

Pain among patients with substance use disorders and non-pharmacological options: An integrative review

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ABSTRACT

Background: An increased incidence of chronic pain is growing worldwide. Typical treatment of chronic pain often involves a medication regimen. Opioids are the most highly prescribed class of medications for chronic pain by providers. The liberal use of opioids to help relieve chronic pain has led to other undesirable effects such as addiction, morbidity and mortality.

Methods: A literature search was conducted using the key search concepts: pain AND physical therapy AND substance use.

Results: A total of 5 articles met inclusion criteria out of 331 articles considered.

Conclusions: The focus on alternative approaches to treatment of chronic pain/back pain for the SUD population is limited in the literature. Training for non-pharmacological options is needed for the NP and other practitioners to treat chronic back pain in the SUD population.

Key Words: Pain, Chronic pain, Chronic low back pain, Substance use disorder, Opioids

1. INTRODUCTION

The management and treatment of chronic pain among individuals with substance use disorder (SUD) presents a complex issue that is associated with a public health crisis.^[1] Chronic pain identification is determined by an episode that lasts greater than a three-month period, as the pain has gone beyond an expected date of healing; there is not an end date for the occurrence.^[2-4] According to Substance Abuse and Mental Health Services Administration,^[1] there is an increased likelihood of opioid addiction and chronic pain to co-occur. It is known that those with SUD are more likely to abuse opioids and obtain additional doses without a prescription.^[5] Globally, chronic pain is estimated to affect up to 50 percent of the world's population, with an estimated 10 percent of the population being newly diagnosed each year.^[6,7] In the United States, it is estimated that more than 20 percent of adults suffering with chronic pain include those living in poverty, women, those with public health insurance,

and adults who have an education less than high school.^[8] Per the National Institute of Health (NIH), the number of people affected by chronic pain far exceeds those affected with cancer, diabetes, and heart disease combined.^[9]

Chronic low back pain is a common complaint expressed among many adults with a history of substance abuse disorder. Low back pain that lasts, at minimum, twelve weeks or greater is considered a chronic condition.^[2] Substance use disorder (SUD) is a disease that affects a person's brain and behavior, characterized by continuous use of a substance among individuals that can increase the risk for developing serious health problems.^[1,10] Typical treatment of chronic pain often involves a medication regimen that includes opioids, the most highly prescribed class of medications for chronic pain. The use and potential overuse among those prescribed opioids has become the center of a national debate.^[11] Over the past few decades, the liberal use of opioids

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to help relieve chronic pain has led to other undesirable effects such as addiction, morbidity and mortality.^[11,12]

Individuals who have a history of SUD are met with unique challenges when dealing with chronic pain. First, pain can present more intensely in individuals with SUD.^[13] Secondly, individuals with SUD history can have a relapse in the presence of pain.^[13] In either case, the SUD patient may require higher doses to effectively manage pain intensity levels. According to the Centers for Disease Control and Prevention^[14] (CDC) mental and physical conditions have a correlation with those dealing with chronic pain. Due to these additional factors, those with SUD history can experience psychological, physical, and physiological barriers to effective treatment and management of pain.^[13]

Long term use of opioids and the benefits of treating chronic pain has yielded very little evidence in long term efficacy.^[15] The sole treatment of chronic pain with opioids alone is not beneficial due to the increased likelihood of addiction or overdose.^[15] An emphasis on alternative treatments and self-management in conjunction with pain management can be much more advantageous to the patient. Non-pharmacological methods or treatment incorporate physical activity and physical therapy.

Those with chronic pain often have more restriction in daily movement because of the pain. Physical exercise may have specific benefits in reducing the severity of chronic pain, improve physical and mental health, and increase physical functioning, which can enhance activities of daily living.^[16] By educating patients on the benefits of physical activity and making this a part of the normal daily routine, patients can help themselves lessen pain intensity. The purpose of this integrative literature review is to describe the impact of non-pharmacological methods in managing chronic pain intensity of the patient with a substance use disorder.

