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## **Efficacy of Cognitive Behavioral Therapy on Adults Experiencing Chronic Musculoskeletal Pain**

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### **Focused Question**

What is the effect of the cognitive behavioral interventions on the performance of instrumental activities of daily living of adult men and women who have chronic musculoskeletal pain?

### **Overall Purpose Statement**

The purpose of this critically appraised topic (CAT) paper is to explore the effectiveness of pain reduction through cognitive behavioral therapy (CBT) in assisting men and women who have chronic musculoskeletal pain with instrumental activities of daily living. There is a gap in the literature regarding the effect of cognitive behavioral therapy when managing and perceiving chronic musculoskeletal pain. There is also a gap in long-term research in the performance and satisfaction of instrumental activities of daily living (IADLs) when living with chronic pain. Aegler and Satink (2009), Cheng et al. (2017) and Ehde et al. (2014) discussed the impact of chronic pain on occupational performance but do not follow up on specific IADLs and levels of pain post-study or treatment.

### **Case Scenario**

Chronic musculoskeletal pain is the most common type of chronic pain suffered in older populations. It consists of persistent or recurrent pain for at least three months that arises usually as part of a disease process (Cheng & Cheng, 2019). In the United States, musculoskeletal chronic pain affects about 100 million individuals (Institute of Medicine, 2011). Many remedies and coping strategies are available to help manage pain symptoms. Over the past several decades, cognitive behavioral therapy (CBT) has become a first-line psychosocial treatment for individuals with chronic pain (Ehde et al., 2014). CBT is a holistic, complex interaction between cognitive, behavioral, and psychosocial aspects influenced by biomedical factors, which may include cognitive and behavioral coping skills training, cognitive restructuring, and behavioral activation techniques (Lindgreen et al., 2016; Niknejad et al., 2018). Some interventions used by occupational therapists, psychologists, and other allied health professionals include social learning, cognitive distortions, self-regulation, and role modeling (Scaffa, 2019). The need for an overarching term to define CBT was determined by Nicholas et al. (2019) due to shortcomings identified by previous publications such as the Diagnostic Statistics Manual (DSM-5) and the International Classification of Diseases (ICD-10). A masters or doctoral degree is needed in a healthcare or mental health field to apply for certification to administer CBT ("Certifications," 2021). CBT is one non-pharmacological intervention that is typically delivered to individuals or groups over several weeks and has been shown to reduce pain perception and improve an individual's ability to cope with their pain (Knoerl et al., 2016). More research is needed to support the effectiveness of CBT across a larger spectrum.

The population with the greatest prevalence of chronic musculoskeletal pain are adults, 18-64 years old, and older adults, 65 years and older (Zelaya et al., 2020). Adults and older adults with chronic musculoskeletal pain experience limitations in their performance range of daily life activities such as childcare, driving, financial management, home maintenance, and shopping. Specifically, the area of occupation highlighted in the purpose statement; instrumental activities of daily living (IADLs), has been defined as "*activities that support daily living within the home and community and often require more complex interactions than those used in activities of daily living*" (AOTA, 2020, p. 78). Chronic musculoskeletal pain not only



affects an individual physically, but also influences psychological factors such as anxiety, depression, and thus, the overall quality of life. It is important to consider cultural aspects when determining an individual's level of chronic pain. Cultural aspects can include pain severity, barriers to social participation and personal history. Chronic musculoskeletal pain is complex, difficult to maintain, and is associated with emotional distress and/or functional disability (Ehde et al., 2014; Nicholas et al., 2019; Veehof et al., 2010). It may be as a result of an underlying disease or not accounted for by another condition (Cheng et al., 2017; Nicholas et al., 2019). Considering how chronic pain could affect an individual physically through pain in joints and muscles, and mentally through anxiety and depression, IADLs can be difficult to manage and treat (Cheng et al., 2017). This is due to the complexity and wide spectrum of barriers associated with individuals and their engagement in IADLs.

