

YOGA AND ITS USE IN TREATING CHRONIC LOW BACK PAIN

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Abstract

Purpose: To develop evidence-informed best practice recommendations to reference for nursing professionals and individuals with chronic low back pain when considering different treatment options.

Background: Adults in the United States are at risk for developing chronic low back pain and the susceptibility rate is more than doubled for nursing professionals. Integrative yoga therapy is a non-pharmacological intervention that is gaining evidence-informed support. This first line of treatment is superior to other more invasive interventions such as taking opioids.

Approach to practice: The best practice recommendations in this thesis are constructed from the literature review conducted through PubMed with the terms “chronic pain” and “integrative therapies” used. The following filters were used, “clinical trial,” “review,” “free full text,” and “5 years.” Four articles were included in the literature review which is seen in chapter two of this thesis.

Outcomes: The evidence-informed best practice recommendations are for healthcare professionals to consider as a course of treatment to offer to individuals suffering from chronic low back pain prior to using a pharmaceutical approach. The recommendations are also for nurses to use for themselves to prevent/reduce chronic low back pain.

Conclusions: As more research is conducted on integrative yoga therapy, alterations in the recommendations can be made to help reduce/prevent chronic low back pain and improve overall quality of life.

Yoga and Its use in Treating Chronic Low Back Pain

CHAPTER 1

Introduction

Statement of Purpose

This thesis will create evidence-informed best practice recommendations for nurses who experience chronic back pain or who treat patients with it. Evidence addressing integrative treatments, specifically yoga, will be explored as an alternative to medications, such as opioids. The importance and prominence of chronic low back pain will be explored by conducting a review of recent literature on the topic. This thesis will also develop evidence-informed best practice recommendations and proposed implementation and evaluation of the recommendations.

Background of Issue Importance

Pain is a complex phenomenon that is theorized to be a response to an injury and/or an indicator of a disease process. There are a variety of ways to define pain including the duration (acute or chronic), neurophysiologic mechanisms (nociceptive or neuropathic), area effected, and etiology. Due to the intricacy of pain, many approaches may be considered for individuals because there is no standardized treatment that has been found to work for everyone. To prevent chronic pain, it is imperative to include timely and personalized care for those with acute pain.

In 1965, Ronald Melzack and Charles Patrick Wall, proposed the gate control theory of pain. This theory suggests that the spinal cord comprises a neurological “gate” that helps direct pain signals. According to McCance & Huether (2019), when painful stimulus occurs, pain signals are transmitted to the central nervous system by the primary neuron which is comprised of both “a” fibers and “c” fibers. Then in the substantia gelatinosa of the spinal cord, the primary neuron synapses with the secondary neuron. The path can be interrupted at the substantia

gelatinosa because it acts as a nerve gate, meaning that it either blocks the pain signals or allow them to continue to the brain. This mechanism is driven by small and large nerve fibers that sends the pain signal to two areas on the substantia gelatinosa. The two different areas either pass the information to the brain or inhibit the transmission of the sensory information (McCance & Huether, 2019).

The gate control theory of pain proposes that the brain plays a key part in pain perception instead of just passively receiving pain signals (McCance & Huether, 2019). It was also suggested that different psychological factors can inhibit the signals and ultimately alter the way that the body responds to the painful stimulation. Banth and Ardebil (2015) states that pain can be reduced by uncoupling the cognitive process from the physical sensation. The idea behind integrative theories is that if the processes in the brain can impact the way that pain is perceived, there is substantial potential to reduce pain.

Chronic pain is defined as a pain – either consistent or intermittent – lasting longer than three months and continuing well past the expected healing time. According to McCance & Huether (2019), pain is a poorly understood concept, and it is currently unpredictable if acute pain will develop into chronic pain. It is hypothesized that chronic pain is caused by a dysregulation of both the pain modulation processes and nociception; this is thought to be caused by alterations that can occur in the peripheral and central nervous systems. Studies have been conducted to assess these brain changes in patients with chronic pain and have found that these alterations may lead to cognitive deficits as well as a decreased capacity to handle the pain that they are experiencing (McCance & Huether, 2019).

The two main physiologic responses to chronic pain are dependent on whether the individual's pain is persistent or intermittent. McCance & Huether (2019) explains that when an

individual's pain is intermittent, the body's response mimics the response to acute pain and this includes increased pulse, increased respiration rate, elevated blood pressure, diaphoresis, and dilated pupils. When an individual is experiencing persistent chronic pain, the body can adapt, often resulting in fewer overt signs. Over time, patients with persistent chronic pain may develop different physiologic and behavioral changes. This may include – but is not limited to – depression, preoccupation with their pain, avoidance of stimuli that provokes their pain, and difficulty eating/sleeping. These patients are often believed to be faking their pain due because the pain is not able to be objectively assessed by health care providers and nurses. When these individuals are turned away by medical providers for complaints of pain, these individuals may turn to illicit opioid use to assist in their pain management (Casiano et al., 2020).

