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Multimodal Approach to Chronic Pain Management and Prevention of Opioid Use Disorder

Hannah Elston

University of Arkansas, Fayetteville

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Multimodal Approach to Chronic Pain Management and Prevention of Opioid Use Disorder

Eleanor Mann School of Nursing, University of Arkansas

Professionals Honors Department

Hannah Elston, Honors Nursing

Abstract

Background. Chronic pain (CP) is a major public health problem that affects one-third of the population and can interfere with the activities of daily life and cause decreased quality of life. Patients with CP have been increasingly prescribed opioids, contributing to the rise in the opioid epidemic. Due to the long-term nature of CP, the use of opioids as the sole treatment for CP can cause tolerance and increased dosages overtime which can lead to addiction and potentially overdose. Therefore, CP treatment should include multimodal approaches to treatment to prevent opioid misuse, opioid use disorder (OUD), and overdose. Multimodal treatments involve a combination of pharmacological and nonpharmacological interventions. **Objectives.** In adult patients (>18 years) with chronic pain treated with prescription opioids, how effective is a multimodal treatment involving nonpharmacological and pharmacological interventions in pain management and prevention of opioid use disorder compared to opioid treatment alone?

Methods. An online search of PubMed and CINAHL for peer-reviewed studies from 2015-2022 was conducted. **Results.** The electronic search yielded 632 articles. Twenty articles were selected and assessed for information related to therapies in addition to opioid therapy that is beneficial for the treatment of CP. Additional outcomes observed in some of the studies include improved quality of life (QOL), sleep, pain relief, physical function, perceived stress, anxiety, and depression. **Conclusion.** Systematic approaches to integrate multimodal CP management and prevent opioid abuse and OUD are essential to promote optimal patient outcomes and prevent opioid-related morbidity and mortality. The benefits of using multiple treatment modalities for chronic pain reduction were found using all 20 studies in the review, with the most beneficial patient outcomes seen when different treatment modalities were utilized.

Introduction

Chronic pain affects over 100 million Americans, or one-third of the population, with 19 million adults experiencing severe chronic pain that interferes with activities of daily life or work (National Institute on Drug Abuse, 2021; U.S Department of Health and Human Services, 2019). According to the Center for Disease Control and Prevention (CDC) (2020), nearly half a million Americans died from an opioid within the past two decades. In addition, eight to 12 percent of people treated for chronic pain with opioids developed an opioid use disorder (National Institute on Drug Abuse, 2021). The CDC released guidelines for prescribing opioids for chronic pain in 2016, stating that opioid therapy should be considered only if expected benefits will outweigh risks to the patient and if opioids are used as treatment, then they should be combined with nonpharmacologic therapy and nonopioid pharmacologic therapy as needed (Dowell et al., 2016). Pain management is not a single approach but multimodal to effectively manage chronic pain while improving quality of life (QOL) and preventing opioid misuse or abuse. Multimodal chronic pain management following the biopsychosocial model of care addresses holistic aspects of treatment for chronic pain, reducing the risk for opioid use disorder. This literature review will address the multimodal interventions for managing chronic pain (CP) among individuals concurrently treated with prescription opioids and evaluate their effectiveness in pain management and prevention of opioid use disorder (OUD).

Background Information

Pain and Quality of Life

The type of pain looked at in this study is chronic pain that is not due to cancer, cancer treatment, or end-of-life care. Chronic pain, a pain lasting for longer than three months, can

cause a decreased QOL through added physical and mental stress. Physical stressors include sleep disturbances, fatigue, trouble concentrating, and reduced appetite. Mental stressors include decreased self-esteem, difficulty participating in social activities, anxiety, and depression. (Mental Health America, 2020). Chronic is a complex and dynamic experience pain that can result from a multitude of diseases, conditions, and injuries. There are three categories of chronic pain: neuropathic pain, mixed pain, and nociceptive pain. Neuropathic pain is comprised of neuralgias, peripheral neuropathy, neuropathic low back pain, post-stroke pain and pain relative to spinal cord injuries (Clark et al., 2015). Mixed pain, which has nociceptive and neuropathic components, includes chronic headache, fibromyalgia, phantom limb pain, complex regional pain syndrome (CPRS), multiple sclerosis, myofascial pain syndrome, and skeletal muscle pain. CPRS is a type of mixed chronic pain that occurs in the arm or leg after an injury, surgery, stroke, or heart attack (Mayo Clinic, 2018). Nociceptive pain includes mechanical lower back pain, rheumatoid arthritis, osteoarthritis, chronic inflammatory conditions, postoperative pain, sickle cell crisis, and sports-related injury (Clark et al., 2015). Effective chronic pain treatment is vital to promoting functionality and a quality of life.

Pharmacology

Opioids are valued for their effectiveness and quick onset of pain relief. The drug binds to one of the three opiate receptors in the central nervous system: mu, kappa and delta. Mu receptors are responsible for analgesia, physical dependence, respiratory depression, and euphoria. When an opioid binds to a mu receptor to block pain signal transmissions, it releases a large amount of dopamine (Dhaliwal et al., 2021). The dopamine surge reinforces the act of taking the drug and leads to positive reinforcement, increasing the potential for addiction. Prescription opioids used for chronic pain include natural opiates, semisynthetic opiates and fully

synthetic opiates. Each of these classes has extended-release, long-acting and immediate acting forms. Opioids have many side effects, including sedation, nausea, vomiting, constipation, respiratory depression, euphoria, physical dependence, and tolerance (Medline Plus, 2018). These drugs can cause physical and psychological addiction, leading to overdose and overdose-related death.

Opioid Misuse

Misuse or abuse of opioids occurs when the prescribed drugs are used in a manner or dose other than prescribed. Opioids that are commonly involved in OUD and opioid-related deaths are Fentanyl, Dilaudid, Percocet and Morphine (National Institute on Drug Abuse, 2014). The population that uses opioid prescriptions is predominantly older adults, but in this study we will be looking at ages 18 years and older related to opioid use and abuse. The epidemic of opioid abuse in the United States started in the 1990s when pharmaceutical companies aggressively marketed sustained-release opioids claiming improved safety and less potential for addiction and abuse compared to immediate-release preparations. This contributed to soaring rates of prescribed sustained-release opioids. After widespread misuse of this medication occurred, it became clear that these medications were more addictive than they had previously thought.

Stigma

Stigma related to living with pain and opioid use can prevent receiving quality care, contributing to decreased mental health. Stigma is defined as a process wherein people with particular social identities are labeled and devalued leading to discriminatory behavior against people with the stigmatized identity (Tsai et al, 2019). Destigmatizing addiction is vital and involves classifying drug addiction as a "disease" instead of blaming the individual for their condition or weakness of character. Stigmatizing someone and their addiction can cause shame

and guilt which cause people to want to escape their reality, artificially connect with others and avoid negative feelings, all which fuel addiction and create a cycle of substance use (Patterson, 2021).

Multimodal Pain Management

Pain is of a complex nature and involves physical, psychological cognitive, and behavioral aspects, underscoring the need for multidimensional treatment. Multimodal pain management involves varied modes of treatment to manage and treat pain including pharmacological and nonpharmacological components that consider the intensity and pathophysiology of pain, the complexity of symptoms, the presence of comorbidity the social context and the time this pain may persist (Arturo et al., 2019). Multimodal treatment can involve many approaches: medications, physical rehabilitation, lifestyle changes, psychology, advanced pain interventions, surgery, and complementary and alternative methods (Dale et al., 2016). The Biopsychosocial Model of Care is used in multimodal pain treatment to describe pain as a multidimensional and dynamic combination of physiological, psychological and social factors that can impact each other (Meints et al., 2018).

Methods

Study Design

A systematic review of research was conducted on the types of interventions and treatments completed in health care facilities in the multimodal management of chronic pain among patients who have prescription opioids as their main pharmacological treatment. This

review uses the PRISMA guidelines as a guide and contains articles retrieved from CINAHL, PubMed, and MEDLINE.

Information Sources

One investigator independently searched CINAHL and PubMed databases. PubMed Medical Subject Headings were used in electronic searches of the PubMed databases. CINAHL subject headings were used in the CINAHL database. A keyword search did not produce further articles for use in study.

Search Strategy

Based on the research questions, keywords used include "opioid use" and "chronic pain" and "treatment". Results from PubMed and CINAHL contained search limitations including publication date of 2015-2022, human subjects, the geography of the USA, and English language. MeSH terms were used to define search terms for the PubMed database. Subject headings were used to define search terms in CINAHL database. The flowchart in Figure 1 illustrates the search terms used in each database and the study selection process.

