

5-9-2018

The Effect of Algorithm Implementation in the Family Practice Setting on the Pain and Recovery of Acute Low Back Pain Patients

Joan Caito

Valparaiso University, joan.caito@valpo.edu

Follow this and additional works at: <https://scholar.valpo.edu/ebpr>

 Part of the [Family Practice Nursing Commons](#), [Occupational and Environmental Health Nursing Commons](#), and the [Primary Care Commons](#)

Recommended Citation

Caito, Joan, "The Effect of Algorithm Implementation in the Family Practice Setting on the Pain and Recovery of Acute Low Back Pain Patients" (2018). *Evidence-Based Practice Project Reports*. 118.

<https://scholar.valpo.edu/ebpr/118>

This Evidence-Based Project Report is brought to you for free and open access by the College of Nursing and Health Professions at ValpoScholar. It has been accepted for inclusion in Evidence-Based Practice Project Reports by an authorized administrator of ValpoScholar. For more information, please contact a ValpoScholar staff member at scholar@valpo.edu.



VALPO

**THE EFFECT OF ALGORITHM IMPLEMENTATION IN THE FAMILY PRACTICE SETTING
ON THE PAIN AND RECOVERY OF ACUTE LOW BACK PAIN PATIENTS**

by

JOAN CAITO

EVIDENCE-BASED PRACTICE PROJECT REPORT

Submitted to the College of Nursing and Health Professions

of Valparaiso University,

Valparaiso, Indiana

in partial fulfillment of the requirements

For the degree of

DOCTOR OF NURSING PRACTICE

2018

J. Caito *4/27/18*

Student Date

Christine P. Kutz *5/9/18*

Advisor Date



**Copyright by Joan Caito 2018. This work is licensed under a
Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.**

DEDICATION

I would like to dedicate this EBP project to my family. They have seen me through the most difficult times of my life. Without their love and support, I would be lost. I also would like to dedicate this to those who have helped and encouraged me along the way, especially those who believed in me before I believed in myself.

ACKNOWLEDGMENTS

It was never a long-term goal of mine to apply to graduate school and earn my DNP. I can only conclude it is God's will that I accomplish this. The best parts of ourselves are reflections of Him and I hope to use this gift to serve others.

I would like to thank my advisor, Dr. Kurtz, in a special way for all her patience and expertise throughout this project. I would also like to thank the faculty of Valparaiso University: I can say without hesitation that their professionalism and enthusiasm in teaching has been inspirational to me. As well, special thanks go to the Newport, MI clinical site for allowing me to work with them and their patients to implement this project.

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
DEDICATION.....	iii
ACKNOWLEDGMENTS.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES.....	vi
ABSTRACT.....	vii
CHAPTERS	
CHAPTER 1 – Introduction	1
CHAPTER 2 – Theoretical Framework and Review of Literature	5
CHAPTER 3 – Implementation of Practice Change	34
CHAPTER 4 – Findings.....	45
CHAPTER 5 – Discussion.....	51
REFERENCES.....	60
AUTOBIOGRAPHICAL STATEMENT.....	64
ACRONYM LIST.....	65
APPENDICES	
APPENDIX A –Acute Low Back Pain Algorithm.....	66
APPENDIX B –Code Sheet.....	69
APPENDIX C – Oswestry Disability Index.....	70
APPENDIX D – Visual Analog scale.....	76
APPENDIX E – PHQ2/PHQ9.....	77
APPENDIX F – Waddell’s Sign.....	79
APPENDIX G – Demographics Characteristics Sheet.....	81
APPENDIX H – Patient Education Brochure.....	83

LIST OF TABLES

<u>Table</u>	<u>Page</u>
Table 2.1 Review of Literature and Appraisal Results	18
Table 4.1 Demographics Characteristics	45
Table 4.2 ANOVAs with Means and Standard Deviations for ODI and VAS.....	47
Table 4.3 ODI, VAS Post Hoc Paired t Tests Outcomes	48

ABSTRACT

Nearly \$86 billion is spent annually in healthcare costs for Americans with low back pain (Lee, McAuley, Hübscher, Allen, Kamper, Moseley, 2016). Additionally, the burden on the economy due to loss in productivity incurs approximately \$114 billion dollars of lost revenue annually (Lee et. al., 2016). Patients with an acute low back injury inadequately treated may become a chronic issue. Only 50% of patients who experience back pain symptoms for 12 months will return to work (Petit, Fouquet, & Roquelaure, 2015). The purpose of this project will be to implement an evidence-based algorithm to standardize acute low back pain care for providers in a family practice clinic, improve patient recovery outcomes thus preventing chronic back pain. The inclusion criteria for the project are patients at a family practice clinic with an acute low back pain episode presenting within 4 weeks of onset. They must be ages 18 years or older and non-pregnant. An algorithm created from current, high quality clinical guidelines will be implemented for patients presenting with initial onset of acute low back pain by each provider in the clinic to assure continuity of care. Patients' response in pain and function improvement will be measured using of the Visual Analog Scale and Oswestry Disability Index via telephone interview on a weekly basis for an eight-week duration or until patient reports return to baseline. A primary aim to prevent acute episodes from becoming chronic issues is utilizing the highest level of evidence-based practice for assessment, treatment, and evaluation (Goertz et. al., 2012). Results demonstrated the use of the standardized algorithm can improve outcomes among patients with acute low back pain in the primary care setting. Replication of this EBP project has been adopted by the project site facility.

CHAPTER 1

INTRODUCTION

Background

Low back pain is one of the most common healthcare issues. In a 3-month period, more than one fourth of the population experiences at least one day of back pain according to the National Institute of Health (National Institute of Health, 2016). Additionally, back pain is rated globally as one of the 10 greatest disease burdens due to its potential for long-term disability (Steffens et. al., 2015). Nearly \$86 billion dollars are spent annually in healthcare costs for Americans related to low back pain. The economic burden is furthered by loss in productivity from inability to work due to back pain. Approximately \$114 billion dollars of revenue are lost a year in the United States alone. (Lee et. al., 2016). The goal of primary care providers when presented with a patient suffering from acute low back pain is to diagnose, treat, and manage patients to prevent the condition from turning into a chronic ailment (Mehling, Ebell, Avins & Hecht, 2015). Consequentially, these actions have the capacity to relieve the massive financial strain on the economy.

Statement of the Problem

Data from the Literature Supporting Need for the Project

While current research indicates that there is no risk factor which is consistently linked as the predictor of first time lower back pain, a one-time prior acute injury is a predictor of future low back pain incidents (Steffens et. al., 2015). Past research suggests long-term repetitive exposure of physical risk factors such as heavy lifting and awkward bending positions as the cause of low back pain (Steffens et. al., 2015). More recent crossover study findings suggest that even brief exposure to heavy lifting or awkward bending can result in moderate to severe injury to the back. Additionally, psychological factors of stress and fatigue triple the odds of developing immediate pain after experiencing a physical risk exposure (Steffens et. al., 2015).

Low back pain is the leading cause of disability globally (Steffens et. al., 2015). While the literature suggests (Petit et. al., 2015) that an estimated 60-70% of patients with acute low back pain recover in 6 weeks and nearly 80-90% after 12 weeks, recovery past this point is slow and not guaranteed. Even more concerning, individuals with an injury which becomes chronic and lasts longer than 12 months have only a 50% rate of ever returning to work (Petit et. al., 2015). Chronic low back pain also has psychological impacts on quality of life such as depression, social isolation, pain catastrophizing, fear-avoidance beliefs, low self-esteem and poor confidence for managing pain (Petit, Fouquet, & Roquelaure, 2015). Therefore, prevention of future injuries after an acute episode is beneficial to reduce the chance of a chronic issue. To do this, the highest level of evidence-based practice for assessment, treatment, and evaluation of acute back pain is required and regarded a primary aim for decreasing the possibility of progression to chronic low back pain (Goertz et. al., 2012).

Though it is common for people to recover spontaneously from acute back pain in 6-8 weeks' time with or without medical intervention (Mehling et. al., 2015), speeding up recovery time as well and allowing the patient to return to preinjury level of function in their daily life activities is the ideal course of action (Mehling et. al., 2015). Primary care physicians are the first line of defense in the prevention of chronic low back pain issues by the accurate assessment and quality treatment of acute episodes. There exists a plethora of clinical guidelines easily accessible to direct the plan of care (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Quaseem et. al., 2016; Slade et. al., 2016; Snow et. al., 2016). While this is beneficial for both the provider and patient, in the clinical setting where multiple providers assume care of the patient, the continuity of care can be disrupted when professionals choose to use contrasting guideline recommendations. A need for streamlined guidelines built on the most current, high level quality of evidence will allow for quicker recovery times and accurate measurement of interventions for patients suffering with acute low back pain (Goertz et. al., 2012).

Data from the Clinical Agency Supporting Need for the Project

At the clinical agency for this project, there are two physicians and one nurse practitioner providing primary care. While each new patient accepted by the practice is assigned to a specific provider, it is not uncommon for providers to see one another's patients based on the volume of appointments and limited scheduling slots. A need exists for a congruent plan of care which is followed by each of the providers resulting in cohesive transition from one provider's care to another's without compromising the patient's treatment plan and reevaluation. According to the doctor of osteopathic medicine at the clinic (N. Boggs, personal communication, August 15, 2017), between the three providers, approximately 15 patients presenting with new onset of acute low back pain schedule appointments at the clinic on a weekly basis. Currently providers are using their personal knowledge to create care plans for patients with each provider's opinions on interventions varying. This project will provide a protocol for patients with acute low back pain using the most current evidence-based practices found in the literature and integrate consistent care practices clinic wide.

Purpose of the Evidence-Based Practice Project**Compelling Clinical Question**

The clinical question the project addresses is: what is the best way of assessing, treating and reevaluating acute low back pain to provide the highest rates of pain reduction and return of mobility function? An extensive search and appraisal of the most current high-quality literature allows for an evidence based protocol to be constructed and utilized in the clinic.

PICOT Question

A PICOT question used in nursing to formulate a question in evidence- based practice (EBP) (Dearholt & Dang 2012). PICOT is an acronym which stands for: population, intervention, comparison, outcome, and time. Therefore, the PICOT question for this project is: What is the effect of an EBP algorithm for (I) assessing, treating and reevaluating acute low back pain in (P) patients ages 18 years and older presenting with an initial episode of acute low back pain in the

primary care setting comparing (C) progress weekly from baseline presentation (O) reduce pain levels and restore mobility function over a (T) eight-week period?

Significance of the EBP Project

In the clinical setting for this project, providers are not performing identical assessment procedures, advising their patients on the same treatment recommendations nor reevaluating the patient's progress at follow up visits using identical clinical tools. This poses a threat to quality care of the individuals seen in the agency for acute low back pain, especially when patients are scheduled with different providers in the practice when they call for appointments.

To rectify the problem, a protocol will be developed. The first goal is to formulate an assessment guide with specific questions to be addressed. This allows for a clear and concise understanding of the problem at visit presentation and most importantly, identifies any "red flag" symptoms which would warrant emergent care to prevent permanent injury. Next the patient will be provided a treatment plan which follows the most current high quality evidence based guidelines to improve acute low back pain outcomes. The plan will be explained, understood, and accepted among all three of the providers so that continuity of care would be maintained as the patient presents for follow up appointments. Finally, implementation of the two evaluation tools as protocol will provide accurate assessment of the treatment plan for reduction of pain and return of mobility function in reevaluation follow-up appointments.

Therefore, the objective of the project is to improve patient outcomes of function mobility and decreased pain levels in those presenting with acute low back pain in the primary care setting by development of a protocol algorithm using EBP found in the literature as a guide for providers to assure continuity of care.

CHAPTER 2

THEORETICAL FRAMEWORK, EBP MODEL, AND REVIEW OF LITERATURE

Theoretical Framework

Overview of Theoretical Framework

Comfort Theory was developed by Katharine Kolcaba in 1994. She defined comfort as "the immediate state of being strengthened through having the human needs for relief, ease, and transcendence addressed in four contexts of experience" (Kolcaba, 2003, p. 251). According to Kolcaba, when a human achieves comfort holistically the physical, psychospiritual, social, and environmental aspects of a person's life are also positively affected. Prior to reaching comfort, the initial patient/provider interaction must take place. Kolcaba's conceptual framework begins at this first interaction, with the patient seeking comfort in the presence of a healthcare deficit. In most scenarios, this deficit is related to pain or disability. This comfort seeking behavior is then met by the provider, who implements interventions according to the individual's needs (Kolcaba & DiMarco, 2005).

The first form of comfort for the patient to attain is "relief." This comfort is experienced when the interventions provided decrease pain. A common mental picture Kolcaba uses to demonstrate this concept is that of a post-operative patient receiving anesthesia. The medication delivers, in many cases, instant reprieve from the suffering of post-surgical pain, thus offering relief (Kolcaba, 2003).

With the comfort form of relief met, the second form of comfort, "ease," is sequentially experienced. Looking at the post-operative patient example once more, relief from a proximate cause of distress, pain, has resulted in decreased anxiety, worry, and stress in the patient now managing long-term recovery. These abstract sources of distress, when removed, result in a patient being at ease returning to their regular processes (Kolcaba, 2003).

Finally, with relief and ease successfully reached, the patient can proceed into Kolcaba's third form of comfort: transcendence. Transcendence is the self-efficacy to move past an immediate comfort need; the ability to "rise above" one's hardships experiencing short term traumas one understands are necessary to result in long term positive outcomes. Once more using Kolcaba's post-operative example, transcendence is when the patient, given education, develops the mental fortitude to cope with the difficulties of physical therapy understanding that long-term benefits of motor function restored will bring a higher quality of life (Kolcaba & DiMarco, 2005).

With the three forms of comfort met, patients are physically, socially, environmentally and psychospiritually strengthened. The patient is then able to begin seeking internal and external health behaviors which promote optimal wellness (Kolcaba & DiMarco, 2005). This step in the theory can be defined as more immediate movements towards recovery. External behaviors such as beginning ambulation or participating in therapeutic exercises are an example of health seeking behaviors. Internal behaviors may be described as a mental openness and eagerness for education or discharge planning for increased quality of life after direct medical care ends (Kolcaba & DiMarco, 2005).

