the mindfulness program could focus on enhancing the durability of functional improvement." (p 8 "conclusions")	None other than what was mentioned in conclusions, implications for research, and limitations.		Our results have important implications for the design of clinical trials in mind–body research including the importance of piloting the control group before running a large clinical trial, and inclusion or exclusion criteria that considers cut-offs of important outcome measures for participant inclusion into the trial (p. 1405 para 6)	An increased awareness of self plays an important role in facilitating mindfulness meditation. Reducing fear of pain suggests one possible mechanism through which mindfulness meditation works to treat chronic pain Awareness—or being differently aware of pain—developed by participants through meditation is consistent with an observing attitude. Participants described awareness as being key to coping with both the negative affective response (fear) and the physical sensation of pain

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		students"							

APPENDIX G

Quality Appraisal Form

Study ID	Alonso-Fernández, Lopez, Losada, Gonzalez, & Wetherell, 2016	Morone et 2016	Morone, Greco, & Weiner, 2008	Luiggi-Hernandez, Woo, Greco, Weiner, and Morone 2018	Morone, Lynch, Greco, Tindle, & Weiner, 2008	Campbell, Prasadaro, & Morris, 2021	Lunde & Nordhus, 2009	Morone, Rollman, Moore, Quin, & Weiner, 2009
Methodology	Quantitative	Quantitative	Quantitative	Qualitative	Qualitative	Mixed	Mixed	Quantitative
Methodology supporting text	Article is drawing conclusions from quantitative data regarding the outcome measures listed in Table 3	Study is collective quantitative data on outcome measures	Study is measuring quantitative data to answer research question	Study is examining qualitative responses of participants in focus groups who had previously completed an 8 week MBSR program	Study is an analysis of qualitative statements from diary entries connected to a study utilizing MBSR for chronic pain	Study includes both quantitative outcome measures and qualitative data in the form of subjective impressions of change	Authors are examining the change in outcome variables for the patient, as well as anecdotal experience throughout treatment.	Study is collecting quantitative data re: outcome measures in Figure 2, pg 1402
Strength of Rationale for Study	3	3	3	3	3	3	1	3
Strength of Rationale for Study supporting text	Authors make a case for a) the high rates of chronic pain w/in the older population (p 2 para 1) b) the lack of treatment, rates of unsatisfactory treatment, widespread discontentment with ability to control pain, and the functional impairment of chronic pain (p 2 para 1) c) The lack of efficacy for CBT as a complementary treatment for this population, and the possible paradoxical effect it may have on chronic pain populations (p. 2 para 2) d) the option of ACT as an alternative complementary treatment, given it's efficacy with severe mental and physical health problems, and the	P. 2, introduction 1. Prevalence of chronic pain among older adults noted (para 1) 2. Issues associated w/ chronic pain noted (para 1) 3. Limitations of current analgesic treatment noted (para 1) 4. Use of meditation as a mediator of chronic pain noted (para 2) 5. Previous studies showing feasibility of mediation program noted, with this study being the next phase of research (para 3)	1. Prevalence of chronic pain among older adults noted 2. Challenges associated w/ chronic pain noted 3. Prevalence of using Complementary alternative medicine 4. Need for research on CAM noted 5. Outline of mindfulness meditation for chronic pain provided (pg 311)	Rationale sufficiently explained - prevalence of chronic pain in older populations, effects of chronic pain, and lack of adequate care all sufficiently described (p1-2) - Rationale for mindfulness as a treatment of chronic pain sufficiently described (p 2 para 2) - Need for qualitative data outlined (pg 2 para 3)	Acknowledgement of pain as a universal, multidimensional experience involving sensory, affective, and cognitive-evaluative components (p 841 Para 2). Literature shows that MM may address all three of these components Note of limited research on first-person accounts related to the individual experience of learning MM (p 842 para 2), and none focus on older adults w/ chronic pain Purpose of study noted as seeking to provide insight into	Very thorough foundation of the prevalence and cost of chronic pain, as well as the impacts of chronic pain for older adults. Rationale offered for the use of psychological treatments for chronic pain, specifically act. (p 217-218). Theoretical conceptualization of ACT and mechanisms of ACT for chronic pain considered pg 219-222	Authors offer a brief discussion of the prevalence of chronic pain and inadequacies of its treatment, though this discussion is general and does not offer specifics (p 296 para 1) Authors provide adequate description of CBT and ACT as a potentially efficacious treatment for chronic pain (p 296 para 2) Adequate reasoning provided for combining CBT	Authors provide basis for high rates of LBP in older adults over 65, as well as inadequately treated pain (p 1396 para 1). Authors provide rationale for use of ACT as efficacious treatment for chronic pain (pg 1396 para 3-6) Authors also provide reference to demonstrated feasibility of an 8-week mindfulness program for chronic pain with this population, and the need to repeat this RCT w/ a "more rigorous control group"