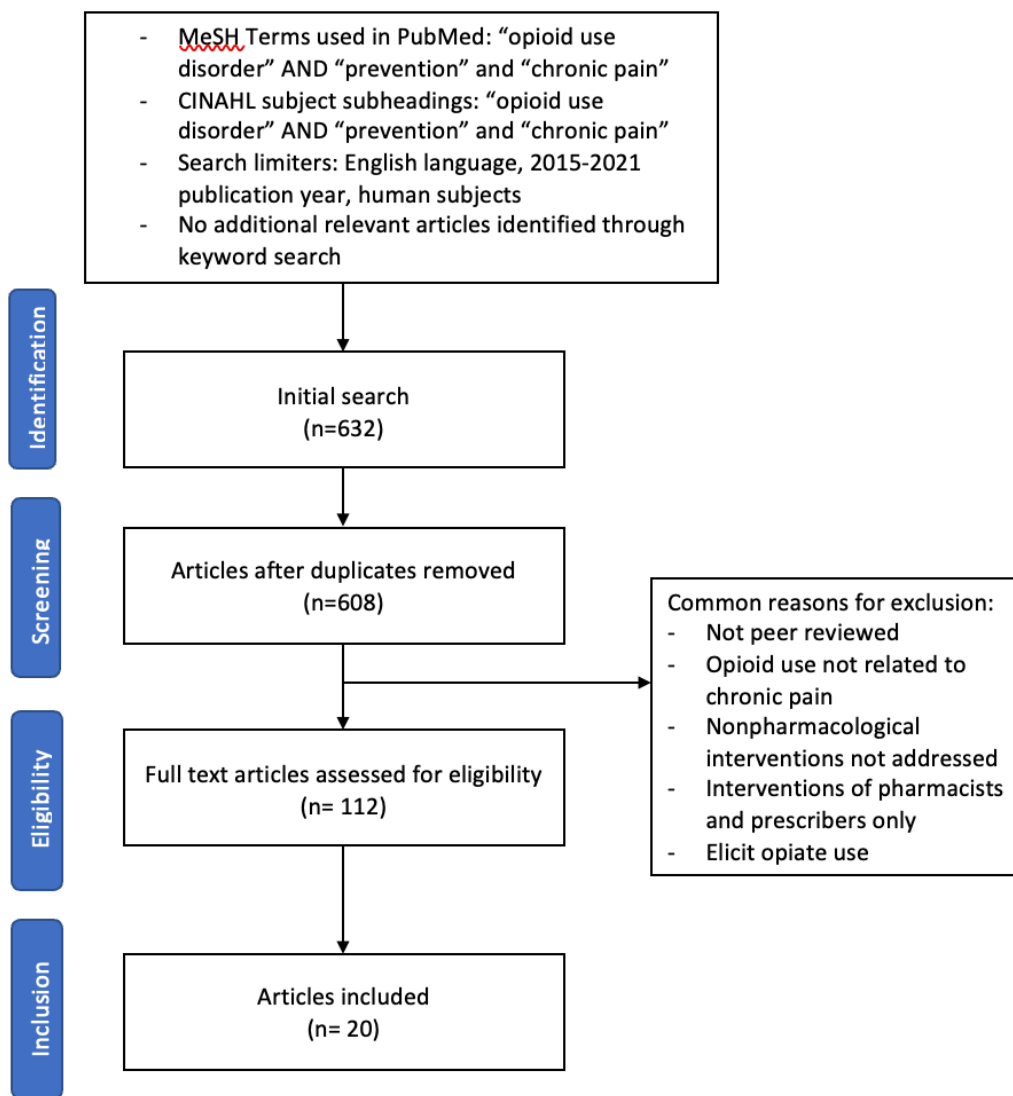
Inclusion/Exclusion Criteria

Articles that did not contain key elements from the research question were excluded. Articles were included in the review if (a) the study was conducted on patients who experience chronic pain that is treated with opioids; (b) examined the relationship between a multimodal pain treatment and decreased incidence of OUD; (c); compared data from groups that used nonpharmacological interventions in addition to opioid use to those that were prescribed only opioid analgesics; and (d) was conducted on adults of all ages.

Data Extraction

By scanning and observing the articles of their information on authors, publication year, subject age, purpose of study and results, data from twenty articles was extracted. One researcher reviewed the articles and compiled the data.

Figure 1



Search Results

The initial search yielded 632 results, 587 articles from PubMed and 45 from CINAHL. Twenty-four duplicate articles were removed. Review of 496 article title and abstracts resulted

in 112 articles for further eligibility evaluation. The remaining full text articles were reviewed with criteria relative to the PICOT question, and 20 studies included in the literature review are illustrated in Figure 1.

Results

Characteristics of Articles

Among the 20 studies that met inclusion criteria, there were five systematic reviews, one literature review, three cohort studies, two case-control studies, one retrospective case-control study, four randomized controlled trials (RCTs), two descriptive qualitative studies, and two integrative reviews of the literature. Findings from the articles is found in Table 2.

Figure 2

Table of Evidence						
Reference	Level of Evidence	Hypothesis, question, or purpose	Design	Sample Methods & Instruments Procedures	Statistical Results or Findings	Implications or Conclusions
Cepeda, M. S., Coplan, P. M., Kopper, N. W., Maziere, J.-Y., Wedin, G. P., & Wallace, L. E. (2017). ER/LA Opioid Analgesics REMS: Overview of	4	To evaluate the impact of the risk evaluation and mitigation problems on opioid misuse, abuse and death.	Case Control study	Sample: outcomes from July 2010 through June 2012 and outcomes from July 2013 through August or December 2014 Methods: used a variety of outcomes including the number of prescribers completing a REMS-	The RADARS system showed a 47% decrease in the rates of ER/LA opioid abuse after REMS implementation while the NAVIPPRO system found a 20.4% reduction; The US Poison control center reported a 24.9% decrease in the rates of hospitalization or	Systems put in place, such as implementing a REMS, help to decrease the rates of opioid use disorders, opioid overdose or opioid related death.

Ongoing Assessments of Its Progress and Its Impact on Health Outcomes. <i>Pain Medicine</i> , 18 (1), 78–85. https://doi.org/10.1093/pm/pnw129				compliant CE activity, assessment of comprehension of the medical guide and patient counseling document by patients, patient satisfaction with their access to opioids Procedures: outcomes from July 2010 through June 2012 were compared to those from July 2013 through August or December 2014	death due to ER/LA opioids after implementation of REMS.	
Chang, Y., Cassalia, J., Warunek, M., & Scherer, Y. (2019). Motivational interviewing training with standardized patient simulation for prescription opioid abuse among older adults. <i>Perspectives in Psychiatric Care</i> , 55(4), 681–689. https://doi.org/10.1111/ppc.12402	4	To examine the effect of motivational interviewing (MI) education on DNP students' learning outcomes	Cohort Study	Sample: 31 DNP students Methods: All 31 DNP students completed MI education including a didactic lecture, a role playing exercise and SP simulation then completed a re- and posttest about their confidence, skills and knowledge of MI when treating patients who abuse opioids	After the MI education and simulation, students indicated an increase in knowledge and confidence regarding MI in the posttest.	Nurse education and practice with MI can help nurses to be knowledgeable and confident in their MI ability and be able to complete MI with patients who are prescribed opioids for chronic pain or for patients who have opioid use disorder
Denis, A. M. (2019). <i>Managing</i>	5	Care management of patients	Literature review	Sample: Compilation of information from 37 articles	During assessment of the patient the provider should	Preventing and treating OUD can be

<p>Opioid Use Disorder: The Nurse Practitioner Addressing the Challenge. <i>MEDSURG Nursing</i>, 28(5), 281–316.</p>		<p>with OUD is reviewed.</p>		<p>Methods: The articles were used to find information relating to management of chronic pain when opioids are involved and how to prevent or treat OUD.</p> <p>Procedures: Information from the articles was compiled in this systematic review to talk about OUD, managing opioid use disorder and nonpharmacological interventions to manage OUD.</p>	<p>perform a risk assessment and assess medical history to assess for OUD risk. Guidelines by the American Society of Addiction Medicine should be followed to provide patient centered care that promote healthy lifestyles.</p>	<p>done through risk assessments completed before providing opioids or by providing care and use of nonpharmacological treatment modalities such as acupuncture and mindfulness based classes that incorporate CBT.</p>
<p>Messina, B. G., & Worley, M. J. (2019). Effects of craving on opioid use are attenuated after pain coping counseling in adults with chronic pain and prescription opioid addiction. <i>Journal of consulting and clinical psychology</i>, 87(10), 918–926. https://doi.org/10.1037/a0056888</p>	4	<p>To determine whether behavioral pain coping strategies would facilitate extinction of the conditioned opioid use response.</p>	<p>Retrospective case control study</p>	<p>Sample: 653 participants in Phase 1 and 360 in Phase 2; Individuals were at least 18 years old diagnosed with current opioid dependence, not dependent on other substances and had no unstable medical or psychiatric conditions. In 74 participants received standard medical management and 74 received enhanced medical management</p> <p>Method: Individuals were randomized to receive standard medical management (SMM) or enhanced medical</p>	<p>Pain and craving had a strong positive association, as a greater time varying pain significantly predicted greater craving. Treatment week significantly predicted craving, with a reduction in craving over time. Craving was also seen to have a strong effect on future opioid use. All of these results suggest craving mediated the effect of pain on opioid use. Findings indicate that greater pain caused greater subsequent use of opioids and that the risk of poor treatment outcomes</p>	<p>Use of pain coping modules in patient who have known opioid dependence can decrease opioid cravings. Additional module repetitions also increased reductions in opiate use and craving.</p>

rg/10.1037/ ccp0000399				<p>management (EMM);</p> <p>The SMM consisted of physicians assessing substance use, craving and BPN-NLX response, recommending abstinence and referring patients to self-help groups while the EMM consisted of a opioid dependence counseling delivered by a trained substance abuse or mental health counselor. The opioid dependence counseling involved education and discussion on one of the 13 modules on topics related to pain, substance use and coping. The pain skills module involved cognitive behavioral coping skills such as relaxation, pacing, engagement in pleasurable activities and cognitive restructuring of pain catastrophizing. Weekly clinic visits were used in SMM and EMM to complete assessments, receive medication refills or adjustments and attend counseling sessions.</p>	<p>associated with ongoing pain is due to cravings. It also found that participants who received the pain coping module reported reduced opiate use and coping with cravings when they occur.</p>	
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				Procedures: Opioid use was assessed at baseline and weekly; reports from participants of current pain rating and craving; time varying covariates; which participants received the pain coping modules and the amount of times the module was repeated.		
Fishman, M. A., & Kim, P. S. (2018). Buprenorphine for Chronic Pain: A Systemic Review. Current pain and headache reports, 22(12), 83. https://doi.org/10.1007/s11916-018-0732-2	5	Describes the role and safety advantages of buprenorphine in the treatment of chronic non-cancer pain compared with other potent opioid analgesics.	Integrative review of the literature	<p>Sample: 12 studies</p> <p>Methods: Articles were assessed for information related to the use of buprenorphine in the treatment of chronic pain.</p> <p>Procedures: Studies chosen to be assessed were high quality unbiased studies.</p>	The use of buprenorphine in the treatment of chronic noncancer pain can reduce pain as well as reducing the number of opioid tablets dispensed. If buprenorphine is used doses should be titrated up and patients should be monitored closely.	This type of treatment types including buprenorphine can be beneficial for those that have a high risk of OUD.
Nicol, A. L., Hurley, R. W., & Benzon, H. T. (2017). Alternatives to Opioids in the Pharmacol	1	To report the current evidence-based medicine on the use of nonopioid analgesics for the most common noncancer	Systematic Review	<p>Sample: 271 studies</p> <p>Methods: Studies were selected with the inclusion criteria of adults 18 or over with chronic pain conditions, including low back pain, myofascial pain syndrome,</p>	Topical capsaicin cream was found to have a 30% reduction in numerical pain score rating in those with lower back pain and was effective in the reduction of pain intensity when used 4 times a day in	In many of the common pain conditions people aged 18 and above encounter, there are interventions to help relieve pain,