This thesis will mainly be focused on integrative yoga therapy. Chronic low back pain is a very common problem and often individuals with it receive opioids as a first line of treatment. This goes against the principle that “integrative nursing practice is informed augment healing, moving from least intensive by evidence and uses the full range of therapeutic modalities to support/ /invasive to more, depending on need and context” (Kreitzer & Koithan, 2014, p. 12). It would be ideal if before the opiates were prescribed if yoga or other integrative interventions were recommended first. As discussed in later chapters, it has been found that practicing yoga is an effective way to prevent/reduce chronic low back pain and improve quality of life. Yoga is a non-pharmacological intervention that focuses on body posture, regulating breathing, and relaxation (Patil et al., 2018).

The remainder of this thesis will focus specifically on chronic low back pain as it one of the leading causes for disability (Gedin et al., 2017). According to McCance & Huether (2019), individuals are at a higher risk of developing chronic low back pain if they have poor muscle

tone, are inactive, strain any of their muscles, and/or participate in sudden/vigorous exercises. There are two types of low back pain: specific and nonspecific. Specific low back pain is caused by an identifiable pathology, whereas nonspecific low back pain is not able to be attributed to a specific pathology. In a mindfulness study conducted by Luiggi-Hernandez et al. (2017), the study showed that most of the participants (older adults who suffered from chronic back pain) wanted to a reduce their fear of pain, to see pain differently, and reduce the consequences of pain in their life. This is significant because it shows that for patients with chronic pain it can be all-consuming for them and impact their overall quality of life. There are currently few integrative treatments that are known to reduce the chronic pain that these individuals suffer daily.

Significance of the Problem

Around the world, persistent lower back pain is the most common form of chronic pain and affects approximately 25% of people, or 1 in 4 adults (Cambron et al., 2017). Research conducted by Gedin et al. (2017), indicates that low back pain cost the society of Sweden approximately 860 million euros, which roughly equates to 1 billion dollars. In the United States this number is approximately 200 billion dollars annually and it was estimated that approximately 84% of that total cost was due to lost productivity (Saper et. al, 2017). This shows that when individuals suffer from chronic low back pain it clearly has a negative impact not only to themselves, but also on society.

Chronic low back pain is often treated with highly addictive pain medications, most commonly opioids. The use of this medicine is often the first line of defense in treating anyone with either acute or chronic pain (Volkow & Blanco, 2021). As previously mentioned, the best way to prevent and treat chronic pain is to prioritize timely, individualized care while patients are experiencing acute pain. Integrative therapies are often overlooked, despite evidence that these

modalities can decrease chronic low back pain (Ali & Katz, 2015). When integrative therapies are introduced to the plan of care, there has been evidence to show they can prevent and reduce pain. There is still further investigation and research that should be done to further understand the effectiveness of different integrative therapies. The goal is to find treatments that minimize pain with the hope that these treatments can be regularly implemented into patient education.

In recent years, there has been a vast increase in unnecessary opioid medications being prescribed to patients who experience chronic pain. According to Casiano et al. (2020), opioid medications have only demonstrated short-term benefits, can lead to addictive tendencies, and have undesirable side effects. Benyamin et al. (2008) states that some of the common side effects of opioid administration include “sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, and respiratory depression” (p. 1). Side effects from long term use of opioids include “tolerance, hyperalgesia, hormonal effects, and immunosuppression” (Benyamin et al., 2008, p. 2).

Patients who experience persistent pain are often undertreated when it comes to medications due to concerns and/or suspicions regarding abuse. According to (Volkow & Blanco, 2021), the challenge is trying to distinguish the difference between patients seeking pain relief and patients who are seeking the medication for other reasons. Benyamin et al. (2008), states that for patients with a previous history of prolonged opioid use will most likely develop a physical dependence on the drug. Even patients who have never taken opioids in the past can develop tolerance and become addicted.

Relevance to Nursing

Chronic low back pain is a problem seen in the general adult population but is also a major problem in the field of nursing because of the physical demands associated with patient

care. There is a high percentage of nursing professionals who also report experiencing chronic pain. According to Patil et al. (2018), 63-86% of nursing professionals suffer from chronic low back pain. This may be because chronic low back pain is multifactorial and the fact that nurses are required to perform many tasks that may cause strain on their back, such as lifting/transporting patients. This chronic low back pain can impact their quality of life, which in turn can lead to reduced productivity at work.

The integrative therapies that will be recommended in this thesis for chronic low back pain are evidence-informed and cost effective. This will allow for these therapies such as yoga, to be widely accessible for those to prevent—or minimize—chronic low back pain. The interventions that will be analyzed will also be simple enough so that individuals can incorporate them into their day-to-day life. For nursing professionals, these treatments can be recommended to their patients because of the simplicity of the interventions, or even used by the nurses themselves.

