

ABSTRACT OF DISSERTATION

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The Graduate School
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2011

PRACTICE PATTERNS OF PHYSICAL THERAPISTS IN CLINICAL DECISION-
MAKING WHEN TREATING PATIENTS WITH LOW BACK PAIN

ABSTRACT OF DISSERTATION

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Rehabilitation Science
in the College of Health Science
at the University of Kentucky

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Lexington, Kentucky

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PRACTICE PATTERNS OF PHYSICAL THERAPISTS IN CLINICAL DECISION- MAKING WHEN TREATING PATIENTS WITH LOW BACK PAIN

Low back pain (LBP) is a common musculoskeletal problem with a significant economic burden for the healthcare system. Direct costs of LBP are estimated in the range of \$33 - \$55 billion annually in the USA and are rising by 7% per annum. Classification guidelines are available to physical therapists (PTs) for decision-making to treat LBP. This is challenging as the evidence supports patients not fitting, or fitting into more than one group, creating uncertainty for the clinician. Use of outcome measures for LBP is recommended to assess a patient's current disability and response to treatment, but what is actually used in practice in the Commonwealth of Kentucky is unknown. Therefore, the primary aim of this study was to identify baseline information on the classification systems and outcome measures used by physical therapists in the Commonwealth of Kentucky for decision-making when treating patients with LBP. I also sought to identify existing barriers to the use of classification systems or outcome measures by surveying PTs across the state. Observations from these studies are: classification systems and outcome measures are used in practice and PTs understand classification systems, but experience, education, and other aspects of the PTs' backgrounds influenced their preferred decision-making style. Lack of knowledge and training is the main barrier to use of classification systems in practice. Insufficient time was described as the main barrier for not choosing to use an outcome measure. Further reported barriers were: patient difficulty with completing outcome measurement tools, habit/laziness, lack of knowledge/ training, too constraining to current practice pattern and lack of administrative support. Therapists also mentioned lack of utility of the measurement tools for making clinical decisions and potential negative consequences of marketing based on

the use of outcome measures. Our study demonstrates that PTs in the Commonwealth of Kentucky have yet to address the overall barriers to implementing practice guidelines or evidence into clinical practice for patients with LBP.

KEYWORDS: Classification Systems, Outcome Measures, Decision-making, Low Back Pain

Student's Signature

Date

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DEDICATION

I dedicate this dissertation to my wonderful family especially my wonderful supportive husband, Tim. Thanks for your patience, understanding, and support the last five years while I have been working on my research, and for editing my many papers. To Daniel, Hannah and Joseph, thank you for letting me take time to go to school, and for sleeping so well at night so I could work on reading and writing during the evenings. Thanks Mum for always reminding me that no one can ever take an education away from us and to always follow your dreams and never give up. You have always supported my education and encouraged me to learn more. To all those “average” students out there, find an area you are passionate about, work hard, persevere and be patient you will eventually reach your goals if you stay true to your plans. Thanks to my in laws for baby-sitting while I traveled to present my research findings or network with other researchers. Finally, I dedicate this dissertation to my Dad who has suffered with chronic back pain for many years of my life. He has provided me with a purpose to help others by trying to identify ways to provide early effective treatment, and help with understanding people with chronic low back pain.

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Chapter One

Introduction

Low back pain (LBP) is a common musculoskeletal problem and will affect 75 - 85% of adults in their lifetime.¹ The economic burden for the healthcare system is significant²⁻⁸ as direct costs of LBP are estimated to range between \$33 - \$55 billion annually in the USA and are rising by 7% per annum.⁹ LBP is the most frequent cause of physical disability for people under age 45 years,¹⁰ and the leading cause of missed time from work. A systematic review reported that the cumulative risk of a reoccurrence of LBP within three months was 26%, this increases to between 66% - 84% at 12 months.¹¹ Therefore, it is suggested that if patients are classified and acute LBP is successfully managed within the first month of occurrence, disability and pain rapidly improves thus limiting progression.^{12,13}