<p>ogic Management of Chronic Pain Syndromes : A Narrative Review of Randomized, Controlled, and Blinded Clinical Trials. Anesthesia and analgesia, 125(5), 1682–1703. https://doi.org/10.1213/ANE.0000000000002426</p>		<p>chronic pain conditions</p>		<p>fibromyalgia, postherpetic neuralgia, painful diabetic neuropathy, radicular pain and complex regional pain syndrome. The studies must have investigated the efficacy of nonopioid medications when compared to placebo. The studies had to be a prospective, randomized, controlled, or blinded design</p> <p>Procedure: Literature search conducted in Medline, Cochrane Library and Scopus. There was no limitation on the year of publication. The search terms used were the specific chronic pain condition couples with the looked into nonopioid medication.</p>	<p>patients with postherpetic neuralgia. The use of capsaicin cream 4 times a day and intradermal injection of BoNT-A were both shown to reduce pain, improve quality of sleep and improve the quality of life in patients with diabetic neuropathy. BoNT-A when injected into the lumbar spine paraspinal muscles provided superior pain relief and when injected intradermally into painful areas of the skin of postherpetic neuralgia patients it was shown to effectively reduce pain intensity, sleep disturbances and reduce opioid use for up to 12-16 weeks. In patients with postherpetic neuralgia the use of a 5% lidocaine patch.. A pharmacological intervention that was effective in all the pain conditions with the exception of MPS was the use of ARI/opioid medications such as tramadol/acetaminophen.</p>	<p>improve sleep disturbances, improve quality of life and even reduce opioid use. These interventions include use of low or high dose topical capsaicin cream, BoNT-A injections to the area of pain and 5% lidocaine patches.</p>
<p>Pullen, S. D., Acker,</p>	<p>6</p>	<p>Is physical therapy an effective</p>	<p>Case Study (qualitative)</p>	<p>Sample: 4 participants aged from 31 to 65. All</p>	<p>The average pain report was 7.5/10 over the study. After</p>	<p>Use of PT interventions such as</p>

<p>C., Kim, H., Mullins, M., Sims, P., Strasbaugh, H., Zimmerman, S., Del Rio, C., & Marconi, V. C. (2020). Physical Therapy for Chronic Pain Mitigation and Opioid Use Reduction Among People Living with Human Immunodeficiency Virus in Atlanta, GA: A Descriptive Case Series. <i>AIDS research and human retroviruses</i>, 36(8), 670–675. https://doi.org/10.1089/AID.2020.0028</p>		<p>nonpharmacological strategy to mitigate chronic pain in people living with HIV?</p>		<p>participants identified as African American with two female and two male participants. All had a noncancer, chronic pain diagnosis, had a undetectable HIV viral load and were on chronic opioid therapy. All had pain in multiple locations including lower back, upper back, neck, shoulder, hip and knee. Pain duration varied from 4 months to 4 years.</p> <p>Methods: Eligible participants were referred by their physicians and further screened through electronic chart review. The PT based interventions were performed and documented. PT based interventions used include individualized home PT stretching/exercise routines, Transcutaneous Electrical Nerve Stimulation (TENS) for 20 minutes on painful area and diaphragmatic/paced breathing. Each person completed 5-10 PT sessions, based on participant needs, lasting 45 minutes in duration.</p>	<p>completion of the interventions, two participants had complete resolution of pain (0/10), one had a final pain report of 1/10 and one had a final pain report of 3/10. All participants showed a decrease in opioid use. On the post-BPI questionnaire all participants reported a decrease in pain severity, a decrease in pain interference with life activities and an increase in pain relief after the intervention. Results from the postintervention SF-36 indicate that participants thought they had improvement in general health, pain, emotional wellbeing, energy/fatigue and role limitations due to physical health.</p>	<p>stretching and exercising routines, TENS and diaphragmatic/paced breathing was shown to decrease pain severity, opioid use and pain interferences with life activities. The PT interventions caused an increase in general health, wellbeing, energy and pain relief.</p>
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				<p>These PT based interventions were completed before administration of an opioid analgesic.</p> <p>Procedure: Pre and postintervention data including: The Brief Pain Inventory (BPI), the 36-Item Short Form Survey (SF-36) for quality-of-life measurements and the HIV Opioid and Pain Survey (HOPS) to gather data, pain experience and opioid usage.</p>		
<p>MacLean RR, Armstrong JL, Sofuoglu M. Stress and opioid use disorder: A systematic review. <i>Addict Behav.</i> 2019 Nov;98:106010. doi: 10.1016/j.addbeh.2019.05.034. Epub 2019 Jun 1. PMID: 31238237.</p>	1	<p>What is the relation of primary appraisal of stress to opioid craving, opioid use and OUD treatment?</p>	<p>Systematic Review</p>	<p>Sample: 21 manuscripts included in the review</p> <p>Methods: Pubmed, EMBASE, PsychINFO, Scopus and Cochrane Library databases were searched in January 2019 using the Boolean search terms opioid OR opiate OR methadone OR buprenorphine OR naltrexone AND stress OR chronic+stress. Studies were included if participants were diagnosed with OUD, appraised stress was assessed using self report with or without</p>	<p>In the articles where observed stress of groups was researched, they found that stress was higher after exposure to triggers such as drug cues, negative affect and thoughts about use. Four studies reported a positive relationship between appraised stress and opioid cravings, each study making groups complete a stressful scenario than asking about opioid cravings They also found that the interaction of stress and drug cues was associated with higher number of cravings. There were also environmental</p>	<p>Stress, when looked at as observed stress or is experimentally induced is tied to higher cravings for opioids. Participation in cognitive behavioral therapy in those with previous substance use disorders, was associated with lower stress and opioid use.</p>

				<p>physiological or neuroendocrine measures and if craving, use an OUD treatment related outcomes were reported.</p> <p>Procedures: Included manuscripts were separated into categories: observed stress, experimentally induced stress and stress focused interventions.</p>	<p>factors related to lower levels of observed stress such as being at home, resting or taking care of a child.</p>	
<p>Zelfand E. (2020). Vitamin C, Pain and Opioid Use Disorder. <i>In integrative medicine (Encinitas, Calif.)</i>, 19(3), 18–29.</p>	5	<p>Can Vitamin C spare those in pain from developing OUD and prevent and treat OUD?</p>	<p>Integrative Review of Literature</p>	<p>Sample: data taken from personal interviews, articles and studies.</p> <p>Methods: The data from articles was extracted and used to look at the effect of Vitamin C on the treatment of chronic pain relief and opioid use disorder.</p> <p>Procedures: Included studies were separated into sections to address certain clinical trials, case reports, experiences, and all the effects of Vitamin C in the body.</p>	<p>Vitamin C has been found to have analgesic benefit in complex regional pain syndrome (CRPS) and may reduce the risk of developing CRPS after an acute fracture. Two people who took 2 g of sodium ascorbate every 2 waking hours were able to lower opioid dosages without having any withdrawal symptoms. Vitamin C has been shown to modulate the actions of glutamate and dopamine, both of which are involved in opiate tolerance and withdrawal, to offset addictive behavior. Vitamin C deficiency is associated with</p>	<p>Vitamin C can help patients comfortably taper off opioids and prevent opioid tolerance and dependency when administered before a surgery or immediately after an injury that could cause CRPS. Vitamin C is key in opiate tolerance and withdrawal through its effect on glutamate and dopamine and stress due to its effect on cortisol levels,</p>

					high cortisol levels, and indicates poorer health outcomes indicating a need for supplementation.	both of which could prevent opioid use disorder.
Silva, M. J., Coffee, Z., Yu, C. H., & Martel, M. O. (2021). Anxiety and Fear Avoidance Beliefs and Behavior May Be Significant Risk Factors for Chronic Opioid Analgesic Therapy Reliance for Patients with Chronic Pain- Results from a Preliminary Study. <i>Pain medicine (Malden, Mass.)</i> , 22(9), 2106–2116. https://doi.org/10.1093/pm/pnab069	4	Are patients with chronic noncancer pain (CNCP) who participate in a chronic opioid analgesic therapy (COAT) cessation program able to successfully cease COAT and is COAT reliance motivated by anxiety and fear-based beliefs?	Case Control Study	<p>Sample: 109 patients with CNCP who has used daily COAT and struggled to maintain recent opioid cessation.</p> <p>Methods: Psychological questionnaires were given to each patient at orientation, comparing the morphine milligram equivalence of each patient and gender of those who successfully ceased COAT use. Each patient completed a COAT cessation program. The program occurred once a week in a 6 hour session for 10 weeks. The cessation program included group cognitive behavioral therapy that emphasized pain coping skills and mood regulation, complementary care modalities and individualized medication management. The A panel urine drug screen was mandated at every meeting. Many scales were used</p>	A 90% success rate of participant COAT cessation was revealed by all participants by the end of the program. Elevated anxiety and fear based beliefs, as measured by the Fear Avoidance Belief Questionnaire (FAB), support COAT reliance and further continue CNCP. Consistently elevated scores from the Fear Avoidance Belief Questionnaire – The Physical Activity subscale (FAB-PA) were found in patients who were unable to cease COAT, suggesting fear avoidance of physical activity being significant for COAT reliance. PCS, TSK and COMM scores were noncontributory to the data found.	In patients with CNCP, fear avoidance beliefs and behavior, as measured by the FAB-PA, plays a significant role in unmanageable COAT dependence. COAT cessation was seen in 90% of the participants in the program that included CBT and pain coping skills.