Summary

There is a great need to find effective integrative treatments that reduce chronic low back pain. One in four members of the adult population experience this ongoing pain and often, it negatively impacts their daily activities. Many individuals experience behavioral and physical changes such as depression and avoidance of pain-provoking stimuli, while others turn to opioids for pain relief, which only has short-term benefits and can have negative side effects. These changes can also lead to the abuse of these medications because of individual tolerances that may be developed if the medication is used for long periods of time. The following literature review analyzes research that supports integrative yoga as an intervention that reduces individuals chronic low back pain and can even help increase muscle tone.

CHAPTER 2

Review of Literature

Chapter two will investigate scientific literature that represents the current data that is available about integrative therapies for chronic low back pain. Reviewed articles address the use of integrative therapies for chronic low back pain in the general population as well as nurses and discuss how such therapies impact quality of life. In this search for research articles, the database PubMed was utilized. When looking for these sources, search terms “chronic pain” and “integrative therapies” were used. To further filter through the database, the following filters were used, “clinical trial,” “review,” “free full text,” and “5 years.” After placing all these search terms into PubMed, the following four peer-reviewed articles were selected. The literature will guide the development of the proposed best practice recommendations that will be presented in chapter three.

Integrative Therapies for Chronic Low Back Pain

Yoga for military veterans with chronic low back pain: A randomized clinical trial

In a study conducted by Groessl et al. (2017), the authors investigated if individuals with chronic low back pain could have improved health outcomes by performing yoga therapy. This randomized control trial was comprised of 150 military veterans from a Veterans Affairs Medical Center (VAMC) in California who suffered from chronic low back pain. Their mean age was 53 years old with an average of 15 years of chronic low back pain. Of the participants, 26% were females and 35% were unemployed or disabled. Participants were referred by clinicians from the VAMC and were notified by email, presentations, or word of mouth. These participants were divided into two main groups with one group completing integrative yoga therapy and another having the intervention delayed by 12 weeks; the purpose of having a group wait to do

the therapy was to have them act as a control group. These yoga classes occurred twice a week for 12 weeks and were led by a certified instructor. Participant attendance was verified using a sign-in sheet that the instructor confirmed.

To collect the data, the Roland-Morris Disability Questionnaire (RMDQ) was used to assess the participants at baseline, 6 weeks, 12 weeks, and 6 months. The authors used these scores to analyze participant health outcomes and measured their pain intensity using the short version of the Brief Pain Inventory, which is a scale from 0 (no pain) to 10 (worst pain imaginable). The authors utilized the Wilcoxon rank sum and Fisher's exact examinations to compare both the demographic and baseline clinical variables among the study groups (Groessler et al., 2017). To assess their primary and secondary outcomes they used version 3.3.0. of the statistical software R (Groessler et al., 2017). The authors found that yoga did lead to better health outcomes among the veteran community and that there was an overall decrease in pain intensity (Groessler et al., 2017). As noted by Groessler et al. (2017), for primary outcome, both study groups had significant reductions in RMDQ scores after 12-weeks with no significant differences in the groups; after six months there were significant differences between the groups that emerged

One thing that Groessler et al. (2017) pointed out that helps validate the reliance of the study was that there was an improvement in overall health outcomes despite the veterans in this study having less resources, worse health conditions, and more challenges getting to the classes than previous studies conducted. One thing that could be improved regarding the limitation of this study is that there was one instructor that led all the yoga intervention classes which could negatively impact the study's results, such as skew the attendance of the participants. A strength of this study is that the intervention was completed over the course of six months, helping to validate the long-term effectiveness of yoga on chronic low back pain.

Yoga, physical therapy, or education for chronic low back pain

In a randomized noninferiority trial conducted by Saper et al. (2017), researchers analyzed the effectiveness of yoga in individuals with mild to moderate chronic low back pain in comparison to physical therapy. This study also examined how yoga impacts patients with severe functional disability. There were 320 participants who were mainly low-income, racially diverse, that suffer from chronic low back pain. These participants were English speakers and ranged from 18 to 64 years old. Most of the selected participants were females, not college graduates, and earned less than \$30,000 annually (Saper et al., 2017). To be included they had to report experiencing chronic low back pain lasting at least 12 weeks and have had a least a pain level of 4 or higher, on a scale of zero to ten, in the week prior to the enrollment.

Once the participants were screened for their eligibility, they were placed into a data management platform called StudyTRAX. This software then randomly organized the patients into the different groups: yoga, physical therapy, and education (Saper et al., 2017). After all the pre-surveys were finished by the participants, they were then informed of which intervention they were to complete. The study consisted of a 12-week treatment phase and a 40-week maintenance phase. The yoga group did at least one 75-minute class a week with one of the 13 yoga instructors who were specially trained to teach classes for this population; the class sizes were always at a ratio less than five participants to one instructor. This group was also strongly encouraged to complete 30 minutes a day of home practice that was facilitated by a manual, DVD, and take-home yoga supplies. For the physical therapy group, they had to attend five 60-minute appointments over the course of the 12 weeks with physical therapists who had to complete eight hours of training (Saper et al., 2017). Individuals assigned to the education section received a book titled *The Back Pain Helpbook* which details chronic low back pain

self-management, stretching, strengthening, strengthening, as well as how fear and other emotions can lead to avoidance. Every three weeks they received a one-to-two-page newsletter summarizing the assigned chapters and a five-to-ten-minute check-in phone call with the staff.

