IMPROVING ADHERENCE AMONG PRIMARY-CARE PROVIDERS TO CLINICAL-PRACTICE GUIDELINES FOR THE DIAGNOSIS AND TREATMENT OF ACUTE LOW-BACK PAIN

by

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DEDICATION

I would like to dedicate this project to my wonderful family. To my husband, Casey, for your love, support, encouragement and many times, patience. To my parents, Steve and Julia, for your unwavering love, support, and assistance all along, but especially over the past three years. To my daughter, Ella, for the motivation to persevere through the ups and downs of graduate school. And finally, to my other family, friends, and coworkers that have supported and encouraged me throughout this journey. Thank you.

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ABSTRACT

Back pain is a condition primary-care providers will inevitably see among their patients. It is one of the most prevalent medical conditions, affecting between 50% and 90% of the general adult population in developed countries. Nonspecific low-back pain accounts for approximately 85% of all low-back-pain incidents in primary care, and the majority of these episodes will resolve within two weeks of onset. Care for low-back pain is often fragmented and results in a very heavy economic burden from both direct and indirect costs. Clinical-practice guidelines have been developed to improve patient care and outcomes, and decreased healthcare costs have been demonstrated when clinical-practice guidelines are followed. However, despite the wide availability of clinical-practice guidelines, adherence by primary-care providers is less than optimal. Therefore, the purpose of this project is to evaluate the effectiveness of an educational program for primary-care providers in a rural clinic regarding the proper management of acute low-back pain following available clinical-practice guidelines.

A quasi-experimental project design with retrospective chart reviews was conducted. Data from the first review, along with current evidence-based protocols for back-pain management, were used to develop an educational presentation for the primary-care providers of a family-medicine clinic in a rural, southwest Montana town. A second chart review was performed after the educational presentation to evaluate utilization of the evidence-based protocol of the primary-care providers.

Results indicated a significant improvement in the prescription of methylprednisolone by primary-care providers, decreasing from 40% during the initial retrospective chart review to 0% during the second retrospective chart review. Other areas of the outcomes data, although not significant, showed improvement related to adherence to the clinical-practice guidelines by the primary-care providers. This indicates the educational intervention was overall successful in fulfilling the purpose of this project.

CHAPTER ONE

INTRODUCTION

Background

Primary-care providers will inevitably encounter patients with low-back pain in practice. Low-back pain is one of the most prevailing medical conditions with a lifetime incidence between 50% and 90% in the general adult population in developed countries (Dagenais, Tricco, & Haldeman, 2010). Nonspecific low-back pain, commonly characterized by periodic occurrences and remissions, accounts for approximately 85% of all low-back-pain instances in primary care. In addition, primary-care providers typically evaluate the initial low-back pain presentations in 65% of cases and often, ultimately, become the sole provider for these patients, especially in rural areas (Scott, Moga, & Harstall, 2010).

The economic burden for low-back pain is heavy because of the direct healthcare costs and indirect costs from lost productivity (Dagenais et al., 2010). Low-back pain has significant medical and socioeconomic implications as it is the highest-ranked condition contributing to years lived with a disability (Slade et al., 2015; Dahan et al., 2008). Patients with back pain spend about 75% more annually on healthcare than people without back pain, and this does not include costs for lost work time or diminished productivity (Amorin-Woods et al., 2014). This burden can be impacted by current evidence-based guidelines related to the initial treatment of back pain.

Evidence-based clinical-practice guidelines are designed to improve quality of care and reduce practice variation by providing graded recommendations based on the best available evidence (Slade et al., 2015). Current evidenced-based guidelines for the management of acute and subacute low-back pain are largely homogenous (Amorin-Woods et al., 2014); however, the guideline that will be used for this project will be "Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society" (Chou et al., 2007) (Appendix A). This specific clinical-practice guideline was noted to be the most cited and most widely used throughout the literature. Although this particular clinical-practice guideline is almost 10 years old, it remains the most widely cited clinical-practice guideline from the review of literature performed for this project. UpToDate also continues to reference this particular clinical-practice guideline.

Ideally, clinicians should be guided by current best evidence to minimize the use of interventions that are ineffective, costly, or even harmful (Oostendorp & Hujibregts, 2011). However, more and more data are emerging that demonstrate providers are non-adherent to the clinical-practice guidelines for the diagnosis and treatment of back pain. Several studies have demonstrated that non-adherence to the guidelines generally leads to costly procedures and unnecessary surgeries or treatments without concomitant improvements in health outcomes (Graves, Fulton-Kehoe, Jarvik, & Franklin, 2014; Srinivas, Deyo, & Berger, 2012; Deyo, Jarvik, & Chou, 2014). Currently, primary-care providers deliver the least expensive care for acute low-back pain and these costs could

be further reduced by stricter adherence to the clinical-practice guidelines available (Traeger et al., 2015).

Given the human and economic impact of low-back pain, it is crucial that healthcare professionals be well trained and knowledgeable about current treatment strategies (Cutforth, Peter, & Taenzer, 2009). By adhering to the clinical-practice guidelines for the diagnosis and treatment of low-back pain, there is potential for improved patient care, better patient outcomes, and cost savings for the patients and payers. Therefore, the aim of this project is to evaluate the effectiveness of a continuing-education program for primary-care providers in a southwest Montana clinic regarding the proper management of acute low-back pain.

Purpose

The purpose of this project was to improve patient care by increasing primary-care providers' adherence to the recommendations set forth by a clinical-practice guideline for the diagnosis and treatment of acute low-back pain. This quality-improvement project, using the recommendations of the "Diagnosis and Treatment of Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society", sought to identify gaps in the actual diagnosis and treatment practices of primary-care providers in a family-medicine clinic. This project aimed to answer the following questions: (1) What is the current practice of diagnosing and treating acute low-back pain among primary-care providers? and (2) Will a continuing-education program for primary-care providers, referencing the Diagnosis and Treatment

of Low Back Pain guideline, be effective for increasing clinical-practice guideline adherence?

Conceptual/Theoretical Framework

The aim of this quality-improvement project was to change individual primary-care-provider behaviors, and the Theory of Planned Behavior was chosen to guide the project. The Theory of Planned Behavior (TPB) was proposed by Icek Ajzek in 1985 and is an extension of the Theory of Reasoned Action first proposed by Ajzek and Fishbein in 1975 (Madden, Ellen, & Ajzen, 1992). The theory was developed in the psychology field, but has since found application in other fields, including healthcare. The selection of this theory was based on the attributes explaining behavior change at the level of the individual healthcare professional (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). A systematic review of studies based on the Theory of Planned Behavior, among other social cognitive theories, found the TPB to be an appropriate theory to predict behavior in healthcare professionals (Godin, Belanger-Gravel, Eccles, & Grimshaw, 2008). Results of a study by Kortteisto et al. (2010) confirmed that the TPB is a suitable theoretical basis for implementing clinical guidelines in healthcare practices. The TPB is a framework for understanding human social behavior in which one central determinant of behavior is the intention to perform it (Kortteisto et al., 2010). The strength of intention consists of three different components: (1) the attitude toward the behavior; composed of human beliefs about consequences of the behavior, (2) the subjective norm; composed of human normative beliefs and social pressure toward the behavior, and (3) the perceived behavior

control; composed of human beliefs concerning capability and the controllability of performing the behavior (Kortteisto et al., 2010). These three components were addressed in this project by evaluating: (1) the primary-care providers' intention to follow the clinical-practice guidelines, (2) the overall impact of individual beliefs and perceptions on the strength of their intention to follow the clinical-practice guidelines, and (3) beliefs that have the strongest relationship with behavioral intention to use clinical-practice guidelines (Eccles et al., 2005). These components are important factors associated with healthcare professionals' intention to use clinical-practice guidelines.

Assumptions

It was assumed that the data gathered during this project had the potential to provide valuable information regarding implementation of clinical-practice guidelines. It was also assumed that the primary-care providers would be interested in using evidence to change their individual practice.

Definition of Concepts

In order to clarify the key concepts used frequently in this project, the following definitions were used:

1. Acute Low-back Pain: Low-back pain present for fewer than four to six weeks, sometimes grouped with subacute low-back pain as symptoms present for fewer than 12 weeks (Chou et al., 2007).

2. Chronic Low-back Pain: Low-back pain present for more than 12 weeks (Chou et al., 2007; Cutforth, Peter, & Taenzer, 2009).

3. Nonspecific Low-back Pain: Mechanical type of pain unrelated to a recognizable pathology, osteoporosis, structural deformity, or radicular syndrome (Metzger, 2016). Degenerative changes on lumbar imaging are usually considered nonspecific, as they correlate poorly with symptoms. (Chou et al., 2007).

