Alternatives to Opioids in Treating Adults with Acute and Chronic Back Pain:

Systematic Review

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Alternatives to Opioids in Treating Adults with Acute and Chronic Back Pain

Acute and chronic back pains are among the world's most frequent reasons for a visit to the physician and for adults to miss their daily activities in pursuit of treatments (Hoy et al., 2014). Approximately 90% of the population globally experiences back pain at one point during their lifetime, and over 45% of these people are from the working class population (Rubin, 2007). There are numerous types of back pains or injuries some of which are treated using non-invasive techniques, that is, without surgeries. The primary cure for chronic as well as acute back pains is the prevention of this condition through precautions such as always maintaining the correct posture, stretching before exercise activities, wearing appropriate footwear before any activities, and the use of correct techniques of lifting among others (Breivik et al., 2006). Back pains are classified into three types, that is, chronic, acute and subacute. Acute back pains are those that last less than one month before relief but might recur from time to time. Subacute back pains are those that last less than three months but more than one month whereas chronic back pains normally last more than three months. People experiencing back pains are advised to see physicians if their pain lasts longer than three days to ensure that their problems are diagnosed early enough for treatments before the pains cause other complications (Qaseem et al., 2017). The areas most affected by back pains include the cervical region, the coccyx and sacral region, the thoracic region, and the lumbar region. Recurrent acute back pain in some instances develops into chronic back pain even after healing if the patient does not take proper care (Cramer & Darby, 2017). Chronic back pain can be understood only through the chronic pain model due to its complicated nature. The chronic pain model helps to conceptualize the pain's causes and perceptions which is useful for understanding pain perceptions (Crombez et al., 2012). The chronic pain model classifies the causes of chronic pain into many categories which include pain

sensation, pain behaviors, external environmental factors, suffering, thoughts, emotions, as well as tissue damage. These factors influence the occurrence of most back pains although other factors such as incorrect postures as well as old age generally increase the chances of suffering from back pains (Flor & Turk, 2015). Acute and chronic pain normally causes frustration in patients as it hampers their health as well as well-being. Back pain in most occasions prevents individuals from achieving their potential at work, spending leisure time with friends, eating right, sleeping, as well as exercising.

There are many treatment measures for both acute as well as chronic back pain, and therefore, the decision regarding the best must be made to ensure quick recovery of patients. Opioids have been used as a back pain treatment for a long period, but their use are accompanied with many risks as well as side effects. The risks and side effects associated with the prolonged use of opioids have prompted studies on alternative back pain treatments with the same therapeutic value as opioids or better (Deyo et al., 2015). Long-term opioid use leads to addiction risk and other side effects including constipation, confusion, and mental disturbance (moodiness and outbursts) as well as breathing problems (slow heart rate) which are fatal (Ricardo et al., 2008). Compton and Volkow (2006) established that one out of four long-term opioid users become addicts and Hubbard et al. (2018) further discovered that in 2017, approximately 155 American citizens succumbed to opioid overdose daily and hundreds were hospitalized in emergency rooms for the same. Medical practitioners have encouraged the use of alternative treatments such as other over-the-counter treatments, intervention therapies, as well as nondrug treatments. Prevention measures such as avoiding injuries during exercises, muscle spasms, constipation, depression, and stress can also be used to eliminate back pain conditions (Nachemson et al., 2000). Nondrug treatments include massages, exercises, and acupuncture;

intervention therapies include psychological therapies, cognitive behavioral therapy, and functional restorations among others whereas over-the-counter treatments include NSAIDs, acetaminophen, naproxen, neuromodulation, and Ibuprofen (Lynch et al., 2008).

Given the challenge posed by back pain, this systematic review aims at exploring nonopioid treatments for acute and chronic back pain. The review involves the use of articles meeting certain conditions specified in the paper as the secondary sources of data. The review will explore the both opioid and alternative treatments comparing their effectiveness, efficiencies, risks, and side effects through secondary sources, essentially ten articles, and will devise recommendations for the best alternative to opioid treatments for acute and chronic back pain. The articles for review will be obtained through database search as well as manual search using Google Scholar. The review will focus on the efficiencies of nonopioid chronic and acute back pain treatments as well as on enhancing their efficiencies during the treatment processes.

Materials and Methods

The researcher utilized the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) in the systematic review by evaluating randomized trials and articles from credible authors (Moher et al., 2009). A practical assessment of the alternatives to opioids was also conducted where ultrasound-guided trigger point injections, physical therapies, massage, and chiropractic adjustments were administered at the researcher's office. These trials yielded positive results after a short period from the beginning of their administration.

Relevant Review of the Literature

Database Search

Different database search engines were utilized to obtain the relevant articles used in the systematic review. The researcher utilized Google Scholar, EBSCO, LexisNexis Academic, and

Journal Storage (JSTOR) during article search (Kushwah & Singh, 2016). These online databases provided the required studies on alternative treatments for opioid through the analysis of secondary sources of information.

Article Selection

The articles for the systematic review were selected based on certain properties which include the following:

- Relevance: Only psychologically relevant articles were selected for review, that is, only researches conducted on alternative treatments for acute and chronic back pains apart from opioids were considered.
- Article types: The researcher selected specific articles which were not only relevant but also binding and provided sufficient evidence through the use of primary or secondary data collection tools. The most preferred articles included surveys, case studies, theoretical reviews, original reports and their replications, meta-analyses and literature reviews. Articles such as papers presented at conferences, personal testimonies, proselytizing and testimonies, and informal reports were not used.
- Articles had to be experimental to ensure the validity of content or rather claims.
- The articles had to have been published within the last 18 years.
- The articles had to have been published in English originally.
- The articles had to have utilized qualitative research methods instead of qualitative or both.

- The articles had to be based on alternative treatments for acute and chronic pain treatments other than opioids or had to indicate, through statistical data, the use of alternative treatments and their effectiveness.
- The articles were selected based on their reliability and validity.