From this study, Saper et al. (2017) found that for improving moderate to severe nonspecific chronic low back pain, yoga was found to have similar effectiveness as physical therapy. Both the yoga and physical therapy groups were found to have a greater improvement in function and pain compared to the participants in the education group; the yoga and physical therapy individuals were also more likely to stop their pain medications than those in the education group. A very large strength of this study is that at the one-year mark, the improvements that were seen in the yoga and physical therapy groups were maintained. One weakness is that the follow-up for the physical therapy group was not the same as the other two intervention groups. Saper et al. (2017) concluded that a structured yoga program for individuals with chronic low back pain is an effective alternative to physical therapy contingent on the availability, cost, and ultimately patient preference.

A randomized trial comparing effect of yoga and exercises on quality of life in among nursing population with chronic low back pain

In a randomized trial conducted by Patil et al. (2018), the authors analyzed the differences between integrative yoga therapy and physical exercise. This study included 88 female nursing professionals from South India. These women were carefully selected from 176 nurses diagnosed with chronic back pain and were referred to the study by an orthopedician. This study was a single-blind design, meaning that the participants were split into two groups of 44, with one half assigned to do yoga and the other half assigned to a control group that completed physical exercises. The mean age of these groups was 31.45 ± 3.47 and 32.75 ± 3.71 ,

respectively. Both groups completed their respective interventions for one hour a day, five days a week, for six weeks. The yoga therapy participants completed was an integrative approach focused mainly on asanas (body posture), pranayama (regulating breathing), and relaxation. Meanwhile, the control group completed physical exercises of a similar intensity as the yoga group. Although both groups were assigned to do a set number of hours of their intervention, there was nothing stated in the article regarding how the authors kept track of the participants' compliance with their assigned intervention.

One of the aims of this study was to see how the interventions impacted the participants' quality of life. To determine this, they had participants take the World Health Organization Quality of Life-brief questionnaire (WHOQOL-BREF) two different times; the first being on day one of the interventions, and after the six weeks had passed (Patil et al., 2018). This questionnaire measures individuals' perception of their quality of life using four different categories: physical health (seven items), psychological health (six items), social relationships (three items), and environmental health (eight items). It also includes two questions: one for "general health" and one for "overall quality of life." Upon analyzing the data from the WHOQOL-BREF surveys, the results for both the yoga and control groups suggest significant improvement in physical, psychological, and social health with no significant difference for the environmental category (Patil et al., 2018). Looking at the preintervention data, there was no statistically significant difference between the two groups in the WHOQOL-BREF surveys, with an even baseline for all four of the domains. When looking at the postintervention data, the yoga group scored significantly higher than the control group in the physical, psychological, and social health domains (Patil et al., 2018).

According to Patil et al. (2018), yoga is an integrative and therapeutic tool that is a

practical and reasonable intervention for helping improve an individual's QOL, specifically in the domains of physical, psychological, and social health. The main limitation of this study was that it did not address how the authors ensured the compliance of the participant to their respective interventions. The strengths of this study include that none of the participants dropped out of the study and there was a good sample size of 88 women.

Yoga compared to non-exercise or physical therapy exercise on pain, disability, and quality of life for patients with chronic low back pain: A systematic review and meta-analysis of randomized controlled trials

In the systematic review and meta-analysis conducted by Zhu et al. (2020), the authors compiled 18 different randomized control trials to analyze the effects of yoga on chronic low back pain, specifically at different follow up points in comparison to other physical therapy exercises. Studies were only eligible if they assessed one of the following important outcomes: pain, back-specific disability, and quality of life. This study only included randomized control trials that focused on nonspecific back pain lasting for at least three weeks and that had a participant age of 18 or older with no gender limitations (Zhu et al., 2020). At the start of the research, it was established the data was to be collected by two independent reviewers who would then they came together to reach a consensus; if there was a disagreement that was unable to be resolved, a third reviewer would make the final decision.

Initially, they collected 549 randomized control trials from different databases and when the duplicates were removed, they were left with 217 articles. When all the exclusion aspects were assessed from the abstract, 173 of them were removed, leaving 26 articles. Upon fully reading the remaining 26, only 18 of them fit the criteria they established (Zhu et al., 2020). The 18 studies publish date ranged from 2004-2019 and the interventions ranged from 7 days to 24

weeks. Of the established 18 randomized control trials, 13 of them compared yoga to a non-exercise control group, eight of them compared yoga to traditional physical therapy and exercise, with three of the articles falling into both categories. There were 17 of the randomized control trials that measured pain intensity, six looked specifically at disability that could be caused by pain, and four assessed the quality of life (Zhu et al., 2020). The Cochrane risk bias tool was used to assess the bias of the randomized control trials; this tool showed that the main weakness of the studies included stemmed from the blinding method process. This is because each group knew what intervention they were completing which caused the quality of evidence to be rated from very low to moderate (Zhu et al., 2020).