				<p>including the Pain Catastrophizing Scale (PCS), Fear Avoidance Beliefs Questionnaire-Work and Physical Activity, Tampa Scale of Kinesiophobia (TSK) and Current Opioid Misuse Measure (COMM) to look at fear avoidance beliefs and behavior.</p> <p>Procedures: Fishers Exact Test and Probability Plot was used to determine whether incoming MME was related to COAT cessation. Penalized regression was utilized to identify potential predictors of the failed COAT cessation based on the psychological questionnaires. After the penalized regression, Linking and brushing was used to determine the relationships between the outcome and the predictors. The Decision Tree Approach was used to determine the threshold of FAB-PA and FAB-W scores that conferred risk of opiate cessation.</p>		
Zgierska, A. E., Burzinski,	2	What are the benefits of mindfulness meditation	Randomized Controlled Trial	Sample: 35 patients with CLBP under long-term treatments with	Compared with the controls, the meditation-CBT improves the	The statistically significant reduction in

<p>C. A., Cox, J., Kloke, J., Stegner, A., Cook, D. B., Singles, J., Mirgain, S., Coe, C. L., & Bačkonja, M. (2016). Mindfulness Meditation and Cognitive Behavioral Therapy Intervention Reduces Pain Severity and Sensitivity in Opioid-Treated Chronic Low Back Pain: Pilot Findings from a Randomized Controlled Trial. <i>Pain medicine (Malden, Mass.)</i>, 17(10), 1865–1881. https://doi.org/10.1093/pm/pnw006</p>		<p>and cognitive behavioral therapy (CBT) interventions for patients who are treated with opioids for chronic low back pain (CLBP)?</p>		<p>daily opioids. 14 patients were randomly assigned to the control group and 21 patients were randomly assigned to a meditation CBT group.</p> <p>Methods: Assessments and evaluations of the participants were completed prior to the start of the intervention, immediately post intervention and 18 weeks post intervention. Usual care was provided to all participants including pharmacotherapy safety and treatment progress monitoring and referral to specialty care and complementary therapy for pain and/or mental health. Participants receiving the meditation-CBT intervention completed a 2 hour session per week for 8 weeks. Each session focused on topics relative to meditation and CBT that built on the previous topics and had a specific therapeutic focus.</p>	<p>averaged pain ratings across the study, reducing the pain score by 8% at both 8 and 26 weeks, while the pain scores in control group increased by 8% at 8 weeks and 10% at 26 weeks. Through The Pain Psychophysical Testing, the relationship between stimulus intensity (temperature) and pain ratings was found between the two groups for both pain intensity and unpleasantness indicating reduced pain sensitivity in the meditation-CBT group. The C reactive protein levels in the meditation-CBT group were lower at 8 weeks compared to the control. Those that completed home based formal meditation had a greater decrease in pain ratings at 26 weeks.</p>	<p>pain severity symptoms in the experimental group suggests meditation-CBT benefits patients with opioid treated CLBP. There was also a reduction in perceived stress in the group that practice mindfulness and CBT.</p>
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				<p>Procedures: Assessment and evaluation data was measured including IMMPACT guidelines with pain intensity and CLPH-specific function ratings serving. During each assessment session three measures were collected: self reports of pain, function, general psychological and physical health, medication and other substance use; biomarkers (urine specimens for toxicology testing; venous blood for biomarkers); and pain psychophysics. Pain intensity was assessed using a Numerical Rating Scale from 0-10. Psychological health was assessed by the 20 item Chronic Pain Acceptance Questionnaire (CPAQ), the 15 item Mindful Attention Awareness Scale (MAAS) and the 10 item Perceived Stress Scale.</p>		
Eccleston, C., Fisher, E., Thomas, K. H., Hearn, L., Derry, S., Stannard, C., Knaggs,	1	What treatments help adults safely reduce or stop taking opioids to manage chronic	Systematic Review	Sample: All 5 studies were randomized controlled trials comparing opioid users receiving an intervention with a control group receiving treatment as usual. Studies	Mindfulness Oriented Recovery Enhancement (MORE) treatment was effective in lowering desire for opioids and opioid misuse as seen in the study by	MORE treatment and Therapeutic Interactive Voice Response (TIVR) combined

<p>R., & Moore, R. A. (2017). Interventions for the reduction of prescribed opioid use in chronic non-cancer pain. The Cochrane database of systematic reviews, 11(11), CD010323. https://doi.org/10.1002/14651858.CD010323.pub3</p>		<p>noncancer pain?</p>		<p>included had more than 10 participants.</p> <p>Methods: Cochrane Central Register of Controlled Trials, MEDLINE and Embase were searched to find studies. Search results were filtered by two review authors. Each study was assessed for random sequence generation, allocation concealment, blinding of outcome assessment, incomplete outcome data, selective reporting and size of study. Primary outcomes assessed in each study were opioid use and adverse events. Secondary outcomes assessed were pain intensity, psychological function and physical function</p> <p>Procedures: Risk ratio was used to establish statistical difference. Mantel-Haenszel statistics and report risk ratio outcomes were used for the analysis. Inverse variance methods in a random effects model was used to analyze pain</p>	<p>Garland. The MORE group also reported significantly lower pain intensity at post treatment. In another study, the group that received Therapeutic Interactive Voice Response through a computer for four months following CBT reported a significant decrease in opioid use from baseline, a decrease in typical pain from baseline and a slight increase in physical function when compared to the standard care control group. This group also had lower depression scores seen using the Beck Depression Index. In another randomized control study, where participants received either real electroacupuncture or sham electroacupuncture the average pain in pre and post test treatment in the real electroacupuncture went from a 4.9/10 to a 4.2 out of 10 after 8 weeks. In the study by Jamison, substance misuse CBT was used and was seen to reduce anxiety and depression scores</p>	<p>with CBT were both effective in lowering opioid misuse and pain intensity. TIVR and CBT intervention had effects on psychological functioning, lowering depression and anxiety scores.</p>
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				intensity, psychological functioning and physical functioning.	when compared to the control group.	
Crouch, T. B., Wedin, S., Kilpatrick, R. L., Christon, L., Balliet, W., Borckardt, J., & Barth, K. (2020). Pain rehabilitation's dual power: Treatment for chronic pain and prevention of opioid-related risks. <i>American Psychologist</i> , 75(6), 825–839. https://doi.org/10.1037/amp0000663	6	Is pain rehabilitation an effective treatment for chronic pain and what are its effects on opioid misuse risk?	Descriptive Qualitative study	<p>Sample: 126 patients who were evaluated for the Medical University of South Carolina (MUSC) Pain Rehabilitation Program (PRP) and 77 individuals met inclusion criteria.</p> <p>Methods: Every patient completed the MUSC PRP program which included CBT, physical therapy, occupational therapy and medical management including opioid tapering. Measures of pain and pain interference, physical functioning, psychological functioning, health related quality of life, opioid use and risk for opioid misuse were administered to patients at pre and posttreatment, at Day 0 and Day 15.</p> <p>Procedures: Pain and pain interference was measured using the Brief Pain Inventory Short Form (BPI). Physical functioning was assessed using the 6 minute walk</p>	<p>Average pain rating decreased from pre to posttreatment, with BPI scores going from 6.41 to 5.34. The percentage of patients who reported their own health status as “poor” decreased from 20% at pretreatment to 1.7% at posttreatment. Feeling of anxiety and depression relative to pain control and opioid use decreased as seen by the Brief Symptom Inventory, with anxiety decreasing from 8.52 to 4.55 and depression decreasing from 9.50 to 3.60. Physical functioning increased from 1193.67 ft to 1505.25 ft posttreatment as measured by the 6MWT. 56.7% of patients entered the program with at least on opioid medication and at discharge 88.3% of patients left without an opioid prescription or any remaining opioids.</p>	<p>Patients who participated in the 3 week PRP reported significantly reduced physical pain, reduced pain interference with daily activities, improved quality of life and lowered depression. The majority of patients who entered the MUSC PRP on opioids left the program having fully tapered off their opioid medication. Opioid misuse risk was significantly reduced among patient who entered on opioids.</p>

				<p>test (6MWT). Psychological functioning was assessed using the Brief Symptom Inventory 18. Health related quality of life was assessed using the Short Form 12 Health Survey. Information of patients opioid use was gathered via a combination of patient report and review of the South Carolina Prescription Drug Monitoring Program (PDMP). Risk for opioid misuse was assessed using the Current Opioid Misuse Measure. Descriptive and univariate analyses were conducted to determine sample characteristics. Two way paired t tests were used to find differences in mean outcome scores from pretreatment to discharge.</p>	<p>For the patients that continued chronic daily opioid therapy, their doses were tapered significantly. For patients that entered the program on opioids, their mean scores on the COMM were significantly reduced from 13.57 to 5.86.</p>	
<p>Garland, E. L., Hanley, A. W., Nakamura, Y., Barrett, J. W., Baker, A. K., Reese, S. E., Riquino, M. R.,</p>	2	<p>Do mindfulness-based interventions reduce chronic pain and opioid misuse in the primary care setting more than supportive</p>	<p>Randomized Controlled Trial</p>	<p>Sample: 250 adults with chronic pain and opioid misuse blindly randomized. 129 were randomized to the Mindfulness-Oriented Recovery Enhancement (MORE) group and 121 to the supportive</p>	<p>At 9 months 36 of 80 participants (45%) in the MORE group were no longer misusing opioid compares with 19 of 78 participants in the supportive psychotherapy group. 35 of 70 participants in the MORE group experienced greater</p>	<p>The participants who completed the MORE intervention had statistically significant decreases in opioid misuse compared to those</p>