Data Extraction

Using EBSCO, LexisNexis Academic, and Journal Storage (JSTOR), 900 articles were recognized as relevant and containing binding experimental findings on the alternative acute and chronic back pain treatment other than opioid administration. After a thorough review of the available 900 relevant articles, five articles were seen to fulfil all the article selection criteria. To make the systematic review binding, more search was conducted on Google Scholar and a further five articles fulfilling the criteria were acquired. Google Scholar provided a more accessible manual platform for articles relevant to the research topic. The articles for review, therefore, totaled to 10 articles.

Critical Appraisal

A critical analysis of the ten articles available for systematic review was conducted using the Quality Assessment Tool for Quantitative Studies as well as Kmet's Quality Assessment Tool for both qualitative as well as quantitative papers (Zeng et al., 2015). Subsequently, the researcher's three reviewers (identified as A, B, and C) were consulted to gain insight into the quality of information contained therein to ensure relevance and reliability of the systematic review. With the help of the reviewers, five qualitative articles were assessed against 16 and the other five against 11 as per the PRISMA criteria and guidelines.

Data Collection Procedure

Having settled for 10 articles for the systematic review process, the researcher utilized tables in the extraction of data necessary for the reviewing process. To guarantee the relevance, validity, as well as the reliability of the contents of these chosen articles, recordings were made based on article aims, titles, authors, the year, and the publication dates (Schmidt & Brown, 2017). This was to ensure that the articles used were relevant and were easily accessible in case of any need for reassessment. The data pertaining to treatment apart from opioids for acute and chronic back pains was extracted from the articles. The analysis was not based on age differences, but where applicable, the researcher was able to differentiate the findings based on age as well as other important factors for the successful analysis of the articles.

Results

Study Characteristics

This systematic review utilized ten articles including qualitative and quantitative studies which discussed the alternative acute and chronic back pain treatments other than opioids, their effectiveness, characteristics, health risks, side effects and compared their efficiencies during the treatment process. Factors such as age and sex were, in most instances, not considered during the systematic review but were used for validity and originality of the studies wherever provided. All ten articles compared various alternative acute as well as chronic back pain treatments to opioids in terms of their effectiveness, side effects, as well as benefits. This review also aims to explain the reasons why opioids are not currently preferred for treatment of both chronic as well as acute back pains. The participants in the articles under review were generally patients who had, at a given point, suffered from either acute or chronic back pain or both and had sought treatment either from doctors, psychiatrists, physicians, or clinical masseuses. The number of patients in

each article varies, for example, 1730 in Liddle et al. (2004), 123 in Brennan et al. (2006), 19% of 46,394 in Breivik et al. (2016), 130 in Cho et al. (2013), and 6390 in Hayden et al. (2005). On the other hand, the other articles targeted general population of people who had suffered back pains in the past or at present to investigate the treatments used and the effectiveness of the same.

These alternative treatments include exercise (Liddle et al., 2004; Jennifer et al., 2018), acupuncture, psychological therapies, exercise therapy, interdisciplinary therapy, spinal massage, functional restoration, Traumeel trigger point therapy, chiropractic treatments, physical therapies (low-level laser therapy, interferential therapy, lumbar support, superficial heat, manipulation, shortwave diathermy, traction, ultrasonography, and transcutaneous electrical nerve stimulation) and yoga (Chou & Huffman, 2007; Roelofs et al., 2008; Brennan et al., 2006; and Breivik et al., 2006), opioid therapy and nonopioid pharmacologic treatments (Jennifer et al., 2018), manual therapies and passive physical modalities (Wong et al., 2016; Cho et al., 2013; Hayden et al., 2005). Most of the eligible articles under review provided a quantitative approach to these treatments in which some acute and chronic back pain patients were administered nonopioid treatments and their conditions were monitored in terms of how many were treated, how long the treatment lasted, and the effectiveness and side effects of the treatments. The ages of the participants were specified in some articles, but in others, all patients were liable for participation as long as they were suffering or had suffered from either acute or chronic back pain.

From the 10 articles, information about alternative back pain treatments with fewer risks was obtained such as massage, steroid injections, prednisone, ultrasound therapy, and drugs such as naproxen, Ibuprofen, and acetaminophen among others. These treatments can be divided into four groups, that is, over-the-counter medicines, nondrug treatments, as well as interventional

therapies for easy analysis, each of which have their advantages, risks, and efficiency. Opioids have numerous lethal side effects when compared to other treatments.

Critical Analysis

All the 10 articles utilized in this systematic review were relevant to the topic under review, clearly and thoroughly described their contexts, used justified and relevant sampling strategies, and described substantially clear as well as systematic data collection methods and analysis in addition to the provision of well-supported and justified conclusions and recommendations. All the articles connected their findings to the established bodies of knowledge or theoretical frameworks to ensure the credibility of their researches. Six articles out of 10 provided information on sample size, selection, and characteristics of the participants. In all the articles, however, the conclusions were based on the research findings both from primary as well as secondary sources, thereby acknowledging contributions by other authors in this field. The average quality of the articles according to the quality assessment score was considered during the choice of the articles such that only high-quality articles were selected, that is, only articles with a score of between 75% and 100% were considered.

PRISMA Flow Diagram, Indicating Articles Included as well as those Excluded During the Systematic Review

The PRISMA table below summarizes the findings from the ten articles under review.