When analyzing the 18 articles they explored at how yoga affects pain relief. There were two categories of articles: yoga versus a non-exercise control group and yoga versus physical therapy exercise. There were 12 studies that focused on the effects of yoga on pain compared to a non-exercise control group and there was a total of 2,590 participants in the studies with 1,360 participants being in the intervention groups (Zhu et al., 2020). It was found in these studies that yoga can significantly reduce pain at 4-8 weeks, 3 months, and 6-7 months, but at 12 months there was no statistically significant difference between the pain level of the two groups. Nine of the studies analyzed the effects of yoga on pain compared to physical therapy exercises with a total of 1,466 participants, 738 of them being in the yoga groups and 728 of them in the physical therapy groups (Zhu et al., 2020). It was found after 7 days that yoga significantly reduced pain compared to physical therapy exercise, but there was no significant difference between the groups in the categories of 4-10 weeks, 3 months, and 6 months (Zhu et al., 2020).

In their article, Zhu et al. (2020) also looked at how yoga can impact changes in disability. There were 11 randomized control trials that compared yoga to non-exercise to

investigate the impacts of yoga on disability. Upon analysis, it was found that in disabled patients, yoga was statistically more effective than non-exercise at 4-8 weeks, 3 months, 6 months, and 12 months. Six of the studies investigated the impact of yoga on disability changes compared to physical therapy exercise. The results showed that there was no statistical difference in the RMDQ scores between the two types of groups at 6 weeks, 3 months, and 6 months (Zhu et al., 2020).

The last category they looked at was the effect of yoga on quality of life. For the category of yoga versus non-exercise there were six randomized control trials that fell under this category; the results showed yoga had the same effect on the physical and mental quality of health as non-exercise (Zhu et al., 2020). When analyzing the yoga versus physical therapy articles, there was also no significant difference in physical or mental quality of life at 3 months and 6 months between the groups (Zhu et al., 2020).

This study concluded that yoga may reduce pain from short-term to intermediate-term and comparatively with non-exercise. Although there seems to be a minimal difference between yoga and other means of moving, the important thing to remember is that with all the interventions and controls improvement occurred in the areas of reducing pain, functional disability, and quality of life. A strength of this study is that it contained 18 different randomized control trials with thousands of participants; one of the main weaknesses of this systematic review was that it did not take into consideration things such as yoga type, yoga frequency/length, age, and gender.

Conclusion

There is a high percentage of the adult population and nursing population who suffer from chronic low back pain. Integrative therapies have been shown to prevent the onset of low

back pain and reduce the severity if/when this pain occurs. The research shows that yoga and physical therapy can lessen pain and increase overall quality of life, with yoga most often being the more cost effective and more widely available. There are still gaps in the knowledge regarding chronic low back pain and integrative therapies that help prevent and reduce the pain. Although there have been many studies regarding yoga and its' connection to reducing chronic low back pain, there may still be inaccuracies in the research due to studies' inability to concealing intervention group assignment participants and research staff. Further research should be conducted on other modalities of integrative therapies for chronic low back pain, but it has been consistently found that yoga is an effective therapy to help in these areas. There also needs to be further research in the nursing population to analyze ways that the workplace can be improved to minimize the occurrence of chronic low back pain and implement yoga for nurses to both prevent and reduce the severity of chronic low back pain.

CHAPTER 3

Best Practice Recommendations: Yoga and its Use in Treating Chronic Low Back Pain

Chronic pain is a complex phenomenon and can lead to a decreased quality of life due to severe pain and/or disabilities. The most common chronic pain is low back, and this impacts approximately 25% of the general adult population (Cambron et al., 2017). According to Patil et al (2018), this percentage is approximately 63-86% in nursing professionals. Chronic low back pain is also the leading cause of disability in the United States and costs the United States more than 200 billion dollars annually (Saper et. al, 2017). Clearly, chronic low back pain is very prevalent and impacts the lives of millions of individuals.

In treating chronic low back pain there has been an increase in the prescribing of opioids. According to Volkow & Blanco (2021), the recent opioid epidemic is one of the largest public health crises in United States History. Unfortunately, about 10% of individuals prescribed opioids develop an opioid use disorder. As more of these opiates are prescribed, the number of individuals being exposed to opioids is rapidly increasing. Focusing on integrative therapies and utilizing best practice recommendations (see Table 1) before prescribing opiates will lead to a reduction in the risk of addiction from these medications. The main integrative therapy focused on in this thesis is yoga. Yoga is a practice that incorporates physical postures, breath control, and meditation and has shown to have other positive effects on individuals, such as reducing depression and anxiety (Saeed et. al, 2019).