Multiple classification systems are available to guide decision-making with LBP,^{9,13} but according to Harris-Hayes² consistent evidence to support one effective conservative treatment approach for LBP is not available. This may be due to the comparison of heterogeneous study populations in relevant research.² A definition of classification is: to order entities into categories or groups with maximum within group homogeneity and between group heterogeneity.^{14,15} Classification based on clinical examination data identifies sub-groups and guides treatment choices.² Many authors support using homogenous sub-grouping with LBP, with the aim of matching signs and symptoms with an intervention, resulting in more efficient treatment and improved clinical outcomes.^{2,16-18} Three systems have been studied that were designed to direct treatment for LBP. These are: the Treatment-based Classification system,¹⁹ the

Movement-System Impairment²⁰ Classification system for LBP, and the McKenzie LBP Classification system.²¹

Classification systems are available to guide decision-making in patients with LBP, and have been the focus of many research studies in recent years due to the increased knowledge with respect to associated signs and symptoms of LBP.¹³ From a recent survey,²² aiming to understand the Orthopaedic Certified Specialist's approach to the diagnosis process, it is recommended that more physical therapists use an evidence-based approach when choosing classification systems to examine patients with LBP. Two classification systems (Treatment-based and Movement-System Impaired) are well supported in the literature but are only used in practice by 9% and 7% (respectively) of Orthopedic Certified Specialists surveyed. This leads to two questions: How can information with respect to LBP classification be more effectively disseminated for clinicians? And, how can this information be more effectively implemented into clinical practice? This may develop an understanding of whether therapists read current literature, and how they subsequently use the information they read.

As a physical therapist in the clinic treating patients with LBP, it is important to be aware of current evidence and guidelines to most efficiently and effectively treat patients. Evidence based practice (EBP) is clinical decision-making using current research evidence integrated with clinical expertise and patient values;²³ it underpins the provision of effective and efficient health care.²⁴ Classification systems or clinical guidelines are part of the environment of evidence-based care, with the aim to produce the best quality care available.²⁵⁻²⁷ In the case of LBP, evidence supports improved patient outcomes using the Treatment-based classification system including the clinical

prediction rule for manipulation.^{9,28-30} Using the Treatment-based classification systems has narrowed clinical decision-making in respect to selection of treatment.³¹⁻³⁴ This reduces the number of treatment options for LBP and has allowed the effectiveness of the treatment approach to be researched further. While these evidence-based practice (EBP) guidelines have been developed, there is little evidence in clinical practice to demonstrate their implementation: guideline publication does not always guarantee use in practice.²⁷

Current literature suggests many barriers exist to the acceptance of new research evidence and its application to clinical practice. This includes: limited clinician skill in interpreting research, lack of time, skepticism about the value of research, isolation from literature sources, poor understanding of research methods, lack of personal skills in searching the literature and in administration supporting research uptake.³⁵⁻³⁸ When seeking to use a classification system the physical therapist should be informed about the methodology of the classification system and use sound clinical judgment in decision-making skills to determine whether the patient fits into the sub-groups. Sub-groups are determined based on a cluster of signs and symptoms that classify a patient and lead to effective intervention strategies.^{13,14} The *Guide to Physical Therapy Practice* states the primary goal of the diagnosis process is to sub-group.³⁹ The most effective strategies for management are based on effective sub-grouping methods that direct decision-making according to advocates of evidence based practice, and the *Guide to Physical Therapy Practice*.³⁹ Sub-grouping is a challenging process and may determine the patient's benefit from the chosen interventions. Most recently the literature supports a patient-centered approach, which involves incorporating the patient in decisions regarding their care and taking ownership of their progression with treatment. According to Jensen et al,

experienced therapists use the patient-centered approach, most often concluding that it is more effective to teach and guide patients than “do” for them.⁴⁰⁻⁴²