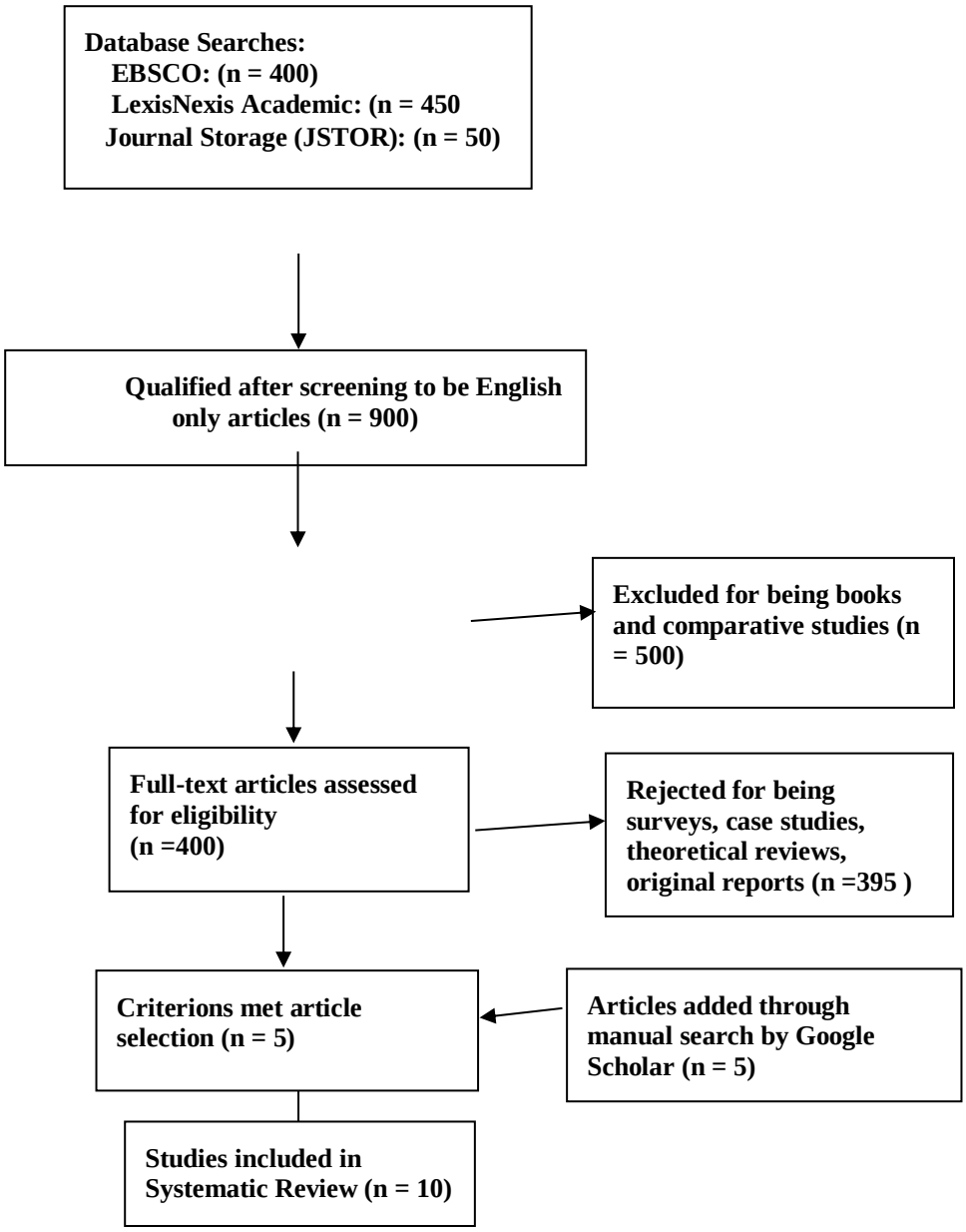

Figure 1. PRISMA Flow Diagram: Indicating articles Included as well as those Excluded during the Systematic Review

Study	N	Study Design and Setting	Treatment Type(s)	Age of Participant	Primary Outcomes	Summary of Results
Liddle et al., 2004	1730	Patients were placed in randomized trials (RCTs) to monitor their treatment processes for chronic back pain. Exercise was the primary treatment for chronic pain, and the patients were divided into 16 RCTs. The quality of the exercise was monitored. 12 out of the 16 RCTs involved strengthening exercises.	Exercise	All ages	Exercise had a therapeutic effect on chronic, lower back pain patients.	Exercise had positive effects in all the 16 trials conducted. Most patients started getting better from the initiation of exercise practices, indicating the efficiency of this treatment method. The various exercises offered had different effects on the patients depending on the strength of the exercise; routine exercises recorded the highest efficiency compared to non-routine exercises. From the success of exercise treatment in all the 16 trials, it is clear that exercise is one of the best chronic back pain treatment methods.
Chou and Huffman, 2007	Patients	The study was a systematic review with random trials using therapies for both acute as well as chronic low back pain. The systematic review utilized only English-based studies through databases such as MEDLINE searches and Cochrane Database of Systematic Reviews. The electronic searches were conducted by	Acupuncture, psychological therapies, functional restoration, exercise therapy, interdisciplinary therapy, spinal manipulation, massage, yoga and physical therapies (low-level laser therapy, interferential therapy, lumbar supports, superficial heat, shortwave diathermy, traction, ultrasonography,	All ages	The treatments for acute as well as chronic low back pain were effective as the patients in the review responded positively to the treatments.	Cognitive behavior therapy, spinal manipulation, interdisciplinary rehabilitation as well as exercise were moderately effective for both chronic and subacute low back pain as it took more than three weeks to yield positive results. Massage, acupuncture, functional restoration and yoga were indeed effective for chronic as well as acute back pain. Nonpharmacological therapies, especially