The last and final step of Kolcaba's theory is to extends past the individual patient experience into the healthcare providing institution's integrity (Kolcaba & DiMarco, 2005). In the last step in her theory, Kolcaba firmly expresses the value of enhanced patient comfort in guiding complete, whole, sound, upright, and professional healthcare (Kolcaba, 2003). This can be interpreted as appraising the highest level of evidence based practices (EBP) which statistically suggest improvement of patient outcomes, comfort, and health seeking behaviors then using them to formulate institution-wide policy to improve the healthcare system and provide ethical, quality care. The step of institutional integrity completes Kolcaba's theory by implementing the interventions which improve patient comfort to future patient care experience for ongoing ethical practices.

Application of Theoretical Framework to EBP Project

Katharine Kolcaba's theoretical framework is easily applicable to the assessment, implementation, and evaluation of policy formation within an EBP project involving acute lower back pain. The main focus of treatment of back pain is to decrease symptoms, mainly pain, and restore health and function in the patient (Goertz et. al., 2012). Providers must first accurately diagnose the problem presented to them. After categorizing the back pain as nonemergent through taking a detailed medical history in addition to pain and function questionnaires, the provider can begin to initiate EBP implementation to direct the progress of the patient towards Kolcaba's first form of comfort, "relief".

Offering the correct interventions is paramount to the patient achieving the second form of comfort, "ease." Here, the state of ease is the patient's ability to eliminate stress and anxiety because they feel confident about their capacity to function normally in their daily roles, be it in the family or work sector (Kolcaba, 2003). Ease also deters psychological deterioration, such as depression, seen in individuals who are in states of chronic back pain (Brinzo, Crenshaw, Thomas, & Sapp, 2016). The presence of ease allows for the movement into the last form of comfort, "transcendence". Thinking clearly with recovery from pain and having a sense of well-being, the acute back pain patient can participate in goal setting. Goal setting is active involvement in the plan of care, and will facilitate the patient's ability to look ahead to long-term comfort despite current circumstances (Kolcaba, 2003). The patient will collaborate with the provider to plan continued lower back pain recovery, ideally to the prior state of health. Additionally, discussions of how to strengthen the back and improve body mechanics will aid future injury prevention.

Strengths and Limitations of Theoretical Framework for EBP Project

Kolcaba's comfort theoretical framework has a strong application to the clinical problem of acute back pain. It presents a logical sequence of transitions to direct the provider in delivering the best care and restoring health. Comfort forms of relief, ease, and transcendence are applicable to many disease states. Kolcaba's framework was created around the idea of holistic personhood (Kolcaba, 2003). Comfort achieved, the successful treatment of acute back pain improves physical, environmental, psychospiritual and social wellbeing. The first, and most obvious of these is the physical context, where patients can go about their day participating in normal activities without functional or pain setbacks. The physical health restoration cascades into an environmental context achieved not only for patients themselves in their homes and workplaces, but as a second order effect, for those within their families and workplaces as they preserve their roles and keep routines. People then build psychospiritual health by feeling productive and capable in the successful completion of these daily activities and looking forward to long-term recovery (Kolcaba & DiMario, 2005).

Achieving physical, environmental, and psychospiritual health, the patient's social context will also be restored. This is related to the successful completion of the other three contexts. When physical, psychospiritual and environmental contexts are secure, the patient is able to thrive in society (Kolcaba, 2003). Utilizing another well-known theory, Maslow's Hierarchy of Needs outlines in an obvious way how with the other three contexts met, the patient reaches the point of self-actualization. The bottom of Maslow's pyramid lists the most important necessities for humans; food, water, rest, warmth or "basic needs" (Noltemeyer, Bush, Patton, & Bergen, 2012). These needs would also include comfort from pain since it is a physiological state. Psychological needs such as self-esteem and relationships are in the middle section and of moderate importance following successfully achieving basic needs (Noltemeyer et. al. 2012).

Finally, the top tier of the pyramid lists self-actualization. Self-actualization is the ability of the person to reach their full potential and thus thrive socio-culturally (Noltemeyer et. al. 2012). Therefore, applying Katharine Kolcaba's theory one can fulfill Maslow's most foundational tier of basic needs in order to move forward towards self-actualization. Advanced practice nurses working in the primary care setting are educated to look at the patient holistically. This includes all the aspects of health Katharine Kolcaba also considers important, indicating the strengths of her framework in the application of care to acute low back pain.

The element of Kolcaba's framework which sets it above other middle range theories for an EBP project on acute low back pain is the step it addresses in improving institutional integrity and best care policies and practices in the future (Kolcaba 2003). This is important because the purpose of any EBP project is just that: to implement changes based on new evidence to improve future health practices. This is of interest to healthcare administrations, healthcare professionals, and patients alike. Her theory is easy to comprehend and apply, and provides logical progression for attaining comfort goals, improving quality of life, and inaugurating EBP institution-wide.

A limitation of using the comfort theory in the care of acute back pain is financial constraint. In the economic situation our country currently faces regarding healthcare, there are many situations where best care practices are either not available or not affordable. In these circumstances, providers are forced to deviate from more expensive treatments which would facilitate the fastest results in lieu of those realistically at their disposal in their communities or those covered by insurance. The forms of comfort relief, ease, and transcendence may take longer to transition through consequently causing roadblocks in the health restoration of physical, psychospiritual, environmental and social contexts.

Another limitation is that Kolcaba's theory is only successful with patients who demonstrate health-seeking behaviors (Kolcaba, 2003). A common occurrence in healthcare is a lack of patient responsibility in their own health promotion. It is not difficult to find a patient seeking relief of pain and ease of mind, but achieving transcendence through active and ongoing participation with goal setting for future prevention is the step where most waver (Kolcaba, 2003). In acute injury situations, this challenge is common because once the two comfort forms are achieved, the work required to attain the third is at times, unmotivated (McCarberg, Stanos, & D'Arcy 2014). It is a classic, "out of sight, out of mind" problem. Resolving the acute pain is often a satisfactory solution for the patient. Therefore, committing to daily activities when free of pain is low priority on the checklist of daily obligations for many. Unfortunately, the framework doesn't outline specific tools or advice on how to assist providers in avoiding incomplete achievement of the entire comfort theory in acute pain situations. However, the literature suggests healthcare professionals involve family members in the plan of care to encourage continued health seeking behaviors (McCarberg, Stanos, & D'Arcy 2014).

Evidence-based Practice Model

Overview of EBP Model

The John Hopkins EBP model is based on three cornerstones for professional nursing: practice, education, and research. Practice encompasses the who, what, where, when, and why of nursing activities with their patients. Important influences on changes in practice are defined as internal and external factors. Internal factors include all aspects within the specific institution which have the ability to modify healthcare practices, however, they are not guaranteed to be evidence based. These are organizational culture, values, equipment, staffing, and standards. External factors are outside forces that recommend change, with lack of assimilation sometimes linked with punitive consequences. These factors include accrediting bodies, quality measures, and legislation or regulations requirements (Dearholt & Dang, 2012).

The education cornerstone indicates to professional nurses the importance of acquiring the knowledge and skills to proficiently and accurately provide quality care to their patients. This leads to the third cornerstone, research. The John Hopkins model emphasizes the importance of professional nurses generating new knowledge within the nursing profession. This information helps to guide institutional policy and patient care practices because logically sound evidence is not easily refuted (Dearholt & Dang, 2012).

Nurses wishing to use their education to understand and appraise research which can then be implemented into practice may utilize John Hopkin's practice question, evidence, and translation (PET) process (Dearholt & Dang, 2012). This process includes an 18-step procedure to assist professional nurses in their evaluation of quality evidence in the literature. First, the nursing professionals must create a practice question. Problem are framed into a PICO question, "PICO" standing for patient/population, intervention, comparison of other interventions, and outcomes of interest (Dearholt & Dang, 2012). Once the practice question is clearly identified, keywords must be chosen to perform a thorough, scholarly literature search which is the start of the evidence phase. The John Hopkin's model encourages the nurse to organize a team to assist in the gathering of evidence that includes professionals who have expertise in the specialty or specific problem being addressed. Using controlled vocabulary, year limiters, boolean operators, a truncation symbol, or quotations around keywords or phrases is suggested to help unearth articles related to the practice question. Finally, the model provides an appraisal tool to assist in categorizing the level and quality of gathered evidence. This tool helps the nurse determine the value of each of the literature articles in transferability of evidence (Dearholt & Dang, 2012). This is the translation phase. The collected high level and quality evidence is put into healthcare practice. At this time an appropriate avenue for disseminating findings is also chosen. This can be a written forum such as a scholarly journal, a presentation to current students at a university, or a conference presentation among other nursing professionals or institutions of higher learning (Dearholt & Dang, 2012).

Application of EBP Model to EBP Project

The cornerstones of practice, education, and research are of consequential importance among advanced practice nurses. A project to determine the best way to assess, treat, and evaluate acute low back pain would certainly benefit from utilizing the John Hopkins EBP model. The model will help create a well-formed PICO question which will focus the evidence search. It provides a simple outline in obtaining and evaluating current research presented in the literature. In the case of an acute low back pain project, a way of translating evidence is formulating quality care policies relevant to a healthcare organization. The clinic will have a streamlined procedure for assessing, treating and evaluating acute low back pain so each provider will be able to easily transfer patient care amongst each other without decreasing quality or efficiency of care.

Strengths and Limitations of EBP Model for EBP Project

A particular strength of the John Hopkins EBP model is the 18-step PET process. As discussed, it is a very specific, logical progression of the correct way to identify the problem, gather evidence, verify it, implement current best practice research into patient care, and familiarize other professionals with the information. The first 5 steps are related to the practice question phase. The steps involve choosing an interprofessional team, identifying and agreeing on the PICO question, establishing the leader of the project and planning meeting times for all involved to share their search results (Dearholt & Dang, 2012). The second 5 steps of the PET process are evidence phase related. The team will conduct their external and internal search, appraise evidence, summarize evidence and together recommend change in practice based on the evidence. The last 8 steps are part of the translation phase. The team will determine the value of the evidence for the clinical setting, create an action plan, acquire support to implement it, set the plan to action, evaluate outcomes and report them to stakeholders in the organization, identify a plan for moving forward with the evidence with implementation in the clinical setting and finally sharing the results with other professionals (Dearholt & Dang, 2012).

For nurses, who despite their knowledge expertise may be novices in the ways of securing EBP change in their organizations, the PET process is simple to understand and user friendly.

A second strength of the John Hopkins Model is the appraisal tool. It is a straightforward method of evaluating evidence which flows similarly to an algorithm. For an advanced practice nurse and team viewing dozens of literature articles, simplicity in evaluation saves much time and energy. The appraisal tool consists of both experimental and non-experimental sections to further aid in organizing the evaluation. It also contains a section for gauging both the quality of evidence in addition to the level of evidence, further raising its value in setting metrics for drawing correct conclusions.

A limitation of the model is that it will not fit every organization's cultural flow. Some clinicians prefer a more open, thoughtful discussion regarding the evaluation of level and quality of evidence, and the very straightforward John Hopkins model leaves little room for that. Another potential limitation is its contingency on acceptance by those with authority to govern practice changes. The model encourages specialists and experts to be the searchers and evaluators of current research with the sole focus of incorporating the highest level and quality of evidence into practice. Often, administrators have vastly different priorities such as financial gain and hospital prestige in selecting which evidence they wish to impact policy in their institution (Newhouse & Balotsky, 2013). Therefore, in organizations where many policy decisions are made by an administration remote from healthcare professionals, the John Hopkins model may not be the best fit.

Literature Search

Sources Examined for Relevant Evidence

The literature search was initiated with the use of ProQuest. The key terms used were “acute low back pain AND primary care.” Limiters were scholarly articles published within the past 5 years, patient subjects age 18 year or older, being treated in primary care who have symptoms of acute low (pain for up to 7 weeks). Inclusion criteria was scholarly journals which were peer reviewed and published in the English language. This resulted in 464 articles. To narrow the literature search, key terms were searched in the form of “acute low back pain in primary care.” This resulted in 27 articles. Each title and abstract was reviewed. 24 were excluded because they were overly specific to a patient population such as pregnant women or geriatrics or they did not fit the project objectives. Two of the articles were read due to project applicability; however, only 1 was kept since it was specifically about acute low back pain and management in the primary care setting with the use of pharmaceuticals.

CINAHL was utilized next with the same key terms, published within the past 5 years, in the English language, exclusion criteria included articles written for chronic back pain treatment, research in geriatric and children treatment plans as well as the pregnant women population. “Acute low back pain” AND “primary care” yielded 16 results. Four of the articles were duplicates from the ProQuest search, including the one kept for project application. 12 abstracts were reviewed and 0 articles were kept. Medline was searched with the key terms “acute low back pain” and “primary care” with the same limiters, resulting in 41 articles; each title was reviewed, of these 6 were duplicates, 2 abstracts were read, and 0 articles were kept. When searching the Joanna Briggs Institute database, the same key terms and limiters resulted with 19 articles. There were no duplicates; all titles were reviewed; 4 abstracts were read with 2 clinical guideline articles were kept.

The National Guideline Clearing house was searched using the terms “acute low back pain” AND “primary care” with the same time limiter of 5 years and those published in the English language. There were 5 results produced; all article titles were reviewed, 0 duplicates were present, 2 abstracts were reviewed, and 2 articles were kept. The titles of the guidelines were, “Adult acute and subacute low back pain” and “American Osteopathic Association guidelines for osteopathic manipulative treatment (OMT) for patients with low back pain.” Citation chasing was performed on the guideline, “Adult acute and subacute low back pain” for specific recommendations regarding discharge education and reassurance.

Three guideline articles written by the college of American physicians were kept from this citation chase. One was written about “Systemic Pharmacologic Therapies for Low Back Pain” and the other was written recommendations about, “Nonpharmacologic Therapies for Low Back Pain.” The third guideline chosen was titled, “Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain.” The National Guideline Clearing house article titled “American Osteopathic Association Guidelines for Osteopathic Manipulative Treatment (OMT) for Patients with Low Back Pain.” was also citation chased. No articles were kept from this chase because they were past the 5-year limiter and were not as applicable individually as the original article.