Patient centered knowledge and clinical reasoning is a key to differentiate an “expert” from a “novice” clinician.⁴¹ Jensen et al³⁷ demonstrated that an “expert therapist” combines their data collection with previous experience. A reasoning process is then applied and relevant clinical data analyzed by meta-cognition to determine an outcome. Meta-cognition is a higher order level of thinking, is active and knowledge or learning is developed from actively controlling cognitive processes.^{43,44} It is also known as “thinking about thinking” and can also be applied to the knowledge of task variables, person variables and strategy variables.^{43,44} It is concerned with the active planning of a learning task, understanding the cognitive process, and using evaluation to reflect and learn. Meta-cognition is a key element of clinical reasoning according to Higgs and Jones,⁴⁵ as well as the understanding and awareness of one’s own cognitive process. Developing knowledge from experience occurs through reflection, allowing a continued learning process that supports the clinical decision-making of the expert therapist.³⁷ An “expert” therapist exhibits clinical reasoning skills by demonstrating an ability to use reflection to produce an evolving patient-centered knowledge base that is dynamic in nature and has many dimensions. An “expert” therapist will predict patient outcomes more successfully, digress from frameworks of evaluation, and spend further time reinforcing patient education.^{46,47} Advanced clinical reasoning, using LBP classification, has only been considered in one study.⁴⁸ One “expert therapist”, used the McKenzie classification system with patients to classify LBP, and demonstrated organizing their knowledge and clinical experience to make decisions. Overall, little research has

examined the clinical reasoning process used by physical therapists in the classification procedure to identify treatments for people with LBP. Classification systems are available to use for LBP to help guide a PT's decision-making process, but it is not clear whether therapists use these systems? Also, does experience have an effect on the decision-making skills of the therapist in choosing an intervention? In addition, there is little published research revealing what classification systems, if any, physical therapists are using in clinical practice. There is also a lack of evidence as to the reasoning processes physical therapists utilize when they interview patients with LBP and formulate their intervention strategies. Therefore, there is a need to better understand the decision-making process used by physical therapists in evaluating and determining interventions for LBP patients. Making appropriate decisions early can affect long-term cost effectiveness of treatment of LBP. Although 90% of acute LBP cases recover well, a small number, representing the highest cost/burden, become chronic.⁴⁹ If early decisions are made then there will be a reduced potential for long term disability and associated increased health care costs. Physical therapists play a crucial part in initial decision-making to classify and sub-group patients with LBP to guide treatments, and this could potentially have long term benefits in terms of decreasing health care costs and preventing disability.

There are many outcome measures for LBP available for clinicians to use to help further understand a patient's self report of their physical disabilities. Two gold standard disability outcome measures used for patients with LBP are: the Oswestry Disability Index (ODI) and Roland-Morris Disability Questionnaire (RM). Both measurement tools have been used over the past 20 years, and have undergone extensive tests for reliability

and validity. Both tools can be used at initial evaluation, during treatment, and at discharge as they have been established as valid over time to assess a patient's progress with interventions. Outcome measure use can demonstrate effectiveness of treatment and measure changes in the patient's functioning and pain levels. These can also be used as part of goal setting, providing a meaningful measure for a patient and physical therapist. A clinical goal of physical therapy is functional improvement, but this is often described by subjective reports and opinion.⁵⁰ According to Liddle,⁵⁰ barriers identified as to why therapists do not use clinical outcome measures are: time limitation, and lack of emphasis or availability of specific outcome measures.⁵⁰ Identifying what outcome measures are used clinically, if any, is important to determine a baseline of current practice. It is also important for physical therapists to choose an outcome measure that will allow subjective information to be expressed in a standardized fashion and often numerically to provide support for their treatment and demonstrate improved patient outcomes. It is important that the most appropriate outcome tool be used for a given patient with LBP, and that the tool is valid and reliable. Exploring what outcome tools, if any, are used in practice will provide information to determine a baseline of what LBP outcome tools are used, in the clinic as well as to identify the barriers to their use.