Study	N	Study Design and Setting	Treatment Type(s)	Age of Participant	Primary Outcomes	Summary of Results
		manually searching for references as well as suggestions by experts.	and transcutaneous electrical nerve stimulation).			superficial heat and spinal manipulation were effective for acute low back pain treatments, taking less than four weeks to yield positive results.
Roelofs et al., 2008	Patients	Oxman criteria were used during the systematic review for grading methodology quality, and Cochrane Back Review Group criteria were used for personal trials. This research was based on the administration of therapies to facilitate relief and treatment of back pain.	Electrotherapy modalities (transcutaneous electrical nerve simulation), exercise, acupuncture, manual therapies (massage and manipulation) as well as thermal modalities (ultrasound and moist heat)	No specific age limits	Most of the therapies had positive effect, and the recovery lasted between two and four weeks.	Most of the therapies had a positive impact on the patients' condition, suggesting they could be significantly effective against acute and chronic back pain. From the findings, it is clear that exercise, manual therapies, and acupuncture could be beneficial in musculoskeletal pain management and chronic back pain treatment. To ensure effective and faster recovery of patients, physicians utilize a combination of the therapies instead of single treatments, for example use of exercise, acupuncture, and manual therapies together.
Brennan et al., 2006	123 patients	The study was based on the observation of individuals suffering acute or chronic back pain. Different physical therapy types were utilized in the management of	Physical therapy was conducted in three different groups based on different physical therapy types (specific therapy, manipulation, and stabilization exercises)	Mean age of the participants was 37.7 plus or negative 10.7 years	Patients under matched treatments experienced greater long or short-term positive developments than those receiving unmatched treatments. A combination of these	Physical therapy was effective in the treatment of back pain. Matched physical therapy sessions aided in ensuring recovery from back pains irrespective of the type. Patients responded positively to physical therapy and within

Study	N	Study Design and Setting	Treatment Type(s)	Age of Participant	Primary Outcomes	Summary of Results
		musculoskeletal disorders.			therapies yielded increased therapeutic advantages for the patients.	four weeks from its initiation were relieved off their pain, indicating the beginning of their recovery. Strained muscles need to be stretched and strengthened to ensure relief, which can be achieved through exercises, massages, acupuncture, and physical therapies.
Breivik et al., 2006	19% of 46,394 respondents were willing to engage in the study. 4839 respondents engaged in in-depth interviews This study utilized interviews as the primary source of information from acute and chronic treatments.	This study was a randomized clinical trial activity utilizing patients with low back pain in establishing the effectiveness of these treatment methods where both non-medical as well as over-the-counter medicines were used.	Non-medical treatments (massage, acupuncture, as well as physical therapy) Non-prescription analgesics Over-the-counter medications (Paracetamol, NSAIDs, a COX-2 inhibitor and weak opioids)	All ages	All these treatment types worked as the patients testified to having used them and recovered from the back pain. Certain side effects were realized during treatments, especially when-over-the counter medicines were used.	The treatment use was recorded in percentages, revealing the number of patients who had used a certain medication or treatment type against acute or chronic back pains. 30% used massage. 21% used physical therapy. 13% used acupuncture. 1-36% used COX-2 inhibitors. 5% used strong opioids. These statistics indicate that this study's population preferred the alternative treatments for acute and chronic back pains as opioids only record a 5% usage which indicates that it is unpopular compared to the other treatment types.

Study	N	Study Design and Setting	Treatment Type(s)	Age of Participant	Primary Outcomes	Summary of Results
Jennifer et al., 2018	They utilized general statistics from the United States on recorded patients' information in different health facilities. This research targeted the entire United States population suffering from acute and chronic back pain	Patients or rather people suffering from acute or chronic back pain were interviewed to obtain information on their treatment procedures as well as the effectiveness of these treatment types.	Opioid therapy Nonopioid pharmacologic treatments Exercises Physical therapy Medicinal treatments Behavioral therapy	All ages	Opioids provided analgesia for acute back pain For chronic back pain, long-term use of opioid resulted in more pain, low quality of life as well as less inefficiency in patients with mood disorders. Opioid use also led to neuropathic pain, centralized pain syndromes, as well as psychiatric disorders. Confusion, depression, tolerance, overdose, and worsened pain were also reported.	Opioid use is normally more effective for acute back pain treatment. Chronic back pain patients should not utilize opioid treatments due to the serious side effects of the treatment as well as its inefficiency. Opioid treatment did confer benefits to patients but was associated with risks and side effects and adverse medical-related events followed after prolonged use of opioid treatments. Nonopioid treatments were more effective than opioid treatments as they involved fewer risks as well as less to no side effects. Nonopioid treatments are not costly compared to opioid. Thoracic manipulations provided short-term benefits to patients Clinical massage added value to the treatment process Acupuncture offered relief from back pain or neck pain in patients. A combination of Traumeel trigger point therapy and chiropractic treatments are more effective when administered together for back pain patients

Study	N	Study Design and Setting	Treatment Type(s)	Age of Participant	Primary Outcomes	Summary of Results
						as many recovered fast after a combined administration of these two treatments.
Wong et al., 2016	Patients with neck pain (whiplash-associated disorders) and back pain-associated disorders	The study involved going through hospital statistics as well as using previous researches to identify the advantages and disadvantages of opioid and nonopioid treatments of acute and chronic back pain.	Manual therapies Passive physical modalities	No age limits	Manipulation (Traumee) trigger point therapy), chiropractic treatments, mobilization, and clinical massage are effective interventions for neck pain management. Relaxation, massage, and physical modalities are not effective and should not be used as alternatives to opioid treatments.	There was a significant difference in the Visual Analogue Scale score for pain intensity and bothersomeness score of chronic low back pain for the two groups under study. The Score improved continuously for about three months after the initiation of the treatment process.
Cho et al., 2013	130 adults	A systematic review and best evidence synthesis using samples comprising randomized controlled trials, cohort studies as well as case-control studies comparing the three nonopioid treatments	Acupuncture	18 to 65 years	This study affirms that acupuncture is an effective chronic back pain treatment. Acupuncture shows better effects in the reduction of pain intensity as well as bothersomeness.	Mean improvement for patients was 13.3 points on a scale of 5.5 to 21.1 for the pain. Exercise therapy can, therefore, be used instead of opioid treatment as it has limited side effects as compared to opioid and is effective as well.
Hayden et al., 2005	6390 patients	This study was a randomized as well as sham-controlled clinical trial	Acupuncture Exercise therapy	Adults	From the results of the study, exercise therapy is effective in the treatment of	

Study	N	Study Design and Setting	Treatment Type(s)	Age of Participant	Primary Outcomes	Summary of Results
		aimed at investigating acupuncture chronic low back pain treatment. This study involved randomized controlled trials aimed at evaluating exercise for adult low back pain treatments and therapy.			acute and chronic back pains.	