2. METHODS

A search strategy was conducted with the question “What is known about non-pharmacological education and physical activity in relation to improving chronic low back pain among patients with a substance use disorder?” The inclusion and exclusion criteria were identified using the provided question and proposed search terms. An integrative literature search was applied to PubMed and adapted to CINAHL plus and Embase. The following key search concepts were selected: pain AND physical therapy AND substance use. Their Medical Subject Heading (MeSH) terms and other controlled vocabulary equivalents were applied in the search. The initial search was performed in September of 2019, a secondary search was performed December 2020. These

searches were not limited to dates of publication or language. Titles and abstracts relevant to the study were chosen and retrieved for full text. Articles were then screened for inclusion using the following exclusion criteria: non-English language, non-peer-reviewed articles, book chapter, conference proceedings and non-human subjects. Details of the search process are illustrated using The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) (see Figure 1). The data base search yielded 331 articles for consideration once duplicates were removed. Title and abstract screening were performed by one reviewer (MR) for relevance and inclusion criteria.

3. RESULTS

Of the five publications in this review, four were randomized control trials and one was a quasi-experimental study. All articles were appraised for strength and quality of evidence using the Johns Hopkins Evidence-Based Practice scale.^[17] Evidence Level I (1), Level II (3) and Level III (1) were identified and rated as A, B or C quality. These articles provided recommendations of physical activity in the management of chronic low back pain (see Table 1). The articles ranged from dates 2016-2019 and were set in various parts of the world including Nepal, Denmark, New Zealand, Germany and the United States. The articles sample size ranged from 38 to 501 participants. Four studies had smaller sample sizes, three were conducted in outpatient settings or general community, and one was conducted in an inpatient rehabilitation facility (see Table 1). The larger sample-size study (n = 501) was conducted in an outpatient facility. Two of the studies focused on substance use disorder with physical activity as an intervention for low back pain. All studies included in this review discuss the significance of low back pain including prevalence and financial burden. Themes that emerged among the selected publication were use of non-pharmacological treatments, education, substance use disorder and the pain prevalence and burden.

3.1 Non-pharmacological treatment

Non-pharmacological intervention was a key theme identified in this review. All five articles reported use of non-pharmacological therapy to assist in relieving chronic or low back pain. Non-pharmacological treatments included patient education, exercise therapy, physical therapy or physiotherapy, other interventions involved meditation, yoga, acupuncture, psychotherapy or herbal remedies.^[3,4,18-20] Although effective across all studies, the use of a specific exercise for chronic pain treatment showed variations between studies with the use of different strategies such as coaching and cognitive behavior therapy.^[3,20] Implementation of such strategies were done with the intention of improving health

outcomes, such as promotion of physical activity thereby decreasing doctor visits. Sharma and colleagues^[20] specifically focused on testing the feasibility of education intervention and reducing pain intensity among participants. Meanwhile,

a randomized control trial done in the United States recommended use of an app-based online education program as being more effective in combination with physiotherapy and psychological needs.^[4]