<p>Froeliger, B., & Donaldson, G. W. (2022). Mindfulness-Oriented Recovery Enhancement vs Supportive Group Therapy for Co-occurring Opioid Misuse and Chronic Pain in Primary Care: A Randomized Clinical Trial. <i>JAMA internal medicine</i>, e220033. Advance online publication . https://doi.org/10.1001/jamainternmed.2022.0033</p>		<p>psychotherapy?</p>		<p>psychotherapy group.</p> <p>Methods: The group receiving the MORE treatment completed training in mindfulness, reappraisal and savoring positive experiences and the control group received just supportive group psychotherapy. The treatment occurred over 8 weeks for a 2 hours group session each week. Outcomes were collected at baseline, after treatment and at 3, 6 and 9 months of follow up.</p> <p>Procedures: Primary outcomes were opioid misuse assessed by the Drug Misuse Index and pain severity and pain related functional interference assessed by subscale scores on the Brief Pain Inventory through 9 months follow up. Secondary outcomes were opioid dose, emotional distress and ecological momentary assessments of opioid craving</p>	<p>reductions in pain severity and 41 of 71 experienced reductions in pain related function interference. 22 of 62 participants in the MORE group had decreased their opioid dose by at least 50% compared with 11 of 69 participants in the supportive psychotherapy group. Participants in MORE group experienced greater decreases in emotional distress than the other group.</p>	<p>receiving supportive therapy. Participants in the MORE group also has improvement in pain severity and pain related functional interference and were able to reduce their daily opioid dose to a greater extent than participants in the supportive therapy group. The effects from MORE were greater than the effect size of CBT and the treatment of psychological pain.</p>
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<p>Hassan, S., Zheng, Q., Rizzolo, E., Tezcanli, E., Bhardwaj, S., & Cooley, K. (2020). Does Integrative Medicine Reduce Prescribed Opioid Use for Chronic Pain? A Systematic Literature Review. <i>Pain medicine</i> (Malden, Mass.), 21(4), 836–859. https://doi.org/10.1093/pm/pnz291</p>	1	<p>Is the integrative medicine (IM) approach including Complementary Alternative Medicine therapies effective in reducing opioid use in chronic pain patients.</p>	<p>Systematic Review</p>	<p>Sample: 23 studies were chosen in this study comprised of eight randomized controlled trials, seven retrospective studies, four prospective observational, three cross sectional and one quasi experimental study.</p> <p>Methods: An online search of MEDLINE and Embase, CINAHL, PubMed and Allied and Complementary Medicine Database for studies that are randomized or non-randomized controlled trials and retrospective studies that include one or more Complementary alternative medicine (CAM) therapies administered to adults who had chronic pain. 3 studies focused on CBT, seven studies examined cannabis, two studied the efficacy of acupuncture, two studied education and opioid tapering support, one explored mindfulness oriented recovery enhancement (MORE), one examined</p>	<p>All three studies using CBT as an intervention reported significant improvement in pain, function and psychological health. The study using TIVR showed decreased pain and depression, improved function and coping and reduced opioid analgesic use. The study assessing the effectiveness of MORE demonstrated lower levels of pain severity, functional interference and less desire for opioids post treatment. The study evaluating an opioid tapering support intervention found that the intervention group saw more than double the percent reduction in morphine equivalent dose and improved pain interference, pain self efficacy and perceived opioid problems. Two studies assessing the impact of acupuncture found that pain medication was reduced, better pain relief and ability to function was achieved and quality of life after one year was improved.</p>	<p>CBT, TIVR, MORE and acupuncture were all interventions that were seen to improve pain severity, opioid craving, physical functioning, and psychological health. Opioid tapering including psychiatric consultations, motivational interviews for opioid tapering and education sessions for self management skills was seen to reduce doses of opioid medications used for CP.</p>
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				<p>therapeutic interactive voice response (TIVR) after CBT and one assessed the role of physical therapy.</p> <p>Procedure: To critically appraise the selected studies the Mixed Methods Appraisal Tool (MMAT) was used.</p>		
<p>Thacker, L., Walsh, R. M., Shinyoung Song, G., Khan, H. A., Parmar, P., Vance, K. T., Grant, G., Mesaroli, G., Hunter, J., & Vader, K. (2021). Exploring physiotherapy practice within hospital-based interprofessional chronic pain clinics in Ontario. Canadian journal of pain = Revue canadienne</p>	5	<p>What is the role of physiotherapy practice in chronic pain management at hospital based interprofessional chronic pain clinics (HICPCs)?</p>	<p>Descriptive qualitative study</p>	<p>Sample: ten physiotherapists who practiced in pediatric and adult HICPCS (n = 4 pediatric; n = 6 adult)</p> <p>Methods: Each physiotherapist completed a semi-structured interview and demographic questionnaire.</p> <p>Procedures: The interviews were audio recorded and transcribed verbatim. Each transcript was using a codebook with description of each code using NVivo 12. Potential themes were discussed, reviewed, and defined by the whole group.</p>	<p>Five themes were constructed related to physiotherapy practice including (1) contributing a functional lens to care; (2) empowering through pain education; (3) facilitating participation in physical activity and exercise; (4) supporting engagement in self-management strategies; and (5) implementing a collaborative approach to a whole person care. Contributing a functional lens to care includes assessing how pain affects the patient's life, creating goals for quality life and not one without pain and to increase functionality. Empowering through pain education includes</p>	<p>A collaborative and whole person approach to chronic pain care in patients is seen to be beneficial. Tailored approaches are used in aspects of care related to physical activity, pain education, self-management strategies and improving functional outcomes of meaningful activities.</p>

<p>de la douleur, 5(1), 96–106. https://doi.org/10.1080/24740527.2021.1905508</p>					<p>empowering patients to engage in active CP management techniques, reducing fear of movement and changing beliefs related to chronic pain. Facilitating participation in physical activity and exercise includes providing exercises related to patient’s goals and gradually increasing activity tolerance over time. Supporting engagement in self-management includes teaching patients how to implement mind-body management strategies and support engagement of behavioral self-management strategies. Implementing a collaborative approach to a whole person care includes collaborating with interprofessional teams to establish shared goals in patient care.</p>	
<p>Young, S. D., Koussa, M., Lee, S. J., Perez, H., Gill, N., Gelberg, L., & Heinzerling, K. (2018).</p>	2	<p>Can a Harnessing Online Peer Education (HOPE) social media-based support group engage patients at risk for</p>	<p>Randomized Controlled Trial</p>	<p>Sample: 52 participants enrolled in Facebook community groups (n = 25 in group without the peer role models (control); n = 26 in group with peer role models)</p>	<p>13 out of the 25 participants (52%) in the control group provided a total of 45 posts or comments while 19 out of the 26 participants (73%) provided a total of 411 posts or</p>	<p>A HOPE peer led social media community can serve as an effective online tool to engage participants with other</p>

<p>Feasibility of a social media/online community support group intervention among chronic pain patients on opioid therapy. Journal of addictive diseases, 37(1-2), 96–101. https://doi.org/10.1080/10550887.2018.1557992</p>		<p>misuse or overdose to discuss risk reduction strategies?</p>		<p>Methods: Participants engagement was recorded in Facebook community groups for 12 weeks for each group. Engaged participants were defined as those who whose, commented or reacted at least once and were given an engagement score. Post and comment were categorized into the following topics: Physical health status, mental health status, pain, non-medication treatment, medication treatment, substance use disorder, coping and social support.</p> <p>Procedures: Grytics software was used to automatically collect and aggregate online community discussions for the intervention and control groups. It provided data on number and rates of engagement as well as most popular topics in each group. One researched hand coded the topics for each 4</p>	<p>comments. Participants in the intervention group posted about the following topics: coping (33%), physical health status (32%). Medication treatment (27%), pain (26%), non-medication treatment (24%), mental health status (21%) and social support (19%). The control group posted about the following topics: physical health status (56%) and medication treatment (53%).</p>	<p>people also experiencing CP and are on opioid therapy. The HOPE intervention group posted ten times more than the control group, had higher levels of engagement and talked about a wide range of topics relative to behavioral interventions.</p>
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				<p>week period of the 12 week intervention using a modified grounding theory. Chi square test of independence was used for categorical variables (demographic characteristics, number of engaged participants) and two sample t test were used to compare difference in continuous variables (age, engagement score)</p>		
<p>Cheatle, M. D., Compton, P. A., Dhingra, L., Wasser, T. E., & O'Brien, C. P. (2019). Development of the Revised Opioid Risk Tool to Predict Opioid Use Disorder in Patients with Chronic Nonmalignant Pain. <i>The journal of pain</i>, 20(7), 842–851.</p>	4	<p>Is the opioid risk tool able to discriminate between patients with and without OUDs?</p>	<p>Cohort study</p>	<p>Sample: 1178 patients with chronic nonmalignant pain (CNMP) who were receiving long term opioid therapy (LTOT). The control group (n = 781) was patients who did not have an opioid use disorder (OUD) while the case cohort (n = 397) included patients who were treating CNMP with LTOT and developed a opioid dependence.</p> <p>Methods: This is a secondary analysis of baseline data collected from a cross sectional naturalistic study. Control patients were recruited from multiple ambulatory</p>	<p>Patients with OUDs were likely to be younger men, unmarried, living with fewer household members, have lower education levels, lower socioeconomic status, receive disability benefits and report higher ORT total scores. Patients with OUDs were less likely to be working full time than those without. Preadolescent sexual abuse was considered a poor predictor for the group with OUD therefore it was not weighted in the study. Six of the nine weighted items loaded on the strongest factor such</p>	<p>ORT successfully predicts the risk of developing an OUD in patients with CNM, with the 9-item unweighted version of ORT found to be superior. The ORT can be utilized to assess the risk of aberrant drug related behaviors in patients being considered for LTOT efficiently and see if there are currently problematic drug taking behaviors in the patient</p>