Study ID	Alonso-Fernández, Lopez, Losada, Gonzalez, & Wetherell, 2016	Morone et 2016	Morone, Greco, & Weiner, 2008	Luiggi-Hernandez, Woo, Greco, Weiner, and Morone 2018	Morone, Lynch, Greco, Tindle, & Weiner, 2008	Campbell, Prasadaro, & Morris, 2021	Lunde & Nordhus, 2009	Morone, Rollman, Moore, Quin, & Weiner, 2009
	mechanisms by which ACT may serve as a successful complimentary treatment (p 2 para 3) e) the lack of currently available research for ACT w/ this population (p2 para 4) f) the potential ability of SOC to augment the impact of ACT (p 2 para 5)				mechanisms of effect (p 842 para 2)		and ACT, and it's potential application w/ this populations (p 297 para 2)	(pg 1396 para 7).
Strength of Literature Foundation for Study	2	3	3	3	3	3	2	3
Strength of Literature Foundation for Study supporting text	All references relevant to topic, though 75 of 114 older than 10 years from the published date of study, and may not reflect current trends in pain treatment. Many studies before 2000. Additionally, some of the references relied on older patients with cognitive impairment for pain data, which may have had an effect on the recorded data. Overall, the literature foundation seems to be thorough and relevant, supporting the rational for conducting the study.	All sources recent and relevant.	References all relatively recent and relevant. Original sources for theoretical foundations included (e.g. Kabat-Zinn)	All sources recent and relevant	Literature is recent, relevant, and sets theoretical importance of qualitative research related to MM w/ chronic pain	References recent and relevant	All references are relevant and relatively recent	Supporting literature is relatively recent and related to the topic. Primary sources included for discussion of mindfulness meditation from Kabat-Zinn
Clarity and specificity of Research Aims/Objectives/ Questions	3	3	3	3	3	0	1	3

Study ID	Alonso-Fernández, Lopez, Losada, Gonzalez, & Wetherell, 2016	Morone et 2016	Morone, Greco, & Weiner, 2008	Luiggi-Hernandez, Woo, Greco, Weiner, and Morone 2018	Morone, Lynch, Greco, Tindle, & Weiner, 2008	Campbell, Prasadaro, & Morris, 2021	Lunde & Nordhus, 2009	Morone, Rollman, Moore, Quin, & Weiner, 2009
Clarity and specificity of Research Aims/Objectives/ Questions supporting text	Aim of study listed in introduction with clear focus (p 2 para 6)	Overview aim stated in abstract (p 1) Aim/hypotheses described on p2 para 3	Aim and secondary aim of pilot study clearly provided - pg 311 para 4	This study builds upon previous research by the same authors. The aim of the present study is outlined clearly, with strong rationale for it's necessity and utility, on pg 2 para 3-4	Importance and aim of study sufficiently described on p842	No mention or description of specific aims other than to illustrate the application/utility of ACT with this individual (abstract)	Authors articulate the purpose of this case presentation to be demonstrating the feasibility of combining ACT and CBT for chronic pain (pg 297 para 3) In a true experimental study, this would not be sufficient specificity. Given that this is a single case study, it is an adequately specific goal. However, authors do not offer any hypotheses, questions, or specific aims of this approach other than demonstrating feasibility.	Aim of study clearly described in abstract, hypotheses provided on pg 1396, para 7
Quality of Research Design or Methodological Approach	2	3	2	3	3	1	1	3
Quality of Research Design or Methodological Approach	Factors supporting strength of methodological approach: a) the outcome measures chosen will accurately answer the posed	Methodology is appropriate to measure variables in question. (for detailed description, see p 2	Design effective in isolating variance in dependent variables (randomized waitlist controlled clinical trial)	Inclusion in this study requires that participants were part of the parent study, which had a strong	Utilizing grounded theory allowed for the development of theory based on the researcher's	Methodological approach is appropriate for a case study. The nature of the study limits the conclusions	From the perspective of demonstrating the feasibility of a combined ACT-	RCT designed to effectively demonstrate whether mindfulness meditation program for LBP would show