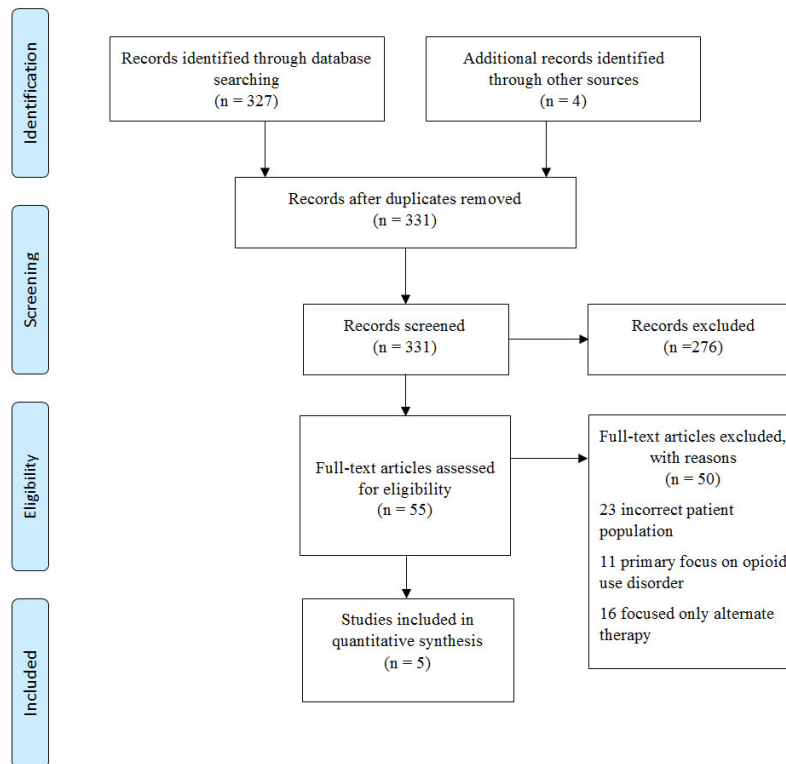


Figure 1. Prisma flow diagram

Adapted From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Med* 6(6): e1000097. doi:10.1371/journal.pmed1000097

3.2 Education

It was determined in the studies that pain education is needed,^[20] as well as, addressing the physical and psychological needs. These findings together led to more coherence to the program and lower pain levels.^[4] The app-based education online intervention included the use of motivational messages which significantly reduced pain intensity ($p = .021$) over a 12-week period. While one study focused on reducing the burden of pain using non-pharmacological interventions, others highlighted the role in which SUD plays in the management of chronic pain whether using pharmacological or non-pharmacological remedies. Utilization of a holistic approach has been found to be a better alternative than stand-alone education or physical activity.^[4,20]

3.3 Physical Activity

Another theme that emerged from this review was management of chronic pain among those with substance use disorder. Studies that addressed substance abuse used the standard definition of SUD from the DSM-5. In the studies, the ef-

fects of opioid or alcohol use on pain perception and the probable reduced response to pharmacological management of chronic pain is recognized.^[18,19] One study followed the recommended physical activity guidelines as a treatment for opioid users while the other focused on the effects of exercise on pain management among those with alcohol used disorder (AUD). Both studies analyzed adult males over 18 years of age participating in treatment services for addiction in the United States and Denmark.^[18,19] Exercise and increased physical activity were used as an intervention for reducing chronic back pain. A significant level of pain was self-reported ($p = .078$) among those with SUD.^[19] Pain levels were found to be not significantly different ($p = .94$) when compared to those who did not use non-pharmacological methods of treatment among those with AUD.^[18] Underutilization of recommended non-pharmacological treatment was revealed in the two studies.^[18,19] Additionally, the literature implies that decreased illicit drug use and/or a sober lifestyle can improve chronic pain management.

Table 1. Table of evidence

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Intervention	Pain Measures	Results	Evidence Level, Quality
1	Amorim, et al. (2019)	Pilot Randomized Control Trial	90 participants Sydney, Australia Outpatient physiotherapy General community Pain score > 3 on the Numeric Pain Scale	Physical activity information booklet, 1-face to face meet, & 12 telephone-based health coach sessions; support with internet application and Fitbit Control group: booklet and advice	Numeric Rating Scale of Pain Intensity	Between groups, no pain differences regarding intensity level at follow-up Participants (8.7 out of 10) satisfied with intervention. Intervention group, care-seeking reduced by 38%.	I, A
2	Lin, et al. (2017)	Quasi experimental	501 patients United States Residential Addiction treatment with moderate to severe pain, who may or may not have received non-pharmacological treatment in last year	Cognitive Behavior Therapy	11-Point Numeric Rating Scale Chronic Pain Acceptance Questionnaire	Difference in pain intensity not exhibited in past year non-pharmacological treatment to non-user Average pain intensity 6.7 (SD = 1.7)	II, C
3	Sari, et al. (2019)	Three Arm Randomized Control Trial	117 participants Denmark Receiving treatment for an Alcohol Use Disorder	Usual treatment, Usual treatment, w/supervised group exercise-1hour-2x/week or individualized exercise 2x/week	EuroQOL (EQ-5D) (includes pain/discomfort) and visual analog scale (EQ-VAS) questionnaire at baseline and six-months.	Exercise groups reported no pain or discomfort on EQ-5D EQ-VAS-no difference between groups Individualized exercise group reported absence of pain at study end (62%) compared to non-intervention group (38%) ($p = .078$). Exercise intervention managing pain for those with AUD.	II, A
4	Sharma, et al. (2019)	Two Arm Randomized Clinical Trial	40 adults Nepal From rehabilitation facility with no specific low back pain	Pain education group (PEG) Guideline based physiotherapy (CG) 1-hour group session.	PROMIS measures: 1) pain intensity; 2) interference; 3) sleep disturbance; 4) depression. Pain Catastrophizing Scale and 10 item Connor Davidson Resilience Scale.	PEG group significance found from pre to post treatment, except in resilience CG group improvement found in pain and depression ($p = .021$)	II, A
5	Toelle, et al. (2019)	Randomized Control Trial	101 participants Germany Social media recruitment	mHealth application digitalizing Multidisciplinary Pain Treatment (MPT) Control Group: Individualized physiotherapy plus online education	11-Point Numeric Rating Scale	Significant decrease in pain symptom for both groups App group reported significantly lower pain intensity after 12 weeks ($p < .001$)	III, C