4. Radiculopathy: Dysfunction of a nerve root associated with pain, sensory impairment, weakness, or diminished deep tendon reflexes in a nerve root distribution. (Chou et al., 2007).

5. Clinical-Practice Guidelines (CPG): Systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances (Field & Lohr as cited in Open Clinical, 2001).

6. Red Flags: Signs, symptoms, or patient characteristics that may indicate the need for additional screening to eliminate the possibility of serious, underlying pathology (Dagenais et al., 2010).

CHAPTER TWO

LITERATURE REVIEW

This chapter provides a summary of evidence relevant to the questions posed: (1) what is the current practice of diagnosing and treating acute low-back pain among primary-care providers? and (2) Will a continuing education program for primary-care providers be effective for increasing clinical-practice-guideline adherence? Content is organized according to the following concepts: (a) incidence and burden of low-back pain, (b) low-back pain in primary care, and (c) use of clinical-practice guidelines for low-back pain.

Incidence and Burden of Low-back Pain

With a high incidence and prevalence, back pain and, more specifically, low-back pain, is a leading cause for primary-care visits in the United States. It has been estimated that low-back pain has a lifetime prevalence of 84% in the general adult population (Dagenais et al., 2010). The majority of people that incur an episode of low-back pain do not seek medical care. This is due to the fact that many patients have self-limited episodes of acute low-back pain that resolve without medical intervention (Chou et al., 2007). The precise etiology underlying most cases of low-back pain is unknown; however, biological, psychological, and social factors may all play an important role (Riis et al., 2016). Nonspecific low-back pain is a common diagnosis for patients that present with acute low-back pain. Nonspecific low-back pain is a mechanical type of pain

and is unrelated to a recognizable pathology, osteoporosis, structural deformity, or radicular syndrome (Metzger, 2016). It has been noted that pain, disability, and return to work typically improve rapidly among people that do present for medical care. However, the probability of recurrence within the first year ranges from 30–60% and, in as many as one-third of people, the initial episode of low-back pain will persist for a year (Amorin-Woods et al., 2014). In the U.S., back problems are associated with nearly one-quarter of all lost workdays. In addition, back pain is now the second leading cause of work absenteeism, and approximately 2% of American adults are either temporarily or chronically disabled by low-back pain (Cutforth et al., 2009). In fact, according to a recent Global Burden of Disease study, low-back pain is the highest ranked condition contributing to years lived with a disability (Slade et al., 2014).

The economic burden associated with low-back pain is immense due to both direct healthcare costs and indirect costs related to lost productivity (Dagenais et al., 2010). In the United States, healthcare costs associated with spine problems were estimated at $102 billion; however, Dadenais et al. (2010) suggest that indirect costs may be five to six times higher than direct costs, bringing the total annual costs of low-back pain to $500 billion or more. Patients with back pain spend about 75% more annually on healthcare than people without back pain and this does not include costs for lost work time or diminished productivity (Amorin-Woods et al., 2014). Due to the prevalence and impact of low-back pain, an expanding array of tests, treatments, and medications have been implicated in the management of low-back pain (Deyo, Mirza, Turner, & Martin, 2009). However, more tests and treatments do not necessarily reflect better treatment of

back pain. From 1997 to 2005, the inflation-adjusted cost of all health services for U.S. adults with spine problems increased by 65%; but the effectiveness of care declined during the same period, as measured by age- and sex-adjusted self-reported measures of health-related quality of life among adults with spine problems (Whedon, Goertz, Lurie, & Stason, 2013).

Low-back Pain in Primary Care

It is generally accepted that management of low-back pain should begin in the primary-care setting. Primary-care providers undertake the initial evaluation in 65% of low-back-pain cases and often ultimately become the sole provider for these patients, especially in rural areas (Scott et al., 2010). In addition, nonspecific low-back pain accounts for approximately 85% of all low-back-pain instances in primary care (Slade et al., 2014). However, the care of low-back pain is often fragmented due to patients seeking secondary care on their own accord. Patients with low-back pain often attain concurrent treatment from several different providers including nonsurgical spine specialists, such as chiropractors and physical therapists, and allied-health providers such as acupuncturists, naturopaths, massage therapists, psychologists, etc. Differences in training, education, and scope of practice for these different providers have led to heterogeneity in the management of low-back pain (Dagenais et al., 2010). Consequently, healthcare providers may be under false impressions that their plan of management for low-back pain is successful if they are unaware of other treatments the patient is receiving. It can be difficult to determine which provider is in charge at any point in a

given episode of low-back pain (Wasiak, Pransky, & Atlas, 2007). This fragmented care can lead to unnecessary tests and treatments including, but not limited to, MRI, CT, steroid injections, and surgery, which further increases the costs associated with the management of low-back pain.

Use of Clinical-Practice Guidelines for Low-back Pain

Clinical-practice guidelines have been developed to assist in guiding care for low-back-pain patients. These guidelines have been developed using a synthesis of research evidence, expert consensus, and patient's perspective (Oostendorp & Hujibregts, 2011). Guidelines generally include statements of expected practice and specify standards of care against which providers can be audited (Kredo et al., 2016). Improvements in quality of care and outcomes, as well as decreased costs and practice variation, have been demonstrated when clinical-practice guidelines are followed (Bishop & Wing, 2006; Slade et al., 2014). Many clinical-practice guidelines have been developed in reference to the diagnosis and management of low-back pain. As mentioned above, the joint clinical-practice guideline by Chou et al. (2007) titled "Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society" is the most widely referenced clinical-practice guideline for back pain to-date and was used in this project. There are seven recommendations for back-pain management in the guideline (See Appendix A).

Despite wide availability of evidenced-based, clinical-practice guidelines to assist with the management of low-back pain, a lack of adherence with such recommendations

has been noted (Amorin-Woods et al., 2014). In a simulation study by Abdel Shaheed et al. (2015), it was reported that primary-care providers' self-care advice and referral pattern often diverged from the recommendations of the guidelines. Healthcare providers often rely on shared beliefs and personal opinion to make treatment decisions, and it is this practice of non-adherence to evidence-based guidelines that has led to the "know-do gap"; the gap between what is known and what is done in practice (Scott et al., 2010). The "know-do gap" is particularly prevalent in conditions such as back pain, where there is controversial treatment or no universally effective treatment (Scott et al., 2010). Barriers to the adoption of clinical-practice guidelines include lack of awareness, lack of familiarity, lack of agreement, lack of self-efficacy, lack of outcome expectancy, inertia of previous practice, or external barriers, which can include patients' expectations and providers' inclination to patients' demands (Dahan et al., 2008). The barriers addressed in this project were lack of awareness, lack of familiarity, and lack of outcomes expectancy.

It stands to reason that the next step after guideline development is guideline dissemination. Kredo et al. (2016) state that clinical-practice-guideline implementation often requires behavior changes by healthcare professionals, patients, and other stakeholders within the healthcare system because they may need to change or discard "usual" practices in light of current best-evidence recommendations. A few studies have attempted to glean the best strategy for distribution and implementation. Bishop and Wing (2006) noted poor transfer outcomes and high resistance when the nature of knowledge transfer strategies has been passive, nonspecific, indirect, and largely dependent on the attending physician's ability to locate and analyze complex guideline

information. In a randomized controlled trial by Riis et al. (2016), it was determined that a multifaceted implementation strategy changed general practice-referral behavior when compared to a passive implementation strategy. A complex approach with active engagement of the providers throughout the process has demonstrated effectiveness in other studies (Riis et al., 2013; Oostendorp & Hujibregts, 2011). Strategies for knowledge transfer include multifaceted interventions, such as interactive educational meetings, computer-based reminder systems, quick-reference guides, academic detailing, performance assessment gaps, and audit/feedback, which are consistently more effective as an implementation strategy for disseminating clinical-practice guidelines (Oostendorp & Huijbregts, 2011; Riis et al., 2013;). Amorin-Woods et al. (2014) found that medical providers are more likely to be receptive to guidelines when they are aware of shortcomings in the care that they provide.