An additional search of the National Guideline Clearing House was completed with the key terms “acute low back pain,” 12 articles resulted. 5 of these were duplicates, 7 titles were reviewed, 2 abstracts were read and 1 article was kept. The title of this article was, “Low Back Pain: Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health from the Orthopedic Section of the American Physical Therapy Association.”

After obtaining these guidelines, a more recent search was done on ProQuest, Medline, CINAHL and Cochrane using the key terms of “acute low back pain” AND “primary care” AND “treatment”, though the year limiter was changed to between January 2016 and June 2017. As with previous searches, the limiter of articles published in the English language was applied as well. ProQuest resulted in 74 articles. Each title was reviewed, two abstracts were read and 1 kept because it was found to be of specific relevance to the project topic. Medline resulted in 39 articles, each title was reviewed, however none were further assessed because they were not related to the project objectives. CINAHL resulted in 26 articles, all titles were reviewed, 2 abstracts were read and 1 article was kept.

Appraisal of Relevant Evidence

A total of 11 articles were chosen from the search for the implementation of the EBP project regarding the assessment, treatment and evaluation of acute lower back pain in the primary care setting. Of those chosen, 9 articles (Chou et. al., 2017a); (Chou et. al., 2017b); (Delitto et. al. 2012); (Goertz et. al. 2012); (Lizarondo, 2016); (Quaseem et. al., 2012); (Slade, Ther, & Ther 2016); (Snow et. al., 2016) were level 1 high quality guidelines. The Agree II instrument was used in the appraisal of quality of these guidelines. The Agree II appraisal tool addresses 6 factors within 24 questions to appraise the guideline (Brouwers et. al., 2010). These factors are scope and purpose, stakeholder involvement, rigor of development, clarity of presentation, applicability, and editorial independence. The tool also assists in the process by providing easy to comprehend explanations of each of the categorizing questions to help with accurate literature appraisal (Brouwers, et. al. 2010).

The other 3 articles were level 1 (Friedman et.al., 2015); (Lin et. al., 2016); and a level 2 (Chiarotto et. al., 2016) systematic review of randomized controlled trials of high or moderate quality. The John Hopkins research appraisal tool was used to evaluate these articles. The tool evaluates the level of evidence by categorizing the study design into experimental (level 1), quasi-experimental (level 2), or non-experimental (level 3).

If the article has more than one research design, it is categorized into either systematic reviews with or without meta-analysis. If the articles are all randomized controlled trials, it is considered level 1 evidence. For those with quasi experimental studies included, the appraisal would be level 2 and those with qualitative or non-experimental studies are considered level 3 evidence (Dearholt & Dang 2012). Furthermore, for evaluating quality level, the John Hopkins appraisal tool asks questions about the research study or systematic review with or without meta-analysis to help determine the quality as either high, moderate or low. High quality articles are consistent and have generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; and consistent recommendations (Dearholt & Dang 2012).

Construction of Evidence-based Practice

Synthesis of Critically Appraised Literature

Articles were chosen which provided high quality evidence for the assessment, treatment and evaluation of care for acute low back pain. Acute low back pain is defined as lasting less than 7 weeks (Goertz et. al., 2012). Best practice model recommendations for assessment, treatment, and evaluation were developed using clinical guidelines from the National Guideline Clearinghouse (Goertz et. al., 2012), based on their ability to direct the provider on the most effective treatment plan for patients presenting with acute low back pain. The 8 guidelines chosen are written for the classification of function and disability related to acute back pain (Delitto et. al., 2012) initial treatment and management, (Goertz et. al., 2012) and one guideline was specifically written about osteopathic manipulation treatment (Snow, Seffinger, Hensel & Wiseman 2016). Additionally, clinical guidelines from the citation chase provided information about nonpharmacological treatments (Chou et. al., 2017a), the other about pharmacological treatments, (Chou et. al., 2017b) and 1 clinical guideline describing noninvasive treatments (Quaseem, Wilt, Mclean, & Forcica 2012).

Two of the guidelines were selected from the Joanna Briggs Institute for initial management information (Lizarondo, 2016) and general recommendations for acute back pain treatment (Slade, Ther, & Ther 2016).

A recent randomized control trial was utilized which researched medication prescriptions for patients with acute low back pain (Friedman et. al., 2015). A systematic review comparing the quality of evaluation scales for acute low back pain was selected (Chiarotto et. al., 2016). Finally, a trial analysis article discussing the results of a randomized control trial results of economic burden of following recommended guidelines was also referenced (Lin et. al., 2016).

Table 2.1 Review of Literature and Appraisal Results

Citation	Purpose	Sample	Design	Measurement	Results/Findings	LOE
Chiarotto, A., Maxwell, L. J., Terwee, C. B., Wells, G. A., Tugwell, P., & Ostelo, R. W. (2016). Roland-morris disability questionnaire and Oswestry disability index: which has better measurement properties for measuring physical functioning in nonspecific low back pain? Systematic review and meta-analysis. <i>Physical Therapy</i> , 96(10), 1620-1637.	The purpose of this study was to evaluate whether the 24-item Roland-morris disability questionnaire (RMDQ) or the Oswestry disability index (ODI) has better measurement properties than the other to measure physical functioning in adult patients with nonspecific low back pain (NSLBP).	6 observational longitudinal, 4 observational cross-sectional, and 1 RTC studies	Systematic Review	Reliability, Measurement Error, Construct Validity, and Responsiveness	ODI displays better test-retest reliability and measurement error RMDQ displays better and construct validity. Conflict seen in both tools related to responsiveness No recommended preference of 1 of these 2 instruments to measure physical functioning in patients with NSLBP	Level 2 moderate quality
Chou, R., Deyo, R., Friedly, J., Skelly, A., Weimer, M., Fu,	Review of current evidence on acute,	114 Randomized Control Trials of 9	Systematic Review.	Pain levels were defined using the visual analog scale (VAS)	Moderate statistically significance improvement in pain was seen with the use	Level 1, High Quality

<p>R., Dana, T., Kraegel, P., Griffin, J., Grusing, S., Brodt, E. (2017). Nonpharmacological therapies for low back pain: A systematic review for an American college of physicians clinical practice guideline. <i>Annals of Internal Medicine</i>, 166(7), 493.</p>	<p>chronic, and radicular lower back pain to provide strong guideline recommendations for nonpharmacological therapies.</p>	<p>nonpharmacological options compared against either sham treatment, usual care, or each other.</p>	<p>Function levels were defined using the Oswestry Disability Index (ODI) and the Roland Morris Disability Scale. (RDQ)</p>	<p>of superficial heat vs. nonheated control for acute and subacute LBP. Small statistically significant improvement in pain with acupuncture vs. sham in patients with acute LBP. Spinal manipulation resulted in statistically significant return of function at 1 month, (acute) but no significance at 6 and 12 months' (chronic) duration of LBP.</p>		
<p>Chou, R., Deyo, R., Friedly, J., Skelly, A., Weimer, M., Fu, R., Dana, T., Kraegel, P., Griffin, J., Grusing, S., Brodt, E. (2017). Systematic pharmacological therapies for</p>	<p>Review of current evidence for pharmacological treatments of acute, chronic and radicular low back pain.</p>	<p>46 Randomized Controlled Trials that compare reported pain, functions, and side effects following medications vs. placebo or other intervention.</p>	<p>Systematic Review.</p>	<p>Pain levels were defined using the visual analog scale (VAS) Function levels were defined using the Oswestry Disability Index (ODI) and the Roland Morris Disability Scale. (RDQ) Side</p>	<p>Acetaminophen is ineffective for pain improvement in acute LBP. NSAIDs have small improvement in pain intensity, no improvement in pain relief and small improvement on function in acute LBP.</p>	<p>Level 1, High Quality</p>

<p>low back pain: a systematic review for an American college of physicians clinical practice guideline. <i>Annals of Internal Medicine</i>, 166(7), 480.</p>	<p>effects were verbally self-reported.</p>	<p>Muscle Relaxers show pain relief when used between 5-7 days of onset of acute LBP.</p>	<p>Systemic corticosteroids show no improvement in pain or function in acute LBP.</p>			
<p>Delitto, A., George, S., VanDillen, L., Whitman, J., Sowa, G., Shekelle, P., Denninger, T. (2012). Low back pain: clinical practice guidelines linked to the international classification of functioning, disability, and health from the orthopedic section of the American physical therapy</p>	<p>Provide guideline recommendations for examination and treatment of low back pain</p>	<p>high-quality diagnostic studies, prospective studies and randomized controlled trials</p>	<p>Clinical Guideline</p>	<p>Overall strength of recommendation are graded A, B, C, D, E, and F. A= strong evidence due to level 1 and level 2 studies which support the recommendation . Must include at least once level 1 study. B= moderate evidence supported by a single high-quality controlled trial or several level 2 studies.</p>	<p>Clinicians should use Oswestry Disability Index or Roland-Morris Disability Questionnaire to gauge baseline pain and function (Grade A)</p> <p>Clinicians should consider thrust manipulation in patients with LBP (Grade A)</p> <p>Clinicians should consider utilizing repeated movements, exercises to reduce symptoms of acute LBP (Grade A)</p>	<p>Level 1 High Quality</p>

association.
*National
Guideline
Clearinghouse,*
42(4), A1-A57.

C= weak
evidence
determined by a
single level 2
study and
statements of
expert
consensus.

D= Conflicting
evidence due to
higher quality
studies with
conflicting
conclusions.

E=
Theoretical/foun
dational
evidence,
collected from
animal or
cadaver studies
or conceptual
models or
principals.

F= Expert
Opinion. Best
practices on the
clinical
experiences of
the guideline
development
team.

<p>Friedman, B.W., Dym, A.A., Davitt, M., Holden, L., Solorzano, C., Esses, D., Bijur, P. E., Gallagher, E.J. (2015). Naproxen with cyclobenzaprine, oxycodone/acetaminophen, or placebo for treating acute low back pain: a randomized clinical trial. <i>Jama</i>, 314(15), 1572-1580.</p>	<p>To compare functional outcomes and pain at 1 week and 3 months after an ED visit for acute LBP</p>	<p>323 participants randomized into double-blind 3 groups. Patients randomized to a 10-day course of: (1) naproxen + placebo; (2) naproxen + cyclobenzaprine; or (3) naproxen + oxycodone/acetaminophen.</p>	<p>Randomized Control Trial</p>	<p>Roland-Morris Disability Questionnaire given at discharge from emergency department and reevaluated one week later.</p>	<p>Adding cyclobenzaprine or oxycodone/acetaminophen to naproxen did not improve functional outcomes or pain at 1-week follow-up. These findings do not support use of these additional medications for acute, non-traumatic LBP</p>	<p>Level 1, Good Quality</p>
<p>Goertz, M., Thorson, D., Bonsell, J., Bonte, B., Campbell, R., Haake, B., Johnson, K., Kramer, C., Mueller, B., Peterson, S., Setterlund, L.,</p>	<p>Provide major recommendation guidelines for the assessment, diagnosis, treatment algorithm,</p>	<p>133 studies</p>	<p>Clinical Guideline</p>	<p>Overall strength of recommendation are categorized by quality of evidence. Strong recommendation of high quality: Desired effects</p>	<p>Providers should educate patient on prognosis expectations as an adjunct to physical treatment. (Strong/Mod) Heat should be used for pain relief (Strong/Mod)</p>	<p>Level 1, High Quality</p>

<p>Timming, R. (2012). Adult acute and subacute low back pain. <i>National Guidelines Clearing House</i>. 91.</p>	<p>evaluation of patients with LBP lasting up to 7 weeks and between 7-12 weeks. Early and late treatment recommendations are listed.</p>	<p>of recommendation outweigh any undesired effects, and applies to most patients.</p> <p>Strong recommendation of moderate quality: benefits outweigh risks, but evidence has limitations and future evidence may impact current recommendation .</p> <p>Strong recommendation of low quality: Evidence consistently indicates benefits outweigh risks, but recommendation very likely will change with higher quality evidence becomes available.</p>	<p>Advise patients to continue ADLs as permitted by pain (Strong/Mod)</p> <p>Exercise recommended to decrease future occurrence of subacute LBP (Strong/Mod)</p> <p>Bed rest not recommended (Strong/Mod)</p> <p>No imaging for nonspecific LBP unless fracture is suspected (Strong/Mod)</p> <p>Spinal Manipulation should be considered for early treatment of acute LBP (Strong/Mod)</p>
---	---	---	---

<p>Lin, C.C., Li, Q., Williams, C. M., Maher, C. G., Day, R. O., Hancock, M.J. & Jan, S., (2016). The economic burden of guideline-recommended first line care for acute low back pain. <i>European Spine Journal</i> 1-8.</p>	<p>To outline healthcare costs and the factors incurring those costs in patients with acute low back pain receiving guideline-recommended first line care</p>	<p>Randomized Control Trial</p>	<p>Trial Analysis</p>	<p>Changes in baseline pain characteristics, SF-12 physical component score, Roland Morris Disability Questionnaire, and total healthcare costs.</p>	<p>Taking acetaminophen as part of first line care for acute low back pain results in increased disability, longer symptom duration and receiving compensation were independently associated with increased health care costs.</p>	<p>Level 1 Moderate Quality</p>
<p>Lizarondo, Lucylynn (2016). Low back pain: initial management. <i>The Joanna Briggs institute</i>. JBI15441</p>	<p>Determine the best available evidence in relation to the initial treatment of acute or recent onset back pain among adults.</p>	<p>Systematic Review of 14 Clinical guidelines</p>	<p>Clinical Guideline</p>	<p>Guideline recommendations are graded as high, moderate, or low quality of evidence and strength of recommendation . Strength is measured as: Strong- benefits clearly outweigh the risks or burden clearly</p>	<p>Comprehensive history and physical should be taken to rule out malignancy and other potential red flag emergencies (Grade A) Routine imaging should not be conducted unless pathology is suspected (Grade A) Patients should be given appropriate education on expected</p>	<p>Level 1 High Quality</p>

				<p>outweighs benefit.</p> <p>Weak- benefits finely balanced with risk and burden.</p>	<p>recovery prognosis times and told to continue in daily activities (Grade A).</p> <p>Exercises, acupuncture and manipulation therapy may be suggested if self-management is unsuccessful (Grade A)</p> <p>Tylenol and NSAIDs are the recommended treatment for pain relief (Grade A).</p>	
<p>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. <i>American College of</i></p>	<p>Provide guidelines for acute (<4 weeks), subacute (4-12 weeks) and chronic (>12 weeks) low back pain treatments.</p>	<p>>550 Randomized Controlled Trials</p>	<p>Clinical Guidelines</p>	<p>Overall strength of recommendation are categorized by quality of evidence.</p> <p>Strong recommendation of high quality: Desired effects of recommendation outweigh any undesired effects, and applies to most patients.</p>	<p>NSAIDS and muscle relaxers should be used as pharmacological treatment (Strong/Mod)</p> <p>Patients with acute or subacute low back pain should use nonpharmacological treatment of superficial heat (Strong/Mod), massage, acupuncture or spinal manipulation (Strong/Low).</p> <p>No specific exercise regimen is</p>	<p>Level 1 High Quality</p>

Physicians,
(166) 514-530.