3.4 Pain prevalence and burden

All studies in the review reported a high prevalence of chronic low back pain within their respective countries and worldwide. Amorim and colleagues^[3] reported low back pain as a condition that affects approximately 500 million people globally and has led to more than 9 billion dollars in health care expenditures in Australia alone. In their study they utilized multiple delivery components to assess for differences made on pain intensity. Many participants were satisfied with the intervention that was delivered which could have potentially led to the thirty-eight percent reduction in care seeking in

the intervention group. In Denmark, for the SUD population, individualized exercise groups reported absence of pain at study end (62%) compared to non-intervention group (38%) ($p = .078$)^[19].

In the United States, more than 100 million dollars per year has been spent in the treatment of low back pain, accounting for more than 85% of primary care visits.^[4] In a study conducted in the U.S. by Lin and colleagues, the average pain level was found to be 6.7 (SD = 1.7).^[18] At the end of the study there was no difference noted in the pain intensity levels with use of non-pharmacological methods.

However, Sharma and colleagues used the Patient-Reported Outcome Measurement Information System (PROMIS) and found that after utilizing non-pharmacological methods the Patient Education Group (PEG) had substantial effect in the category of pain intensity.^[20] Toelle and colleagues used non-pharmacological methods. The group that utilized an application for non-pharmacological treatment had reported significantly lower pain intensity after 12 weeks of use ($p < .001$).^[4]

Pain experienced in the lower back area, greater than three months, was identified as the leading cause of disability among adults between the ages of 18-65 in low- and high-income countries.^[3,4] Low back pain was reported to occur in 35%-65% of individuals with an expectation to increase in complaints over the next several decades.^[20] Low back pain persists as a global issue, leading to healthcare and financial burdens worldwide. In this review, it was found that income availability was not a contributing factor as recurrent episodes were noted to occur in 24 to 87% of those with low back pain^[3] in both high- and low-income countries.^[20] Pain is non-discriminatory and affects many without regard to race, color, creed or financial status.

4. DISCUSSION

This review attempted to reveal the benefit of physical activity in conjunction with education for those with a substance use disorder and chronic pain. The themes (non-pharmacological treatment, education, substance use disorder and the burden of pain) that emerged may be useful in managing chronic pain for SUD population. Pain, more specifically, low back pain affects millions of people on a global scale with at least 80% of the populations experiencing one episode.^[21] This places a billion-dollar burden on healthcare expenditures due to the increased visits made to primary care providers.^[3,4] Use of non-pharmacological treatment methods have shown to assist SUD patients in managing the burden of experiencing chronic or low back pain potentially eliciting a more sober lifestyle.^[15]

The growing issue of pain or chronic low back pain affects many adults and can interfere with activities of daily living.^[22] Those patients with greater than 3 months of low back pain who are seeking treatment represent up to 85 percent of visits to primary care providers.^[4] Nurse Practitioners (NP) are in a unique position to recognize and promote optimal health outcomes by encouraging the use of non-pharmacological treatment methods for the SUD patient.