Table 1

Best Practice Recommendations for Integrative Therapies for Individuals with Chronic Low Back Pain

Recommendation	Rationale	Reference	Level of Evidence
Attend yoga classes for 6-12 weeks	After 6-12 weeks improvements in physical, physiological, and social domains categories of quality of life can be seen.	Groessl, E. J., Liu, L., Chang, D. G., Wetherell, J. L., Bormann, J. E., Atkinson, J. 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	Level II
		Patil, N., Nagaratna, R., Tekur, P., Manohar, P., Bhargav, H., & Patil, D. (2018). A randomized trial comparing effect of yoga and exercises on quality of life in among nursing population with chronic low back pain. <i>International Journal of Yoga</i> , 11(3), 208. https://doi.org/10.4103/ijoy.ijoy_2_18	Level II
		Saper, R. B., Lemaster, C., Delitto, A., Sherman, K. J., Herman, P. M., Sadikova, E., Stevans, J., Keosaian, J. E., Cerrada, C. J., Femia, A. L., Roseen, E. J., Gardiner, P., Gergen Barnett, K.,	Level II

Participants should attend yoga classes anywhere from 1-5 times a week	Yoga leads to better health outcomes and can decrease pain intensity	<p>Groessl, E. J., Liu, L., Chang, D. G., Wetherell, J. L., Bormann, J. E., Atkinson, J. 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.</p> <p>https://doi.org/10.1016/j.amepre.2017.05.019</p>	Level II
		<p>Patil, N., Nagaratna, R., Tekur, P., Manohar, P., Bhargav, H., & Patil, D. (2018). A randomized trial comparing effect of yoga and exercises on quality of life in among nursing population with chronic low back pain. <i>International Journal of Yoga</i>, 11(3), 208.</p> <p>https://doi.org/10.4103/ijoy.ijoy_2_18</p>	Level II
		<p>Saper, R. B., Lemaster, C., Delitto, A., Sherman, K. J., Herman, P. M., Sadikova, E., Stevans, J., Keosaian, J. E., Cerrada, C. J., Femia, A. L., Rosen, E. J., Gardiner, P., Gergen Barnett, K., Faulkner, C., & Weinberg, J. (2017). Yoga, Physical Therapy, or Education for Chronic Low Back Pain: A Randomized Noninferiority Trial. <i>Annals of internal medicine</i>, 167(2), 85–94. https://doi.org/10.7326/M16-2579</p>	Level II

Yoga classes should be led by a certified instructor	Improvement in overall health outcomes and reduced pain intensity.	<p>Groessl, E. J., Liu, L., Chang, D. G., Wetherell, J. L., Bormann, J. E., Atkinson, J. 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.</p> <p>https://doi.org/10.1016/j.amepre.2017.05.019</p> <p>Saper, R. B., Lemaster, C., Delitto, A., Sherman, K. J., Herman, P. M., Sadikova, E., Stevans, J., Keosaian, J. E., Cerrada, C. J., Femia, A. L., Roseen, E. J., Gardiner, P., Gergen Barnett, K., Faulkner, C., & Weinberg, J. (2017). Yoga, Physical Therapy, or Education for Chronic Low Back Pain: A Randomized Noninferiority Trial. <i>Annals of internal medicine</i>, 167(2), 85–94. https://doi.org/10.7326/M16-2579</p>	Level II
Physical therapy may also be an effective intervention for individuals with chronic low back pain	There were improvements seen in the areas of reducing pain, functional disability, and improving overall quality of life.	<p>Zhu, F., Zhang, M., Wang, D., Hong, Q., Zeng, C., & Chen, W. (2020). Yoga compared to non-exercise or physical therapy exercise on pain, disability, and quality of life for patients with chronic low back pain: A systematic review and meta-analysis of randomized controlled trials.</p>	Level I

		<i>PLOS ONE</i> , 15(9). https://doi.org/10.1371/journal.pone.0238544	
Home practice is an effective option if the right resources are given	Improvements were maintained at one year for patients assigned to home practice.	Saper, R. B., Lemaster, C., Delitto, A., Sherman, K. J., Herman, P. M., Sadikova, E., Stevans, J., Keosaian, J. E., Cerrada, C. J., Femia, A. L., Roseen, E. J., Gardiner, P., Gergen Barnett, K., Faulkner, C., & Weinberg, J. (2017). Yoga, Physical Therapy, or Education for Chronic Low Back Pain: A Randomized Noninferiority Trial. <i>Annals of internal medicine</i> , 167(2), 85–94. https://doi.org/10.7326/M16-2579	Level II

Summary of Best Practice Recommendations

As stated previously, there is large presence of chronic low back pain in the adult population and a high rate of opioid abuse (Cambron et al., 2017). Thus, there is a high need for integrative therapies to be implemented into healthcare practices. The evidence-informed best practice recommendations presented in Table 1 were developed through the analysis of the articles reviewed in chapter two of this thesis. These guidelines have been shown to be effective ways of reducing chronic low back pain and increasing quality of life.