Consequences can be significant when clinical-practice-guidelines adherence rates are low. As stated above, healthcare costs related to the management of low-back pain are excessive, and clinical-practice guidelines are developed in part to provide cost-efficient care. For example, there is overwhelming agreement among clinical-practice guidelines that routine spinal imaging or diagnostic tests within 4–6 weeks of symptom onset for nonspecific back pain are not necessary for patients who do not present with red-flag symptoms (Chou et al., 2007; Graves et al., 2014). The reason for this recommendation is that routine imaging findings are commonly nonspecific and do not improve clinical outcomes (Ivanova, 2011). In addition, unnecessary imaging for low-back pain has been associated with poorer patient outcomes, increased radiation

exposure, and higher healthcare costs (Jenkins et al., 2015). Despite this recommendation and no evidence of improved patient outcomes, Abdel Shaheed et al. (2015) reported that up to one-quarter of acute, nonspecific low-back pain patients are referred for imaging during the first encounter. The use of MRI for low-back pain has increased in the Medicare population by 307% during a recent 12-year interval and it has been found that surgery rates are highest where imaging rates are highest (Deyo et al., 2009). Graves et al. (2014) discuss research findings that indicate early imaging procedures, such as MRI and CT, are associated with increased subsequent treatments, such as injections, surgery, and costs without concomitant improvements in health outcomes. Deyo et al. (2009) discovered that, when judged against guidelines, one-third to two-thirds of spinal CT imaging and MRI might be inappropriate. Therefore, non-concordance with guideline recommendation can lead to increased healthcare utilization in addition to increased costs for the patients and payers. Health system administrators have powerful incentives to ensure concordance with guidelines to encourage back-pain management that demonstrates positive outcomes, cost efficiency, and is patient-centered (Amorin-Woods et al., 2014).

CHAPTER THREE

METHODS

The primary goal of this project was to improve patient care by increasing primary-care providers' adherence to the recommendations set forth by a clinical-practice guideline for the diagnosis and treatment of acute low-back pain. A quasi-experimental, pre- and post-intervention (educational program) retrospective chart review was conducted to answer the projects' questions. This chapter presents and discusses the project methodology and design describing the following: (a) project design, (b) population and sample, (c) procedure for data collection, (d) instrumentation, (e) ethical considerations, and (f) analysis.

Project Design

A quasi-experimental project design with a pre/post retrospective chart review was determined to be the most efficient and effective way to answer questions developed for this quality-improvement project. An uncontrolled quasi-experimental study design allows researchers to measure provider performance before and after the introduction of an intervention (e.g. educational intervention to provide dissemination of guidelines) in the same study site (Grimshaw, Campbell, Eccles, & Steen, 2000). A retrospective chart review is a popular methodology that is widely applied in many healthcare disciplines including quality assessment and professional education as well as to obtain valuable

information that may be used to direct subsequent prospective studies (Vassar & Holzmann 2013).

Population and Sample

The population of interest for this project was two-fold. The first population included primary-care providers working in a southwest Montana family-medicine clinic. Inclusion criteria required that participants were employed as family-practice providers at the aforementioned clinic. Ten family-practice providers were employed by the clinic; therefore, medical documentation from these providers was included in the initial chart review.

The second population consisted of patients presenting to the above-named family-medicine clinic with the primary medical diagnosis of acute low-back pain between the three-month periods of January 1, 2016 to March 31, 2016, and August 3, 2016 to November 3, 2016. Inclusion criteria included age over 18 years old, no prior back pain, or a lapse of at least one year if history of back pain was present. Exclusion criteria included pregnancy, concurrent present illness such as cancer, and patients that presented to the emergency department as the initial visit. During this process, no identifying patient information was collected.

The first retrospective chart review identified 25 patients who met the study's inclusion criteria. The second retrospective chart review identified 10 patients who met the study's inclusion criteria

Procedure for Data Collection

With assistance from the medical records department at the family-medicine clinic, the ICD-10 diagnosis code for low-back pain, M54.5, was used to access the appropriate electronic medical records. Because there is not a specific ICD-10 diagnostic code for acute low-back pain, M54.5 is a “catch-all” code that captures both acute and chronic low-back pain. Due to this coding situation, a total of 143 patient electronic medical records were flagged for review during the first retrospective chart review. Each record was analyzed to determine inclusion into the project; 25 met the criteria for inclusion. The second retrospective chart review yielded a total of 240 patient electronic medical records and, of those, 10 met the criteria for inclusion.

Information collected from the qualifying medical records included demographic and treatment outcomes data. The demographic data was used to describe the patients and their background and included age, gender, height, weight, BMI, triggering incident, history of back pain, and level of service assigned by the provider to the visit. Level of service was based on the Current Procedural Terminology (CPT) code assigned by the provider to each patient encounter. This was chosen to gauge how long the family-practice providers were spending with the patients that presented with acute low-back pain. The outcomes data, compared before and after the intervention, included imaging ordered during the visit, patient education given during the visit, medications prescribed during the visit, and referrals made during the visit. These data were chosen based on the Chou et al. (2007) clinical-practice-guideline recommendations used throughout this project.

The intervention portion of this project involved delivering an educational presentation to the family-practice providers of the aforementioned southwest Montana clinic. The presentation took place during the providers' regularly scheduled, monthly meeting. A 20-minute time slot was reserved for the educational presentation, which included a PowerPoint presentation reviewing literature regarding updated protocols for the treatment of acute low-back pain in primary care based on the literature review and the Chou et al. (2007) guideline. Adherence with the clinical-practice guidelines, resulting in significant changes for the patients and organization in relation to cost containment, was emphasized. This presentation also included information from the first retrospective chart review.

In order to appraise the immediate effectiveness of the educational presentation, a seven-item pre/post questionnaire (Appendix B) was given to the family-practice providers in attendance. The providers were given a copy of the PowerPoint presentation, the clinical-practice guidelines, and a one-page, quick-reference guide (Appendix C). The one-page, quick-reference guide was retrieved from the Cutforth, Peter, & Taenzer (2009) research article. This particular quick-reference guide was chosen based on its availability and the alignment of information to the Chou et al. (2007) guideline. Providers were also encouraged to take informational brochures for patients that present with either acute or chronic low-back pain (Toward Optimized Practice, 2015(a); Toward Optimized Practice, 2015(b); Toward Optimized Practice, 2015(c)). These particular informational brochures are published by *Toward Optimized Practice* and *Institute of Health Economics* (Canada) and are free for download to the public. *Toward Optimized*

Practice is an organization that assists healthcare providers and the teams with whom they work in implementing evidence-based practices to enhance the care of their patients (Toward Optimized Practice, n.d.). The information supplied by the brochures was determined to be sufficient for the purpose of educating patients regarding the expected course and self-care options for low-back pain. The self-care education book recommended by the Chou et al. (2007), *The Back Book*, was available for purchase online and the providers were given this information during the presentation. Providers were also made aware that a second, retrospective chart review would be performed to assess a change in practice, beginning the day after the presentation.

As mentioned above, multifaceted interventions, including interactive educational meetings, quick-reference guides, and audit/feedback—all of which were used in this project—are consistently more effective as an implementation strategy for disseminating clinical-practice guidelines (Oostendorp & Huijbregts, 2011; Riis et al., 2013; Riis et al, 2016). Amorin-Woods et al. (2014) found that medical providers are more likely to be receptive to guidelines when they are aware of shortcomings in the care that they provide. It was assumed that providers would be more receptive to the guideline dissemination if they could visualize the comparison of their results from the retrospective chart review to the recommendation of the clinical-practice guideline.

Instrumentation

A review of literature did not reveal an instrument that would be appropriate for this project. Therefore, the data collection tool and the pre/post questionnaire were

developed by the DNP student based on the recommendations of the clinical-practice guideline (Appendix A) in addition to the project questions. The pre/post questionnaire used during the intervention portion of this project was also developed by the DNP student based on the evidence obtained in the literature review and the clinical-practice guideline by Chou et al. (2007).

Ethical Considerations

The human-resource, medical, and administrative staff at the family-medicine clinic, as well as the Montana State University Institutional Review Board (IRB), approved this quality-improvement project. No identifiable patient or provider information was utilized at any point during this project. Information regarding the purpose of the project was provided to the primary-care provider participants at the beginning of the educational presentation. Consent for participation in the educational presentation was indicated by attendance and completion of the pre/post questionnaire.

Analysis

Data analysis was initiated during both retrospective chart reviews as the DNP student began to quantify the results for each data category. To determine a statistically significant difference between the first and second retrospective chart reviews, Fisher's Exact Test was used with a p-value of less than 0.05, indicating significance. Statistical analysis was completed with the assistance of Josh Wold, PhD, Associate Professor at Montana Tech and MiniTab Statistical Software.

CHAPTER FOUR

RESULTS

The purpose of this project was to improve patient care by increasing primary-care providers' adherence to the recommendations set forth by a clinical-practice guideline for the diagnosis and treatment of acute low-back pain. The clinical-practice guideline chosen for the informational, comparative, and evaluative purposes of this project is the "Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society" (Appendix A). A pre- and post-intervention, retrospective chart review was used to address both goals of this project. The DNP student hypothesized that, following completion of the educational intervention, the second retrospective chart review would reveal greater adherence to the clinical-practice guidelines. This chapter will discuss the results.