Study ID	Alonso-Fernández, Lopez, Losada, Gonzalez, & Wetherell, 2016	Morone et 2016	Morone, Greco, & Weiner, 2008	Luiggi-Hernandez, Woo, Greco, Weiner, and Morone 2018	Morone, Lynch, Greco, Tindle, & Weiner, 2008	Campbell, Prasadaro, & Morris, 2021	Lunde & Nordhus, 2009	Morone, Rollman, Moore, Quin, & Weiner, 2009
supporting text	question (see outcome measures on pg 3) b) Randomized to reduce bias (p 4 para 1) c) as a randomized control design, outcome measures of randomized groups should demonstrate whether null hypothesis should be rejected (that ACT-SOC has no significant impact on outcome measures) Factors supporting weakness of methodological approach: a) control is not inert. Though the control does not offer psychological training, the education provided, time spent in the group, support received from instructors, and merely being enrolled in a group may impact outcome measures and make it more difficult to conclude significance of findings.	"methods") As a follow up study, this improves upon previous research in key ways, including size and diversity of sample population and specific outcome measures that have been informed by previous research.	- pg 311 "methods" between groups. However, the wait-list group crossed over immediately into the intervention after the 8-week intervention was completed with group 1, which may have impacted the integrity of the control group	methodological approach use of four focus groups enabled thematic saturation (p 2 "participants" para 2), suggesting that the number of groups should adequately capture all themes that can be extrapolated. I.e., no new themes would emerge from additional groups Design sufficiently described on page 2 under "participants" - method of study allows for accurate capture and analysis of qualitative themes.	observations and analysis of data. Given that the primary aim of this study was the development of theory based on qualitative responses from individuals, this methodology is sufficient in accomplishing the aim of the study (p 843 "analytic approach").	that can be drawn, but it fits into the existing literature and just accomplish its goal of demonstrating the applicability of ACT for chronic pain.	CBT approach for chronic pain, this chosen methodology is adequate. However, this chosen approach does not speak to the generalizability of such a treatment, nor can conclusions be drawn about the efficacy of such a treatment. This type of study can offer a window into what type of mechanisms may be at work in utilizing ACT w/ chronic pain, but the conclusions that can drawn with confidence are severely limited.	greater improvement that education control. While the control was not inert, as the control showed improvement alongside the MM group, this design allows Morone et al. to evaluate with more specificity what accounts for changes in pain experience. They raise these questions during the discussion section of the article.
Sample Selection and Characteristics	2	3	2	2	2	1	1	2
Sample Selection and Characteristics supporting text	Factors supporting strength of sample selection/characteristics: a) Inclusion criteria/ exclusion criteria allow for accuracy in outcome measures (p 3 "participants")	Strengths: 1. Large sample size, greater diversity in race, gender, education, and income than previous studies (see	Strengths: 1) Inclusion/exclusion criteria preserve quality of outcome measures (see pg 311 "subjects") Broad age range and	Sample selection described on pg 2 Sample size is adequate for purpose of qualitative study	Strengths: 1) Inclusion/exclusion criteria preserve quality of outcome measures (see pg 842 "participants") Broad	Participant description on pg 222. This patient fits the inclusion criteria/exclusion criteria, making him a good candidate for this form of treatment for	Mrs. R is actually a great candidate for this type of treatment. Full description of client and presenting issues	Factors supporting strength: a) Recruitment procedure described in sufficient detail (see pg 1396 "participants"