The purpose of this dissertation is:

1. To determine the psychometric properties of two well established outcome measures for LBP: the ODI and RM. and depending on the patient's disability, determine the most appropriate tool to administer.
2. To understand a process of decision-making PTs use when assessing and determining interventions for patients with acute/ non-specific LBP in outpatient settings.

3. I) Identify and document baseline information on the classification system processes that physical therapists use, if any, to help guide their decision-making process when treating patients with LBP.
- II) If classification systems are used, to identify, which ones: if these are not used to establish barriers as to why they are not being used.
- III) Also, what outcome tools are used in practice, if any? If not identify barriers, if any, to using outcome measures for patients with LBP.

Overview

Three methodologies were used to investigate the different research questions. These were: a systematic review, qualitative methods as well as mixed methods for the final study. The methods, results, discussion, limitations and conclusions from each of the three studies undertaken to address the purposes of the dissertation are presented in the following sequence. Chapter 2 is a review which discusses the psychometric properties and clinical application of the Roland-Morris Disability Questionnaire and the Oswestry Disability Index. Chapter 3 presents a qualitative analysis of the decision-making process PT's utilize when managing patients with LBP; it is based upon interviews of physical therapists treating patients with low back pain in the Lexington area. This study identified those classification systems and outcome measures reported as being used to help determine sub-grouping and interventions for treating patients with LBP. Chapter 4 is based upon a survey of practitioners, and presents what classification systems are used in practice. Depending on the classification systems used, we present the barrier identified for using such systems. The outcome measures that are used in practice are identified, and the barriers to utilization are described. Chapter 5 integrates the relevant findings from these studies.

Chapter Two

Psychometric properties of the Roland-Morris Disability Questionnaire compared to the Oswestry Disability Index: a systematic review

Introduction

According to the National Arthritis Data Workgroup, at least 15% of adults in the United States report frequent back pain or pain that occurs for more than 2 weeks.^{4,51} Physical disability due to low back pain (LBP) is a leading cause of time off work every year. Back pain is subjective and it is hard to measure a patient's perspective of their physical ability associated with their impairment in the clinical setting.

Physical therapy is concerned with restoring normal movement and improving function in patients with low back pain. It is important to understand a patient's interaction with their environment and their level of function and adjust interventions accordingly.⁵² A person with low back pain faces many environmental factors that often influence their motivation and it is necessary to be aware of these factors and remove potential barriers to improve participation and maximize outcomes.⁵² The International Classification of Functioning (ICF) classification system was developed to provide a guide for considering the many facets of the patient's experience and the ability to integrate in society and function and participate appropriately. A core element of the International Classification of Functioning (ICF) classification system is that it reflects/ seeks to reflect the perspectives of the individual and society, as well as the perspectives of the body (the classification of the body structures and function).⁵²

Disability includes the individual's external factors from their living environment, as well as their health condition. The relationship between the two is often complex and

integrated in such a way that they influence each other, limiting a patient's participation in everyday activities.

Self-assessment functional outcome tools or questionnaires measure participation from a patient's perspective. The ICF model includes a patient's perspective of their participation and function. It can provide further information regarding environmental factors, as well as personal factors that may affect the individual every day. By applying the model we can appreciate how someone's life is affected by the disability of low back pain on a day-to-day basis. It shows how a patient may compensate for their impairment in activities of daily living or to what degree their ability to participate is affected.