Strong recommendation of moderate quality: benefits outweigh risks, but evidence has limitations and future evidence may impact current recommendation

recommended in patients with acute LBP (Strong/Mod)

Strong recommendation of low quality: Evidence consistently indicates benefits outweigh risks, but recommendation very likely will change with higher quality evidence becomes available through new high quality studies.

<p>Slade, S., Ther, G. D., & Ther, M. M. (2016). Acute low back pain: assessment. <i>The Joanna Briggs Institute EBP Database</i>, JBI@Ovid. 2016; JBI10929.</p>	<p>Determine the best available evidence in relation to the assessment of acute or recent onset back pain among adults.</p>	<p>Systematic reviews of epidemiological data, prospective cohort studies, 15 clinical practice guidelines, expert opinion, and one randomized control trial.</p>	<p>Clinical Guidelines</p>	<p>Guideline recommendation are graded as high, moderate, or low quality of evidence and strength of recommendation . Strength is measured as:</p> <p>Strong- benefits clearly outweigh the risks or burden clearly outweighs benefit.</p> <p>Weak- benefits finely balanced with risk and burden.</p>	<p>A comprehensive interview and physical examination should be conducted before treatment is commenced. (Grade A)</p> <p>Diagnostic imaging is not recommended unless serious underlying pathology is suspected. (Grade A)</p> <p>Provide patients with evidence-based information on low back pain with regard to their expected course, advise patients to remain active, and provide information about effective self-care options (Level 1)</p> <p>When there is no improvement with self-care clinicians should consider the addition of non-pharmacologic therapy with proven benefits-for acute low back pain, such as spinal manipulation from the doctor of osteopathic medicine (Level 1)</p>	<p>Level 1 High Quality</p>
--	---	---	----------------------------	--	--	-----------------------------

<p>Snow, R. J., Seffinger, M., Hensel, K., Wiseman, R. (2016). American osteopathic association guidelines for osteopathic manipulation treatment (OMT) for patients with low back pain. <i>National Guideline Clearing House</i> 116(8) 536-549.</p>	<p>Provide guidelines for the use of osteopathic manipulation therapy (OMT) in patients presenting with low back pain.</p>	<p>17 randomized control trials</p>	<p>Clinical Guidelines</p>	<p>Level of Evidence are measured using the Cochrane Back Review Group method guidelines: 1a,1b,1c,2a,2b,3a,3b, 4 and 5.</p>	<p>Patients with low back pain should be administered “thrust” OMT procedures performed by a doctor of osteopathic medicine. strongly recommended (evidence level 1a)</p>	<p>Level 1, High Quality</p>
---	--	-------------------------------------	----------------------------	--	---	------------------------------

Best Practice Model Recommendation

The first step in a patient visit with the complaint of acute lower back pain is to assess the history of the problem, (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). The most important differentiation to conclude initially is whether the clinical findings are suggestive of either a medical or psychological issue of a serious nature (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). These differentials are determined by specific questions in the history taking. These questions include job and activity association and a psychological and chemical screening. If the interview and screening does suggest a psychological issue, this can then be addressed by the provider or referred out to a psychiatric specialist care (Delitto et. al., 2012; Goertz et. al., 2012; Slade et. al., 2016). To identify physical issues of a serious nature, pain characteristics including location, character, intensity, duration, exacerbation and alleviating factors should be noted. Character and distribution of sensory changes, strength changes and review of musculoskeletal and neurological systems is sufficient to catch physical red flags which would prompt the provider to initiate a neurological or spinal specialist referral (Delitto et. al., 2012; Slade et. al., 2016). Evidence based literature (Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016) consistently defines red flag concerns as infections more often seen in an immunocompromised patient, cancer common in patients who have had cancer in the past, fractures from reported traumatic injury such as a high fall or car accident, or finally cauda equina requiring urgent attention (Delitto et. al., 2012); (Goertz et. al., 2012; Lizarondo, 2016). Referrals to specialists and emergent care are made in the presence of these red flags.

American guidelines (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Snow et. al., 2016) recommend obtaining baseline pain and function levels for evaluating treatment and outcomes of nonspecific acute low back pain. Pain levels measured by the visual analog scale (VAS) are measured from 0-10 with 10 being the worse pain imaginable (Chou et. al., 2017a; Chou et. al., 2017b; Delitto et. al., 2012; Goertz et. al., 2012).

This qualitative report from the patient is imperative to also reassess at each sequential visit monitoring the patient's pain level, improved function, and perception of improvement (Goertz et. al., 2012). Function levels measured by the Oswestry Disability Index or Roland-Morris Disability Questionnaire are most frequently recommended by Level 1 studies (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Snow et. al., 2016). The scales subjectively assess physical limitations due to lower back pain experienced by the patient. The higher the score, the greater the perceived disability. The baseline function measurement can be referenced in future visits to monitor treatment quality and outcome improvements. A systematic review and meta-analysis (Chiarotto et. al., 2016) comparing the two scales finds no benefit of one over the other in quality. Therefore, for the purposes of the acute low back pain project, preference will be given to the nursing professional (Chiarotto et. al., 2016).

Basic acute low back pain treatment plans in the literature (Chou et. al., 2017a; Goertz et. al., 2012) includes the continuation of daily activities as tolerated (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016) along with deliberate exercise (Delitto et. al., 2012; Goertz et. al., 2012; Slade et. al., 2016). Remaining active to the level symptoms permit is consistent with better-quality recovery (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016). Furthermore, clinicians should educate the patient on utilizing repeated movement exercises to increase flexibility, (Delitto et. al., 2012) improve mobility, and reduce symptoms and mobility deficits. Specifically, muscle strengthening, stretching, aerobic activities, or postural control are strongly recommended as an effective treatment for acute low back pain (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Written handouts given at the end of the visit also may have both explanation and pictures educating patients about movement exercises, how many repetitions to complete and then number of times a day to perform them (Goertz et. al., 2012).

The primary care provider can refer the patient to physical therapy to learn techniques or perform these movement exercises they can perform at home if the provider feels it would be necessary for recovery on an individual basis (Goertz et. al., 2012).

Thrust spinal manipulation procedures are strongly recommended (Delitto et. al, 2012) and may be performed by a doctor of osteopathic medicine (Snow et.al, 2016) in the clinic to reduce pain and disability in patients with mobility deficits and acute low back and back-related buttock or thigh pain (Chou et. al., 2017a; Delitto et. al, 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016; Snow et. al., 2016) with greatest improvement seen within the first month of treatment (Chou et. al., 2017a).

Pain relief with the use of superficial heat is strongly recommended for short periods of time in acute low back to provide comfort (Chou et. al., 2017a; Goertz et. al., 2012; Quaseem et. al., 2012). Superficial heat interventions may be used within the first 5 days of acute low back pain onset (Goertz et. al., 2012; Quaseem et. al., 2016). Application is beneficial when applying superficial heat wraps for eight hours, or an electric blanket applied for a 25-minute duration (Quaseem et. al., 2016). The interventions also improved disability measured with the Roland-Morris Disability Questionnaire, when utilized in the first 4 days of onset (Quaseem et. al., 2016).

Prior recommendations of pharmacological treatment included the use of acetaminophen for pain relief; (Slade et. al., 2016; Lin, Li, Williams, Maher, Day, Hancock & Jan, 2016) however, new systematic reviews of multiple randomized controlled trials have negated this claim (Chou et. al., 2017b; Quaseem et. al., 2016). New recommendations advise the use of non-steroidal anti-inflammatory drugs (NSAIDs) and short treatment (less than two weeks) with muscle relaxers (between 5 and 7 days) in lieu of the use of acetaminophen. (Chou, et. al. 2017b; Friedman et. al., 2015); Goertz et. al., 2012; Quaseem et. al., 2012).

Additionally, imaging, including computed tomography, magnetic resonance imaging, and x-rays is not recommended for assessment or evaluation (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Most patients experience significant improvements in two to four weeks with the use of superficial heat, spinal manipulation, and pharmacological interventions (Goertz et. al., 2012). Therefore, reassurance is highly recommended to provide to the patient of good prognosis for function to ease anxiety (Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016).

Finally, education on nonpharmacological home treatment is recommended at the conclusion of the initial, and each following visit. This includes maintaining good posture by sitting in chairs with back support and changing positions every 20-30 minutes (Goertz et. al., 2012), staying active and continuing daily activities permitted by symptoms, and exercising as tolerated using pelvic tilt, knee raises, and partial press up techniques. The patient is educated to record how many times they perform these in succession and throughout the day. This information should be given in written form for home reference (Goertz et. al., 2012). Reevaluation of the pain and function scales will be completed at every visit (Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Follow up visits should be scheduled every one to two weeks depending on severity of pain and trending recovery (Goertz et. al., 2012). Instructions for an immediate return to the provider's office are also recommended to be given to the patient. Reasons for immediate return include (a) back pain that doesn't seem to be getting better after two to three weeks, (b) pain and weakness traveling down the leg below the knee, leg, foot, (c) groin or rectal area feeling numb, (d) unexplained fever, (e) loss of control of urine or stool, or (f) desire for further reassurance or education (Goertz et. al., 2012).

How the Best Practice Model will Answer the Clinical Question

The clinical question of "what is the best procedure for the assessment, treatment, and evaluation of nonspecific acute back pain" can be answered by applying the best practice recommendations found in the literature.

Implementing these recommendations into streamlined clinic protocols will ensure patients presenting with this condition are receiving the best care resulting in quicker relief, recovery, and return to normal quality of life. This is facilitated through the use of Kolcaba's theory of comfort and the John Hopkins EBP model and PET processes, applied by nurses at the "ground level" of healthcare in direct interactions with patients and administrators.

CHAPTER 3

IMPLEMENTATION OF PRACTICE CHANGE

Participants and Setting

The setting for this evidence-based project is a family practice clinic located in Newport Michigan. Providers employed at the clinic and participating in the project are one doctor of osteopathic medicine, one medical doctor and one family nurse practitioner. Inclusion of all provider's participation in the project will allow for patients to be seen by any available providers without disrupting the credibility of the EBP project algorithm. Patients able to be selected for participation are those presenting to the clinic which fit the inclusion criteria of the project.

Inclusion criteria for participating in this project are patients ages 18 and older, presenting with new onset of acute low back pain. Acute low back pain is defined as pain which lasts no longer than 7 weeks' duration, therefore patients presenting with low back pain with duration of greater than 7 weeks will be excluded. Exclusion criteria for the project will be patients who are currently pregnant, those with chronic low back pain lasting 12weeks or longer, those with radicular pain and finally those which are unable or unwilling to participate for the 8 weeks' project period of implementation.

Recruitment

The process for recruiting participants will begin with rooming of the patient. The medical assistant currently is the first person to interact with the patient. She/he asks the patient about the chief complaint for the visit. The medical assistant will be instructed that when patients reply they are here for acute low back pain, they should be asked whether they are interested in participating in an EBP project to evaluate the progression of their recovery. The medical assistant will explain both verbally and with a written handout, the basic information of the project. Written information will be given to each patient interested in participating. Patients will be assured that declining participation will not result in receiving a lower quality of care for their acute low back pain.

Patients interested in participation will be asked to sign a consent. Contact information along and patient demographics will be collected at that time for the project manager's use. Each participant will be assigned a number and this number will be printed on the outside of their manila folder. The folder will be used to hold all patient demographic and contact information. It will also hold the agreement paperwork and multiple copies of the Oswestry Disability Index and Visual Analog Scale which will be used in follow up visits to indicate recovery progression. Each of these measurement tools will have a slot available for date insertion at the top of the page to accurately keep track of the follow up measurements of recovery.

Outcomes

The goals of initiating this EBP project is to establish a clinic-wide algorithm to provide continuity of care for patients presenting with acute low back pain to improve patient recovery. This algorithm will be initiated as a popup plan of care in the electronic medical record (EMR) of the patient upon the initial visit. It will become a part of the permanent record. A section of the plan of care located within the chart will be dedicated to follow up visual analog scale (VAS) assessment and Oswestry Disability Index (ODI) scale to monitor improvement in pain quality and mobility function. The VAS scale and ODI will be utilized each week of the project's duration. The provider will complete the scales at the initial visit. The project manager will complete each scale with the patient via telephone on a weekly basis for the duration of 8 weeks or until the patient verbalizes return to baseline health prior to acute back pain episode.

Intervention

Following patient agreement to participate in the project the initial assessment section of the algorithm will be initiated. Beginning with the subjective assessment questions, the provider will ask the patient about pain characteristics including location, character, intensity, exacerbating or alleviating factors and duration (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016).

If there was activity associated with the onset of the acute low back pain, it should also be documented at this time. Next the provider will investigate for sensory changes, and if present, note the specific distribution and character (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Strength changes such as a generalized sense of weakness should be differentiated from focal change such as the ability to dorsal or plantar flex the foot or great toe (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Any employment or recreational history which may have contributed to the acute low back pain must also be investigated and noted in the chart (Goertz et. al., 2012).