The following table indicates different alternatives to opioid use for acute and chronic back pain treatment.

Alternative Treatment	Explanation	Evidence
Over-the-counter medicines and medicines	Use of Ibuprofen (Advil, Motrin IB and generic), Acetaminophen (Tylenol and generic) and Naproxen (Aleve and generic) Skeletal muscle relaxants Use of Steroid Injections, Neuromodulation(nerve stimulation) as well as radiofrequency ablation (utilizing heat to target some nerves)	Treatments over the counter recorded the following percentage efficiencies NSAIDS (44% effectiveness) Paracetamol (43%) COX-2 inhibitors (1–36%) (Breivik et al., 2006). Mean improvement for patients was 13.3 points on a scale of 5.5 to 21.1 for the pain (Hayden et al., 2005).
Nondrug treatments	Use of exercise including massage and physical exercise, Counseling, Acupuncture, Cryotherapy (cold therapy) and Yoga (Thorn, 2017)	A significant difference was noticed in the Visual Analogue Scale (VAS) score for pain intensity and bothersomeness score of chronic low back pain for the two groups under study. Score improved continuously for three months (Cho et al., 2013).
Interventional therapies	Psychological therapies, cognitive behavioral therapy, functional restorations as well as interdisciplinary rehabilitation	Cognitive behavior therapy is more effective against acute back pain compared to chronic pain. There is no difference between psychological therapies and nondrug treatments (other active therapies) such as exercises. Combination of therapies does not speed up recovery, and therefore one therapy is as effective as utilizing all therapies simultaneously during the treatment process of acute or chronic back pains (Wong et al., 2016). Acute as well as back pain patients utilizing interventional therapy treatments as alternative opioid treatment improved indicating the efficiency of the treatment method without side effects.

Nondrug Treatments

All the articles under review provided insight into the treatment of acute as well as chronic back pain through nondrug treatments which include exercise, massage and physical exercise, counseling, acupuncture, and cryotherapy among others. The success of these treatment methods was evaluated using different data collection methods in the articles which include interviews with the patients to gain insight into their experiences during the treatment process which primarily centered on the time it took from the first day for them to get well or begin feeling better (Breivik et al., 2006). These articles concluded that nondrug treatment methods are efficient for both acute and chronic back pain although their effectiveness varied from one method to another. Most of the articles evaluated the effectiveness of physical exercises, therapies, acupuncture as well as massages which were considered more effective in these treatments (Hayden et al., 2005, Cho et al., 2013, Wong et al., 2016, Jennifer et al., 2018, Breivik et al., 2006, Brennan et al., 2006, Roelofs et al., 2008, Chou and Huffman, 2007, and Liddle et al., 2004).

In many cases, patients took less than four weeks to experience complete relief especially for acute back pains whereas longer for chronic pain. The only similar result for the use of nondrug treatments is that there are no or rather limited side effects and other benefits such as helping keep individuals healthy especially when exercises are used (Liddle et al., 2004). Liddle et al. (2004) also established that a combination of exercise, massage, and acupuncture was more effective than administration of exercises alone. The number of participants in most of the quantitative research articles were more than 100, implying that the results can be considered valid as the studies involved a large number of participants. Furthermore, the sampling methods used provided equal chances to all the target group members which included people suffering or

people who had suffered from acute or chronic back pain (Onwuegbuzie & Leech, 2007). It was established from the systematic review of the 10 articles that if independently used, these nondrug treatments do not work faster; administration in combinations ensures faster treatments. Combination treatments should be applied when patients are suffering from chronic back pains as single nondrug treatments work slowly and are not significantly ineffective (Chou & Huffman, 2007). Acute back pains, on the other hand, can be effectively treated by the administration of single nondrug treatment without having to combine the treatment methods.

Intervention Therapies

Out of the 10 articles under systematic review, six of the articles provided vital information on the efficiency of interventional therapies in the treatment of acute as well as chronic back pain. These intervention therapies include psychological therapies, functional restoration, exercise therapy, spinal manipulation, massage, yoga and physical therapies (low-level laser therapy, interferential therapy, lumbar supports, superficial heat, shortwave diathermy, traction, ultrasonography, and transcutaneous electrical nerve stimulation), chiropractic adjustments, ultrasound-guided trigger point injections with Traumeel, and interdisciplinary therapy (Chou & Huffman, 2007). The articles concluded that interventional therapies were more effective compared to seeking no treatments in the fight against acute as well as chronic back pain (Chou & Huffman, 2007). Compared to the other back pain treatment methods such as exercise, intervention therapies were considered more effective according to the findings from patients who utilized these methods by comparing their period of treatments and the relief they obtained after each treatment session (Jennifer et al., 2018; Roelofs et al., 2008; Brennan et al., 2006). According to meta-regression analysis, exercise programs incorporating individually supervised and tailored stretching and other exercises normally yield the best

outcomes compared to the other interventional therapies (Chou et al., 2007). The Traumeel trigger point therapy involves an injection, made from substances derived from natural sources, to the back area where the pain is felt. Traumeel therapy begins with ultrasound in office diagnosis to identify the specific area affected pain (Roelofs et al., 2008). Chiropractic treatment refers to a manual therapy used in the treatment of lower back pain conditions. The primary chiropractic treatments include mobilization and manual and spinal manipulations. Patients who underwent a combination of Traumeel therapy and chiropractic treatments recorded faster and high rate recoveries which ranged between two weeks to a month (Roelofs et al., 2008; Wong et al., 2016). Intervention therapy treatments, therefore, function best when administered to patients in combination than when administered alone.