Self-assessment questionnaires are an important part of evidence-based practice: used appropriately these can help to demonstrate effectiveness and justify the treatment provided by a physical therapist. These questionnaires can also allow clinicians to understand a patient's interpretation of their improvement. A questionnaire can provide an objective measurement to support the changes experienced by a patient and can also be used to evaluate treatment outcomes. It can also be used for patient satisfaction, if their disability level is improving, with their treatment seeing their scores improve with therapy can help with motivation. A recent survey by Liddle *et al.*⁵⁰ demonstrated that, among the membership of the Irish Society of Chartered Physiotherapists, there is a marked lack of use of clinically relevant outcome measures used in practice with patients with chronic LBP. In addition, while a primary treatment goal of physical therapy (as reported by the respondents) was functional improvement, assessment relied on opinion and subjective reports.⁵⁰ Reported reasons for lack of clinical outcome measures use were: lack of emphasis or availability of specific outcome measures, and limited time.⁵⁰

Using an LBP specific outcome tool develops meaningful goal setting based on recovery for the patient: reducing the barriers to their use is critical in supporting the assessment of clinical effectiveness in an objective way.

Two common tools to measure physical disability in the population of people with low back pain are the Roland-Morris Disability Questionnaire and the Oswestry Disability Index (Appendix 2.1 and 2.2). Both of these tools can be administered at the initial visit and then following treatment at 2 or 4 weeks or at discharge. The physical therapist can use this information to analyze a patient's progress over time, following the use of interventions, to assess the disability or functional outcomes of a patient. With an increased emphasis on evidence-based medicine, physical therapists need to choose and routinely employ an assessment tool that is reliable and valid.

Reliability demonstrates consistency of results on the same individual when completing multiple tests. It is important when measuring changes in an individual that the change in score adequately reflects the actual changes that are occurring. In the case of self-assessment tools, it is important to have stability or consistency when completing test-retest over a period of time, especially in the case of interventions.⁵³

Validity is associated with accuracy; a valid tool needs to accurately measure that characteristic of interest for which it is designed.⁵³ With the current area of interest, self-assessment tools need to accurately measure a person's disability and participation in day-to-day activities due to low back pain.

The Roland-Morris Disability Questionnaire is a common tool used to assess the functional status of patients with low back pain. It is a self-administered questionnaire consisting of 24 items, and was initially developed from the Sickness Impact Profile in

1983. The questionnaire takes about 5 minutes to complete, and the scores range from 0 (no disability) to 24 (severe disability). The results of the questionnaire can be used clinically to measure a patient's change over time, and it has been documented as a reliable tool to detect change even in less disabled patients.^{53,54}

The questions used in the Roland-Morris Disability Questionnaire address a patient's pain while participating in many different activities, for example: pain with social activities outside the house, sitting, walking, housework, going upstairs, lying down, rest, sit to stand, independence, dressing, turning over in bed.

The Oswestry Disability Index, another common self-assessment tool for patients with low back pain, was first developed in 1976 and later published in 1980. The original is an English version 1.0, which has 10 sections each containing 6 statements. The statements comprising the questionnaire are scored 0 to 5, then scores from each section are added, the total is divided by the highest possible score, and multiplied by 100 to produce a percentage score. A low score indicates no disability and a high score relates to increased disability. Version 1.0 was modified to version 2.0 by changing the first question on pain and including other word clarifications in subsequent sections.⁵⁴ Fairbank further modified the travel section of version 2.0 (to address a typographical error) in late 2000 to produce version 2.1.⁵⁵ Version 2.0, when implemented in the USA, was modified by spine societies and the American Academy of Orthopedic Surgeons (AAOS).⁵⁴ These modifications included deleting sections 1, 8 and 9, and then scoring each remaining statement from 1 to 6 instead of 0 to 5. The Oswestry Disability Index appears to be more sensitive with severely disabled patients.⁵⁴

The Oswestry Disability Index uses questions on pain associated with participating in the following activities: personal care, lifting, walking, sitting, standing, sleeping, sex life, social life, and travelling. These are day-to-day activities in which people with low back pain often have difficulty participating due to pain. Both the Roland-Morris and the Oswestry have been used over the past 20 years and are considered the ‘gold standards’ of functional measurements in low back pain.⁵⁶ Many studies support the reliability and validity of their use. The purpose of this study was to review the psychometric properties of the Roland-Morris Disability Questionnaire in measuring physical ability in people with low back pain and compare it with another well-established tool, the Oswestry Disability Index.