Study ID	Alonso-Fernández, Lopez, Losada, Gonzalez, & Wetherell, 2016	Morone et 2016	Morone, Greco, & Weiner, 2008	Luiggi-Hernandez, Woo, Greco, Weiner, and Morone 2018	Morone, Lynch, Greco, Tindle, & Weiner, 2008	Campbell, Prasadaro, & Morris, 2021	Lunde & Nordhus, 2009	Morone, Rollman, Moore, Quin, & Weiner, 2009
	b) no monetary compensation for study participation, which promotes purity of data (p 3 "participants") c) All participants underwent a baseline assessment to ensure inclusion eligibility (p 4 para 1) d) interviewers were psychologists trained in pain assessment w/ older individuals, and were blind to the randomization status (p 4 para 2) Factors supporting weakness of sample selection and characteristics: a) high attrition rate (from 114 selected to 53 analyzed;p 5 figure 1) b) Basic demographic information not presented - we do not know % of gender, race, socioeconomic status	pg 5 fig 1) 2. Randomization process sufficiently described on p 3, "randomization and blinding". Randomization process strong and limits potential performance or selection bias. 3. No significant between group differences detected post randomization (see pg 6, table 1) 4. Inclusion/exclusion criteria sufficiently described and protects purity of outcome data (pg 2, "inclusion/exclusion") Note: Sample selection procedure is published in a separate companion study. This study is referenced.	few exclusion criteria increase generalizability 2) Sample selection and randomization described with sufficient detail (see pg 311 "overview") - limited selection bias 3) No significant between group differences in demographic information (see pg 313 "Baseline characteristics") Weaknesses: 1) Small sample size (N= 35 - 19 in mediation and 18 in control) 2) Predominantly white and religious, limiting generalizability 3) Eligibility was determined based on a self-report checklist that was reviewed with potential participants over phone (pg 311, "overview") - it is possible that potential participants were not hones	Sample characteristics are somewhat diverse in gender, ethnicity, education, and income Sample selection in parent study involved inclusion/exclusion criteria that preserve reliability of the data collected	age range and few exclusion criteria increase generalizability 2) Sample selection and randomization described with sufficient detail in companion study (see Morone 2008 pg 311 "overview") - limited selection bias 3) No significant between group differences in demographic information in companion study (see Morone 2008 pg 313 "Baseline characteristics") Weaknesses: 1) Small sample size (N= 35 - 19 in mediation and 18 in control) 2) Predominantly white and religious, limiting generalizability 3) Eligibility was determined based on a self-report checklist that was reviewed with potential participants	his chronic pain. However, the authors do note that a portion of his chronic pain comes from "skin lesions/cancers" - they do not expand on this, though the existing literature suggests that malignant pain differs from other types of chronic pain.	on pg 297. We do not know how she was selected for this, and we are missing other demographic information such as education, income, ethnicity, etc.	b) Randomization process sufficient to prevent bias (see pg 1398 para 2) c) attrition described in sufficient detail (pg 1397 figure 1) d) demographic information provided, allowing more thorough conclusions to be drawn regarding generalizability from the data (pg 1400 table 1) e) Screening process sufficient to ensure inclusion/exclusion criteria are met by all participants (pg 1398 "participants") f) many demographic characteristics are varied (gender, education, income, marital status, cause of back pain), enhancing generalizability. Factors supporting weakness: a) Small sample sizes (meditation n=16, control n =19), limiting

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					over phone (see Morone 2008 pg 311, "overview") - it is possible that potential participants were not honest			generalizability b) Sample is not ethnically or religiously diverse (30/35 participants are white; (34/35 have religious faith), limiting generalizability
Appropriateness and Description of Intervention	2	3	3	1	3	3	3	3
Appropriateness and Description of Intervention supporting text	Factors supporting strength: 1. Adequate literature foundation for selection of intervention (see above note on literature foundation), suggesting that ACT-SOC is an appropriate strategy for addressing chronic pain in older adults 2. Brief description of intervention/control provided (pg 4 para 3) with enough detail to understand the basic structure of the intervention and control groups + focus. Factors supporting weakness: 1. Description of intervention does not provide focus of individual sessions or the topics covered. We can only guess at mechanisms that accounted for change through interpreting the data. We do not know	Intervention appropriate to address study aims, sufficiently described, and literature foundation provided for why this intervention is appropriate (pg 3, "intervention") Control program sufficiently described (pg 3 "control program").	1. Theoretical basis of intervention sufficiently provided in introduction; outcome measures selected correspond to hypothesized effects of intervention 2. Overview of intervention + detailed description of week by week focus of intervention provided (see pg 311-312, Intervention)	Given that this is a qualitative study involving focus groups from a parent study, we know only that the intervention was an 8-week MBSR program. This amount of information is adequate, as the purpose of this study is to evaluate the subjective experience of individuals who completed a mindfulness program, and the common themes that resulted.	Intervention appropriate for research aims and sufficiently described on pg 843 "intervention"	Thorough case conceptualization on pg 224, providing rationale for ACT as a treatment of choice for this patient. 8 session course of treatment described in detail on pages 225-226. Intervention is appropriate to address presenting concerns	Intervention is appropriate for the presenting complaints, and a sufficient literature foundation for the intervention is provided. Intervention described in great detail pgs 300-303	Intervention and control group both sufficiently detailed and adapted appropriately from primary sources. References: Pg 1398, "intervention program" - source and brief description of intervention provided, along with methods used to teach mindfulness to participants. Additionally, the paragraphs following provide a weekly breakdown of the sessions and what was taught. pg. 1399 "control program" - description