Occupational therapy practitioners use a client-centered approach by viewing their clients holistically, focusing on what is important to their clients, and how they can help their clients get back to doing the occupations they need to do, want to do, and are expected to do (AOTA, 2020). Occupational therapy practitioners utilize a unique approach with clients, specifically addressing meaningful occupations of daily living. They can assist individuals experiencing chronic musculoskeletal pain and increase the quality of life by addressing occupational performance range through cognitive behavioral interventions. "The cognitive behavioral therapy (CBT) aims at helping patients to be able to evaluate the impact of pain on their lives, encouraging them to keep the orientation to solve problems and to develop means of learning how to deal with pain chronicity" (Castro et al., 2012, p. 864). Occupational therapists can facilitate CBT as an intervention approach to assist adult men and women in coping with chronic musculoskeletal pain, which can lead to improved performance in meaningful IADLs.

### **Theory: Ecology of Human Performance**

The Ecology of Human Performance Model (EHP) created by Dunn et al. (1994), was selected to guide this critically appraised topic (CAT). This model was chosen because it focuses on an individual's functional limitations and how those limitations and the environment can affect the number of tasks available to them (Dunn et al., 1994). This can also be described as an individual's performance range. Using the model of EHP to guide cognitive behavioral therapy, an occupational therapist can help improve an individual's skills and/or adapt to the occupational demands or environment to increase their performance range, which will ultimately lead to improving an individual's quality of life (Dunn et al., 1994).

### **Synthesis of Evidence Review**

Initially, we reviewed 30 articles containing information about chronic musculoskeletal pain and the efficacy of cognitive behavioral therapy on pain reduction, and how the treatment of pain affected adult men and women. Upon further review, we narrowed our results to include 19 articles that were centered around our focused question and included relevant information to our CAT.

The University of North Dakota's School of Medicine and Health Sciences library led us to publications from a variety of databases. The databases used included Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, Medline, OT Search, and Embase. Search terms used were a combination of *musculoskeletal, chronic pain, adults, rehabilitation,*



*occupational therapy, and cognitive behavioral therapy.* Inclusion criteria were population ages 18 years and older who experience chronic pain. Articles were excluded if they were not accessible in English. Articles that were included consisted of systematic reviews, meta-analyses, randomized control trials, narrative reviews, and others.

**Table 1**  
*Articles Critiqued*

<b>Study Design/Level of Evidence</b>	<b>Population</b>	<b>Sampling/Setting</b>	<b>Author(s) (Year)</b>
Narrative Review/Level N/A	8 participants	Purposive sampling	Aegler & Satink (2009)
Semi-structured Interview nested within a Randomized Control Trial/Level N/A	44 participants	Participants used from the prior RCT	Bee et al. (2016)
Randomized Control Trial/Level I	72 participants	Self-selected Sample	Buhrman et al. (2013)
Randomized Control Trial/Level I	93 participants	Purposive Sampling	Castro et al. (2012)
Systematic Review & Meta-analysis/Level I	18 articles	Randomized Control Designs	Cheng & Cheng (2019)
Quantitative Descriptive Study Design/Level N/A	67 participants	Convenience Sampling	Dorfman (2018)
Meta-analytic review/Level I	N/A	N/A	Edhe et al.. (2014)
Mixed methods/Level N/A	147 participants	Convenience Sampling	Heapy et al. (2018)
Meta-analysis/Level I	106 articles	Quantitative Reviews on CBT	Hofmann et al. (2012)
Integrative Review/Level I	35 articles	Randomized Control Trials	Knoerl et al. (2016)
Qualitative/Level N/A	10 participants	Convenience Sampling	Lingreen et al. (2016)