Methods

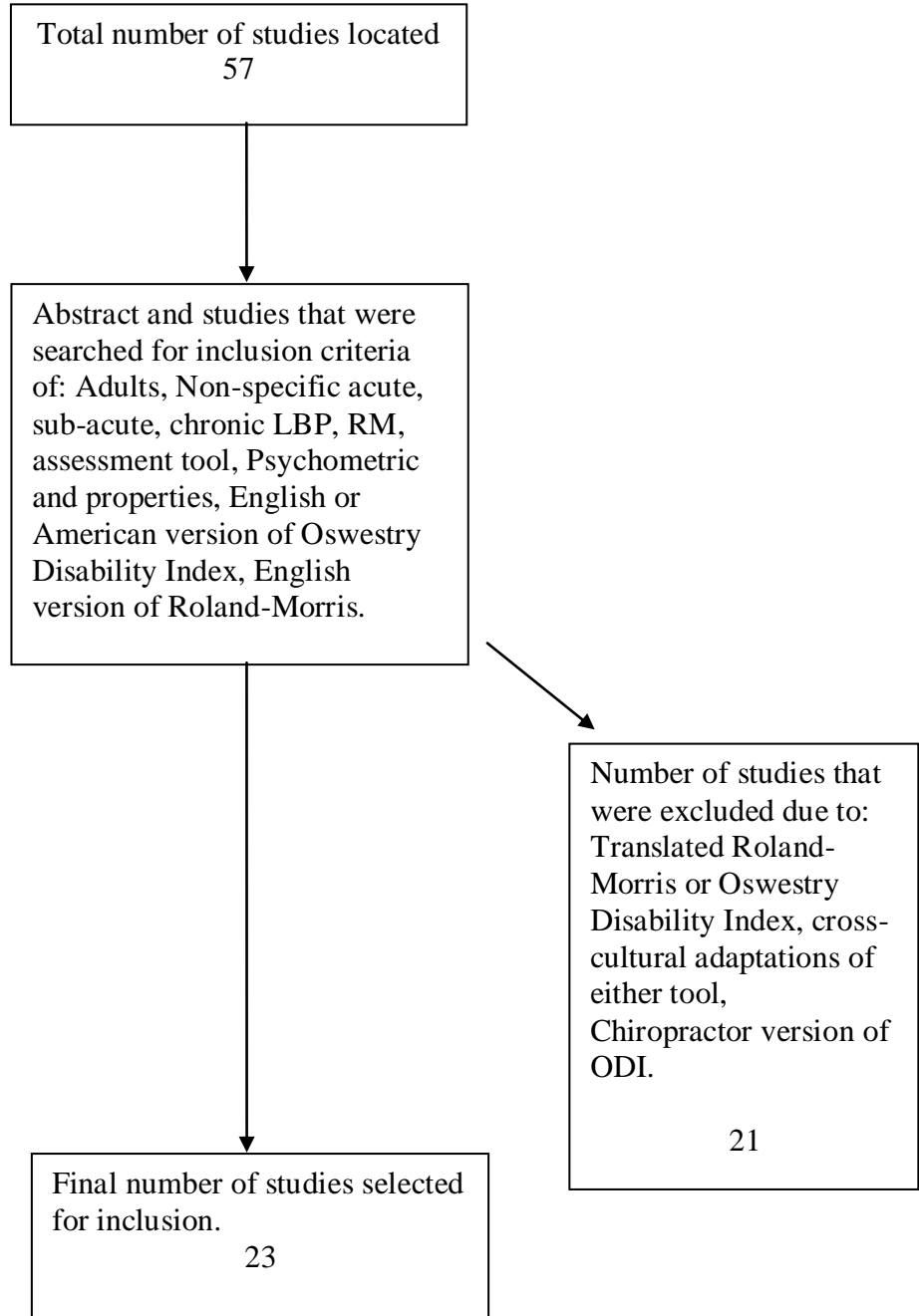
A literature search was performed using computerized databases as well as article bibliographies. The electronic databases were Academic Search Premier, CINAHL, Health source Nursing/Academic, MEDLINE, PRE-CINAHL, Psychology and Behavioral Collection, and Cochrane Database of Systematic Reviews until June 2009. Search terms included: clinical assessment tools, Roland-Morris, questionnaires, back, spine, back pain, Oswestry Disability Index, psychometrics, reliability, validity, responsiveness, specificity and sensitivity. Searches were limited to English language publications.