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	specifically what techniques of ACT were utilized to promote improved outcome measures. It is noted on pg 4 para 3 that the intervention is previously used and described in a pilot study by the same authors and a similar population (though it lacked the requirements to be included in this study).							and breakdown of education control program provided
Data Collection Tools (Scales, Observation, Interviews, etc.)	2	2	2	3	3	2	1	3
Data Collection Tools (Scales, Observation, Interviews, etc.) supporting text	Factors supporting strength of data collection methods a) Outcome measures were captured using scales that have high internal consistency and test-retest reliability, with one exception (see p 3 "outcome variables") b) Interviews were conducted with psychologists who are trained in pain assessment for older adults (p4 para 2;** though we do not know if they collected data for all assessment measures) Factors supporting weakness of data collection: a) measure chosen to capture SOC strategies shows poor	All scales appropriately measure the outcome variables in question and are adequately described (pg 3 para 1). Reliability/validity of each scale not provided in text.	Strengths: 1) Scales for outcome measures isolate constructs that are being examined in this RCT (see pg 312, "Outcome measures") 2) Scales chosen are sufficient for purpose of RCT (to see "which measures had at least a minimal effect size which would be used to calculate sample size in future planned studies" - pg 312 "outcome measures") 3) Though exact figures are not provided, the reliability	The tools being used here (interview style focus groups) will accomplish the aims of the study. Given the nature of qualitative data, the value of the data collection tool depends on whether or not steps were taken to increase the validity and reliability of the focus group. In this case, steps were taken to do so (pg 2 "participants")	Given the qualitative nature of this study, data collection was completed via diary entries of participants. A description of the diary provided to participants is noted on pg 843 "Intervention" Para 3.	Data collection tools provided pg 223-224. Use of clinical interview is helpful with collecting qualitative data. Scales to measure outcome variables will accurately capture change processes, though we are only provided with the validity/reliability values on some of the measures. Rationale for scales chosen is also provided.	Scales used for outcome measures (pg 299) should adequately capture the process of change for this patient on presenting complaints. Reliability/validity is not provided in the text, but measures used are in line with other current literature. It may have been helpful to use the Geriatric Depression Scale as opposed to BDI, given it's validity w/in an	List of data collection measures provided on pg 1399. All scales have high test-retest reliability and high internal consistency. The one exception to this is the MAAS scale, which has has slightly higher variability in internal consistency across it's various domains, but it's lowest Chron a value is .67, which is in the acceptable range.

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	internal consistency. (p 3 para 6)		and validity of each scale is mentioned and references are provided.				older population.	
Data Collection Process and Quality of Data	2	2	3	3	2	1	1	2
Data Collection Process and Quality of Data supporting text	Data collection process described in adequate detail (pg 4 para 2) Interviewers conducting assessments were blind to randomization Process of data collection displays expected timeline for accuracy of outcome measures to determine effect of treatment Inclusion/exclusion criteria should protect data quality form skewed data or significant outliers Scales used for outcome measures display good validity and reliability, with the exception of the measure for SOC strategies.	1. Data collection process adequately described, though not in great detail (pg 3 "assessments and outcome measures - last paragraph). 2. Periods of data collection are in line with what would be expected to receive accurate measures for outcome variables. (same reference as above) 3. Scales used for outcome measures accurately measures the variables in question, though reliability and validity not specifically noted in the text (same reference). 4. Data was analyzed using ITT to prevent outlier data, resulting in more consistent data, but potentially with	Strengths: 1. Data collection process clearly described p 312 "outcome measures" 2. Process avoids detection/reporting bias. (same reference as above) 3. Scales used to collect outcome measures used have good reliability/validity. (one thing to note here, the validity/reliability of these scales is not provided in the text, it is assumed based on the use of these scales in other studies) - see pg 312 under outcome measures. 4. Timing of data collection is appropriate for measuring the effect of the intervention (see p	The quality of the data is excellent, given that it is provided via subjective accounts from participants of a mindfulness program and transcribed (pg 2 "participants" para 3). The collection process is sufficiently described on pg 2 "participants" Small number of participants in each group, multiple groups, trained facilitators, and standardized questions for each group suggests high reliability and validity of the focus groups, and therefore high quality data.	The collection of dairy entries is described on pg 842 "participants." While they were unable to collect data from all participants, an average of 18 participants handed in a diary each week, providing 742 lines of text for analysis, which is sufficient for the aim of this study. Data were coded using thematic analysis (p 843 "analytic approach")	Data collection process is described in adequate detail and corresponds with expected timeframe of collection - pg 223 "assessment" High quality of data collection methods suggests higher quality data Single case study and high potential for factors outside of treatment accounting for change limit conclusions that can be drawn from data, thus lowering it's quality	We are told the process of data collection in sufficient detail (pg 298 "initial assessment") Scales used to measure outcome variables are adequate, though there are some questions about the use of BDI over GDS. Nature of case study weakens the power of the data naturally. Factors not related to the treatment may significantly skew data.	Strengths: a) Data collection process sufficiently reviewed pgs 1397-1398 "procedures" section. Measures administered to all participants by a trained RA following admission to program. Measures were obtained at baseline, 8 weeks, and 4 months. b) Attrition rates and causes sufficiently reviewed and accounted for (p 1397 figure 1) c) Outcome measure data collected from empirically validated scales, implying consistency across scores d) Outcome data shows convergent/discriminant validity