<p>https://doi.org/10.1016/j.jpain.2019.01.011</p>				<p>pain and primary care practices and cases were recruited from substance abuse treatment facilities. After patients were classified as having OUD or not having OUD, research assistants administered the Mini International Neuropsychiatric Interview (MINI) and Opioid Risk Tool (ORT)</p> <p>Procedure: Patients eligibility for this study was assessed using information from the electronic medical record. Adults patients were considered eligible if they were Caucasian and of European descent, if they had CNMP or musculoskeletal or neuropathic origin persisting for 6 months or more in duration and had been receiving LTOT for 6 months or longer.</p>	<p>as family history of substance abuse, personal history of substance abuse and age.</p>	<p>that could be a surrogate for OUD.</p>
<p>Groessl, E. J., Liu, L., Chang, D. G., Wetherell, J. L., Bormann, J. E., Atkinson, J.</p>	<p>2</p>	<p>What are the benefits of yoga among military veterans with chronic low back pain?</p>	<p>Randomized Control Trial</p>	<p>Sample: 150 military veterans with chronic lower back pain (cLBP) (n = 75 receiving the yoga intervention; n = 75 not receiving the yoga intervention)</p>	<p>Both study groups had significant reduction in RMDQ scores after 12 weeks, however after 6 months the RMDQ score continued to drop in the yoga group and increased toward</p>	<p>The yoga intervention was confirmed to be a safe intervention that can reduce pain and disability among adults</p>

<p>H., Baxi, S., & Schmalzl, L. (2017). Yoga for Military Veterans with Chronic Low Back Pain: A Randomized Clinical Trial. <i>American journal of preventive medicine</i>, 53(5), 599–608. https://doi.org/10.1016/j.amepre.2017.05.019</p>				<p>Methods: Participants randomized to the yoga intervention were scheduled to attend a 12-week yoga program consisting of two 60-minute, instructor led yoga sessions per week. Outcomes were assessed via patient self-report at baseline, 6 weeks, 12 weeks and 6 months. Hatha yoga was used and consisted of physical yoga postures, movement sequences and regulated breathing.</p> <p>Procedures: The primary outcome was change in the Roland-Morris Disability Questionnaire (RMDQ) score at 12 weeks. A secondary outcome of interest was pain intensity assessed through the short version of the Brief Pain Inventory. Secondary outcomes include the change in pain intensity and interference, depressed mood, physical and mental quality of life, fatigue, opioid medication use and other pain treatments. The</p>	<p>baseline in the control group. The yoga participants saw larger decreases in mean pain intensity after 12 weeks, but the mean pain intensity went back in the direction of baseline at 6 months.</p>	<p>with cLBP. This intervention was effective in military veterans, which is a population that faces more challenges related to psychological disorders and substance use</p>
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				Wilcoxon rank sum and Fisher's exact tests were used to compare demographic and baseline clinical variables between study groups.		
Bujak, B. K., Regan, E., Beattie, P. F., & Harrington, S. (2019). The effectiveness of interdisciplinary intensive outpatient programs in a population with diverse chronic pain conditions: A systematic review and meta-analysis. <i>Pain Management</i> , 9, 417–429. http://dx.doi.org/10.2217/pmt-2018-0087	1	To explore the overall effectiveness of interdisciplinary intensive outpatient treatment program in adults with chronic pain.	Systematic Review	<p>Sample: 13 studies (1 RCT and 12 observational studies)</p> <p>Methods: Studies included if they had more than one diagnosis related to chronic pain. If the study used group interventions, it had to cover pain education, physical therapy, behavioral therapy and functional exercise. Studies that used individual interventions had to include physical therapy, functional training or behavioral therapy. Outcome measures had to include at least two of the following: pain intensity, depressive symptoms, pain catastrophizing and QOL.</p> <p>Procedures: The CMA was used to perform all statistical analyses. Standardized mean differences were</p>	In adults with chronic pain, intensive outpatient programs that combine behavioral and physical interventions can effectively reduce pain intensity, pain catastrophizing and depressive symptoms and improve QOL post intervention with results maintained 6 months after treatment.	Treatments that focused on a holistic approach that included physical, emotional and psychological support can reduce pain intensity and pain catastrophizing in chronic pain. QOL was most meaningfully improved after 6 months posttreatment.

				calculated using Cohen's <i>d</i> .		
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Summary of Studies

Pharmacological treatment

Out of the 200 medications prescribed for pain, the 20 that are opioids are prescribed most frequently as they treat pain very well. Due to opioids addictive nature and their high prescription volume, patients with CP may take medications for an extended period of time, making them highly likely to have a dependency, addiction or tolerance to these drugs. One drug that has been researched in terms of decreasing frequency of addiction and withdrawal is buprenorphine. Originally used for Medication Assisted Treatment for opioid abuse, Buprenorphine, an opioid receptor partial agonist, has a unique pharmacological profile resulting in less withdrawal symptoms compared to other opioid analgesics (Fishman et al., 2018).. Buprenorphine-naloxone (BUP-NLX) therapy was used in a study related to opioid craving and pain coping skills. Participants in this study received BUP-NLX in adjunct to other behavioral therapies, such as cognitive behavioral therapy, and were seen to reduce cravings and future opioid use when these therapies were combined (Chang et al., 2019).

Other pharmacological methods that have been tested for their efficacy in reducing CP are muscle relaxers, anticonvulsants, NSAIDs, topical lidocaine patches, topical capsaicin, and botulinum toxin type A. One expansive systematic review researched the different types of chronic pain and which pharmacological interventions reduced pain scores, pain intensity, opioid use, improved quality of sleep and QOL. The

types of chronic pain researched included chronic lower back pain (cLBP), myofascial pain syndrome, fibromyalgia, postherpetic neuralgia, painful diabetic neuropathy, radicular pain, and complex regional pain syndrome. Muscle relaxers were seen to provide significant pain relief for myofascial pain when compared to placebo.

Anticonvulsants were used as a potential treatment of postherpetic neuralgia, painful diabetic neuropathy, and fibromyalgia. For postherpetic neuralgia, gabapentin demonstrated effectiveness in reducing pain intensity, improving sleep interference and mood compared to placebo in two studies. For painful diabetic neuropathy, pregabalin was shown to reduce pain intensity, improve mood and reduce sleep interference and gabapentin was effective in reducing pain intensity and improving mood, sleep, and QOL. For pain from fibromyalgia, pregabalin was found to provide superior pain relief and gabapentin was found to significantly improve average pain scores when compared to the placebo group. NSAIDs were effective in cLBP, myofascial pain syndrome, and radicular pain. Five studies found the NSAIDs naproxen, etoricoxib, valdecoxib, and rofecoxib to be superior to the placebo in those with cLBP. One study found indomethacin to be effective in the reduction of chronic radicular pain. Topical lidocaine patches were effective in decreasing pain intensity for postherpetic neuralgia. Topical capsaicin cream was used for cLBP, postherpetic neuralgia, and painful diabetic neuropathy. Capsaicin cream was found to reduce numerical pain score by 30%. In patients with postherpetic neuralgia, high dose capsaicin cream provided significantly greater pain relief while low dose topical capsaicin was found to be effective with use over a longer period of time in the reduction of pain intensity and improvement in sleep interference in patients with painful diabetic neuropathy. Botulinum Toxin Type A

(BoNT-A) was used in the treatments for cLBP, postherpetic neuralgia, and painful diabetic neuropathy. In patients with cLBP, BoNT-A was found to provide superior pain relief at 3- and 8-weeks posttreatment. For postherpetic neuralgia patients, BoNT-A injected intradermally into painful skin was shown to be effective in the reduction of pain intensity, improvement in sleep interference and reduction of opioid use. In patients with painful diabetic neuropathy, intradermal injections of BoNT-A were shown to reduce pain intensity, and pain sensory threshold and improve sleep interference and QOL.

Education

Providers, prescribers, and other clinicians are advised to follow the guidance of the CDC on the prescription and administration of opioids for CP to prevent OUD. If health care providers see patients with CP who are treated with opioids, the provider should be educated on the risks and adverse effects associated with opioids and how to complete motivational interviewing. The patients should also complete a risk and benefit analysis with their provider, educating the patient on adverse effects and potential outcomes to see if opioid therapy is the best treatment (Dowell et al., 2016).

Health care providers can implement a Risk Evaluation and Mitigation Strategy (REMS) to assess the risk associated with opioids. The Food and Drug Administration created a REMS for extended-release/long-acting opioids (ER/LA) to try to reduce serious adverse outcomes related to inappropriate prescribing, misuse, and abuse of ER/LA opioids (Cepeda et al., 2017). Currently, 24 companies that manufacture ER/LA opioids are REMS program companies (RPC) and are all collaborating to operationalize this program (Cepeda et al., 2017). Along with the REMS, the FDA revised patient education materials, including a one-page medication guide and a one-page counseling document, that should be provided to

every patient that is dispensed an ER/LA opioid. In a case-control study, the effectiveness of the REMS was assessed after 36 months of operation by looking at a variety of outcomes important to this analysis: several prescribers completing a REMS continuing education (CE) activity, evaluation of the knowledge and behaviors of prescribers, assessment of patient's comprehension of the medication guide and patient counseling documents, patient satisfaction with their access to opioids and surveillance monitoring of ER/LA opioid misuse, abuse, overdose addiction and death (Cepeda et al., 2017). Opioid rates before and after utilization of REMS were compared by using program data from the Researched Abuse, Diversion and Addiction-Related Services (RADARS) and the National Addictions Vigilance Intervention and Prevention Program (NAVIPPRO) that captured self-reported information from patients entering abuse treatment programs. The program data from RADARS found a 47% reduction and NAVIPPRO found a 20.4% reduction in the rates of opioid abuse after REMS implementation. If health care providers prescribe opioids for the treatment of CP a REMS should be implemented and patients should be educated and counseled on the use of opioids as it is shown to reduce the rates of opioid abuse.

Education of healthcare providers on motivational interviewing (MI) can assist providers with managing prescription opioid abuse, which can be seen in patients who use opioids for CP. In a cohort study completed by Chang et al., 31 DNP students received MI education that included a didactic lecture, a role-playing exercise, and a standard patient simulation. The students completed pre and post-tests, with the greatest increase in MI confidence being from preintervention to post didactic, indicating that their confidence was already built by the time they completed their role-playing exercise and simulation. The students indicated in the

debriefing section that they found value in the MI educational intervention and noted skill acquisition.