Description of the Sample

Initial Retrospective Chart Review

For the first retrospective chart review, data from 25 patient medical records met the inclusion criteria for the period of time between January 2016 and March 2016. As demonstrated by the collected demographic data, the included patients were predominantly women (n=16; 64%), and almost half were between the ages of 60 and 79 years old (n=12; 48%). The majority of the patients described a triggering event (e.g.

shoveling snow, falling on the ice) for their acute low-back pain (n=18; 72%), as well as having a history of back pain (n=14; 56%). A complete summary of the demographic data from the initial retrospective chart review can be seen in Table 1.

Table 1. Demographic Data from the Initial Retrospective Chart Review

Demographic Data	*N*	%
Gender		
Men	9	36
Women	16	64
Age (years)		
18-29	3	12
30-39	4	16
40-49	3	12
50-59	3	12
60-69	4	16
>70	8	32
BMI (kg/m^2)		
<18.5 (underweight)	1	4
18.5-24.9 (normal)	8	32
25-29.9 (overweight)	7	28
>30 (obese)	9	36
Triggering Incident		
Yes	18	72
No	5	20
Unknown	2	8
History of Back Pain		
Yes	14	56
No	9	36
Unknown	2	8
Level of Service		
Level 3	16	64
Level 4	8	32
Level 5	1	4

The outcomes data identified that imaging, including lumbar X-ray and MRI, was ordered for 11 patients (44%); however, only five of these patients had an appropriate triggering event to warrant the imaging. The most common medications ordered were

skeletal muscle relaxants (n=11; 44%), methylprednisolone (n=10; 40%), and opioid analgesics (n=8; 32%). The most common education given by the providers was in regards to patient use of over-the-counter (OTC) medications including acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs) (n=7;28%). For nine of the patients, a referral was given for either physical therapy or a spine specialist. See Table 2 for a complete summary of the outcomes data.

Table 2. Outcomes Data from the Initial Retrospective Chart Review

Outcomes Data	*N*	%
Imaging Ordered		
Lumbar X-ray	8	32
MRI	3	12
None	14	56
Patient Education		
Use of acetaminophen/NSAIDs	7	28
Use of Ice/Heat	6	24
Use of Rx medication	5	20
Use of back exercises & strengthening	5	20
Rest	2	8
Use of trigger point, deep breathing, good posture	1	4
No education	3	12
Medications Prescribed		
Skeletal muscle relaxant	11	44
Methylprednisolone (Medrol dosepak)	10	40
Opioid narcotic combination	8	32
NSAIDs	3	12
Combination of above medications	12	48
No medication	9	36
Referrals Made		
Physical Therapy	6	24
Spine Specialist	3	12
None	16	64

Educational Intervention

During the interventional portion of this project, a presentation was provided to the family-medicine providers at their regularly scheduled, monthly meeting on August 2, 2016. A PowerPoint presentation was given that included a review of the clinical-practice guidelines used in this project and the results of the first retrospective chart review. The providers were asked to complete a seven-item, true/false questionnaire before and after the presentation (Appendix B). Consent for participation in the educational intervention was assumed based on participation in the pre/post questionnaire. Of the 10 family-practice providers that are employed by the clinic, eight were in attendance at the meeting. All eight of the providers agreed to complete both the pre- and post-questionnaire. The results from this questionnaire are shown in Table 3.

Table 3. Number and Percentage of Items Answered Correctly on the Pretest and Posttest

Item-correct response	Pretest (n= 8)		Posttest (n=8)	
	N	*%*	*N*	*%*
1. Systemic steroids are recommended for the treatment of low-back pain with or without sciatica. *False*	7	87.5	8	100
2. A positive straight-leg-raise test has a high sensitivity for diagnosing herniated disc. *True*	5	62.5	5	62.5
3. Routine plain radiography in patients with nonspecific low-back pain is associated with greater improvement in patient's outcomes than selective imaging. *False*	6	75	8	100
4. The natural history of lumbar disc herniation with radiculopathy in most patients is for improvement within the first 4 weeks with noninvasive management. *True*	6	75	8	100

Table 3. Number and Percentage of Items Answered Correctly on the Pretest and Posttest Continued

5. Clinicians should explain that early, routine imaging and other tests usually cannot identify a precise cause, do not improve patient outcomes, and incur additional expenses. *True*	8	100	8	100
6. There is sufficient evidence to recommend the application cold packs as self-care options for low-back pain. *False*	2	25	7	87.5
7. Spinal manipulation is not recommended for patients with acute low-back pain. *False*	3	37.5	7	87.5

Overall, the results from the pre/post questionnaire demonstrated effectiveness of the educational presentation. During the posttest, five of the questions were answered correctly by a larger percentage of participants compared to pretest. Question 5 was answered correctly by all participants both pre- and post-presentation. However, question 2 showed no improvement as it was answered correctly by only five of the participants before and after the presentation.

Second Retrospective Chart Review

The second retrospective chart review occurred from August 3, 2016 to November 3, 2016. Due to only eight of the ten providers being in attendance at the educational intervention, only patient records from those eight providers were included in the chart review. Ten patient medical records met the inclusion criteria for data analysis. The demographic data revealed more than half of the patients were female (n=6; 60%) and between the ages of 40 and 59 years old (n=6; 60%). A large majority of the patients (n=9; 90%) had a BMI greater than 25 kg/m^2, indicating an overweight or obese body habitus. The majority of patients did not have a history of back pain (n=6; 60%) and

seven patients (70%) indicated there was a triggering event for their low-back pain. The demographic data from the second retrospective chart review are summarized in Table 4.

There were similarities and differences between the demographic data of the initial and second retrospective chart reviews. The majority of patients that presented with acute low-back pain were female and described a triggering event precipitating their episode of low-back pain. However, about half of the patients that presented in the initial chart review were above the age of 60 years old; whereas, more than half the patients in the second chart review were between the ages of 40 and 59 years old. Additionally, more patients in the second chart review denied a history of prior back pain compared to the first chart review, and the percentage of patients with a BMI of > 25 kg/m^2 increased by 26 percent.

Table 4. Demographic Data from the Second Retrospective Chart Review

Demographic Data	*N*	%
Gender		
Men	4	40
Women	6	60
Age (years)		
18-29	1	10
30-39	0	0
40-49	3	30
50-59	3	30
60-69	2	20
>70	1	10
BMI (kg/m^2)		
<18.5 (underweight)	0	0
18.5-24.9 (normal)	1	10
25-29.9 (overweight)	6	60
>30 (obese)	3	30

Table 4. Demographic Data from the Second Retrospective Chart Review Continued

Triggering Incident		
Yes	7	70
No	3	30
Unknown	0	0
History of Back Pain		
Yes	4	40
No	6	60
Unknown	0	0
Level of Service		
Level 3	6	60
Level 4	3	30
Level 5	1	10

The outcomes data from the second retrospective chart review revealed that the majority of patients did not receive an order for imaging (n=8; 80%). The education of heat vs. ice was given to seven of the patients (70%) and the education on patient use of over-the-counter medications, such as acetaminophen and NSAIDs, was documented for half of the patients (n=5; 50%). However, no education was indicated as being given by the primary-care provider for three of the patients (30%). Skeletal muscle relaxants (n=6; 60%) and NSAIDs (n=4; 40%) were the most common medications prescribed. The majority of patients did not receive a referral (n=6; 60%). The complete outcomes data are shown in Table 5.

Table 5. Outcomes Data from the Second Retrospective Chart Review

Outcomes Data	*N*	%
Imaging Ordered		
Lumbar X-ray	2	20
MRI	0	0
None	8	80

Table 5. Outcomes Data from the Second Retrospective Chart Review Continued

Patient Education		
Use of acetaminophen/IBU	5	50
Use of Ice/Heat	7	70
Use of Rx medication	2	20
Use of back exercises & strengthening	2	20
Rest	1	10
Use of trigger point, deep breathing, good posture	0	0
No education	3	30
Medications Prescribed		
Skeletal muscle relaxant	6	60
Methylprednisolone (Medrol dosepak)	0	0
Opioid narcotic combination	3	30
NSAID	4	40
Combination of above medications	4	40
No medication	2	20
Referrals Made		
Physical Therapy	4	40
Spine Specialist	0	0
None	6	60

When compared to the first retrospective chart review, there were several notable changes. The most remarkable changes were an increase in the patient education of using heat vs. ice (46% increase) followed by a decrease in prescription for methylprednisolone by 40 percent. The orders for imaging decreased by 24 percent during the second retrospective chart review. There was a roughly 22-percent increase in patient education on the use of over-the-counter medications (acetaminophen and NSAIDs). Referrals to physical therapy increased by almost 16% and the prescription of NSAIDs increased by 28% from first to second chart review. However, there was one change not necessarily expected—the incidence of no patient education recorded in the chart increased by 18 percent.