Quantitative Meta-analytic Review/Level I	12 articles	Controlled & Uncontrolled Studies on CBT	Lunde et al. (2009)
Randomized Control Trial/Level I	170 participants	Convenience Sampling	Monticone et al. (2017)
Descriptive/Level N/A	N/A	N/A	Nicholas et al. (2019)
Systematic Review & Meta-Analysis/Level I	22 articles	Randomized Trial Design	Niknejad et al. (2018)
Dissemination/Level III	71 therapists, 148 veterans	Convenience Sampling	Stewart et al. (2015)
Meta-Analysis/Level I	20 articles	N/A	Turner et al. (2016)
Systematic Review & Meta-Analysis/Level I	22 studies	N/A	Veehof et al. (2011)
Randomized Comparison Trial/Level I	53 participants	Convenience Sampling	Yarns et al. (2020)

### Chronic Musculoskeletal Pain

Chronic musculoskeletal pain increases in prevalence as generations age (Yarns et al., 2020). Chronic musculoskeletal pain varies in type and location, including arthritis, low back pain, headache, fibromyalgia, temporomandibular joint (Lindgreen et al., 2016; Nicholas et al., 2019; Turner et al., 2016; Veehof et al., 2010). Chronic musculoskeletal pain greatly influences and disrupts an individual's ability to perform their daily tasks. Chronic pain is typically treated and managed with pharmaceuticals, but non-pharmaceutical interventions may be warranted alongside pharmaceuticals or as a standalone intervention in order to address the occupational needs of clients. It is necessary to investigate non-pharmaceutical interventions further for their effectiveness in treating/managing chronic musculoskeletal pain.

The researchers of two qualitative studies, Aegler and Satink (2009) and Dorfman (2018), explored how individuals with chronic pain perceive their occupational performance. These studies showed that while pain did not completely prohibit participants from completing tasks, it affected the quality of their performance (Aegler & Satink, 2009; Dorfman, 2018). Participants in the Aegler and Satink (2009) and Dorfman (2018) studies noted that due to their chronic pain, they felt a loss of motivation to challenge themselves and continue to stay engaged with occupations as well as complete their occupations once they were started. Aegler and Satink (2009) and Dorfman (2018) expressed that participants had difficulty learning how to restructure the way they performed their occupations and had to learn how to incorporate breaks throughout their performance.



## Cognitive Behavioral Therapy

Cognitive behavioral therapy (CBT) can be used alone or in conjunction with pharmaceutical or surgical approaches to combat chronic musculoskeletal pain (Niknejad et al., 2018). According to Niknejad et al. (2018), chronic pain is usually managed with pharmacotherapies. With a recent societal shift to focus more on holistic care, psychological treatments are recommended, but little information is available regarding their efficacy (Niknejad et al., 2018). Many patients are apprehensive to trying psychological therapy pre-treatment and typically prefer a physical intervention (Bee et al., 2016). Through interviews conducted by Bee et al. (2016) within a randomized control trial, evidence was found that psychological therapy often exceeds a patient's expectations. It is important to note that CBT can be delivered in a variety of formats including group or individual therapy, web-based therapy and telephone delivered therapy (Edhe et al., 2014). CBT lacks the risk of medications and surgery, however, most patients who experience chronic pain do not receive CBT (Edhe et al., 2014). Select studies that followed up with patients post-intervention over an extended period of time, of at least six months, found significantly positive results in pain intensity compared to studies where there was no follow up after intervention. Sustained improvements were noted in psychological domains, physical domains, quality of life, and pain intensity (Knoerl et al., 2016; Stewart et al., 2015).

The authors of a level one randomized control study and an integrative review found that guided cognitive behavioral interventions for individuals experiencing chronic pain showed a small change of improvement in pain management and a reduced pain intensity (Buhrman et al., 2013; Knoerl et al., 2016). CBT was effective in improving pain intensity of those experiencing chronic pain while also helping to reduce depressive symptoms, increase the general state of health, and overall quality of life (Castro et al., 2012; Knoerl et al., 2016; Monticone et al., 2017). In two meta-analyses, Hofmann et al. (2012) and Lunde et al. (2009) examined the efficiency and effects of CBT on adults experiencing chronic pain. Hofmann et al. (2012) and Lunde et al. (2009) reported that there was a small to medium positive effect in the individual's ability to manage their pain and a significant improvement in self-reported pain experience.