Pain is no longer considered a symptom but rather a chronic disease that has physical and emotional incapacities; and is one of the most common reasons patients seek medical

care.^[8] Over the last decade, prevalence of chronic low back pain has doubled and shown favor to all, both male and females, and a variety of ethnic groups.^[2] With the expected increase of those living with pain, a continued burden on healthcare spending costs, loss of wages and reduced productivity will rise.^[2] Income availability was found not to be considerable, however, studies have shown that those from lower income communities are at a higher risk for chronic low back pain.^[3,18] In the United States approximately twenty percent of adults dealing with chronic pain include those living in poverty, women, public health insurance holders and those with less than a high school education.^[8] One study expressed how low back pain was the fourth greatest problem for men and the second greatest problem for women.^[23] With the guidance of the NP, a reduction of pain burden can be realized.

Findings in this review revealed, non-pharmacological methods such as physical activity, meditation, yoga, acupuncture, psychotherapy or herbal remedies being helpful in chronic pain management.^[3,4,18-20] However, activity recommendations such as physical therapy, although highly encouraged, is underutilized due to lack of provider awareness. Due to the challenges that SUD patients face, when pain is involved opioids are used as the first line of treatment without consideration of the after-effects.^[12] An increase in evidenced based research is needed to strengthen the NP and all other providers' awareness of how to safely and effectively treat the SUD patient.^[24]

Two different substance use disorders were assessed in this review: alcohol and opioid use.^[17,18] Recognition of pain perception in such populations is important as results will vary from those without a substance disorder.^[18] Due to the altered perception of pain and how it is affecting the lifestyle, finding alternate treatments for the SUD patient is critical.^[25] The impact of physical activity on those with a known SUD can assist those in withdrawing from use of addictive drugs and lessen the intake of substances.^[18,25]

Findings in this review are reasonably consistent with previous literature. One study examined Medicaid carriers who sought out treatment frequently in emergency departments (ED) for complaints of low back pain when problems arose.^[26] ED treatment regimens often rely on opioids for relief rather than suggestions of physical therapy.^[26] Treating chronic pain has been noted to have great efficacy but without proper consistent education patients bypasses such treatment.^[23] Participant that were introduced early to physical therapy and maintained with treatment lead to a decrease of incurred healthcare cost over a one-year timeframe in a small group of Medicaid enrollees.^[26] These studies suggest

that, along with feasibility of education, effects of activity on pain reduction can occur and with consistency, an increase of physical activity had benefits.^[4,27] The use of non-pharmacological treatment needs to be frequently considered before the use of pharmacological treatment.

There are limitations in this review. There were few studies that examined SUD patients utilizing non-pharmacological activity to decrease pain levels thus leading to a decreased use of opioids. The generalizability to this review may be restricted due to limitations such as lack of diversity and lack of evaluation of alternative socioeconomic statuses. Many of the studies utilized data from self-report collection, lending to a potential source of bias. Multiple forms of activity were addressed but no consistent specific method identified. Due to the limitations, further research needs to be completed. Minimal literature revealed a primary focus of SUD patients treated with non-pharmacological method such as physical therapy to assist in relieving pain as a primary outcome.

5. CONCLUSION

This review provides a synthesis of what is known about non-pharmacological activity with education improving chronic low back pain among patients with substance use disorder. The review suggests there is not enough evidence available to make a concise conclusion of how physical activity can assist in improving chronic low back pain for the SUD population. Research does suggest that costs of healthcare expenses are

decreased with consistent use of physical activity. Chronic low back pain is a commonly expressed complaint among those with SUD. Gaps in the literature include studies of whether non-pharmacological physical activity decreases or potentially halts use of illicit drugs or alcohol dependency.

An NP's training is constructed in basic healthcare needs and care management; however, the SUD patient is more complex. The background of the NP starts with the nursing mixed with a philosophy of care and evidenced based practice. These combined concepts place the NP in a unique position to improve outcomes and decrease health care cost. However, with lack of sufficient researched evidence, this can make the focus of patient centered outcome difficult to achieve for the SUD patient with chronic back pain.

Further research is needed to explore the result of consistent physical activity decreasing the levels of pain experienced by SUD patients. Healthcare providers, such as Nurse Practitioners, can use this review as a guide to improve pain level outcomes by exploring larger, more inclusive populations, increasing adherence to uniform activity and using consistent tools to measure and deliver physical activity strategies in replacement of opioids. A holistic approach on behalf of providers should be considered when treating the SUD population.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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