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		less fidelity. (P 3 "statistical analysis")	312 "outcome measures). 5. Participants sufficiently randomized to preserve data integrity - pg 313 "randomization" 6. Attrition and variance in group attendance required the use of intention to treat (using last available variable carried forward) which is necessary but does impact the data quality (pg 313 "data analysis". However, completer's analysis was also completed - results did not significantly differ from ITT analysis (pg 314 "Completer's analysis")					e) The only between-group difference was in age, as the meditation group was significantly older than the control group (P=.03), so all analyses controlled for age (pg 1400 last paragraph) Weakness: a) as mentioned on pg 1405, para 4, mindfulness measures have not been validated with older adults, which may skew data. Authors suggest that older adults are more mindful than a younger population, and measures need to be re-examined with an older population
Analysis and Presentation of Data	3	3	3	2	3	1	0	3
Analysis and Presentation of Data supporting text	Data presentation is excellent (see pg 5 fig 1; pg 6 table 1; pg 7 table 2; pg 8 table 3) Analysis of data sufficiently described pg 4-5. Analysis is in line with what would be expected to accurately conclude whether the intervention had a	1. Data presentation is excellent - all measures taken and recorded are reported graphically (see page 5 fig 1; pg 6 table 1; pg 7 table 2; pg 8 table 3 and fig 2). 2. Methods used to	1. Data analysis process sufficiently described on pgs 313-315. Statistical analysis methods described on these pages are appropriate and accurately measure differences means	Process of data analysis thoroughly described on pg 2 "participants" para 4 - pg 3 para 1 Data analysis process ensured that all qualitative data was coded appropriately	Presentation of data is excellent - see p 844 table 3 Data analysis process described sufficiently pg 843 "analytic approach"	Data presentation is sufficient (see pg 227. figure 2-3). Qualitative data presented throughout Brief discussion of the significance of the data	While outcome measures are reported (pg 304, table 2), no analysis of that data is offered. We do not know the significance or effect size of the	Strengths: a) Data is summarized accurately in the "results section" (see pg 1400-1401). Significance of each outcome measure is noted.