The studies analyzed all had positive outcomes by using different spans of yoga classes as well as varying periods of time that the interventions were completed over time. The best practice ranges in the table above were developed because every study included in this thesis showed that practicing yoga can reduce the impediments from chronic low back pain. This demonstrates that there is not just one way to perform yoga that is effective in reducing chronic low back pain and there are a variety of and “doses” of yoga that work.

The recommendations presented in this thesis have the possibility to radically change the way that chronic low back pain is treated. It is important that individuals check with their provider to ensure the intervention is appropriate for them. These recommendations provide an integrative alternative to prescribing opiates that could be implemented in many settings such as acute, outpatient settings, and within the community.

CHAPTER 4

This chapter will discuss the theoretical implementation and evaluation of evidence-informed interventions for individuals with chronic low back pain. The target population that this intervention will be focused on is nurses. As discussed in the previous chapters, many adults in the United States have chronic low back pain, and that number is more than doubled among nursing professionals. This population was chosen because it is important to make nurses aware of their risk of developing chronic low back pain and ways they can prevent or reduce. When starting this evidence informed intervention, it will be targeted towards new graduates during their orientation. Informing them at the beginning of their career and giving them the proper tools can help these individuals prevent the development of chronic low back pain. Once the intervention has been tested on a smaller scale, it would be evaluated to see if it could be adapted as a module or mandatory class for all nurses at the chosen hospital.

Plan-Do-Study-Act Framework

The Plan-Do-Study-Act model from the Institute for Healthcare Improvement will be used as the foundational framework for this thesis (IHI - Institute for Healthcare Improvement, 2021). The four components are a model for improvement and creating a scientific method that can be used for action-oriented learning. The remainder of this chapter breaks down the different components of the model and will discuss how they would be implemented and evaluated. See Figure 1 for a visual of the Plan-Do-Study-Act framework.

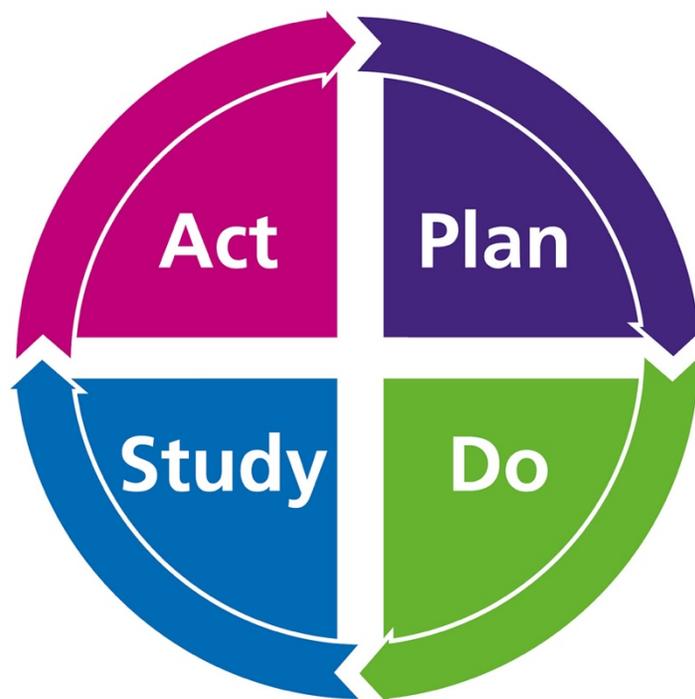


Figure 1. Components of the Plan-Do-Study-Act Framework (IHI - Institute for Healthcare Improvement, 2021).

I. Plan

The overarching goal is that nurses would use yoga as a form of self-care to help prevent chronic low back pain. To start, the population would be new graduate nurses who would be taught yoga poses during their new graduate orientation that have been shown to prevent/reduce chronic low back pain. They will be required to practice yoga for an allotted time span, and complete surveys before and after the intervention period to assess if their levels of pain changed over the intervention period.

To implement this evidence-informed intervention, there needs to be a team assembled to help get this program implemented in a hospital. Then a hospital needs to be identified to host the proposed program and once this is done, it would be imperative for a structured plan to be put in place. In developing this plan, it is important to identify who, what, when, where, and

what data needs to be collected to evaluate the newly implanted program. At the hospital identified, the new graduate nursing manager will need to be contacted and the vision of the plan would need to be communicated to them – human resources may also need to be involved to ensure that this intervention could work logistically from the hospital standpoint. The team would then have to identify a certified yoga instructor to assist individuals with chronic low back pain and pay them appropriately. The intervention would take place during the new graduate nurses' orientation and would be one of the activities that they complete. It would take about an hour out of the existing orientation itinerary but could have a lasting impact on the health of their employees. The data that would need to be collected would be focused on the nurses' pain level and wellbeing in the categories of physically, mentally, and emotionally.