Patients can benefit from pain education related to CP, the difference between hurt and harm, and how to move through pain. In a descriptive qualitative study involving physiotherapists who practiced in hospital-based interprofessional chronic pain clinics (HICPCs), pain education is used to empower patients. Pain education focuses on the biopsychosocial nature of CP with the goal of empowering patients to engage in CP management strategies and should be integrated throughout every patient visit (Thacker et al., 2021). By educating the patients on the meaning of CP and what is occurring in the body the patients are more likely to change beliefs related to CP and be able to make educated choices on pain relief. Pain education was shown to reduce patients' fear of movement and improve confidence in patients to engage in active CP strategies, such as physical activity (Thacker et al., 2021).

Screening and Monitoring

Screening tools can be used for predicting the risk of opioid misuse. The Current Opioid Misuse Measure (COMM) is a self-report measure consisting of 17 items to assess the frequency of abnormal medication-related behaviors and known risk factors for opioid misuse over the past 30 days, with a score of 9 indicating opioid misuse risk (Crouch et al., 2020). The Drug Abuse Screening Test is a valid self-reported assessment, containing 10 yes or no questions to help health care providers assess for OUD (Denis, 2019). Assessing a patient's medical history can help a health care provider predict the risk for OUD since conditions such as Hepatitis, HIV, and tuberculosis are linked to OUD (Denis, 2019). A cohort study claimed that the Opioid Risk Tool (ORT) has

improved predictive validity for assessing potential opioid-related aberrant drug-related behaviors in patients who have chronic nonmalignant pain and are on long-term opioid therapy (Cheatle et al., 2019). This tool was used along with a Mini-International Neuropsychiatric Interview was used to exclude psychiatric disorders (Cheatle et al., 2019). The ORT has 10 items that assess for family history of substance abuse, personal history of substance abuse, age, history of preadolescent sexual abuse (in women only), and presence of psychiatric diseases (attention deficit disorder, obsessive-compulsive disorder, bipolar disorder, schizophrenia, and major depressive disorder) (Cheatle et al., 2019).

Mental health screening tools can be used for patients using opioids for chronic pain to assess for risk factors that facilitate potential abuse such as anxiety, depression, and fear. One Case-Control Study administered psychological questionnaires to assess for anxiety and fear-based beliefs and behavior (Silva et al., 2021). The screening tools used in this study include the Fear Avoidance Beliefs Questionnaire (FABQ), Pain Catastrophizing Scale (PCS), and Tampa Scale for Kinesiophobia (TSK) (Silva et al., 2021). The FAB consists of The Work Subscale and the Physical Activity Subscale. A higher score can correlate with an increased probability of current or future job loss, disability, and social withdrawal. In the study, participants with a higher FAB pretest score were unable to cease chronic opioid analgesic therapy. The PCS determines the patient's level of catastrophizing thinking which is a risk factor for increased disability length, pain intensity, and emotional distress. The TSK measures fear of movement, injury, or reinjury with scoring that could indicate decreased physical performance and

increased pain intensity, depressive symptoms, pain-related anxiety, and perceived disability (Silva et al., 2021).

Behavioral Treatments

Behavioral Treatment such as pain coping strategies, cognitive behavior therapy (CBT), Therapeutic Interactive Voice Response and group therapy can decrease opioid cravings, and opioid dependence, allow tapering of opioid dosages, and decrease the sensation of pain. In nine of the studies, behavioral treatments were included as a treatment modality for CP.

Stress is a key factor in opioid cravings and inefficient coping mechanisms may create an inability to handle multiple or intense stressors, thus turning to opioids. In Maclean et al., there was a positive relationship seen between appraised stress and opioid cravings. This was proven by four studies contained in Maclean et al. systematic review, with all studies experimentally inducing stress in OUD groups and applying neutral stress to other groups, then assessing opioid cravings after (Maclean et al., 2019). Stress in individuals who previously had OUD can be defined as the summation of psychological diagnoses, anxiety sensitivity, all potentially stressful life events, and reactivity to drug-specific cues (Maclean et al., 2019). Acute stress and chronic stress, related to repeated exposure over time, are both found to be significant risk factors for opioid abuse. This study also found that completion of cognitive behavior therapy in those with previous substance use disorders was associated with lower stress levels and decreased opioid use (Maclean et al., 2019). Learning effective coping mechanisms allows those that are taking opioids to not turn to them as a way of coping or have opioid cravings after times of stress. The teaching of coping strategies is also important when utilizing opioid

tapering during certain treatment programs, such as pain rehabilitation programs (Crouch et al., 2020). In a randomized controlled trial, a Harnessing Online Peer Education (HOPE) online community was used to allow people to talk about pain, coping, physical health status, mental health status, and social support (Young et al., 2019). The intervention group joined a Facebook group message with peer role models that led these discussions while the control group joined a Facebook group with no peer models (Young et al., 2019). The intervention group posted 10 times more than the control group and had higher levels of engagement. (Young et al., 2019). Their group served as an effective online behavioral tool for patients to talk to others with similar problems and learn from them. In a retrospective case-control study, a pain skills module was used to test if it moderates the effects of craving on treatment outcomes (Messina et al., 2019). The module involved a brief introduction to cognitive-behavioral coping skills for managing physical pain including pacing, relaxation, engagement in pleasurable activities, and cognitive restructuring of pain catastrophizing (Messina et al., 2019). Craving was found to have a strong positive association with pain, future opioid use, and poor treatment outcomes. In the weeks after subjects received the pain coping modules, there was a reduced association between craving and future opioid use. It was also found that the more module sessions completed, the greater attenuation of craving's effects on opioid use (Messina et al., 2019).

Cognitive Behavioral Therapy (CBT) was used as an intervention in 6 studies. CBT has been found to be effective in reducing opioid cravings, minimizing opioid misuse risk, improving quality of life and improving psychological health. In one RCT, CBT was used as a treatment method through the Medical University of South Carolina

(MUSC) Pain Rehabilitation Program (PRP) (Crouch et al., 2020). This treatment program also included physical therapy, occupational therapy, and medication management such as tapering. Measures collected pre and post-treatment include pain and pain interference, physical functioning, psychological functioning, health-related QOL, opioid use, and risk for opioid misuse. After completing the program, feelings of anxiety and depression relative to pain control and opioid use decreased as seen by the Brief Symptom Inventory, with anxiety decreasing from 8.52 to 4.55 and depression decreasing from 9.50 to 3.60 (Crouch et al., 2020). Participants also reported an increased QOL and a meaningful improvement in self-perceived health status, causing patients to be less likely to seek medical treatment and rely more on self-management skills acquired in the PRP and patients having the ability to pursue a more mindful and accepting attitude towards pain. One systematic review found that CBT used as an intervention to manage CP and opioid use was effective in three studies that reported significant improvements in pain, function, and psychological health (Hassan et al., 2020). A literature review discussing an RCT that randomly assigned either CBT or methadone maintenance treatment and monitored combined scores of the Addiction Severity Index (ASI) and Perceived Stress Scale (PSS) attempted to determine if CBT can be effective in reducing OUD (Denis, 2019). The group that received CBT had a decrease in their ASI and PSS scores, seeing a decrease in weeks 12 and 26 of receiving CBT (Denis, 2019). Findings suggested that CBT reduced opioid use, decreased stress, and improved employment function among individuals with OUD (Denis, 2019). In a case-control study by Silva et al, CBT that emphasized pain coping skills and mood regulation was used as an intervention to attempt to cease chronic opioid analgesic therapy (COAT). The CBT

intervention also involved complementary care modalities such as acupuncture, mindfulness, biofeedback, and gentle motion. A 90% success rate or participant COAT cessation by the end of the 10 weeks (Silva et al., 2021). In a RCT by Zgierska et al., participants with cLBP in the experimental group received a Mindfulness-CBT intervention 2 hours per week for 8 weeks. Session topics built on previous topics and included understanding the relationship between autopilot and pain, bringing mindfulness into daily living, using mindfulness to cope, reducing vulnerability to pain triggered autopilot reactions, understanding the importance of self-care and balance in life, and using mindfulness to support life balance (Zgierska et al., 2016). Data were obtained at baseline, 8 weeks and 26 weeks from self-reports, biomarkers and pain psychophysics. The data indicated that the mindfulness-CBT group had reduced pain scores by 8% at 8 and 24 weeks while the pain scores in the control group increased by 8% and 10% at 8 and 24 weeks respectively (Zgierska et al., 2016). Each group completed pain psychophysical consisting of the application of thermal stimuli. Differences in stimulus intensity and pain ratings indicated reduced pain sensitivity and unpleasantness in the meditation CBT group (Zgierska et al., 2016). In one systematic review, the use of an intensive outpatient chronic pain treatment program including group or individual CBT, pain education and stress, mood and pain self-management along with physical therapy interventions was studied (Bujak et al., 2019). Studies contained in the systematic review found that by helping individuals with chronic pain understand the biopsychosocial components of pain through these interventions, individuals were able to modify their thoughts and actions to improve QOL, emotional and social health and the reduction of pain catastrophizing (Bujak et al., 2019). This study also found that short 2 to 4 week

treatment programs had lasting behavioral changes, with the changes being maintained at 6 months posttreatment (Bujak et al., 2019).

One study contained in a systematic review used Therapeutic Interactive Voice Response (TIVR) after CBT (Hassan et al., 2020). TIVR is an automated telephone-based tool developed for maintenance enhancement following CBT and includes a daily self-monitoring questionnaire, an instructional review of coping skills, prerecorded behavioral rehearsals of coping skills, and monthly feedback methods from the CBT therapist personalized to each patient's daily reports (Hassan et al., 2020). Results from the study suggested that TIVR decreased pain and depression, reduced use of opioids, and improved function and coping mechanisms (Hassan et al., 2020).

In a descriptive qualitative study, tapering in addition to CBT was successful as 56.7% of patients entering the program were on opioids and 88.3% of patients left with no opioid prescription due to allowing tapering (Crouch et al., 2020). In a systematic review, one RCT assessed an opioid taper support intervention for its efficiency in lowering opioid doses in CP patients. The opioid taper support intervention consisted of psychiatric consultation, motivational interviews for opioid tapering, and educational sessions for self-management skills. The intervention group was able to achieve more than double the percent reduction in opioid dose when compared to the control group (Hassan et al., 2020).