The initial search resulted in 57 articles. The principal author then reviewed the abstracts and titles of the articles to identify studies that specifically addressed the research purpose. Forty-four articles were retrieved and evaluated for appropriateness to

be included. Inclusion criteria consisted of: studies that examined adults with non-specific acute, sub-acute and chronic low back pain, and pain of nonspecific origin or pathology; studies that used the Roland-Morris questionnaire as an assessment tool, and included an analysis of psychometric properties of the main outcome measure. Only those studies using either the English or the United States versions of the Oswestry Disability Index,⁵⁶ and only the English translated version of the Roland-Morris questionnaire were analyzed in this review. Review of articles and agreement was reached by both authors. Exclusion criteria included: discussion of the translated forms, cross cultural adaptations of the Roland-Morris questionnaire or Oswestry Disability Index, or the Chiropractic version of the Oswestry Disability Index. The population included in the study was limited to adults over 18 years of age with acute (6 weeks or less), sub-acute (6 to 12 weeks duration), or chronic low back pain (longer than 12 weeks).⁵⁷ The final number of articles reviewed was 23 (Figure 2.1).

Figure 2.1: Method used to select studies

Number of studies located and selected.



Results

A detailed review of the 23 selected studies is presented in Tables 2.1 and 2.2, for the Roland- Morris Disability Questionnaire and Oswestry Disability Index, respectively. A generalized review of findings of the psychometric properties of these questions is presented evaluating the reliability, validity, and responsiveness of each assessment tool.

Table 2.1: Roland-Morris Table of Analysis

Study	Type of study	Relative Reliability	Validity	Responsiveness
Resnik and Dobrykowski ⁷³ (2005)	Review of measurement instruments. Provide guidelines to implement measures for patients with LBP in clinical practice.	Well established no score given	Well established no score given	Sensitivity depends on the patient's initial score either below 5 if low score or above 5 if high score.
Chansirinukor et al ⁶⁴ (2004) (n= 499) (n=113) (n=55)	Review of the RM and the multi-level RM in clinical practice on patients with LBP in the hospital and private practice setting.	ICC Multi-level Roland-Morris .95 Original Roland-Morris 0.88 Test-retest reliability ICC Multi-level RM 0.76 All subjects 0.89	Construct Validity (SES) Multi-level RM 1.08 Original RM 0.89 No ceiling or floor effects.	Good responsiveness ROC (AUC) = 0.88 Multi-level Original = 0.80
Müller et al ⁶⁵ (2004)	Literature review. Overview of which condition-specific tool to use.	ICC 0.53 0.86 0.91	Floor effects unknown Ceiling effects present	MCID 5.2 ROC 0.78 / 0.74 0.77

Table 2.1: Roland-Morris Table of Analysis (continued)