In the literature, the term “red flags” is used for the presence of acute low back pain to define serious medical issues such as cancer, infection, cauda equine, or fragility fractures (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). The presence or absence of red flags must be documented during the time of the subjective assessment; if red flags are present, differential treatment plans are to be initiated and the patient will not be included in the EBP project. Cancer red flags are the presence of the following 3 factors: (a) over the age of 50 years with unexplained weight loss, (b) history of cancer, and (c) no recovery improvement in 6 weeks with conservative treatment (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). If the provider finds the patient to present with red flags of cancer, a different plan of care involving specified guidelines will be prescribed. Red flags for infection are a history of intravenous drug use, those patients who are immunosuppressed, those who are febrile for more than 48 hours, presence of urinary infection or history of or active tuberculosis (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). If suspected, plain spinal films and magnetic resonance imaging (MRI) may be necessary for diagnosis of infection (Goertz et. al., 2012).

Red flags for cauda equina include new onset of incontinence, urinary retention and or saddle anesthesia (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016).

If suspected, the patient must immediately proceed to the emergency room and be seen by surgical spine specialist (Goertz et. al., 2012). Red flags for fragility fractures include a history of osteoporosis, steroid use, immunosuppressed patients, drug or alcohol abuse, major accident or injury, blunt trauma or those involved in a motor vehicle accident (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). A combination of two or more of these factors, imaging may be ordered on provider's judgement when fracture is suspected (Goertz et. al., 2012). Finally, the last red flag which would trigger the provider to consider a more serious concern is patients with unrelenting night pain or pain at rest (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). If either or both of these red flags are reported, the provider would consider the pain is related to possible visceral disease and proceed with the appropriate deductive workup (Goertz et. al.).

Assessment tools used in the initial patient visit for acute low back pain are the Oswestry Disability Index (ODI), the Visual Analog Scale (VAS), and two psychological screen tools. The ODI assesses the patient's subjective rating of perceived disability and provides a baseline of the function limitations the patient has for future comparison of the recovery progress (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Snow et. al., 2016). Each of the ten sections is scored separately (0 to 5 points each) and then added with a (maximum total of 50). If all 10 sections are completed, the patient's score is to be doubled. If a section is omitted, divide the patient's total score by the number of sections completed/multiplied by 5. This answer is then multiplied by 100 to determine the function disability category. The categories range from 1 to 5 from minimal disability to bed-bound.

The VAS quantifies the patient's perception of pain; it assists the provider in assessing the severity of pain along with establishing a baseline for future reference (Chou et. al., 2017a; Chou et. al., 2017b; Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016).

It is measured using a 0-10 scale with 0 representing no pain and 10 representing the worse pain imaginable. Patients were shown the VAS scale and familiarized with it for future reevaluation purposes.

The psychological screen which will be completed consists of two parts: assessment for the presence of Waddell's Sign and the PHQ-2 tool. The Waddell's Sign assesses the possibility of psychological distress by testing the consistency and reproducibility of the patient's responses to non-organic physical signs (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). These five signs are tenderness, simulation, distraction, regionalization, and overreaction (Goertz et. al., 2012). When three of five Waddell sign tests are positive, there is a high probability of non-organic pathology. Three positive signs indicate the individual needs further psychological assessment. (Goertz et. al., 2012). A description for how to determine these physical signs will be in each patient chart for the provider to refer to during the patient visit. The results will be documented in the progress note of the patient's first visit. Additionally, the PHQ-2 tool will be completed to determine if the acute low back pain may be related to depression. The two questions asked to the patient during this screen are: Over the past two weeks, have you been bothered by little interest or pleasure in doing things? Or feeling down, depressed or hopeless? If the patient answers "yes" to either of the above questions, the full PHQ-9 depression instrument will be completed (Goertz et. al., 2012). The provider can, upon determining the presence of both subjective and objective assessment depression findings, choose to treat the patient themselves or refer to a psychiatric specialist depending on their comfort in handling each individual situation (Goertz et. al., 2012). The ODI, VAS, Waddell's sign and PHQ-2/PHQ-9 results will all be recorded in the patient's EMR. A printed copy of the ODI and VAS screens be placed in each of the participant's folders. These will be a quick guide reference for follow-up comparison.

Objective Assessment

The provider will assess the patient for symmetry of movement (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016) and range of motion (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016) recording baseline findings in the patient's chart. The provider will then perform a neurological examination focusing on sensation, strength and reflexes. To evaluate for nerve root compromise, assessing the reflexes and strength of the L4, L5, and S1 nerves for primary dermatomal mapping should be done (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Straight leg raises, slump, prone knee bend and femoral stretch are assessed bilaterally. A test is considered positive if it results in pain or other low back pain associated symptoms (Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Any indication of nerve compromise, or radiculopathy pain should prompt the provider to consult the national guidelines for core treatments recommended for such pain (Goertz et. al., 2012). Though the current recommendations for initial treatment of radicular pain are similar to that of nonspecific low back pain, the ongoing treatment plan varies. Therefore, patients presenting with radicular pain will be excluded from the EBP project to maintain consistency in follow-up.

Treatment

Several initial treatment recommendations will be given to the patient for acute low back pain. The first is non-steroidal anti-inflammatory drugs (NSAIDs). This medication may be used for short-term pain relief for a period of less than two weeks (Chou, et. al. 2017b; Friedman et. al., 2015; Goertz et. al., 2012; Lizarondo, 2016; Quaseem et. al., 2012; Slade et. al., 2016). The physician will advise the patient to follow dosing instructions on the over-the-counter bottle as needed for pain relief. The second recommended pharmaceutical medication is a muscle relaxer (Goertz et. al., 2012). A script will be given for this medication to be taken for 5-7 days, which will be given to the patient prior to check out (Chou, et. al. 2017b; Friedman et. al., 2015); Goertz et. al., 2012; Quaseem et. al., 2012).

All patients seen by the doctor of osteopathic medicine and present within 7 weeks of acute low back pain onset will have spinal manipulation performed in the office on their initial visit. For those patients seen by the medical doctor or family nurse practitioner also presenting within the 7 week time frame, a referral to have spinal manipulation therapy performed as soon as possible will be provided (Chou et. al., 2017a; Delitto et. al, 2012; Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016; Snow et. al., 2016)

Education on conservative treatments to be done at home will be given to the patient in a take-home written brochure as well as discussed verbally at the visit to assure comprehension. On the handout, recommended treatments include the use of superficial heat (Chou et. al., 2017a; Goertz et. al., 2012; Quaseem et. al., 2012) Applying heat wraps for eight hours, or an electric blanket applied for 25 minutes within the first 5 days of onset are recommended for pain relief (Goertz et. al., 2012; Quaseem et. al., 2012). Recommendations to stay active and continue activities of daily living as tolerated by symptoms (Chou et. al., 2017a; Delitto et. al, 2012; Goertz et. al., 2012; Lizarondo, 2016) and exercise recommendations to reduce future reoccurrence of acute low back pain episodes will also be provided (Delitto et. al, 2012; Goertz et. al., 2012; Slade et. al., 2016). These exercises include stretching with pelvic tilt knee raises and partial press ups to relieve pain. As pain decreases, the patient is encouraged to incorporate swimming and biking to improve back strength (Goertz et. al., 2012). Visual examples of the stretching exercises will be provided to the patient in the written brochure.

The provider will answer all questions the patient may have. In general, this includes discussion of causation and the natural history of acute low back pain, the reason laboratory tests or imaging is not being ordered (Goertz et. al., 2012) and reasons the patient should make an immediate appointment with the provider. The reasons to make a follow-up appointment include: pain that does not improve after two to three weeks, pain or weakness traveling down the leg below the knee, or leg, foot, groin or rectal numbness.

Other reasons include unexplained fever, nausea and vomiting, stomach aches, urine or stool incontinence, immobilizing pain, and redness or swelling of the back or spine (Goertz et. al., 2012). The patient will also be encouraged to schedule an appointment if there is a desire for further education or reassurance (Goertz et. al., 2012). Reassurance is important for reducing fear and anxiety. The provider will reassure the patient that acute low back pain is a common problem and has a high probability of quick resolution (Goertz et. al., 2012). It helps promote self-care management as well and will be given prior to the conclusion of the patient visit (Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016).

Reevaluation

Reevaluation will be conducted via telephone by the project manager on a weekly basis using the VAS and ODI for a total of eight weeks or until the patient reports a pain score of zero. This information will be dated and kept in the patient's folder to be used for analysis at the end of the project. The patient will be advised to follow up in the office two weeks after their initial visit if pain has not decreased or there is severely impaired function. At this visit the VAS and ODI will be re-administered, and the patient will be assessed for changes in strength, changes in job and activity association, and the presence of red flags will be noted (Goertz et. al., 2012; Lizarondo, 2016; Slade et. al., 2016). Patients showing minor or no improvement with conservative treatments will be referred to a spinal specialist due to delayed recovery risk (Goertz et. al., 2012).

Planning

A meeting will be conducted by the project manager with the providers of the clinic agency. The meeting will last approximately 20 minutes. During this time the algorithm will be explained and all questions about the project and initiation of the evidence-based practice will be answered. Follow up planning for office visits as well as phone follow up with evaluation tools will be discussed. With the support and acknowledgment of the project objectives and interventions, the dates and times of the implementation will be agreed upon.

Prior to initiating the clinical practice change, a separate educational meeting will be conducted with the medical assistant tasked with rooming the patients to provide education regarding the intervention and processes she will participate in to successfully implement the change. The medical assistant will be instructed on a script to use with each patient presenting with a chief complaint of acute low back pain for recruitment purposes. She will also be instructed on how to collect the initial contact information and consent. She will provide the patient with a demographic information form to be completed prior to being seen by the provider and returned to the project manager conducting the project at the end of the clinic visit after the educational session.

Data

Measures and their Reliability and Validity

After obtaining consent, patients will be asked to complete a demographic information form. To maintain systematic and consistent execution, the plan of care will be identical for each initial patient visit.

The ODI has internal consistency of Cronbach α ranges from .71 to .87. Test-retest reliability has also shown high value ranges from $r = 0.83$ to 0.99 (Vianin, 2008). The variance in range has a direct relation with the length of time between repeated measurements. The longer the period of time the lower the score (Vianin, 2008).

The VAS scoring tool also has been shown to have high reliability and validity. The test-retest reliability of the VAS in the acute pain setting is 90% with a correlation coefficient ranging from 0.97 to 0.99 (Williamson & Hoggart, 2005).

Collection

All survey data will be stored in the DO's desk and locked at the facility site after business hours. Each patient will have an individual manila folder which all of the project information will be kept for the duration of the eight weeks time. The folders will be marked with a randomly assigned number to maintain anonymity for patient privacy.

As patients are recruited for participation and sign consent, his or her name will be obtained and each patient will be randomly assigned a number from 1 to 12 drawn from a hat after the appointment before filing the patient's folder in the physician's desk. The project manager utilized a Survey Code Sheet to track all patients' names with their randomly assigned identification numbers for future referencing. The demographic information form, the PHQ-2, (or PHQ9 if indicated), Waddell's sign results and 8 copies of the Oswestry Disability Index surveys and VAS scales each had a blank square in the upper right corner for the project manager to place each individual participant's identification number. After the project is complete, the identification number will be utilized to identify the patient and compare individual outcomes to determine the benefits of the algorithm initiated.

Management and Analysis

The patient folders were kept at the clinical site locked in the physician's drawer when not in use. Patient information at the time of project completion was taken from the office to the project manager's home and kept in a locked desk drawer to ensure patient privacy. Confidentiality was maintained during all emails and meetings between the project manager and her advisor. Only the patient assigned identification numbers were referenced in discussions of the project. In presenting the project at Valparaiso University, at no time were patient names or other identifiable information disclosed.

Protection of Human Subjects

Prior to implementation of this EBP project, IRB approval was granted by Valparaiso University and permission to use the clinic was given the family health clinic office manager. All patient participants were provided a consent which stated the project's purpose, procedures, risks, benefits, voluntary participation and freedom to withdraw, and assurance of patient confidentiality. Furthermore, the project manager's contact information was provided on the consent for any questions or concerns the participants may have through the duration of the project.

Benefits of the project algorithm will be explained to the patient. Interventions utilized for the project algorithm are the most recent, recommended guidelines for the assessment, treatment, and reevaluation of acute low back pain, which are statistically shown to improve pain and function. Consistent use of the algorithm among providers improves continuity of care. Furthermore, participation in the EBP project will provide the patient with more frequent opportunities to report pain and function recovery through conducted telephone assessments on a weekly basis with the project manager.

CHAPTER 4

The purpose of this project was to implement an algorithm for the assessment and treatment of acute low back pain to standardize care within a medical practice and improve outcomes for patients. The result of implementing the acute low back pain algorithm was pain and mobility resolution by the end of 8 weeks' time. For each participant however, recovery was reported with statistical significance up to 2 weeks' time. The Oswestry Disability Index and Visual Analog Scale were implemented to measure pain and mobility improvement from the patient's baseline acute visit and on a weekly basis via telephone follow up.

Participants

Size

At the beginning of this EBP project, 12 patients consented to participate, completed the demographic sheet, and allowed for baseline ODI and VAS scores to be obtained. Each of the 12 patients had the algorithm's initial assessment and treatments plan implemented. The final number of participants at the completion of the project was 10 with an attrition rate of 16.7%. Reasons for attrition were unknown. The participants did not answer or return the follow up phone calls.

Characteristics

Descriptive statistics were used to describe the demographic characteristics gathered for this EBP project (N=12). The majority (75%) of participants were Caucasian, single (58.3%), with a high school diploma/GED as the highest level of education, (58.3%), and making less than \$60,000 a year (47.1%). There was an equal amount of male and female participants. The mean age range of participants was 36.

Table 4.1

Demographics Characteristics

Demographics	Frequency (12)
Gender	50% (6)
Male	50% (6)
Female	
Mean Age/Standard Deviation	36.83/16.39
Age Range	18-69
Caucasian	75% (9)
African American	8.3% (1)
Hispanic	16.7% (2)

Changes in Outcomes

The tool utilized to determine improvement in function mobility was the ODI. It is a questionnaire consisting of common activities of daily life. Patients select a statement indicating the level of disability they are experiencing for various activities (see Appendix D) To assess pain, the VAS scale was used (see Appendix E). It is a numerical survey from 0-10, with zero representing no pain and 10 representing the worse pain imaginable, to measure the level of pain the patient is currently experiencing.