Statistical Analysis of the Retrospective Chart Reviews

Fisher's Exact Test was used for each category and subset of the outcomes data. There were two outcome-data points that proved statistically significant. The patient education on the use of heat vs. ice increased significantly by 46 percent from the first to the second chart review ($p=0.0196$). The prescription of methylprednisolone by the providers demonstrated a significant decrease in the second retrospective chart review compared to the initial retrospective chart review ($p=0.0339$). The Fisher Exact Test indicated these were a positive result with improvement from pre- to post-intervention. Therefore, it can be assumed that the educational intervention produced a significant positive result for increasing the education of heat vs. ice and decreasing the prescription of methylprednisolone by family-practice providers for patients that present with acute low-back pain.

Although the other outcomes data categories and subsets did not see a statistically significant change, a few of the subsets confirmed improvement from the initial to the second retrospective chart review. Though not significant, referrals to physical therapy increased by 16 percent, referrals to a spine specialist decreased by 12 percent, the incidence of imaging ordered decreased by 24 percent, the prescription of NSAIDs increased by 28 percent, and the patient education on the use of over-the-counter medications increased by 22 percent. See Table 6 for the Fisher's Exact Test evaluation of each category and subset of the outcomes data.

Table 6. Fisher's Exact Test Evaluation of the Outcomes Data

Outcomes Data	*p-value*
Imaging Ordered	
Lumbar X-ray	0.6858
MRI	0.5416
None	0.2591
Patient Education	
Use of APAP/IBU	0.2577
Use of Ice/Heat	0.0196
Use of Rx medication	1
Use of back exercises & strengthening	1
Rest	1
Use of trigger point, deep breathing, good posture	1
No education	0.322
Medications Prescribed	
Skeletal muscle relaxant	0.4705
Methylprednisolone (Medrol dosepak)	0.0339
Opioid narcotic combination	1
NSAID	0.1554
Combination of above medications	0.7233
No medication	0.447
Referrals Made	
Physical Therapy	0.4207
Spine Specialist	0.5416
None	1

Summary

In summary, a total of 25 patient medical records were analyzed in the first retrospective chart review compared with 10 patient medical records analyzed in the second retrospective chart review. Eight family-medicine providers attended the educational interventional and completed the seven-item true/false pre/post questionnaire. Five of the seven items on the questionnaire were answered correctly by more providers from pretest to posttest. Two of the 19 data points, education of heat vs. ice and prescription of methylprednisolone, proved statistically significant for a positive result

from pre- to post-intervention. It should be noted that it was not expected that all of the data points would change significantly due to the fact that many were well within the guideline recommendations prior to the educational intervention. However, the data did determine that some of the data points showed improvement toward more guideline-concordant care.

CHAPTER FIVE

DISCUSSION AND CONCLUSION

Discussion of the Results

The principal purpose of this professional project was to improve patient care by increasing primary-care providers' adherence to the recommendations set forth by the clinical-practice guidelines for the diagnosis and treatment of acute low-back pain. The questions created for the project were: (1) what is the current practice of diagnosing and treating acute low-back pain among primary-care providers? and (2) Will a continuing education program for primary-care providers be effective for increasing clinical-practice guideline adherence? The clinical-practice guideline, "Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society" from Chou et al. (2007), was used to guide this project. Although this particular clinical-practice guideline is almost 10 years old, it remains the most widely cited clinical-practice guideline from the literature review. UpToDate also continues to reference this particular clinical-practice guideline.

A quasi-experimental project design with a retrospective chart review was used to address the project's questions and purpose. Data from the initial retrospective chart review provided answers for the first project question and informed the educational intervention. The educational intervention and the second retrospective chart review provided evidence necessary to answer the second project question. Participants in

attendance at the educational intervention (N=8) answered a seven-item pretest and posttest to assess effectiveness of the clinical-practice-guideline presentation.

As in many areas of medicine, providers caring for patients with acute low-back pain can vary widely in their diagnosing and treatment practices. This finding was confirmed in the results of this project. There was wide variety among providers in diagnosing and treating low-back pain. The providers did demonstrate improvement in adherence to the clinical-practice guidelines after the educational intervention. The largest improvement was seen in the providers educating patients in regard to the benefit of heat vs. ice application for the relief of acute low-back pain. According to the guidelines by Chou et al. (2007), “application of heat is a self-care option for short-term relief of acute low-back pain...and there is insufficient evidence to recommend the application of cold packs as self-care options” (p.484). The other statistically significant improvement was exhibited in the providers’ prescribing practices of methylprednisolone, or Medrol Dosepak, for the patient with acute low-back pain. According to guidelines by Chou et al. (2007), “systemic corticosteroids are not recommended for treatment of low-back pain with or without sciatica, because they have not been shown to be more effective than placebo” (p.486). Both of these recommendations were shared with the family-medicine providers during the educational intervention. From the first to second retrospective chart review, education on the use of heat vs. ice increased from 24% to 70% and the prescription of methylprednisolone decreased from 40% to 0%, respectively. It was determined that the educational

intervention had a profound impact on the educational and prescribing practices of the providers in these respects.

The other categories of the outcomes data that showed improvement in adherence to the clinical-practice guidelines, although not statistically significant, included decreased imaging ordered (lumbar X-rays or MRI) and increased recommendation of acetaminophen or ibuprofen for acute pain. However, with the exception of education on heat/ice and use of over-the-counter medication, it was disappointing to see little to no improvement in the patient education by providers. Missing patient education increased from 12% to 30% in the first and second retrospective chart review, respectively. The importance of patient education during the acute low-back pain episode was emphasized during the educational intervention, and patient-specific, informational brochures were given to the providers to take for use with patients. An explanation for this discrepancy may be that, while education was a part of the provider-patient interaction, it was not documented and no assumptions were made during data collection. The concept of provider documentation could be the basis for an entirely different project.

As discussed in Chapter Two, many factors can affect the adherence to clinical-practice guidelines among primary-care providers. Some providers continue to rely on shared beliefs and personal opinions despite knowing the clinical-practice guidelines are based on the best evidence available (Amorin-Woods et al., 2014; Scott et al., 2010). The barriers to the adoption of clinical-practice guidelines addressed in this project were lack of awareness, lack of familiarity, and lack of outcomes expectancy of the providers (Dahan et al., 2008). The aim of the educational intervention was to increase awareness

and familiarity of the clinical-practice guidelines by providing an in-depth review of each recommendation from the guidelines during a PowerPoint presentation and by supplying the guideline and quick-reference guide for the providers. The PowerPoint presentation also addressed the consequences of non-adherence with the clinical-practice guidelines including increased costs and higher utilization of healthcare resources without an improvement in patient outcomes.

The conceptual framework that guided this project was the Theory of Planned Behavior. As a review, TPB is a framework for understanding human social behavior in which one central determinant of behavior is the intention to perform it (Kortteisto et al., 2010). The strength of intention consists of three different components: (1) the attitude toward the behavior; composed of human beliefs about consequences of the behavior, (2) the subjective norm; composed of human normative beliefs and social pressure toward the behavior, and (3) the perceived behavior control; composed of human beliefs concerning capability and the controllability of performing the behavior (Kortteisto et al., 2010). Although this project did not directly measure the providers' intention to use the clinical-practice guideline, it nevertheless guided the strategies used for improving dissemination among the providers. The subjective norm of the providers' practicing patterns was determined during the first retrospective chart review by mining data to compare the providers' diagnosing and prescribing practices to those of the clinical-practice guidelines. This was guided by the premise that medical providers are more likely to be receptive to guidelines when they are aware of shortcomings in the care they provide (Amorin-Woods et al., 2014). The perceived behavior control was addressed

during the educational intervention by highlighting potential benefits of adopting clinical-practice guidelines into their practice. By discussing the immense cost burden of non-adherent care, provider use of guideline-concordant care was anticipated. It is the opinion of the DNP student that this method was successful in allowing the providers to visualize the difference between their practice as a group and the clinical-practice guideline recommendations. It allowed the providers to have a real-life comparison to the guideline recommendations.

Limitations of the Project

Several limitations are acknowledged in this project and are discussed now. The first limitation is the small sample size of primary-care providers (n=8) and patient medical records (n=25 and n=10) drawn from one, rural, family-medicine practice in southwest Montana. The small sample size decreases the generalizability of this project's findings to a larger population or different setting. In addition, a limited ability to detect significant differences in the results from pre- and post-intervention is another consequence of a small sample size.