Complementary alternative medicine

Complementary alternative medicine (CAM) was used as an intervention in 9 studies. CAM interventions used include acupuncture, yoga, mindfulness, and the use of Vitamin C.

In the systematic review from Eccleston et al., electroacupuncture was seen to reduce pain ratings, with the average pain rating in the pre and post-test decreasing from a 4.9/10 to a 4.2/10. The average pain rating in the control group that received sham electroacupuncture went from 5.6/10 to 5.4/10, indicating a statistically significant difference between the groups in the ratings of pain after the intervention (Eccleston, et al., 2017). Two studies contained in a systematic review found that patients that received at least 4 acupuncture treatments in one year reduced their opioid use, had better pain relief, better ability to function, and improved QOL (Hassan, et al., 2020). The other study assessing patients receiving electroacupuncture found that opioid use was significantly reduced by 6 weeks of treatment (Hassan, et al., 2020). In a literature review, Denis investigated the efficacy of acupuncture as an adjunctive treatment. In the studies found, acupuncture was found to diminish opioid-associated anxiety and depression (Denis, 2019).

Yoga as a mind-body approach to exercise was used in a descriptive qualitative study and was used for the goal of exploring movement in a safe way to rewire and remap a patient's nervous system (Thacker et al., 2021). Yoga as a self-management strategy used by physiotherapists was seen to increase patients' sense of control over their CP (Thacker et al., 2021). Other mind-body self-management techniques used include belly breathing, muscle relaxation, body scans, and breath awareness scans (Thacker et al., 2021). A RCT by Groessl et al. assessed the effects of a 12-week yoga program on functional limitations and pain intensity in a military veteran population with cLBP at 6 weeks, 12 weeks, and 6 months. One group received the 60-minute hatha yoga intervention twice a week, consisting of physical yoga postures, movement sequences

and regulated breathing, and a home practice manual that recommended 15-20 minutes of yoga practice on days that yoga sessions were not held while the other group continued with usual pain treatments (Groessler et al., 2017). The yoga intervention group was seen to have decreased in their Roland-Morris Disability Questionnaire and mean pain intensity, especially after 6 months, though the magnitude of the reduction in pain was somewhat small. There were problems seen with adherence to the yoga intervention. The median number of classes attended was 15 of 24 classes, due to transportation and access issues in this population, which could have contributed to the magnitude of health improvements (Groessler et al., 2017).

Vitamin C has been found to be helpful in the tapering of opioids and the prevention of opioid tolerance and dependency. Vitamin C was seen to prevent opioid tolerance for use before specific surgeries and after injuries, such as wrist injury and surgery, that may cause complex regional pain syndromes, when 500 mg was used daily (Zelfand, 2020).

Mindfulness can be taught to patients with CP who are using opioids to decrease opioid misuse and emotional distress related to opioid use. Mindfulness Oriented Recovery Enhancement (MORE) combines mindfulness training, CBT, and principles from positive psychology into integrative group therapy. A randomized controlled trial assessed the effectiveness of MORE for patients with CP, completing assessments on opioid misuse, pain severity, pain-related function interference, opioid dose, opioid craving, and emotional distress post-treatment and at 3, 6, and 9-month follow up appointments (Garland et al., 2022). At the 9-month follow up 36 of 80 (45%) participants in the MORE group were no longer misusing opioids compared to 19 of 78

participants in the supportive psychotherapy group (24.4%) (Garland et al., 2022). Reductions in pain severity were seen in 35 of 70 (50%) participants in the MORE group compared to 22 of 75 (29.3%) in the supportive psychotherapy group. 35% of the MORE participants were able to decrease their opioid dose by at least 50% and saw greater decreases in emotional distress. MORE interventions were seen to restructure reward processing, enhancing neurophysiological responsivity to natural and healthy rewards instead of drug-related rewards, helping with the long-term ability of those who have CP to not misuse opioids. MORE treatment was also assessed in the literature review by Eccleston et al., finding that participants who completed the MORE treatment had a lower desire for opioids and self-reported lower opioid misuse at posttreatment. The literature review completed by Denis surveyed mindfulness-based relapse prevention (MBRP) therapies for managing OUD. MBRP incorporates CBT and consists of a series of classes to raise patients' awareness of how to cope with relapse triggers and recognize negative thinking that contributes to the risk of relapse (Denis, 2019). Using MBRP in the plan of care was found to decrease the risk of relapse (Denis, 2019). In an RCT, mindfulness techniques along with CBT were used in patients with cLBP (Zgierska et al., 2016). Mindfulness techniques used were breath meditations, pain wave surfing techniques, body scan meditations, mindful movement, SABER (Stop, Acknowledge, Breathe, Expand, Respond) mini-meditation, Lovingkindness meditation, and formal mindfulness sessions (Zgierska et al., 2016). These interventions all helped bring attention to the breath, provided a nonjudgmental awareness of pain, engaged in present moment acceptance of self and one's chronic pain, and enabled mindful awareness of sensation (Zgierska et al., 2016). At the 8 and 26-week follow-up assessments, pain

scores were decreased and pain acceptance scores were increased in the experimental group, indicating the potential of CBT and mindfulness medication techniques to safely reduce pain severity and sensitivity to pain (Zgierska et al., 2016).

Physical Treatments

Physical therapy or exercise was used as an intervention in 4 studies. In a descriptive qualitative study, physiotherapists used a tailored approach to facilitate participation in physical activity focusing on patient preferences and goals for exercise, graded activity, and establishing a connection with community-based services (Thacker et al., 2021). Recommendations for exercises are based on the patient's goals and focus on gradually increasing activity tolerance through increasing the exercise parameters over time (Thacker et al., 2021). Connecting patients to community-based services, such as free access to a community center, can help with adherence to exercise long-term (Thacker et al., 2021). In a qualitative study evaluating a Pain Rehabilitation Program (PRP), physical and occupational therapy interventions were used along with CBT in patients completing the 15-day program (Crouch et al., 2020). Patients who completed the PRP reported a reduction in physical pain and pain interference with daily activities. Physical functioning was seen to increase as measured by the 6 Minute Walk Test, with the distance increasing from 1193.67 feet pretreatment to 1505.25 feet at discharge (Crouch et al., 2020). In a cohort study, personalized stretching and exercise routines were created along with transcutaneous electrical nerve stimulation (TENS), and various pain coping strategies were used in treatment for four CP patients over five to ten, 45-minute visits (Pullen et al., 2020). The average pre-intervention pain rating was a 7.5/10. After the intervention two participants had a 0/10 rating, one had a 1/10 rating and one

had a 3/10 rating, indicating a significant reduction in pain scores. Participants also reported improvements in general health, emotional wellbeing, energy/fatigue, and role limitations due to physical health (Pullen et al., 2020). In a

Transcutaneous electric nerve stimulation (TENS) is a non-invasive, nonpharmacological treatment delivered to the patient through surface electrodes on the site of pain (Pullen et al., 2020). In a cohort study by Pullen et al., TENS was used in CP patients for 20 minutes on the painful area. Each patient also went through personalized physical therapy. All participants reported improvements in physical function, QOL related to pain, and general health in the postintervention assessment.

Discussion

Studies included in this review consistently acknowledged opioids as an integral component of CP management while emphasizing the potential complications associated with long-term opioid use. Risks associated with long-term opioid therapy include tolerance, physical dependency, abuse, or OUD. Prevention of opioid abuse and OUD is a national public health priority for reducing opioid-related morbidity and mortality. Studies addressed a variety of non-opioid and nonpharmacological approaches to safely manage CP in patients currently treated with opioids while integrating other therapies to provide pain relief and prevent adverse outcomes, such as OUD. Many of the studies used multiple interventions spanning different categories for treatment of chronic pain, mostly combined with behavioral treatment, especially pain coping strategies and CBT. Behavioral interventions are important to decreasing chronic pain and reducing the risk of OUD as the feeling of pain is created in the brain and has emotional, cognitive, and social components related to the intensity of pain felt and pain

perception (Alshami, 2019). It was also found in many studies that when mindfulness is combined with CBT it is more efficient in decreasing opioid misuse and cravings.

Healthcare providers face two significant challenges in treating CP—effective pain management and preventing opioid-related morbidity and mortality. Nurses have an ethical responsibility to minimize pain and suffering and promote optimal functioning and QOL. Therefore, nursing education on multimodal treatment approaches is crucial to balancing pain management efficacy and prevention of opioid-related risks, especially for nurses practicing in settings with adults with CP. In addition, nurses should also be knowledgeable on appropriate indications, use, monitoring for risks, and inappropriate use. Nurses can educate patients about the mechanisms underlying their pain and the variety of non-opioid and nonpharmacological treatments to optimize pain management and QOL.

More data is needed on each type of CP to see which nonpharmacological and pharmacological interventions affect each type of CP. There is also more data needed on which combination of pharmacological and nonpharmacological interventions is the most beneficial to treating CP and preventing opioid use disorder in the patients that use opioids as an adjunct therapy.

Limitations

Though all studies were knowledgeable and provided great insight into the multimodal treatment interventions for CP, there are multiple gaps and limitations within the articles and the information gathered that needs to be discussed. A limitation of the review includes not assessing all types of medication used to treat CP and prevent opioid use disorder. There are also other interventions that weren't used in this study but were seen in some of the study results.

There were also limitations seen in some of the studies used in the literature review. There was a major limitation in generalizability due to small sample sizes in one cohort study, as it had 4 participants (Pullen et al., 2020). One of the studies about REMS relating to ER/LA opioids had authors that were all employees of companies that market ER/LA opioid analgesics, creating a conflict of interest. One randomized control trial related to mindfulness and CBT therapies was not blinded for the participants or the study personnel, which could have introduced a bias for both groups (Zgierska, 2016).

Conclusion

Systematic approaches to integrate multimodal CP management and prevent opioid abuse and OUD are essential to promote optimal patient outcomes and prevent opioid-related morbidity and mortality. The findings of this literature review demonstrate that utilization of multiple treatment modalities in the management of CP improve patient outcomes. The most beneficial treatment modalities among the studies were behavioral treatments, especially cognitive behavioral therapy and pain coping education.

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