Cheng and Cheng (2019) designed a systematic review and meta-analysis to examine the effects of physical exercise and cognitive behavioral therapy in conjunction on alleviating pain intensity and mood/mental symptoms, in those suffering from chronic pain, found that results greatly varied. The researchers noted that some studies reported that CBT and physical exercise used together in intervention had a small but positive effect, a few had a large effect, and others had no effect at all on chronic musculoskeletal pain (Cheng & Cheng, 2019). Cheng and Cheng (2019) found little evidence that CBT is better than exercise, however, they did find that CBT independently was an effective intervention for chronic pain but the value of adding CBT to exercise is questionable.

CBT consists of many aspects that may influence the effectiveness of CBT on pain reduction. Heapy et al. (2018) summarized client goals created while receiving cognitive behavioral therapy found themes of occupations including physical activity, functional status, wellness, recreational activities, house/yard work, socializing, and work/school. Interest and willingness to participate influence success rate, therefore client created/client-centered goals,



may increase the success rate of CBT in combating chronic pain. Along with interest and willingness, is the delivery type of CBT. Formats of CBT range from web-based, telephone based, group setting, or one on one and different individuals may experience success with varying methods (Edhe et al., 2014). CBT can be delivered anytime along the course of combating chronic musculoskeletal pain. Lindgreen et al. (2016) discussed chronic low back pain and surgical intervention alongside CBT, therefore it may be important to note the timing of CBT, whether it be early on in a chronic pain experience or a later intervention. Rater consistency and therapist competence also directly relates to the quality and effectiveness of CBT as noted by Stewart et al. (2015) in their article which highlighted a therapist training program as well as patient outcomes. CBT may include cognitive restructuring, coping skills, behavioral activation techniques, along with a variety of activities (Niknejad et al., 2018). The type of approach and what is included in a CBT agenda could affect patient outcomes and their satisfaction with their occupational performance. Further research is needed in order to determine the impact of each aspect on CBT effectiveness.

### **Emerging Interventions**

While CBT is a therapy that is still in need of further research, it is important to note that new research and therapies are consistently changing and advancing. Yarns et al. (2020) found that leading psychosocial treatments for pain, such as CBT, demonstrate only modest pain reduction for a minority of patients, including older adults. In their randomized comparison trial, other non-pharmaceutical therapies such as Emotional Awareness and Expression Therapy (EAET) proved to result in lower pain intensity than CBT (Yarns et al., 2020). EAET showed a 30-50% pain reduction compared to other psychosocial therapies (Yarns et al., 2020). Yarns et al. (2020) discovered that an awareness of emerging psychosocial therapies is crucial in finding what is considered best practice for individuals experiencing chronic pain.

### **Summary**

The evidence found from the literature review for this CAT paper highlighted that CBT as an intervention for reducing pain intensity for adult men and women who experience chronic musculoskeletal pain is inconsistent (Cheng & Cheng, 2019). Results for the effectiveness of CBT as a sole intervention have shown mild to moderate effects, however, when paired with other treatments, outcomes are questionable (Cheng & Cheng, 2019; Knoerl et al., 2016).