The uncontrolled quasi-experimental project design could also be considered a limitation to this project. Grimshaw et al. (2000) state that uncontrolled before and after studies are intrinsically weak evaluative designs and there is evidence to suggest that the results of these types of studies may overestimate the effects of the interventions. Additionally, with the use of a retrospective chart review, incomplete charting and

variance in the quality of charting caused difficulty interpreting the data resulting in a limitation for this project.

The time of the educational intervention could have had an impact on the results. Twenty minutes were reserved to present the PowerPoint and allow for any questions. As a result of this time constraint, the presentation felt slightly rushed. There was a sizeable amount of information to cover and, because of the time restraint, providers may not have fully comprehended the information, causing a possible lack of full understanding and familiarity with the clinical-practice guidelines. This problem could have been amended by requiring a longer time slot for the presentation or by presenting the information to each individual provider at a time that was convenient for them. By presenting to providers individually, the DNP student could have allowed time for questions and clarification.

Additionally, the difference in seasons for the two retrospective chart reviews may have been a limitation. The first retrospective chart review was performed during the months of January through March, when snowfall is the highest. Many of the patients from the first retrospective chart review presented with low-back pain resulting from falling on ice or shoveling snow. The second retrospective chart review occurred during the months of August through November, when there was little to no snow. Therefore, no triggering incidences related to falling on the ice or shoveling snow were noted during the second chart review.

Finally, different strategies could have been implemented to gain a bigger impact on the results. As mentioned in Chapter Two, a complex approach with active

engagement of the providers throughout the process has demonstrated effectiveness in other studies (Riis et al., 2013; Oostendorp & Hujibregts, 2011). The study by Kortteisto et al. (2010) reaffirmed the general contention that different strategies need to be in place when clinical-practice guidelines are targeted at different professional groups. Strategies for knowledge transfer include multifaceted interventions, such as interactive educational meetings, computer-based reminder systems, quick-reference guides, academic detailing, performance assessment gaps, and audit/feedback, which are consistently more effective as an implementation strategy for disseminating clinical-practice guidelines (Oostendorp & Huijbregts, 2011; Riis et al., 2013;). This project utilized several of the strategies including an interactive educational meeting, a quick-reference guide, performance assessment gaps, and audit/feedback. It is possible that other strategies may have been more effective for certain providers. A computer-based reminder system could be an effective way to increase adherence by constantly reminding the provider of the recommendations from the clinical-practice guidelines. Additionally, there was only one, interactive educational presentation given to the providers. This could have been an obstacle to better uptake of the clinical-practice guidelines by the providers as more meetings could have had a greater impact with comprehension reinforcement of the guidelines. However, despite these limitations, there was evidence that learning occurred due to the improvement of adherence to the clinical-practice-guideline recommendations discussed above.

Implications for Clinical Practice

Because of the large prevalence of low-back pain in developed countries, primary-care providers are expected to diagnose and treat patients that present to them. Providers must remain up-to-date, using evidence-based, clinical-practice guidelines to improve patient outcomes, while reducing unnecessary costs and utilization of healthcare resources related to low-back pain. One implication for practice, brought forth by this project and supported by the literature, is the need for implementation of different strategies for assisting primary-care providers in becoming aware of and adhering to the clinical-practice guidelines. For example, a different provider could present an evidence-based, clinical-practice guideline at each of the scheduled, monthly meetings while supplying supplemental material to their colleagues. Another idea is to continue this project in the form of a quality-assurance project performed by the clinic staff. By having a continual audit and feedback program, providers may be more likely to be consistently reminded of the positive outcomes of adhering to clinical-practice guidelines.

Recommendations for Future Research

This project provides information related to the use of evidence to change clinical practice. There remains a large gap in the evidence regarding most effective strategies for implementing clinical-practice guidelines among primary-care providers. One recommendation would be to repeat this project over a longer period of time to gain a larger sample size. It may also be beneficial to repeat this project with different strategies executed in order to determine the greatest impact on practice. As more studies are

completed, reviewing the best strategies for implementation of clinical-practice guidelines, a bigger body of evidence will be available for practitioners.

Conclusions

Low-back pain remains one of the most common and debilitating health conditions that patients present with to their primary-care provider. In addition, the economic burden associated with low-back pain is immense due to both direct healthcare costs and indirect costs related to lost productivity (Dagenais et al., 2010). Because of the prevalence and impact of low-back pain, an expanding array of tests, treatments, and medications have been implicated in the treatment of low-back pain, although these tests and treatments do not necessarily reflect better treatment of back pain (Deyo, Mirza, Turner, & Martin, 2009). It is for this reason, among others, that clinical-practice guidelines have been developed for health conditions such as low-back pain. When clinical-practice guidelines are adhered to, they have demonstrated improved patient outcomes and decreased costs (Graves, Fulton-Kehoe, Jarvik, & Franklin, 2014; Srinivas, Deyo, Berger, 2012; Deyo, Jarvik, & Chou, 2014). However, there remains a gap in the literature addressing the best strategy for guideline implementation.

A goal of this project was to improve the diagnosis and treatment practice of primary-care providers for patients that present with low-back pain by improving the adherence to clinical-practice guidelines. This was partially achieved, along with providers' increased awareness of best practices for diagnosing and treating low-back pain. Support for the development of new approaches regarding patient-care

improvement at this clinic, as a result of this initial project, will continue using best-practice recommendations.

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APPENDICES

APPENDIX A

RECOMMENDATIONS FROM THE "DIAGNOSIS AND TREATMENT OF LOW BACK PAIN: A JOINT CLINICAL PRACTICE GUIDELINE FROM THE AMERICAN COLLEGE OF PHYSICIANS AND THE AMERICAN PAIN SOCIETY"

Recommendations from the "Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society"

Recommendation 1: Clinicians should conduct a focused history and physical examination to help place patients with low back pain into 1 of 3 broad categories: nonspecific low back pain, back pain potentially associated with radiculopathy or spinal stenosis, or back pain potentially associated with another specific spinal cause. The history should include assessment of psychosocial risk factors, which predict risk for chronic disabling back pain (strong recommendation, moderate-quality evidence).

Recommendation 2: Clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain (strong recommendation, moderate-quality evidence).

Recommendation 3: Clinicians should perform diagnostic imaging and testing for patients with low back pain when severe or progressive neurologic deficits are present or when serious underlying conditions are suspected on the basis of history and physical examination (strong recommendation, moderate-quality evidence).

Recommendation 4: Clinicians should evaluate patients with persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis with magnetic resonance imaging (preferred) or computed tomography only if they are potential candidates for surgery or epidural steroid injection (for suspected radiculopathy) (strong recommendation, moderate-quality evidence).

Recommendation 5: Clinicians should 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 (strong recommendation, moderate-quality evidence).

Recommendation 6: For patients with low back pain, clinicians should consider the use of medications with proven benefits in conjunction with back care information and self-care. Clinicians should assess severity of baseline pain and functional deficits, potential benefits, risks, and relative lack of long-term efficacy and safety data before initiating therapy (strong recommendation, moderate-quality evidence). For most patients, first-line medication options are acetaminophen or nonsteroidal anti-inflammatory drugs.

Recommendation 7: For patients who do not improve with self-care options, clinicians should consider the addition of nonpharmacologic therapy with proven benefits—for acute low back pain, spinal manipulation; for chronic or subacute low back pain, intensive interdisciplinary rehabilitation, exercise therapy, acupuncture, massage therapy, spinal manipulation, yoga, cognitive-behavioral therapy, or progressive relaxation (weak recommendation, moderate-quality evidence).

APPENDIX B

EDUCATIONAL PRESENTATION PRE/POST QUESTIONNAIRE

Improving Adherence to Clinical Practice Guidelines for the Diagnosis and Treatment of Low Back Pain

Katelyn Briggs
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DNP Scholarly Project

Pre/Post Questionnaire

1. Systemic steroids are recommended for the treatment of low back pain with or without sciatica.

True False

2. A positive straight leg raise test has a high sensitivity for diagnosing herniated disc.

True False

3. Routine plain radiography in patients with nonspecific low back pain is associated with greater improvement in patient outcomes than selective imaging.

True False

4. The natural history of lumbar disc herniation with radiculopathy in most patients is for improvement within the first 4 weeks with noninvasive management

True False

5. Clinicians should explain that early, routine imaging and other tests usually cannot identify a precise cause, do not improve patient outcomes, and incur additional expenses.