Over-the-Counter Medicines

Of the 10 articles used in the systematic review, two articles provided vital information regarding over-the-counter medicines or rather medicinal treatments for acute and chronic back pain apart from opioid treatments (Jennifer et al., 2018; Breivik et al., 2006). The two articles affirmed that over-the-counter medicines are the most definite ways of treating both chronic as well as acute back pain since; most of the drugs have been tested scientifically for this purpose (Jennifer et al., 2018; Breivik et al., 2006). Over-the-counter medicines include the use of Ibuprofen (Advil, Motrin IB and generic), Acetaminophen, (Tylenol and generic) Naproxen (Aleve and generic), and NSAIDs (Hayden et al., 2005). NSAIDs are considered to be more effective for pain relief compared to acetaminophen although the two are associated with certain risks such as renovascular and gastrointestinal risks (Chou et al., 2007). Opioids, on the other hand, have many risks such as addiction and abuse, opioid analgesics harms as well as other vulnerabilities and even deaths (Jennifer et al., 2018). Other side effects of long-term opioid use include constipation, confusion, mental disturbance (moodiness and outbursts), and breathing problems (slow heart rates) which are fatal (Ricardo et al., 2008). From these reviews, it is evident that although most over-the-counter medicines have side effects, opioids have more side effects as well as risks compared to these other treatments and normally lead to extremely serious situations and even death for long-term users. Although almost all alternative medicines for acute and chronic treatment have side effects, Ibuprofen, Acetaminophen and Naproxen, NSAIDs, as well as acetaminophen have fewer side effects and, therefore, should be employed as alternative treatments although their effectiveness and efficiency in the treatment differs. Medicinal treatments for back pain are generally among the primarily used treatment methods,

and it is reported in one of the articles that out of all the patients under study, 1 to 36% used COX-2 inhibitors and other medicines and 5%, mentioned using opioids (Breivik et al., 2006). These percentages indicate how individuals prefer medicinal treatments as they are easy to access and take according to the medical personnel's prescription. These treatments also take shorter time depending on the patients' adherence for the prescriptions. Furthermore, skeletal muscle relaxants are a group of medications which carry FDA approval for musculoskeletal spacity or conditions' treatment. These drugs include tizanidine and baclofen among others. They are normally more effective for acute back pain treatments but have sedative effects on its users (Chou et al., 2007). In certain cases, especially extreme cases, physicians normally prescribe medications which normally include pain relievers, anti-inflammatories, muscle relaxants, antidepressants as well as narcotic pain relievers (Chaparro et al., 2013). In more severe cases, however, physicians have no choice but to prescribe surgical treatments ranging from intricate arthroscopic procedures requiring hospitalization to minimally invasive outpatient surgery (Filler, 2012). Therefore, there exist many other medicinal as well as hospital-based treatments apart from opioid treatments that can effectively be used in both acute as well as chronic back pain treatments.

Discussion

This systematic review on nonopioid treatments for acute and chronic back pain treatments utilized ten articles that had been identified and chosen through databases (five articles) and manual search through Google Scholar (five articles). These articles provided different treatment methods which were grouped into three, indicating that the review topic is an emerging research area requiring more future research to provide insight into the problem. Six of the articles provided vital information on the efficiency of interventional therapies in the

treatment of acute as well as chronic back pain. All the articles under review provided insight into the treatment of acute as well as chronic back pain through nondrug treatments indicating patients' preference for this treatment type . Two of the articles provided relevant information for over-the-counter medicines or rather medicinal treatments for acute and chronic back pain apart from opioid treatment (Jennifer et al., 2018; Breivik et al., 2006). Opioids recognized as one of the most effective treatments of acute and chronic back pain but are not preferred for their numerous risks as well as side effects. Opioid use has certain risks including addiction and abuse, opioid analgesics harm, and even death (Jennifer et al., 2018). Opioids also have numerous side effects, especially with prolonged use, including constipation, confusion, and mental disturbance or rather moodiness and outbursts as well as breathing problems resulting from slow heart rates (Ricardo et al., 2008). As a result of the many risks as well as side effects, alternative treatments are preferred to ensure that patients get well with fewer risks and side effects. These alternative treatments have their own side effects as well as risks but those are far fewer than those associated opioids, justifying their preference over opioid treatments. According to these research studies, the three alternative back pain treatments are effective and therefore can be utilized by patients as per their preference and convenience.

The Efficiency of the Treatments Methods

From the findings of the 10 articles on nonopioid treatments for chronic and acute back pain, nondrug treatments are among the most preferred as they not only serve as treatments for back pain but also help in relaxing the body as well as keeping it fit and healthy. This systematic review recommends that patients consider the type of nondrug treatments to employ as nondrug treatments differ in terms of their effectiveness (Cho et al., 2013; Wong et al., 2016). The most preferred among all the nondrug treatment types include therapies, massages, acupuncture, and

exercises which, from the review, were seen to yield promising recovery rates (Jennifer et al., 2018, Breivik et al., 2006, Brennan et al., 2006, and Roelofs et al., 2008). The articles reviewed also consistently recommended the utilization of a combination of nondrug treatments as they are more effective when administered in combination compared to the utilization of a single treatment type. For instance, a combination of acupuncture, exercises, and therapy is considered more effective than any single treatment administered from among the three (Liddle et al., 2004). All the articles under review prescribed nondrug treatments as effective back pain treatment based on the percentage of patients who had recovered from this condition using either exercise, acupuncture, and therapies or a combination of all. Most patients found relief from the use of nondrug treatments, and with proper guidance from health practitioners, patients received quick relief from both acute as well as chronic back pain. Acute back pain is easier to manage using these treatments whereas it takes a while before full recovery from chronic back pains. A single nondrug treatment such as exercise is effective for acute treatments, but a combination of several treatments is preferred for both acute and chronic types (Hayden et al., 2005). An increased awareness nondrug treatment methods, therefore, ensure quick as well as complete recovery of back pain patients.