Statistical Testing

Effectiveness of the algorithm was assessed statistically with the use of SPSS Version 22. A repeated measures ANOVA was calculated comparing participants' ODI results at 3 different times: baseline, week 1, and week 2. A significant effect was found ($F(2,18) = 54.24, p < 0.05$).

Follow up protected *t* tests revealed significant improvement in ODI scores from the initial visit ODI ($MD = 2.9, sd = .73$) to week 1 ($MD = 1.0, sd = .56$) and from week 1 to week 2 ($MD = 0.6, sd = .51$).

A statistically significant increase in function from ODI baseline to ODI week 1 was found ($t(9) = 6.12, p < 0.05$) and also from ODI week 1 to ODI week 2 ($t(9) = 3.67, p < 0.05$).

A repeated measures ANOVA was calculated comparing each participant's VAS results at 3 different times: baseline, week 1, and week 2. A significant effect was found ($F(2, 18) = 78.52, p < 0.05$). Follow up protected *t* test revealed VAS improvement significantly from the baseline VAS ($MD = 7.0, sd = 1.41$) to week 1 ($MD = 4.6, sd = 2.17$) and from week 1 to week 2 ($MD = 2.4, sd = 1.95$).

A statistically significant decrease in pain from VAS baseline to VAS week 1 was found ($t(9) = 6.46, p < 0.05$). This statistical significance was also seen in VAS week 1 to VAS week 2 ($t(9) = 6.73, p < 0.05$).

Table 4.2

RM ANOVAs with means and Standard Deviations for ODI and VAS (n=10)

Variable	Mean	SD	F	p
ODI				
Baseline	2.9	0.73	54.24	.000
Week 1	1.8	0.78		
Week 2	1.2	0.91		
VAS				
Baseline	7.0	1.41	78.52	.000
Week 1	4.6	2.17		
Week 2	2.4	1.95		

Table 4.3

ODI, VAS Post Hoc Paired t Tests (N=10)

Variable	Mean Difference	(SD)	<i>t</i>	<i>df</i>	<i>p</i>
ODI					
Baseline – Week 1	1.10	0.56	6.12	9	<0.05
Week 1 – Week 2	0.60	0.51	3.67	9	<0.05
VAS					
Baseline – Week 1	2.40	1.17	6.46	9	<0.05
Week 1 – Week 2	2.20	1.03	6.73	9	<0.05

Significance

The results of the statistical analysis answer the PICOT question: Does implementing a EBP algorithm for assessing, treating and reevaluating acute low back pain result in improvement of pain scores and functional mobility over an 8-week period. The results of the repeated measures ANOVA for both ODI and VAS were statistically significant prompting post hoc paired *t* tests of the participants' aggregated pain and disability scores comparing baseline to week 1 and week 1 to week 2. Follow up results show significant improvement in all week to week comparisons of both ODI and VAS ($p < 0.05$).

CHAPTER 5

DISCUSSION

This evidence-based practice project examines the impact implementation of an algorithm on patients presenting with acute low back pain in the primary care setting will have in improving their pain scores and mobility function over a series of weeks. The purpose of chapter five is to provide an evaluation of the findings described in Chapter four. It will also discuss the theoretical and EBP frameworks utilized for the project. Strengths and limitations of the EBP project will be described as well as implications for future utilization of the project in clinical practice, theory, research and education.

Explanation of Findings

The findings of this EBP project indicate an earlier recovery from acute low back pain. Each participant reported recovery by the end of week three, at the week 4 reevaluation. Therefore, the answer to the PICOT question is use of an algorithm in the primary care setting did result in improved pain and mobility function.

However, the project did indicate statistical improvement. The ODI and VAS were taken at each patient's initial visit to provide a baseline assessment for disability and pain. The algorithm was then implemented and a follow-up call was performed on a weekly basis for 4 weeks to collect additional ODI and VAS information to evaluate the intervention. Statistically significant improvement was found from baseline to week 1 and week 1 to week 2. Data analysis was only included up to week 2, the time when all ten participants were being called and the first two participants reported recovery.

EBP Outcomes Consistent with Research

People commonly recover spontaneously from acute back pain in 6-8 weeks' time with or without medical intervention (Mehling et. al., 2015); For this reason, the 8 week time frame for reevaluation was specifically chosen for comparison.

Results of the project indicate with utilization of the algorithm, return to preinjury state was seen by all 10 participants at the end of week 3 at the week 4 follow up call. In 2 systematic reviews, heat wrap therapy significantly reduced pain after 5 days (Lizarondo, 2016), this is congruent with the largest mean difference outcome in the VAS scores within the first week of treatment.

The literature strongly recommended spinal manipulation for the treatment of acute low back pain (Delitto et. al, 2012) with the greatest improvement seen within the first month of treatment (Chou et. al., 2017a). Additionally, according to Goertz (2012), patients experience significant improvements in two to four weeks with the use of superficial heat, spinal manipulation, and pharmacological interventions. This research is consistent with the participants reporting recovery by 4 weeks' time (Goertz, 2012).

It is believed that the algorithm, which incorporated each of the recommended treatments, was the reason behind the rapid recovery in pain and function mobility. Previously, each provider in the clinic would suggest treatments of acute back pain, but did not incorporate every recommendation. The outcomes of the project reflect the importance of following clinical guidelines fully rather than implementation of personal preference or tradition. The results of the EBP project indicate the value of the algorithm which includes use of all recommendations rather than one or two for treatment of acute low back pain.

Evaluation of Applicability of Theoretical and EBP Frameworks

The EBP project was developed using a theoretical framework, which supported the practice change, and an EBP framework, which guided the EBP process. These frameworks maintained the consistency of the project throughout each stage to completion.

Theoretical Framework

Kolcaba's conceptual framework begins at the first interaction, with the patient seeking comfort in the presence of a healthcare deficit (Kolcaba & DiMarco, 2005). For this EBP project, the first interaction between provider and patient was at their initial visit when a complaint of acute low back pain was made.

According to Kolcaba, it is then the responsibility of the provider to implement interventions assisting the individual in attaining the first level of comfort: relief (Kolcaba & DiMarco, 2005). Implementation of the acute low back algorithm provided in-office interventions such as spinal manipulation, pharmacological interventions such as NSAID and muscle relaxers, and education for home non-pharmacological interventions such as stretching, exercises, and continuing usual ADLs as tolerated.

The course of relief took place over the span of 4 weeks' time. Each week the patients reported improvement which was statistically significant. By the end of the 4th week, the participants reported recovery of their acute low back pain. Kolcaba states that with relief met, the second form of comfort, "ease," is sequentially experienced. Ease is when a decreased level of anxiety and distress allows the patient to return to normal everyday functioning. (Kolcaba, 2003). Unfortunately, in this EBP project, the only reevaluation tools used were the VAS and ODI which do not assess for decreased anxiety or distress. Furthermore, although patients may subjectively report recovery from pain and return to normal function, this does not equate to a state of "ease" which may be due to lingering psychological factors. This is a limitation of the project manager's created algorithm. It can be altered with the use of a psychological screen in the future to indicate Kolcaba's state of comfort "ease."

The final comfort state of Kolcaba's framework is "transcendence". Transcendence is a frame of mind which lead the patient to make active lifestyle modifications that improve their health and wellbeing (Kolcaba & DiMarco, 2005). The providers offered an avenue for the patients to achieve transcendence by distributing educational brochure, which gave examples of exercise routines conducive to improving back strength and stretches to relive acute pain (Kolcaba & DiMarco, 2005). Continuation of daily activities as tolerated (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016) along with deliberate exercise (Delitto et. al, 2012; Goertz et. al., 2012; Slade et. al., 2016). is consistent with better-quality recovery (Chou et. al., 2017a; Delitto et. al., 2012; Goertz et. al., 2012; Lizarondo, 2016).

A limitation to this model is time constraints. It would be helpful to assess the patient's transcendence; however, transcendence occurs for individuals at different points in their lives. A longitudinal study with repeated follow up over many years may more accurately demonstrate the patients' growth in lifestyle modifications resulting in transcendence. Ongoing patient/provider discussion would be necessary to establish use of preventive self-care. The clinical significance of transcendence could be assessed collectively by a decrease in incidence and severity of acute low back pain measured by relapse visits and ODI/VAS assessment tools. Kolcaba's theoretical framework can be utilized in this way, however for this EBP project, the time was not available to measure participants transcendence.

EBP Framework

The John Hopkins EBP model was useful in this project because it provided a guide for formulating the practice question, researching the topic, appraising the evidence, and evaluating the outcomes (Dearholt & Dang, 2012). The model is based on three cornerstones for professional nursing: practice, education, and research (Dearholt & Dang, 2012). These cornerstones were helpful in progressing the project manager in the EBP project. The cornerstone of practice helped identify the clinical problem. Within the clinical site, the internal factor of organizational culture was affecting the treatments patients were receiving for their acute low back pain. Providers were only applying certain recommendations but not all the clinical guidelines. The model was used to formulate a PICOT question about a patient population specific enough to have standardized and measurable interventions and outcomes.

To rectify the practice problem, the project manager used John Hopkins' 18-step process and the professional cornerstone, research, to gather and evaluate the quality of evidence in the literature. This led to the exclusion of literature associated with back pain of different etiologies and location. The appraisal tool provided a straight-forward logical formula for evaluating the level and quality of evidence. This allowed for determination of whether a study may or may not meet an acceptable quality standard to be used in an EBP.

Finally, the John Hopkins model also encouraged generating new knowledge within the nursing profession. The model cornerstone, education, was reached with the dissemination of statistically significant information in a poster and lecture presentation to other professional nurses within an APN program. In conclusion, the John Hopkins model was valuable in guiding this EBP project.

Strengths and Limitations of the EBP Project

Evaluation of this EBP project revealed a variety of strengths and weaknesses. The following section provides an overview of the factors that potentially impacted the implementation and results of this EBP project as well as recommendations for improvement in future iterations.

Strengths

A strength of this project was ease of implementation. Since the acute low back pain algorithm concept was well received in the clinic, each of the providers was eager to utilize it. The algorithm was not overly time consuming, so it was not a burden that added time to patient visits. The VAS and ODI screens consisted of simple, straight-forward questions; this aspect was crucial to preventing patient burnout with the follow-up reevaluations. Overall, the EBP project was well-received, simple to use, and easy to perform.

Another strength of the project was its low cost. Aside from spending money on the patient educational brochures and printing the demographics sheets, there were no monetary expenses as the baseline and follow-up documentation was entered via the EMR. A quick link was created for providers to access within the EMR when patients presented with acute low back pain. This provided extra security of patients' sensitive information while also accruing no additional cost to the project manager or clinic. Given these considerations, the EBP project could easily be reproduced in other patient care settings on a limited budget.

Limitations

A limitation to the project was the small number of participants. The project site was a clinic within a rural Michigan farming community. The implementation phase took place after summer and fall harvesting, when patients typically have acute low back pain due to outside activities, but before winter where patients present with symptoms from shoveling snow. The estimated number of patients originally given to the project manager by the provider was made based on the chief complaints of the 2 months prior to implementation. The number of patients available for the project was grossly smaller than what the project manager was expecting. It would be beneficial to see if the results remained statistically similar with a larger number of participants.

A flaw in the projects design is the project manager discontinued calling patients after they reported recovery. The oversight excluded data for possible relapse of acute low back pain symptoms which may have been experienced by participants previously expressing recovery earlier in the reevaluation weeks. For this reason, week 3 and week 4 data which may have also shown statistical significance could not be included. Table 4.3 contains the ODI/VAS data of patients for baseline through week 2. Each participant should have been called for the entire 8 weeks' time frame even after reported recovery to ensure no rebound symptoms existed.

Implications for the Future

The project indicated significant improvement in patients' reported pain and disability levels when reevaluated on a weekly basis. Given the project's relative ease of implementation and low cost, wider adoption could yield significant positive results across a variety of patient-provider settings.

Practice

It is commonplace for nurse practitioners to be primary care providers in the state of Indiana. As a profession that holds evidence-based practice in high esteem, an APN can be a leader in an organization by introducing an algorithm which improves recovery of patients suffering from acute low back pain both into their method of practice. DNP educated APNs have the responsibility to continuously update their knowledge base and apply tools that will better serve their patients. The current recommended treatments for acute low back pain are not groundbreaking revelations in the medical community. However, assuring all of them are applied for each patient is not guaranteed. Utilizing this algorithm may decrease the likelihood of overlooking evidence based guidelines resulting in decreased recovery time and exemplifying how the APN can be a leader in change.

Theory

Kolcaba's comfort theory was an appropriate tool in guiding the progress of this EBP project, but the EBP project itself needed modifications to incorporate the 3 stages of comfort. The comfort stage "ease" was unable to be assessed with the algorithms current reevaluation tools ODI/VAS. A separate psychological tool to analyze the participants' anxiety and distress at baseline and in reevaluation weeks would allow for measuring this in the future. Though unable to measure transcendence in the time frame of this EBP project, Kolcaba's framework would be suitable for long-term follow-ups of acute low back pain. To ensure validity in measuring transcendence, a patient appointment may be scheduled at 6 and 12 months post recovery time. They would be requested to fill out an essay-based questionnaire. Requiring the patient to list their activities which improve their health and strengthen their lower back may provide a more honest reflection than a "yes or no" survey. If the activities the patient lists are congruent with the recommendations given during their acute low back pain treatment, and patients who reported utilizing these techniques presented with a lower incidence and severity of acute low back pain, this would be indicative of transcendence into preventative self-care.

Research

Patient/provider collaboration is the new standard of delivering healthcare (Schottenfeld, et al., 2016). It is found to result in better patient/provider relationships, higher patient satisfaction, better recall of information and treatment adherence (Schottenfeld, et al., 2016). Medical professionals have educational knowledge which guides their treatment options. This education is of no use without effective communication. In the clinical site where the EBP project was implemented, current treatment guidelines on acute low back pain were not clearly understood by many of the patients at their initial appointments. Attempting to correct preconceived notions regarding the most effective treatments, explanations were given to patients. After answering all questions, a written brochure was distributed for future reinforcement. Research on patient perceptions of the algorithm would be helpful to identify if the current strategies of communication are effective or require different educational tools.