True False

6. There is sufficient evidence to recommend the application of cold packs as self-care options for low back pain.

True False

7. Spinal manipulation is not recommended for patients with acute low back pain.

True False

APPENDIX C

LOW-BACK PAIN ONE-PAGE QUICK-REFERENCE GUIDE

A Summary of the Guideline for the Evidence-Informed Primary Care Management of

Low Back Pain

This evidence-informed guideline is for non-specific, non-malignant low back pain in adults only

Red Flags help identify rare, but potentially serious conditions. They include:

- Features of Cauda Equina Syndrome including sudden onset or loss of bladder/ bowel control, saddle anaesthesia (**emergency**)
- Severe worsening pain, especially at night or when lying down (urgent)
- Significant trauma (urgent)
- Weight loss, history of cancer, fever (urgent)
- Use of steroids or intravenous drugs (urgent)
- Patient with first episode over 50 years old (soon)
- Widespread neurological signs (soon)

EMERGENCY - referral within hours
URGENT - referral within 24 - 48 hours
SOON - referral within weeks

Conduct a full assessment

Including:

- history taking
- physical and neurological exam
- evaluation of **Red Flags**
- psychosocial risk factors/ **Yellow Flags**

Yellow Flags indicate psychosocial barriers to recovery. They include:

- Belief that pain and activity are harmful
- 'Sickness behaviours' (like extended rest)
- Low or negative mood, social withdrawal
- Treatment expectations that do not fit best practice
- Problems with claim and compensation
- History of back pain, time-off, other claims
- Problems at work, poor job satisfaction
- Heavy work, unsociable hours (shift work)
- Overprotective family or lack of support

Kendall et al. Guide to Assessing Psycho-social Yellow Flags in Acute Low Back Pain. ACC & NZGG, Wellington, NZ. (2004 Ed.).

Any Red Flags? **Yes** → **Refer for immediate evaluation and treatment**
e.g., emergency room, relevant specialist

No

Acute and Subacute (within 12 weeks of pain onset)

- **Educate patient** that low back pain typically resolves within a few weeks (refer to Patient Information Sheet)
- **Prescribe self-care strategies** including alternating cold and heat, continuation of usual activities as tolerated
- **Encourage early return to work**
- **Recommend physical activity and/or exercise**
- **Consider analgesics** in this order:
  - Acetaminophen
  - NSAIDs
  - Short course muscle relaxants
  - Short-acting opioids (rarely, for severe pain)

1-6 Weeks

Reassess (including Red Flags) if patient is not returning to normal function or symptoms are worsening

Consider Referral

- Physical therapist
- Chiropractor
- Osteopathic physician
- Physician specializing in musculoskeletal medicine
- Spinal surgeon (for unresolving radicular symptoms)
- Multidisciplinary pain program (if not returning to work)

Chronic (more than 12 weeks since pain onset)

- **Prescribe physical or therapeutic exercise**
- **Analgesics Options**
  - Acetaminophen
  - NSAIDs
  - Low dose tricyclic antidepressants
  - Short term cyclobenzaprine for flare-ups
- **Referral Options**
  - Community-based active rehabilitation program
  - Community-based self management/cognitive behavioural therapy program
- **Additional Options**
  - Progressive muscle relaxation
  - Acupuncture
  - Massage therapy, TENS as adjunct to active therapy

Moderate to Severe Pain

- **Opioids** (for appropriate patients: refer to the Canadian National Opioid Guideline endorsed by the College of Physicians and Surgeons of Alberta)
- **Referral Options**
  - Multidisciplinary chronic pain program
  - Epidural steroids (for short-term relief of radicular pain)
  - Prolotherapy in conjunction with exercise

For complete guideline refer to the TOP Website: www.topalbertadoctors.org

new for 2009

TOP Toward Optimized Practice

Low Back Pain

Key Messages

- Do a full clinical assessment; rule out red flags
- In the absence of red flags, reassure the patient there is no reason to suspect a serious cause
- Reinforce that pain typically resolves in a few weeks without intervention
- Encourage patient to keep active
- Consider evidence-based management as per the guideline
- Recommend physical activity and/or exercise to prevent recurrence
- If pain continues beyond 6 weeks, reassess and consider additional treatment and referrals
- The goal of chronic pain management is improved quality of life
- Encourage and support pain self-management
- Monitor patient for relative benefit versus side effects

Contraindications

Evidence indicates these actions are ineffective or harmful

- Lab tests and diagnostic imaging in the absence of red flags
- Prolonged bed rest
- Traction
- Oral steroids
- Epidural steroid injections in the absence of radicular pain
- TENS for acute pain
- Back schools for acute pain
- Massage therapy for acute pain

Medication Table[1]

Pain Type		Medication		Dosage range
Acute and sub-acute low back pain or flare-up of chronic low back/ spinal pain		**1st line**	Acetaminophen	Up to 1000 mg QID (max of 4000 mg/day)
		2nd line NSAIDs	Ibuprofen	Up to 800 mg TID (max of 800 mg QID)
			Diclofenac	Up to 50 mg TID
		Add: Cyclobenzaprine for prominent muscle spasm		10 to 30 mg/day; Greatest benefit seen within one week; therapy up to 2 weeks may be justified
		If taking controlled release opioids: add a short-acting opioid or increase controlled release opioid by 20 to 25%		See opioids below
Chronic low back/ spinal pain		**1st and 2nd lines**	See acute pain, above	
	OPIOIDS AND TRICYCLICS	**3rd line** Weak Opioids	Codeine	30 to 60 mg every 3 to 4 hours
			Controlled release codeine	50 to 200 mg Q8h, may also be given Q12h
		Tricyclics (TCAs)	Amitriptyline Nortriptyline fewer adverse effects	10 to 100 mg HS
		4th line Tramadol (*not currently covered by Alberta Blue Cross*)		Slow titration up to max of 400 mg/day; short acting form is only available in combination with acetaminophen. Monitor for total combined daily acetaminophen dose.
		5th line Strong Opioids (controlled release)	Morphine sulfate	15 to100 mg BID
			Hydromorphone HCl	3 to 24 mg BID
			Oxycodone HCl	10 to 40 mg BID -TID
			Fentanyl patch	25 to 50 µg Q3days

[1] *Adapted from the Calgary Regional Pain Program. September 19, 2006*

- This guideline was written to provide healthcare providers and patients with guidance about appropriate prevention, assessment and intervention strategies
- It was developed by a multidisciplinary team of Alberta clinicians and researchers
- This guideline is for adults 18 years of age or older with low back pain and is not applicable to pregnant women
- It is recognized that not all recommended treatment options are available in all communities
- For further details on the recommendations, see the guideline and background document

APPENDIX D

EVIDENCE TABLE

Evidence Table

Author & Date	Study Design	Sample Size	Methods	Study Findings	Limitations	Level of Evidence (II, III)
Abdel Shaheed et al. (2015)	Cross-sectional observational study	534 pharmacies with 336 NSLBP scenarios and 198 fracture scenarios	Researchers observed the management recommendations for LBP provided in primary-care using a simulated patient approach. Trained actors requested an over-the-counter medicine or asked for management advice for 1 of 2 simulated patient scenarios: nonspecific LBP (NSLBP) or vertebral compression fracture. Visits were audio-recorded to allow data capture, validation, and review. Concordance with key recommendations provided in evidence-based LBP guidelines on pain medicines, patient self-care	Recommendations for pain medicines, but not patient self-care advice and referral, were typically consistent with guidelines. For the NSLBP scenario, the concerns were infrequent provision of reassurance of favorable outcome (8%), advice to stay active (5%), advice to avoid bed rest (0%), advice to use superficial heat (24%), and excessive endorsement of referral (57.4%) and imaging (22.7%).	The generalizability of these findings to other primary-care settings and countries is unclear. Age and years of experience of pharmacist and nonpharmacist staff were not collected, therefore, it was not possible to explore the effects of these on management outcomes.	Level IV

			advice, and referral we evaluated			
Amorin-Wood et al. (2014)	Best Evidence Synthesis of literature	11 studies	Six databases were searched for peer-reviewed papers on adherence to clinical-practice guidelines among chiropractors, physiotherapists, and medical practitioners	No profession consistently attained high concordance rating; however chiropractors adhered more than PTs and MP (73%, 62%, 52%, respectively)	An appraisal tool was adapted to assess concordance. And lack of data in several categories for all professions limited the comparisons.	V
Bishop & Wing (2006)	Prospective randomized controlled study	428 pts with acute low-back pain	Pts were placed into one of three groups	Direct, physician-to-physician, pt-specific communication was only partially successful in improving concordance.	The number of variables that may have affected pt outcomes were not controlled for.	II
Chou et al. (2007)	Clinical Practice Guideline	N/A	A multidisciplinary panel of experts developed key questions and scope used to guide the evidence report, review its results, and formulate recommendations	The result was seven recommendations	N/A	I