Drug treatments, on the other hand, are preferred especially for patients who do not have time for the alternative treatment methods as they can be administered at the comfort of the patient, that is, they can be taken in the form of tablets or liquid wherever the patient is at a given time. Over-the-counter, acute and chronic back pain treatments include the use of NSAIDs, Acetaminophen, Naproxen, Neuromodulation, opioids, Ibuprofen, and skeletal muscle relaxants. Their effectiveness in the treatment process varies from one treatment to another, and they also are associated with risks as well as side effects. From the articles under review, opioid and

skeletal muscle relaxants have many risks as well as side effects (Breivik et al., 2006). Opioids are even worse as they might lead to the death of the patient especially when overdosed as the drug is addictive. The remaining over-the-counter medicines have fewer risks as well as side effects and have almost the same pharmacology as opioids, making them more preferred during acute and chronic back pain treatments. From the conclusions in the two articles primarily focusing on over-the-counter medicines (Jennifer et al., 2018 and Breivik et al., 2006), many patients use these which generally prove to be effective. From the systematic review, NSAIDs, tricyclic antidepressants, and skeletal muscle relaxants are normally effective treatments for acute back pain. Gabapentin, tramadol, acetaminophen, and benzodiazepines are also normally effective in relieving pain in general and, therefore, can be utilized in relieving back pain (Chou & Huffman, 2007).

According to the articles, intervention therapies are more effective compared to acupuncture and exercises, and therefore, a combination of these treatments is more efficient (Jennifer et al., 2018, Roelofs et al., 2008; Brennan et al., 2006). The review highlights the importance of combining these treatment methods, especially intervention therapies and nondrug treatments to achieve maximum efficiency during treatments. Relaxation massage, electroacupuncture, and passive physical modalities are also considered less efficient and should not be used in pain relief. Traumeel therapy has replaced traditional invasive treatments as a result of its efficiency and effectiveness when administered to patients especially in combination with chiropractic treatments. A combination of Traumeel therapy and chiropractic treatments enhances pain reduction as well as the healing process, making one better within a short time (Wong et al., 2016). Therefore, patients can consider using other acute and chronic back pain treatments apart from opioids due to the aftermath of prolonged opioid use. A combination of

these alternative back pain treatments is more effective than the single use of opioids and has other health and therapeutic values, for instance, physical exercise is vital for keeping fit and prevention of diseases such as diabetes and heart diseases (Liddle et al., 2004). Medical practitioners should encourage clinicians as well as patients to use alternative opioid treatments to ensure that risks, side effects, and mortality rates are reduced within the United States as well as around the world.

Limitations and Future Directions

This systematic review included 10 articles, five of which were obtained through Google Scholar, a manual search tool that aids in obtaining academic books as well as journal material among others. Although we conducted a thorough database search using three different databases, only five relevant articles were obtained. The electronic databases used during the systematic review include EBSCO, LexisNexis Academic, and Journal Storage (JSTOR) which were selected due to their ease of access and the availability of articles meeting the selection criteria. Most of the articles under review addressed the issue of acute or chronic lower back pain, thereby not including the entire back region. Some of the selected study articles were systematic reviews and, therefore, provided only a qualitative approach toward the study topic. Most of the articles did not specify the ages of their participants, thereby making it almost impossible to predict the effectiveness of these treatment methods in the various age groups and age sets. These research challenges require researchers to conduct more research on alternative and non-opioid treatments and establish the optimal treatments for acute and chronic back pain. The gaps in these studies also challenge scientists to research the best alternatives of opioid back pain treatments.

Conclusion

Acute as well as chronic back pains are a menace that almost all humans experience within their lifetimes. In most cases, this deprives individuals from achieving their best at their workplace as well as other aspects of life. Opioid use has been discouraged by medical practitioners due to the deadly risks as well as side effects of its prolonged use. Therefore, alternative treatments are necessary for providing relief to patients. Exercise, acupuncture, physical therapy, as well as other pain treatment methods are vital for back pain interventions, and a combination of these treatments ensures high efficiency and speed of recovery during the treatment process as recorded in the reviewed articles. Strained muscles need to be stretched and strengthened to ensure relief, which can be achieved through exercises, massages, acupuncture, and physical therapy. Another reason for the importance of exercise, therapies, acupuncture, and massage among other nondrug treatments is that they do not poise side effects and risks and normally provide instant relief in case of back pain caused by strained muscles. Exercises help in increasing flexibility and strengthening the back and abdomen muscles, thereby eliminating pain that might result from strained muscles. The Traumeel therapy has replaced traditional invasive treatments as a result of its efficiency and effectiveness when administered to patients especially in combination with chiropractic treatments. A combination of Traumeel therapy and chiropractic treatments aids pain reduction as well as the healing process, making one better within a comparatively shorter time. Over-the-counter treatments such as Ibuprofen, Acetaminophen, Naproxen, and NSAIDs have been recommended by the articles as better alternatives to acute and chronic back pain treatments due to their reduced side effects and risks as well as by offering similar efficiency as opioids. Although over-the-counter treatments are effective in most cases, they cannot be preferred over nondrug and interventional therapy

treatments as the latter has no risks and side effects compared to the former. Future studies on alternative back pain treatments need to focus on the types of exercises, acupuncture, therapies, massages, and other nondrug treatments which can be used as both preventive measures and treatments. The studies need to focus on the appropriate combination of treatments which will yield better back pain relief within the shortest time as well as measures to be undertaken to prevent acute and chronic back pains. Awareness regarding all alternative back pain treatment methods other than opioids will help reduce the instance of such cases, thereby enabling individuals to adopt preventive measures and treatments at home through physical exercise and therapy. More research is required to ascertain the most effective treatments to be applied even though the current study recommends a combination of treatments that yield better results within the shortest time.

References

Baron, R., Binder, A., & Wasner, G. (2010). Neuropathic pain: diagnosis, pathophysiological mechanisms, and treatment. *The Lancet Neurology*, *9*(8), 807–819.