Education

Future education is necessary to ensure primary care providers understand and utilize the acute low back pain algorithm to unlock its potential. None of the providers at the clinical site were treating this patient population using all of the recommended guidelines. This situation may be indicative of a wide-spread inconsistency with implementing the evidence-based practice for chief complaints of acute low back pain. Oral lecture presentations and scholarly journal publications of the algorithms' effectiveness will help ensure the information is reaching healthcare professionals and the public. Practice changes will only occur when the evidence-based information is understood and the tools to implement it are available.

Conclusion

The DO, and head of the clinic, decided to adopt the algorithm for future use within the organization. After a discussion with the MD and NP, verbal agreement was reached that each provider would implement the algorithm for acute low back pain complaints.

Follow up reevaluation calls will not be conducted as they were used as a measurement tool for the project, however, patients will be instructed to make a follow up appointment if they have no improvement in two weeks' time per the clinical guidelines. The algorithm is currently able to be accessed in the EMR for use when patients present with acute low back pain. Additionally, the algorithm's detailed outline for assessment, treatment and evaluation is a valuable tool for reference in situations where the condition worsens or to demonstrate proper documentation and due diligence in the unfortunate event of a lawsuit. The evaluation of this project suggests that the implementation of an evidence-based algorithm in the assessment, treatment, and reevaluation of acute low back pain results in significant pain reduction and function recovery within 4 weeks. The algorithm may decrease the progression to chronic low back pain improving patient quality of life and decreasing healthcare costs.

REFERENCES

- Brinzo, J. A., Crenshaw, J. T., Thomas, L., & Sapp, A. (2016). The effect of yoga on depression and pain in adult patients with chronic low back pain: a systematic review protocol. *Joanna Briggs Institute Database of Systematic Reviews & Implementation Reports*, 14(1) 55-66. doi: 10.11124/jbisrir-2016-2409
- Brouwers M, Kho M.E., Browman, G.P., Cluzeau, F., Feder, G., Fervers, B., Hanna, S., Makarski, J. (2010). AGREE II: Advancing guideline development, reporting and evaluation in healthcare. *Canadian Institutes of Health Research*, Retrieved from: www.agreetrust.org.
- Chiarotto, A., Maxwell, L. J., Terwee, C. B., Wells, G. A., Tugwell, P., & Ostelo, R. W. (2016). Roland-morris disability questionnaire and Oswestry disability index: which has better measurement properties for measuring physical functioning in nonspecific low back pain? Systematic review and meta-analysis. *Physical Therapy*, 96(10), 1620-1637. doi: 10.2522/ptj.20150420
- Chou, R., Deyo, R., Friedly, J., Skelly, A., Weimer, M., Fu, R., Dana, T., Kraegel, P., Griffin, J., Grusing, S., Brodt, E. (2017a). Nonpharmacological therapies for low back pain: A systematic review for an American college of physicians clinical practice guideline. *Annals of Internal Medicine*, 166(7), 493. doi: 10.7326/M16-2459
- Chou, R., Deyo, R., Friedly, J., Skelly, A., Weimer, M., Fu, R., Dana, T., Kraegel, P., Griffin, J., Grusing, S., Brodt, E. (2017b). Systematic pharmacological therapies for low back pain: a systematic review for an American college of physicians clinical practice guideline. *Annals of Internal Medicine*, 166(7), 480. doi:10.7326/M16-2458.
- Dearholt, S. L., & Dang, D. (2012). Johns Hopkins nursing evidence-based practice: Models and guidelines (2nd ed.). *Indianapolis: Sigma Theta Tau International*. Retrieved from: <http://ebookcentral.proquest.com>

- Delitto, A., George, S., VanDillen, L., Whitman, J., Sowa, G., Shekelle, P., Denninger, T. (2012). Low back pain: clinical practice guidelines linked to the international classification of functioning, disability, and health from the orthopedic section of the American physical therapy association. *National Guideline Clearinghouse*, 42(4), A1-A57. Retrieved from: <https://www.guideline.gov>.
- Friedman, B.W., Dym, A.A., Davitt, M., Holden, L., Solorzano, C., Esses, D., Bijur, P. E., Gallagher, E.J. (2015). Naproxen with cyclobenzaprine, oxycodone/acetaminophen, or placebo for treating acute low back pain: a randomized clinical trial. *Journal of American Medical Association*, 314(15), 1572-1580. doi:10.1001./jama.2015.13043
- Goertz, M., Thorson, D., Bonsell, J., Bonte, B., Campbell, R., Haake, B., Johnson, K., Kramer, C., Mueller, B., Peterson, S., Setterlund, L., Timming, R. (2012). Adult acute and subacute low back pain. *National Guidelines Clearing House*, 91. Retrieved from: <https://www.guideline.gov>.
- Kolcaba, K. (2003). Comfort theory and practice. *New York, NY: Springer Publishers*.
- Kolcaba, K., & DiMarco, M. A. (2005). Comfort theory and its application to pediatric nursing. *Pediatric Nursing*, 31(3), 187. Retrieved from: <http://ezproxy.valpo.edu/login?url=https://search.proquest.com/docview/199528895?accountid=14811>
- Lee, H., McAuley, J. A., Hübscher, M., Allen, H. G., Kamper, S. J., Moseley, G. A. (2016). Tweeting back: predicting new cases of back pain with mass social media data. *Journal of American Medical Information Association*, 23(3) 644-648. doi: 10.1093/jamia/ocv168
- Lin, C.C., Li, Q., Williams, C. M., Maher, C. G., Day, R. O., Hancock, M.J. & Jan, S., 2016). The economic burden of guideline-recommended first line care for acute low back pain. *European Spine Journal*, 1-8. doi:10.1007/s00586-016-4781-0.

- Lizarondo, L. (2016). Low back pain: initial management. *The Joanna Briggs institute*. Retrieved from: JBI15441
- McCarberg, B., Stanos, S., & D'Arcy, Y. (2014). Back and neck pain. Retrieved from <http://ebookcentral.proquest.com>
- Mehling, W.E., Ebell, M. H., Avins, A. L., & Hecht, F. M. (2015). Clinical decisions rule for primary care patients with acute low back pain at risk of developing chronic pain. *The Spine Journal: Official Journal of the North American Spine Society*, 15(7), 1577-1586. doi:10.1016/j.spinee.2015.03.003
- National Institute of Health (2016). Back pain. Retrieved July 28, 2017, from https://www.niams.nih.gov/Health_Info/Back_Pain/default.asp
- National Institute of Health (2014). What Is back pain? fast facts: an easy-to-read series of publications for the public. *National Institute of Arthritis, Musculoskeletal, and Skin Disease*. Retrieved from: www.niams.nih.gov.
- Newhouse, J. J., & Balotsky, E. (2013). What motivates hospital CEOs to commit to ethical integration in their organizations. *Cambridge Quarterly of Healthcare Ethics*, 22(4), 346-54. doi:10.1017/S0963180113000194.
- Noltemeyer, A., Bush, K., Patton, J., & Bergen, D., (2012). The relationship among deficiency needs and growth needs: an empirical investigation of Maslow's theory. *Children and Youth Services Review*, 34(9), 1862-1867. doi:10.1016/j.childyouth.2012.05.021.
- Petit, A., M.D., Fouquet, N., M.D., & Roquelaure, Y., PhD. (2015). Chronic low back pain, chronic disability at work, chronic management issues. *Scandinavian Journal of Work, Environment & Health*, 41(2), 106-110. Retrieved from <http://ezproxy.valpo.edu/login?url=https://search.proquest.com/docview/1662769764?acountid=14811>
- 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. *American College of Physicians*, (166) 514-530. doi: 10.7326/P17-9032.
- Slade, S., Ther, G. D., & Ther, M. M. (2016). Acute low back pain: assessment. *The Joanna Briggs Institute*. Retrieved from: JBI@Ovid.com JBI10929.
- Snow, R. J., Seffinger, M., Hensel, K., Wiseman, R. (2016). American osteopathic association guidelines for osteopathic manipulation treatment (OMT) for patients with low back pain. *National Guideline Clearing House*, 116(8) 536-549. Retrieved from: <https://www.guideline.gov>.
- Steffens, D., Ferreira, M. L., Latimer, J., Ferreira, P.H., Koes, B.W., Blyth, F., Li, Q., Maher, C. G. (2015). What triggers an episode of acute low back pain? A crossover study. *Arthritis Care and Research*, 67(3) 403-410. doi:10.1002/acr.22533
- Schottenfeld, L., Petersen, D., Peikes, D., Ricciardi, R., Burak, H., McNellis, R., & Genevro, J. (2016). Creating patient centered team-based primary care. *Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services*, 16-0002-EF Retrieved from: <https://pcmh.ahrq.gov/page/creating-patient-centered-team-based-primary-care>
- Vianin, M. (2008). Psychometric properties and clinical usefulness of the Oswestry disability index. *Journal of Chiropractic Medicine*, 7(4), 161-163. doi:10.1016/j.jcm.2008.07.001
- Williamson, A. and Hoggart, B. (2005), Pain: a review of three commonly used pain rating scales. *Journal of Clinical Nursing*, 14: 798–804. doi:10.1111/j.1365-2702.2005.01121.x

BIOGRAPHICAL MATERIAL

Ms. Caito graduated from Henry Ford Community College in 2011 with an associate's degree in nursing. She worked in South Bend Indiana on both a Renal unit and a postpartum unit while she pursued further education. She graduated in 2013 from Indiana University with a bachelor's degree. Ms. Caito is currently attending Valparaiso University and anticipates completion of a doctorate of nursing practice degree in 2018. Ms. Caito is a member of the American Association of Nurse Practitioners and National Association of Prolife nurses. She has presented an evidence-based practice (EBP) project on acute low back pain treatment in Merryville, IN in 2017 and will be submitting her work to the Journal of Nurse Practitioners May 2018. Ms. Caito has a considerable interest in other cultures and healthcare systems. While in graduate school she participated in three travel-abroad trips to Ireland, Germany, and China. Ms. Caito hopes to further her knowledge in international healthcare and implement EBP from diverse cultures into the American healthcare setting. Ms. Caito also wishes to teach undergraduate nursing students part-time in the future. She has a love for teaching and would like to pay forward the knowledge and kindness bestowed on her during her studies to students wishing to pursue further education in the nursing field.

ACRONYM LIST

ANA: American Nurses Association

APA: American Psychological Association

CDC: Centers for Disease Control

DO: Doctor of Osteopathic Medicine

EBP Evidence-Based Practice

EMR: Electronic Medical Record

MD: Medical Doctor

NP: Nurse Practitioner

NSAID: non-steroidal anti-inflammatory drug

ODI: Oswestry Disability Index

PET: Practice Evidence Translation

VAS: Visual Analog Scale

Appendix A

Acute Low Back Pain Clinical Algorithm

Patient: _____ Date(s) of Visit: _____

Screening	Date Completed
Subjective Assessment	
Assessed for sensory changes	
Assessed for pain characteristics	
Assessed for strength changes	
Assessed employment associations	
Assessed for presence or absence of red flags: Cancer, Infection, Cauda Equina, Fracture, Unspecified and unrelenting night pain	
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
Performed both psychological screens with Waddell's sign tool (see Appendix F) and PHQ-2/PHQ-9 (see Appendix E)	
Objective Assessment	
Observed patient for asymmetry	
Conducted range of motion test	
Conducted neurological exam	
Treatment of Acute Low Back Pain	
Educate on use of Non-steroidal anti-inflammatory drugs (NSAIDs)	
Prescribe muscle relaxant	
Advise patient to use Superficial Heat (Applying heat wraps for eight hours, or an electric blanket applied for 25 minutes)	
Advised to remain active as symptoms allow	
Educated on exercise options and stretches (Pelvic tilt knee raises, and partial press ups to relieve pain. As pain decreases swimming and biking)	
Spinal manipulation performed or referral given (for patients presenting within 4 weeks of acute onset)	
Educate on reasons to return to office: <ul style="list-style-type: none"> • pain with no improvement in 2-3 weeks • loss of bowel or bladder function • pain and weakness traveling down the leg below the knee Leg, foot, groin or rectal area feeling numb • redness or swelling on the back or spine • unexplained fever, nausea/vomiting, stomachaches, weakness or sweating • desire for more reassurance or education 	
Answer All questions and provide take-home educational brochure	

Reevaluation on Weekly Basis	Date Completed
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
After two weeks of severe pain or impairment in function, and the patient having minor or no improvement seen through the screening tools the provider should then refer to a spinal specialist due to delayed recovery risk	
	Date Completed
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
After two weeks of severe pain or impairment in function, and the patient having minor or no improvement seen through the screening tools the provider should then refer to a spinal specialist due to delayed recovery risk	
	Date Completed
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
After two weeks of severe pain or impairment in function, and the patient having minor or no improvement seen through the screening tools the provider should then refer to a spinal specialist due to delayed recovery risk	
	Date Completed
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
After two weeks of severe pain or impairment in function, and the patient having minor or no improvement seen through the screening tools the provider should then refer to a spinal specialist due to delayed recovery risk	
	Date Completed
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
After two weeks of severe pain or impairment in function, and the patient having minor or no improvement seen through the screening tools the provider should then refer to a spinal specialist due to delayed recovery risk	

	Date Completed
Assessed function using Oswestry Disability Index tool (see Appendix C)	
Assessed pain using the Visual Analog Scale tool (see Appendix D)	
After two weeks of severe pain or impairment in function, and the patient having minor or no improvement seen through the screening tools the provider should then refer to a spinal specialist due to delayed recovery risk	

*Appendix B***Code Sheet**

Patient Name (Last, First)	Code Number
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12

Appendix C

Oswestry Disability Index

Section 1 – Pain Intensity

I have no pain at the moment.

The pain is very mild at the moment.

The pain is moderate at the moment.

The pain is fairly severe at the moment. The pain is very severe at the moment.

The pain is the worst imaginable at the moment.

Section 2 – Personal Care (washing, dressing, etc.)

I can look after myself normally but it is very painful.

I can look after myself normally but it is very painful.

It is painful to look after myself and I am slow and careful.

I need some help but manage most of my personal care.

I need help every day in most aspects of my personal care.

I need help every day in most aspects of self-care.

I do not get dressed, wash with difficulty, and stay in bed.