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	significant effect on the change in means between groups. Data is interpreted and it's significance communicated pg 6-8	analyze data are sufficiently described (p 3, "statistical analysis". Analyses conducted are sufficient and in line with what is expected to test hypotheses	between groups for each outcome measure, as well as variance in control group after being crossed over into intervention. 2. Presentation of data is excellent (see pg 314, fig 1; pg 315, table 1; pg 316, table 2; pg 317, table 3)	and analyzed according to theme. Codebook development and coding by trained qualitative research specialists suggests high quality of data Although the data isn't represented graphically, a thorough discussion of each theme is provided on subsequent pages of the study.	Analysis process is excellent. Effective in achieving purpose of study.	that were analyzed on pg 226 "Outcome" Enough data presented to understand the clinical outcomes of the case	change. Patient did improve on outcome measures, but it is hard to come to any conclusions about the significance of those changes.	b) Data presented in graph form (see pg 1402, figure 2) as well as table form (see pg 1403, table 2). While the graphic form does not allow for an examination of exact measures, it is sufficient in conveying the overall results and significance of each measure. c) Analysis of data outlined in "statistical methods" section of pg 1400 - appropriate statistical tests used to determine between group differences and significance of results
Discussion of Study Limitation	3	3	3	3	3	2	1	3
Discussion of Study Limitation supporting text	Thorough discussion of study limitations on pg 8-9 under "Limitations of the findings"	Limitations of study are sufficiently described on pg 8	Limitations discussed in sufficient detail on pg 318, para 3.	Thorough discussion of limitations offered on pg 6-7 'limitations of this study'	Discussion of limitations sufficient - p 847 "limitations"	Discussion of limitations within the data and of the study itself discussed on pg 229 "treatment implications of the case"	A brief but adequate discussion of limitations / complicating factors are noted on pg 304	Strengths: a) Limitations described in sufficient detail - pg 1401-1403, discussion of non-intert control group + possible reasons for improvement in both groups - pg 1404, discussion of possible ceiling effect impacting

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								RMDQ scores - pg 1405, para 3, discussion of length of treatment program as a possible factor affecting outcome measures (8 weeks may be too short to see meaningful improvement from meditation) - pg 1405, para 4, discussion of limitation of mindfulness measures for older adults - pg 1405 para 5, discussion of small sample size and lack of cultural diversity
Consideration of culture and diversity	0	0	--	0	2	1	1	2
Consideration of culture and diversity supporting text	Limited discussion of culture and intersectionality on results. Some characteristics addressed in the limitations section of the study, but no substantive discussion of cultural differences within the group are offered.	Study notes that there is greater diversity within the sample, but there is no substantive discussion of cultural considerations.	Discussions of culture not included in article	As is consistent with other research conducted by these authors, only a brief mention of diversity is noted. No substantive conversation occurs within the text of cultural differences/diversity/intersectionality and it's impact on the qualitative data received.	Lack of diversity w/in sample is acknowledged as a limitation of study - pg 847 "Limitations of this study". High rate of religious identification of sample not addressed.	Some discussion of cultural factors impacting treatment (see p 229, access and barriers to care; pg 224, "case conceptualization"; Pg 222 "case introduction" and "history	Authors provide a brief history and overview of the case and factors which may impact the course of treatment (pg 298), but do not offer a substantive discussion of cultural beliefs or intersectionality.	Ranked as "good/adequate" as authors indicate LACK of diversity in sample size as a factor impacting generalizability, and the need for that in future studies. (see pg 1405 para 5).
Risk of Bias	Minimal		Minimal	Minimal	Minimal	Minimal	Minimal	Minimal