The objective of this plan is to have nursing professionals incorporate yoga into their lives in hopes of preventing/reducing chronic low back pain. From the evidence seen in the articles previously analyzed, the prediction is that yoga would help improve quality of life and reduce chronic low back pain. The hope is once the new graduates learn the importance and effectiveness of this integrative therapy, they will pass the information on to their patients as well as their peers.

II. Do

When this intervention is first implemented in the hospital, it would be trialed with a group of new graduated nurses. During the new graduates' orientation to the hospital, there would be a session that focuses on self-care, with the main intervention recommended being yoga. During this session it would be important for the new nurses to be advised of the research evidence supporting the benefits of yoga-this could be done by a nurse leading the session who is familiar with the evidence. The reason this would be taught is because it would be beneficial for

the new nurses to understand their risk of developing chronic low back pain and how yoga can help prevent it. First, they would be given a pre-survey on the day of orientation to establish their baseline pain level and their wellbeing physically, mentally, and emotionally. The questions would be ranked on a scale of 1-10, with one being the negative end of the scale and ten being the positive end. The five questions that would be asked on the survey would be:

- “How would you rate your pain at rest?”
- “How would you rate your pain with movement?”
- “How would you rate your physical health?”
- “How would you rate your mental health?”
- “How would you rate your emotional health?”

Next a certified yoga instructor would come in and walk them through yoga positions that have been found effective in reducing back pain. Following this session, the new graduates would be asked to verbalize or demonstrate five positions that they learned from the session. It would be required for the new graduates to complete yoga one hour a day, two days a week, for 8 weeks; they would have to attend the classes at the hospital and their time would be incorporated into the new graduate schedule. They would also have a short journal submitted weekly about how they feel physically, mentally, and emotionally. At the end of the 8 weeks the new graduates would have to complete a post-survey that had the same five questions as the pre-survey to assess any changes that occurred. There would be additional surveys conducted with the same questions at 1 month, 3 months, 6 months to see how their pain is impacted over time; there would also be a free response question asking if the individuals kept practicing yoga or any other forms of self-care after the intervention period. In their final survey 6 months after the end

of the interventions, there would be three free response questions: what went well, what could be improved, and any additional comments.

III. Study

To ensure that this intervention is as effective as possible, it is important to set time aside to investigate the data and study the outcomes. The five questions that would be asked on the surveys that the individuals took before/after the intervention as well as the ones taken at the 1 month, 3 months, and 6 months mark would be analyzed. There would be comparisons made and based on the data there would be summarizations of how effective this intervention was for the new graduate nurses.

IV. Act

If the program was successful and had positive outcomes, then there would be a standardized program developed from the feedback received. The hope is that in the future this would be extended past the new graduate nurses and made a mandatory module or class for all nursing staff at a hospital. The long-term goal is that leadership at different hospitals will adopt this into their facilities and embed this as part of their education for new and current nurses.

Strengths, Limitations, and Recommendations for Future Research

This thesis has a review of articles that vary in levels of evidence and range from a randomized control trial with a sample size of 88 to a meta-analysis that reviewed 18 articles totaling 2,590 participants. The articles did conclude that yoga does reduce pain and improve quality of life. A limitation of this thesis is that the best practice recommendations presented in the thesis are supported by four articles leading them to be evidence-informed as there is not enough evidence for it to be categorized as evidence-based. Another prevalent limitation is that in the literature analyzed, there were variations in the styles of yoga therapies that were

completed. More research needs to be completed regarding the yoga practices and how it can impact chronic low back pain. Due to the studies' inability to have blinded groups, it was challenging for the authors to see the true effectiveness of yoga as compared to other control groups. Finally, further studies should be done to assess which styles of yoga are most effective in reducing pain and increasing quality of life.

Summary

This thesis has developed evidence-informed best practice recommendations from a literature review that was conducted. These recommendations are for individuals who struggle with chronic low back pain as well as for nurses to help prevent/reduce this chronic back pain. The suggestions in chapter three are also for healthcare professionals to consider as a course of treatment that can be offered to individuals with chronic low back pain prior to using a pharmaceutical approach. Yoga has the potential to change the lives of many who struggle with chronic low back pain such as adults in the United States and nursing professionals. As there is further research conducted, the hope is that there will be a greater awareness of yoga and its use in treating chronic low back pain.

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Appendix: Levels of Evidence

Level of Evidence	Description
Level I	Evidence from a systematic review or meta-analysis of all relevant RCTs
Level II	Evidence obtained from well- designed RCTs
Level III	Evidence obtained from well- designed controlled trials without randomization
Level IV	Evidence from well-designed case control and cohort studies
Level V	Evidence from systematic reviews of descriptive or qualitative studies
Level VI	Evidence from single descriptive or qualitative studies
Level VII	Evidence from the opinion of authorities and or reports of expert committees

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