Cutforth, Peter, & Taenzer (2009)	Systematic Review	9 guidelines	A comprehensive review of published LBP guidelines identified the 7 highest-quality CPGs that were used to inform the development of a new CPG	A CPG was developed for non-specific LBP along with point-of-care decision support and patient-education tools.	Very low response rate of initial survey. Current lack of research investigating the general impact of the CPG on clinical practice.	I
Dagenais, Tricco, & Haldeman (2010)	Systematic Review	10 guidelines	Comprehensive literature review for CPGs related to both assessment and management of LBP. Methodological quality was assessed using AGREE	Most of the CPGs had very similar recommendations	May have been limited by search methodology	I
Dahan et al. (2008)	Confidential mailed survey questionnaire	163 primary-care doctors	A multiple choice questionnaire consisting of 50 questions related to LBP guideline recommendations as well as data pertaining to each individual doctor was mailed to a random cluster sample of primary-care physicians	Significant differences were noted between the average test score of family doctors, GPs, and residents as well as for specific variables including age, country of med training, and self-report familiarity with LBP guidelines.	Only surveys Israeli doctors' experience. May also have a participation bias because of poorer response rates from the GPs	VI
Deyo, Jarvik, & Chou (2014)	N/A	N/A	N/A	It is discussed that lumbar imaging is overused in the diagnosis and treatment of low-back pain.	N/A	VII

				Risks, impacts on patient outcomes, and factors supporting unnecessary spinal imaging were discussed.		
Deyo et al. (2009)	N/A	N/A	N/A	This article discusses the implications of over-treating low-back pain including ordering early imaging, opioids, spinal injections, and spinal surgery without improving outcomes.	N/A	VII
Godin, Belanger-Gravel, Eccles, & Grimshaw (2008)	Systematic review	76 studies	Studies were included that aimed to predict healthcare professionals' intentions and behaviors with a clear specification of relying on social cognitive theory.	TPB appears to be an appropriate theory to predict behavior whereas other theories better capture the dynamic	Limited number of studies predicting behavior were identified. During the analysis of the efficacy of prediction, they did not control for the number of variables included in the predictive models.	V

Graves, Fulton-Kehoe, Jarvik, & Franklin (2014)	Prospective, population-based cohort study	1,770 workers with work-related LBP	Health care utilization and costs among workers were compared to determine whose imaging was adherent to guidelines to workers and whose imaging was not adherent to guidelines (early MRI).	It was found that, of the 1,770 workers, 336 (19%) were classified as non-adherent to guidelines. Outpatient and PT/OT utilizations was 52-54% higher and in general, nonadherence was associated with increased likelihood of lumbosacral injections or surgery and higher costs for outpatient, inpatient, and nonmedical services, and disability compensation.	Subjects were restricted to WA state Worker's Compensation claimants with non-severe injuries that resulted in ≥4 days of compensated lost work time. The design and scope limited the ability to evaluate providers' rationale for not adhering to the guidelines.	IV
Ivanova et al. (2011)	Retrospective analysis	211,551 patients	Patients 18-64yo with at least one dx of LBP during 2004-2006 were included in the study and compared with a matched random cohort of pts without LBP. Physiological measures, functional measures, and direct and indirect costs were assessed within a year of dx of LBP.	Patients with LBP had higher mean direct costs compared with controls ($7,211 vs $2,382) with surgery patients having mean direct costs of $33,931. Many pts with LBP start incurring significant resource use and associated expenses soon after the	Administrative claims data do not capture over-the-counter medication use and self-care. The study was also limited in its ability to distinguish a true new LBP episode from	IV

				initial dx.	exacerbations of CLBP	
Jenkins et al. (2015)	Systematic review	7 studies	Studies were eligible if they assessed patients with low-back pain using an intervention designed to reduce the use of imaging in any clinical setting, including primary, emergency and specialist care. Included study designs were randomized controlled trials (RCTs), controlled clinical trials, and interrupted time series studies.	Clinical decision support in a hospital setting and targeted reminders to primary-care doctors were effective interventions in reducing the use of imaging for low-back pain. These are potentially low-cost interventions that would substantially decrease medical expenditures associated with the management of low-back pain.	Number and quality of included studies. Lack of sufficient power within the included studies resulted in lack of statistical significance	I
Kortteisto et al. (2010)	A cross-sectional internet-based survey	2,252 physicians, nurses and other professionals	Indicators of the intention to use clinical guidelines were observed by using a theory-based questionnaire (Theory of Planned Behavior).	All theory based variables were important factors associated with the professionals' intention to use CPG for their area of specialization in the decision they would make on the care of pts in the next 3 mos. This also shows that the	Low response rate and missing values for some of the respondents, which may cause non-response bias.	VI

				TPB is a suitable theoretical basis for implanting CPG.		
Kredo et al. (2016)	Article	N/A	N/A	This article's aim was to provide a guide describing common standards, methods and systems used in current international CPG activities and the various activities to produce and communicate them.	N/A	VII
Oostendorp & Huijbregts (2011)	N/A	N/A	N/A	This article discusses the importance of adherence to CPG and the strategies to increase adherence.	N/A	VII
Riis et al. (2013)	Two-armed cluster randomized trial	100 general practices and 2,700 patients aged 18-65 y.o.	Practices are randomly allocated 1:1 to a simple or a complex implementation strategy.	N/A	Results are below.	II
Riis et al. (2016)	Two-armed cluster randomized controlled trial	54 practices, 28 MuIS, 26 PaIS. 1101	Practices were randomized (1:1) and stratified by practice size to MuIS or PaIS. Primary and secondary outcomes	Using a MuIS changed general practice referral behavior and was cost effective, but patients in	Use of registry data might have introduced uncertainty in the estimates	I

		patients	pertained to the pt, and cost-effectiveness analysis was performed.	the MuIS group were less satisfied. This study supports the application of a MuIS when implementing guidelines.	due to difference in registration practices among different hospital departments, varying completeness of registration, as well as by changes in registration practice over time.	
Scott, Moga, & Harstall (2010)	Systematic Review	14 studies	Studies published from 1996-2008, comparing the clinical-practice patterns of primary-care practitioners with guideline recommendations.	Knowledge gaps were reported among various primary-care practitioner groups in the assessment of red flags, use of diagnostic imaging, provision of advice regarding sick leave and continuing activity, administration of some medications and recommendation of particular treatments.	It is unclear whether the reported guideline noncompliance was related to the strategies used to implement the guidelines, the guidelines themselves, the systemic deficiencies within the health care systems or the intangible	V

					behavioral factors that affect practice patterns.	
Slade et al. (2015)	Systematic review and meta-synthesis of qualitative studies	N/A	Eight databases will be searched for qualitative studies. The PRISMA Statement guidelines will be used.	This study has not yet been completed so therefore there are no results.	N/A	V
Srinivas, Deyo, & Berger (2012)	Article	N/A	A literature search was done to determine the incidence of acute LBP, the frequency of physician visits, and the use of imaging.	High quality consistent evidence shows that imaging pts with acute LBP of <6weeks duration and no red flag symptoms results in no clinical benefit, but is associated with harms, including pt labeling, irradiation exposure, and unnecessary surgery.	N/A	VII
Traeger et al. (2015)	Systematic review and meta-analysis of RCT and non-RCT	14 trials	To be eligible, studies needed to be controlled trials of patient education for LBP that were delivered in primary care and measured reassurance after the intervention. Eligibility criteria were applied, and	There is moderate- to high-quality evidence that patient education in primary care can provide long-term reassurance for patients with acute or subacute LBP.	There was no study found that used a specific measure of reassurance. The direct effect of patient education interventions on functional	I

			2 independent authors selected studies.		outcomes such as pain and disability was not assessed.	
Wasiak, Pransky, & Atlas (2008)	Retrospective case series	22 patients with at least one OLBP-related visit.	PCP involvement was examined relative to overall health care utilization	PCPs were rarely the sole provider during episodes of OLBP, which may contribute to uncertainty regarding the impact of medical care on work disability outcomes.	Small number of patients; therefore, the findings may not be broadly generalizable.	VI
Whedon, Goertz, Lurie, & Stason (2013)	Literature search	29 peer reviewed articles and 7 governm ent reports.	Peer-reviewed articles were reviewed to identify key issues concerning the expansion of coverage for chiropractic under Medicare.	3 key barriers were revealed to full Medicare coverage of chiropractic services: inadequate documentation of claims, possible provision of unnecessary preventative care services, and the uncertain costs of expanded coverage.	Validity of this analysis is limited by the methodology used.	V