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Risk of Bias supporting text	- Selection bias: Minimal. Mitigated by randomization process (p 4 para 1) - Performance bias: moderate - we do not know who taught the MS control group, nor what steps were taken to ensure that the group's variance was not due to iatrogenic factors. - Detection bias: minimal - assessors were blind to treatment grouping - Attrition bias - minimal - attrition is adequately accounted for (reasons provided pg 5 fig 1). A description of accounting for the attrition in the data analysis process is included on p 4 in the first paragraph of "statistical analyses" - Reporting bias - minimal - all pre-determined outcome measures are reported	1. Selection bias: Minimal risk of selection bias d/t randomization efforts (described p 3 "randomization and blinding") 2. Performance bias: Minimal risk d/t randomization, adequate program protocols for both intervention and control groups (see p 3 descriptions of intervention and control) 3. Detection bias: No risk of detection bias, as all staff completing the outcome assessments were blind to the intervention assignment (p 3 "randomization and blinding") 4. Attrition bias: Minimal risk of bias as analyses were conducted using ITT and attrition causes accounted for. 5. Reporting bias: Minimal - all pre-determined outcome measures reported.	Selection Bias: Risk of bias mitigated by selection (inclusion/exclusion) process and randomization (see pgs 311 "subjects" and pg 313 "randomization") Performance Bias: Given nature of waitlist control group and the level of training/experience for intervention group facilitator, no risk of performance bias. Detection Bias: Given the nature of the control (waitlist), no risk for detection bias. Attrition Bias: Possible attrition bias mitigated by using ITT in statistical analysis + completer's analysis. These showed no significant differences. Reporting Bias: None. All pre-specified outcome measures reported. Limitations specified. No intentional withholding of data suggested.	- Selection bias - N/A - all participants belonged to parent study - Detection bias - Minimal. All conversations were recorded and transcribed. - Performance bias - Minimal. Each focus group used uniform questions to collect data, suggesting that little difference occurred between the content/prompts of group discussion (p 2 "participants") - Attrition bias - N/A - Reporting bias - minimal to moderate. A thorough discussion of themes is offered in the text, but we are unable to see the codebook that was created. We do not know if any data was withheld from the final report	Selection Bias: Risk of bias mitigated by selection (inclusion/exclusion) process (p 842 "participants") and randomization (see Morone 2008 companion study pgs 311 "subjects" and pg 313 "randomization") Performance Bias: Given nature of waitlist control group and the level of training/experience for intervention group facilitator, no risk of performance bias. Detection Bias: The nature of data being collected here does not lend itself to detection bias, as qualitative diary entries are being analyzed. Outcome measures are not being taken. Attrition Bias: Minimal-moderate risk of attrition bias here.The nature of data being collected does not lend itself to attrition bias. However, a form of attrition may have	- Selection bias - N/A - Performance bias - N/A - Detection bias - N/A - Attrition bias - N/A - Reporting bias - Minimal - all predetermined outcome measures are reported in this sample. Notes about funding and potential conflicts of interest are included (pg 229, 230)	Selection bias: N/A Performance bias: N/A Detection bias: N/A Attrition bias: N/A Reporting bias: Minimal - all pre-determined outcome measures are reported.	1. Selection Bias - no apparent risk of selection bias. See description of randomization process on pg 1398 in para 2. 2. Performance bias - moderate risk of performance bias, as we do not know who taught the control group, and we don't know whether the PI selected this instructor 3. Attrition bias - low risk of attrition bias. Although several participants dropped out of the study, a completer's analysis was performed to analyze the data in an ideal situation. While this inherently presents risk of bias, authors listed the reasons for attrition on pg 1397 in figure 1. Risk is low, but not negligible 4. Detection bias - low-moderate risk of detection bias. We do not know who assessed participants post-treatment and at follow up, requiring us to assume that all data

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					occurred due to a decreased average of journal entries being handed in as the study progressed. Missing data may have caused researchers to miss other themes that may have come up. However, it does not appear that attrition would have caused any significant between group difference Reporting Bias: Minimal - it appears that all data collected were analyzed and reported. Independent coders arrived conclusions regarding coding, then compared findings to create a coding scheme (p 843 "analytic approach"). Reporting bias is low, but not impossible as we do not know if certain text entires were excluded if they did not fit the coding scheme.			was collected in a uniform way by trained members of the research team. 5. Reporting bias - no apparent risk of reporting bias. All outcome measures are reported in completion. Low significance in difference of outcome measures between groups suggests that data was not modified to present a more positive outcome for the intervention.
Overall Rating	Good	Exemplary	Strong	Strong	Exemplary	Good	Adequate	Good
Overall Rating supporting text	High data quality, moderate sample size, effectively answered research questions. Limitations of study affect generalizability. Fits into	Excellent methodology and processes. Thorough foundation for research. Large sample group w/	This study displays adherence to appropriate methodology - in this regard, the quality is	Excellent data quality, well constructed study, small but adequate sample size. Generalizability limited	Minimal bias, excellent methodology, useful conclusions and directions for future research.	Accurately accomplishes goals of study (providing example/feasibility of ACT for older adults	Study accomplishes goal of demonstrating feasibility of the treatment.	1. Overall risk of bias impacting outcome data is low to moderate 2. Sample

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	existing literature and further demonstrates psychological benefits of ACT for CP in older adutls	diverse population indicates generalizability.	high. The studies limitation gravely impact its ability to be generalizable, and limits the conclusions that can be drawn. However, this was a pilot study meant to explore possible avenues of future research, and does serve as a good foundation for future research.	d/t limitations.		w/ CP). Good data quality, though the conclusions that can be drawn are limited. Adequately showcases possible mechanisms of change resulting from increased mindfulness	Adequate intervention information provided. Poor statistical power and severely limited conclusions/generalizability from this study.	characteristics and size significantly limit generalizability 3. Data quality is adequate 4. Outcome measures show promise for both control and intervention programs, but did not demonstrate significance in difference between groups for reasons that the authors hypothesize in the text as a direction for future research