### **Clinical Bottom Line**

The purpose of this CAT paper was to explore the evidence of using cognitive behavioral therapy (CBT) as an intervention to reduce pain intensity in adults who experience chronic musculoskeletal pain as well as answer the focus question of, "What is the effect of the cognitive behavioral interventions on the performance of instrumental activities of daily living of adult men and women who have chronic musculoskeletal pain?" Based on the literature review for this CAT paper, chronic musculoskeletal pain in adults is becoming increasingly prevalent in aging generations (Edhe et al, 2014; Niknejad et al., 2018). Individuals who experience chronic musculoskeletal pain have increased difficulty during their occupational performance and a decreased performance range while completing instrumental activities of daily living (IADLs) (Aegler & Satink, 2009; Dorfman, 2018). Occupational therapy is an approach used to assist individuals in a variety of tasks. The aim of occupational therapy is to improve the quality of life by increasing occupational opportunities by adapting and/or modifying tasks to





increase the performance range for each individual (AOTA, 2020). Chronic pain can inhibit participation and motivation in the performance of an individual's occupations (AOTA, 2020; Ehde et al., 2014). Occupational therapy facilitates patient-centered goals to get patients back to what they need to do, want to do and have to do (AOTA, 2020).

Evidence from the reviewed studies was looked at through the lens of the Ecological Model of Human Performance (EHP) (Dunn et al., 1994). This model emphasizes the individual and their environment, and its relation to performance range. The range refers to the individual's abilities, tasks available to them, and possible barriers that inhibit participation in tasks. Individual deficits, motivation, type of pain, and environmental resources, are all factors contributing to success rates of CBT addressing chronic musculoskeletal pain (Ehde et al., 2014; Heapy et al., 2018; Niknejad et al., 2018). Each component can impact the other, therefore consideration of each is critical when evaluating CBT as a treatment option for chronic musculoskeletal pain.

Cognitive behavioral therapy (CBT) is a non-pharmacological intervention that is holistic and complex. It can be delivered in a variety of formats and delivered by certified healthcare professionals and occupational therapists to address cognitive and behavioral coping skills training, cognitive restructuring, and behavioral activation techniques (Cheng et al., 2017; Lindgreen et al., 2016; Niknejad et al., 2018; Scaffa, 2019). In many cases, CBT has been shown to decrease an individual's perception of pain and increase their ability to cope with their chronic pain during daily tasks (Knoerl et al., 2016).

Research on CBT includes a variety of factors which may influence the effectiveness of CBT on pain reduction. Aspects to note that could vary across CBT intervention include the type of intervention, therapist competence, when intervention is performed, rater consistency, group versus individual therapy, pain intensity, how long intervention is carried out, types of chronic pain, and goals of CBT (Ehde et al., 2014; Heapy et al., 2018; Lingreen et al., 2016; Niknejad et al., 2018; Stewart et al., 2015). More research is warranted to determine the implications of these aspects on the rate and magnitude of the success of CBT as an intervention.

As occupational therapists, we work with individuals to modify and/or adapt themselves, their environment, or the task they are performing. When delivering client-centered care, practitioners must consider cultural differences and environmental factors that impact the client when using CBT. Cultural differences may include but are not limited to the individual's background, social participation and severity of pain. Evidence shows CBT has a mild to moderate effect at reducing pain intensity and perception held by people who experience chronic musculoskeletal pain (Buhrman et al., 2013; Cheng & Cheng, 2019; Knoerl et al., 2016). As pain intensity is reduced, alongside possible adaptations/modifications to the environment or tasks, the occupational performance range of IADLs is increased. Furthermore, as the performance range of IADLs improves, so does the individual's overall quality of life.

It is essential to remember that occupational therapists will collaborate with other healthcare professionals to meet the needs of adults who experience chronic musculoskeletal pain while using CBT as an intervention. Occupational therapists often work closely with the client's family members, caregivers, or others who are providing support to the client as they receive their occupational therapy services (AOTA, 2020). Regarding CBT as an intervention,



occupational therapists may also work closely with counselors, social workers, and even psychiatrists to provide the best care possible (AOTA, 2020).

During the process of creating this CAT, implications and bias may have been present through our own experiences with chronic pain, availability of articles and access to specified databases through the University of North Dakota. CBT is often defined differently by authors which can create ambiguity in the research (Nicholas et al., 2019). Individuals are complex and experience pain in a multitude of ways which also creates ambiguity when defining chronic musculoskeletal pain.



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