Breivik, H., Collett, B., Ventafridda, V., Cohen, R., & Gallacher, D. (2006). Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *European journal of pain*, *10*(4), 287–333.

Brennan, G. P., Fritz, J. M., Hunter, S. J., Thackeray, A., Delitto, A., & Erhard, R. E. (2006). Identifying subgroups of patients with acute/subacute "nonspecific" low back pain: results of a randomized clinical trial. *Spine*, *31*(6), 623–631.

Chaparro, L. E., Furlan, A. D., Deshpande, A., Mailis-Gagnon, A., Atlas, S., & Turk, D. C. (2013). Opioids compared to placebo or other treatments for chronic low-back pain. *Cochrane Database Syst Rev*, *8*(8).

Cho, Y. J., Song, Y. K., Cha, Y. Y., Shin, B. C., Shin, I. H., Park, H. J., ... & Lee, J. H. (2013). Acupuncture for chronic low back pain: a multicenter, randomized, patient-assessor blind, sham-controlled clinical trial. *Spine*, *38*(7), 549–557.

Chou, R. & Huffman, L. H. (2007). Medications for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of Physicians clinical practice guideline. *Annals of Internal Medicine*, *147*(7), 505–514.

Chou, R., Qaseem, A., Snow, V., Casey, D., Cross, J. T., Shekelle, P., & Owens, D. K. (2007). Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American college of physicians and the American pain society. *Annals of Internal Medicine*, *147*(7), 478–491.

Cramer, G. D. & Darby, S. A. (2017). *Clinical anatomy of the spine, spinal cord, and ANS*. Elsevier Health Sciences.

Crombez, G., Eccleston, C., Van Damme, S., Vlaeyen, J. W., & Karoly, P. (2012). Fear-avoidance model of chronic pain: the next generation. *The Clinical Journal of Pain*, *28*(6), 475–483.

Deyo, R. A., Von Korff, M., & Duhrkoop, D. (2015). Opioids for low back pain. *Bmj*, *350*, g6380.

Filler, A. G. (2012). *Do you need back surgery?: A surgeon's guide to neck and back pain and how to choose your treatment*. Oxford University Press.

Flor, H., & Turk, D. C. (2015). *Chronic pain: An integrated biobehavioral approach*. Lippincott Williams & Wilkins.

Gurcay, E., Bal, A., Eksioglu, E., Esen Hasturk, A., Gurhan Gurcay, A., & Cakci, A. (2009). Acute low back pain: clinical course and prognostic factors. *Disability and Rehabilitation*, *31*(10), 840–845.

Hayden, J., Van Tulder, M. W., Malmivaara, A., & Koes, B. W. (2005). Exercise therapy for treatment of non-specific low back pain. *Cochrane Database of Systematic Reviews*, (3).

Jennifer, F., Waljee, M. D., Chad, M., & Brummett, M. D. (2018). *Opioid prescribing for low back pain*. Section of Plastic Surgery, Department of Surgery, Michigan Medicine, University of Michigan. Retrieved from https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2685622#191347682

Kent, P. M. & Keating, J. L.(2005). The epidemiology of low back pain in primary care. *Chiropractic & Osteopathy*, *13*(1), 13.

Koes, B. W., Van Tulder, M., & Thomas, S. (2006). Diagnosis and treatment of low back pain. *BMJ*, *332*(7555), 1430–1434.

Kushwah, S., & Singh, R. (2016). Retrieval of legal information through discovery layers: A case study related to Indian law libraries. *Journal of Information Science Theory and Practice*, *4*(3), 71–83.

Liddle, S. D., Baxter, G. D., & Gracey, J. H. (2004). Exercise and chronic low back pain: What works?. *Pain*, *107*(1–2), 176–190.

Lynch, M., Rashiq, S., Schopflocher, D., & Taenzer, P. (2008). Drug treatment for chronic pain. *Chronic Pain: A Health Policy Perspective*, 101–119.

Onwuegbuzie, A. J. & Leech, N. L. (2007). Validity and qualitative research: An oxymoron?. *Quality & Quantity*, *41*(2), 233–249.

Qaseem, A., Wilt, T. J., McLean, R. M., & Forciea, M. A. (2017). Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American college of physicians. *Annals of Internal Medicine*, *166*(7), 514–530.

Roelofs, P. D., Deyo, R. A., Koes, B. W., Scholten, R. J., & Van Tulder, M. W. (2008). Nonsteroidal anti-inflammatory drugs for low back pain: an updated Cochrane review. *Spine*, *33*(16), 1766–1774.

Rubin, D. I. (2007). Epidemiology and risk factors for spine pain. *Neurologic Clinics*, *25*(2), 353–371.

Siemionow, K., Steinmetz, M., Bell, G., Ilaslan, H., & McLain, R. F. (2008). Identifying serious causes of back pain: Cancer, infection, fracture. *Cleve Clin J Med*, *75*(8), 557–66.

Thorn, B. E. (2017). *Cognitive therapy for chronic pain: A step-by-step guide*. Guilford Publications.

Wong, J. J., Shearer, H. M., Mior, S., Jacobs, C., Côté, P., Randhawa, K., ... & van der Velde, G. (2016). Are manual therapies, passive physical modalities, or acupuncture effective for the management of patients with whiplash-associated disorders or neck pain and associated disorders? An update of the bone and joint decade task force on neck pain and its associated disorders by the OPTIMa collaboration. *The Spine Journal*, *16*(12), 1598–1630.

Wright, A. & Sluka, K. A. (2001). Nonpharmacological treatments for musculoskeletal pain. *The Clinical Journal of Pain*, *17*(1), 33–46.

Zeng, X., Zhang, Y., Kwong, J. S., Zhang, C., Li, S., Sun, F., ... & Du, L. (2015). The methodological quality assessment tools for preclinical and clinical studies, systematic review and meta-analysis, and clinical practice guideline: a systematic review. *Journal of Evidence-Based Medicine*, *8*(1), 2–10.