Section 3 - Lifting

I can lift heavy weights without extra pain. I can lift heavy weights but it gives extra pain.

Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned (i.e. on a table).

Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.

I can lift only very light weights.

I cannot lift or carry anything at all.

Section 4 – Walking

Pain does not prevent me walking any distance.

Pain prevents me walking more than 1 mile.

Pain prevents me walking more than $\frac{1}{4}$ of a mile.

Pain prevents me walking more than 100 yards.

I can only walk using a stick or crutches.

I am in bed most of the time and have to crawl to the toilet.

Section 5 – Sitting

I can sit in any chair as long as I like.

I can sit in my favorite chair as long as I like.

Pain prevents me from sitting for more than 1 hour.

Pain prevents me from sitting for more than $\frac{1}{2}$ hour.

Pain prevents me from sitting for more than 10 minutes.

Pain prevents me from sitting at all.

Section 6 – Standing

I can stand as long as I want without extra pain.

I can stand as long as I want but it gives me extra pain.

Pain prevents me from standing more than 1 hour.

Pain prevents me from standing for more than $\frac{1}{2}$ an hour.

Pain prevents me from standing for more than 10 minutes.

Pain prevents me from standing at all.

Section 7 – Sleeping

My sleep is never disturbed by pain.

My sleep is occasionally disturbed by pain.

Because of pain, I have less than 6 hours sleep.

Because of pain, I have less than 4 hours sleep.

Because of pain, I have less than 2 hours sleep.

Pain prevents me from sleeping at all.

Section 8 – Sex life (if applicable)

My sex life is normal and causes no extra pain.

My sex life is normal but causes some extra pain.

My sex life is nearly normal but is very painful.

My sex life is severely restricted by pain.

My sex life is nearly absent because of pain.

Pain prevents any sex life at all.

Section 9 – Social Life

My social life is normal and cause me no extra pain.

My social life is normal but increases the degree of pain.

Pain has no significant effect on my social life apart from limiting my more energetic interests, i.e. sports.

Pain has restricted my social life and I do not go out as often.

Pain has restricted social life to my home.

I have no social life because of pain.

Section 10 – Traveling

I can travel anywhere without pain.

I can travel anywhere but it gives extra pain.

Pain is bad but I manage journeys of over two hours.

Pain restricts me to short necessary journeys under 30 minutes.

Pain prevents me from traveling except to receive treatment.

Section 11 - Previous Treatment

Over the past three months have you received treatment, tablets or medicines of any kind for your back or leg pain? Please check the appropriate box.

No

Yes (if yes, please state the type of treatment you have received)

SCORING TECHNIQUE FOR THE OSWESTRY LOW BACK DISABILITY INDEX

1. Each of the 10 sections is scored separately (0 to 5 points each) and then added up (max. total = 50).

Example: Section 1. Pain Intensity

- A. ___ I have no pain at the moment 0
- B. ___ The pain is very mild at the moment 1
- C. ___ The pain is moderate at the moment 2
- D. ___ The pain is fairly severe at the moment 3
- E. ___ The pain is very severe at the moment 4
- F. ___ The pain is the worst imaginable 5

2. If all 10 sections are completed, simply double the patient's score.

3. If a section is omitted, divide the patient's total score by the number of sections completed times 5.

Formula: Patient's Score X 100 = _____ % DISABILITY
 completed x 5

SCORE INTERPRETATION OF THE OSWESTRY LBP DISABILITY QUESTIONNAIRE

0-20% Minimal disability: Can cope with most ADLs. Usually no treatment is needed, apart from advice on lifting, sitting, posture, physical fitness, and diet. In this group, some patients

have particular difficulty with sitting and this may be important if their occupation is sedentary (typist, driver, etc.)

20-40% Moderate disability: This group experiences more pain and problems with sitting, lifting, and standing. Travel and social life are more difficult and they may well be off work. Personal care, sexual activity, and sleeping are not grossly affected, and the back condition can usually be managed by conservative means.

40-60% Severe disability: Pain remains the main problem in this group of patients, but travel, personal care, social life, sexual activity, and sleep are also affected. These patients require detailed investigation.

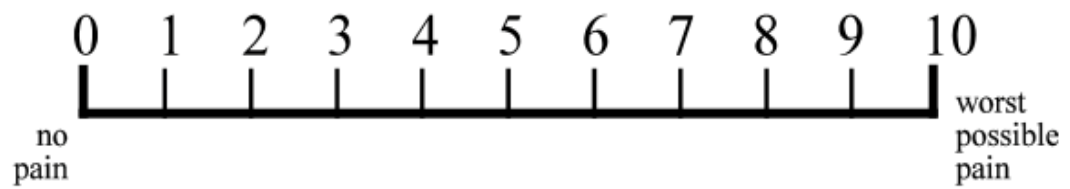
60-80% Crippled: Back pain impinges on all aspects of these patients' lives both at home and at work. Positive intervention is required.

80-100% These patients are either bed-bound or exaggerating their symptoms: This can be evaluated by careful observation of the patient during the medical examination¹

¹ Note. Oswestry Disability Index, by J. Fairbanks. Copyright 1980 by Fairbanks. Reprinted with permission.

Appendix D

Visual Analog Scale (VAS)



² Note. Visual Analog Scale, by Oxford University Press. Copyright 1977. Reprinted with permission.

Appendix E

PHQ-2

Over the past two weeks, have you been bothered by:

- Little interest or pleasure in doing things?
- Feeling down, depressed or hopeless?

If the patient answers "yes " to either of the above questions, administer the full PHQ-9 depression instrument.

PHQ-9

PATIENT HEALTH QUESTIONNAIRE -9

Over the <u>last 2 weeks</u> , how often have you been bothered	Not at	Several	More than half the	Nearly every
by any of the following problems?	all	days	days	day
1. Little interest or pleasure in doing things		1	2	3
2. Feeling down, depressed, or hopeless		1	2	3
3. Trouble falling or staying asleep, or sleeping too much			2	3
4. Feeling tired or having little energy		1	2	3
5. Poor appetite or overeating		1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down			2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual		1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way		1	2	3

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all Somewhat difficult Very difficult Extremely difficult

PHQ-9 SCORING CARD FOR SEVERITY DETERMINATION
for healthcare professional use only
Scoring—add up all checked boxes on PHQ-9
 For every ✓: Not at all = 0; Several days = 1;
 More than half the days = 2; Nearly every day = 3

Interpretation of Total Score

Total Score	Depression Severity
0-4	None
5-9	Mild
10-14	Moderate
15-19	Moderately severe
20-27	Severe

Appendix F

Waddell's Signs

Waddell's Signs assess the possibility of psychological distress or malingering or both by testing the consistency and reproducibility of patient responses to non-organic physical signs. Waddell demonstrates that when three of five tests are positive, there is a high probability of non-organic pathology. Three positive tests identify the individual who needs further psychological assessment.

1. Tenderness: Positive is generalized tenderness overlying the entire lumbar area when skin is lightly pinched or rolled.
2. Simulation: The object of these tests is to give the patient the impression that a specific test is being performed when in fact it is not.
 - Axial loading: Positive when low back pain is reported on vertical loading over the standing patient's skull by the examiner's hands. Neck pain is common and should be discounted.
 - Rotation: Positive if low back pain is reported when shoulders and pelvis are passively rotated in the same plane as the patient stands relaxed with feet together.
3. Distraction: The object of this test is to distract the patient in such a way that a positive result under normal testing circumstances becomes negative in the distracted patient. The most useful test involves Straight Leg Raising (SLR). When the patient complains of pain doing SLR while supine but does not complain of pain doing SLR while sitting, the test is positive. This test is commonly referred to as the "flip test."



Straight leg raising



Supine

4. Regionalization: Pain distributions are a function of known anatomic pathways and structures. Interpretation of the exam depends on patient giving non-anatomic or non-physiologic responses to testing.
 - Weakness: Positive test is a voluntary muscle contraction accompanied by recurrent giving way, producing motions similar to a cogwheel. Patient may show weakness on testing but have adequate strength spontaneously.

- Sensory: Alterations in sensibility to touch and pinprick occur in a non-anatomic pattern (stocking, glove distribution or diminished sensation over entire half or quadrant of body).
- 5. Overreaction: Disproportionate verbalization, facial expression, muscle tension, tremor, collapsing or sweating. Consider cultural variations..

Appendix G

Demographic Information Form
The Effect of Identical Acute Low Back Pain Care Protocol for Assessment, Treatment and
Reevaluation Completed by Each Provider in the A Clinical Agency
Demographic Information

Instructions: Please provide a response for each of the following questions.

1. Please state your age: _____

2. Circle your gender: Male Female

3. What is your marital status? Please circle.

Single Married Separated Divorced Widowed

4. What is your annual household income? Please place an (x) on the line.

_____ Less than \$60,000
_____ \$60,000 to \$80,000
_____ \$80,001 to \$100,000
_____ \$100,001- to \$150,000
_____ Greater than \$150,001
_____ Prefer not to answer

5. With which racial or ethnic category do you identify? Please mark an (x) on the line.

_____ African American
_____ Asian/Pacific Islander
_____ Caucasian
_____ Latino
_____ Native American
_____ Other

6. What is the highest degree or level of school you have completed? Please mark an (x) on the line.

_____ High school diploma;GED
_____ Trade/Technical/Vocational training
_____ Associate Degree
_____ Bachelor's Degree
_____ Master's Degree

- _____ Professional Degree
- _____ Doctorate Degree
- _____ Other

Appendix H

References

Goertz, M., Thorson, D., Bonsell, J., Bonte, B., Campbell, R., Haake, B., Johnson, K., Kramer, C., Mueller, B., Peterson, S., Setterlund, L., Timming, R. (2012). Adult acute and subacute low back pain. *Institute for Clinical Systems Improvement, 91*. Retrieved from: <https://www.guideline.gov>.

[Adventure Works]

Patient Information



What Are Different Types of Low Back Pain?

Acute low back pain – Acute low back pain often lasts for six weeks or less. The pain is not emergent if it does not extend below the knees and usually subsides over the course of a few weeks.

Acute radiculopathy – Acute radiculopathy is low back pain that also lasts for six weeks or less, but unlike acute low back pain, it does extend beyond the knees.

What Are Common Causes of Low Back Pain?

Poor posture and physical activities, such as inappropriate lifting, extensive bending and twisting, can worsen low back pain. It is uncommon that a serious problem, such as infection or other medical conditions is the cause of low back pain.

How Do I Know If I Have a Serious Problem?

Contact your doctor within a week if the pain is not noticeably improving. Call your doctor immediately if you have any of the following:

- Unexplained weight loss
- Constant night pain
- Fever of 100.4° F or higher for more than 48 hours
- New onset of urinary incontinence
- Urinary retention
- Weakness or numbness in your legs A history of cancer may also be a factor in low back pain.

Should I Have X-rays Performed?

Imaging is not recommended. X-rays usually are not necessary when you first develop lower back pain. You may need x-rays...

- If you have experienced a traumatic injury, such as a fall or car accident
- Are 50 years or older
- Have other medical problems
- Low back pain lasting longer than six weeks or no improvement within 2 weeks

What Is the Treatment?

- **Apply heat.** A hot bath or a heating pad on your lower back may help reduce pain and stiffness.
- **Improving posture.** Good posture keeps your body's weight aligned (straight) and reduces stress on the back muscles. To help reduce the stress that sitting puts on your low back, use a chair with back support. Change positions frequently, preferably every 20-30 minutes.

- **Avoid bedrest.** Staying in bed or avoiding activity may increase your pain and stiffness. Mild activity that does not significantly worsen your pain has been shown to be beneficial for quicker recovery.

- **Continue everyday activities.** Resume your daily activities as able. Active lifestyle helps prevent your back from becoming weak and stiff. However, one should avoid lifting heavy objects as well as excessive bending and twisting motions. Increase activity as tolerated.

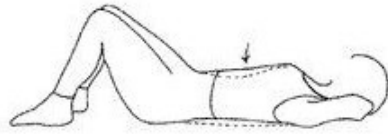
- **Use medication.** Anti-inflammatory medication, such as ibuprofen can help ease the pain and swelling in the lower back. A muscle relaxer may also help decrease pain when used in initial treatment

- **Spinal Manipulative Therapy.** Spinal manipulative therapy is useful in the early phase of acute low back symptoms particularly within the first 4 weeks.

Exercise to Keep Fit

To help in your recovery and to prevent further back problems, keep your back, abdominal muscles and legs strong. Walk daily as soon as you can. Gradually add other physical activities, such as swimming and biking, which can help improve lower back strength. Do not do any exercises that make your pain a lot worse. The following are some back exercises that can help relieve low back pain.

Pelvic tilt



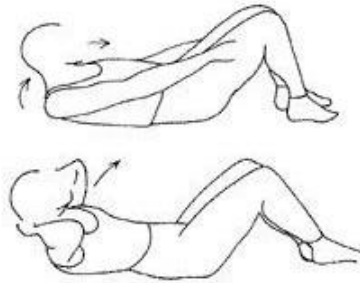
Repeat _____ times, _____ times/day. Lie flat on your back (or stand with your back to a wall), knees bent, feet flat on the floor, body relaxed. Tighten your abdominal and buttock muscles and tilt your pelvis. The curve of the small of your back should flatten towards the floor (or wall). Hold 10 seconds and then relax.

Knee raise



Repeat _____ times, _____ times/day. Lie flat on your back, knees bent. Bring one knee slowly to your chest. Hug your knee gently. Then lower your leg toward the floor, keeping your knee bent. Do not straighten your legs. Repeat exercise with other leg.

Partial press-up



Repeat _____ times, _____ times/day. Lie face down on a soft, firm surface. Then raise your upper body enough to lean on your elbows. Relax your lower back and legs as much as possible. Hold this position for 30 seconds at first. Gradually work up to five minutes. Hold each for five seconds and repeating five to six times.

Be Reassured

Pain in the low back is very common. Most people experience back pain at some point in their lives. Fortunately, 60-70% of people who have low back pain get better within four to six weeks. The majority can return to work within the first two weeks of onset.

Questions about Project Participation or Plan of Care?

Contact Us:

Project Manager: Joan Caito

Joan.caito@valpo.edu or (574) 514-0840

Nicholas Boggs DO

(734) 586-9120