Davidson and Keating ⁶¹ (2002) (n = 207)	Prospective, multi-site study with repeated measures of issuing the RM to patients with LBP at initial evaluation and at 6 weeks later.	ICC 0.53 (6 weeks) lack sufficient reliability for clinical application	SEM 3.7	No more responsive than the SF36, Oswestry Disability questionnaire, Quebec Back Pain Disability scale and Waddell Disability Index.
Stratford and Binkley ⁷⁴ (2000)	Prospective repeated measures study design. Musculoskeletal LBP. RM administered at initial visit, 48 hrs later, 1,2 and 3 weeks later.	Test-retest reliability ICC = 0.79 (within 48 hours) Internal consistency 0.87	No data given	No statistically significant ceiling effects.
Roland and Fairbank ⁵⁴ (2000)	Literature review on the comparison and provision of evidence for the RM and ODI.	Test-retest reliability 0.91 (same day) 0.88 (1 week) 0.83 (3weeks) 0.72 (39 days)	Construct Validity High with pain ratings SF36, Sickness Index Profile, Quebec back scale and the Oswestry questionnaire.	Compares well with Sickness Index Profile and the Oswestry questionnaire. Cronbach's α 0.93, 0.90 and 0.84.
Underwood et al ⁷⁵ (1999) (n= 34) (n= 14)	Postal questionnaire. Compared RM and Von Korff scales on patients with LBP asking about the preceding 4 weeks.	ICC 0.89 (chronic 1-2 weeks) and 0.96 (acute or chronic 1-2 weeks)	No meaningful differences	SRM - 0.07

Table 2.1: Roland-Morris Table of Analysis (continued)

Stratford et al ⁶⁶ (1998) Part 1 (n=226)	Clinical trial. Patients with musculoskeletal LBP were administered the RM at initial physical therapy visit and 3 to 6 weeks later.	r = 0.60 ICC = 0.89	Sensitivity 72%	Specificity 82% ROC curve .84
Riddle et al ⁶⁷ (1998) Part 2	Clinical trial. RM completed by patients with LBP at initial visit and after their final physical therapy visit.	r = 0.39	Sensitivity of change of 8 points 85%	Specificity 77% ROC curve.68
Stratford et al ⁷⁶ (1996)	Before-after study design. Patients with LBP completed the RM on initial visit and again 4 to 6 weeks later.	Reliability coefficient 0.92 (4 to 6 weeks)	None given	None given
Stratford et al ⁶⁰ (1996)	Completion of the RM, by patients with musculoskeletal LBP, before starting PT, then following 3 to 6 weeks of treatment.	ICC = 0.86 (3 to 6 weeks)	None given	None given
Stratford et al ⁷⁷ (1994)	Randomized clinical trial administering the RM and ODI Questionnaires before PT, and following 4 to 6 weeks of treatment.	None given	None given	ROC 0.79 (4 to 6 weeks)

Table 2.1: Roland-Morris Table of Analysis (continued)

Beurskens et al (1996) ⁶⁹ (n= 76)	Cohort of patients with non-specific LBP completed the RM and ODI before and after 5 weeks of treatment.	Original ODI		ROC 0.93 demonstrated best discrimination between improved and non-improved patients.
Deyo ⁵⁹ (1986) (n = 10)	Clinical trial. Patients with mechanical LBP completed the modified Roland scale at initial visit and 3 weeks later.	r = 0.83 (3 weeks)	Not given	Not given
Roland and Morris ⁵⁸ (1983)	Development of the Roland-Morris tool	r = 0.91 (same day)	Good agreement with the 6 point pain rating scale.	More sensitive than a 6 point pain rating scale.

Note; Abbreviations: Oswestry Disability Index (ODI), Roland-Morris Disability Index (RM), Receiver Operator Curve (ROC), Minimal Clinical Important Difference (MCID), Minimal Change Detected (MCD), Visual Analogue Scale (VAS), Intraclass Correlation (ICC) , Standard Error of Measurement (SEM), reliability (r)

Table 2.2: Oswestry Disability Index Table of Analysis

Study	Type of study	Relative Reliability	Validity	Responsiveness
Resnik and Dobrykowski ⁷³ (2005)	Review of measurement instruments. Provide guidelines to implement measures for patients with LBP in clinical practice.	All versions reviewed Reliable no score given	Valid but no score given	Less sensitive than RM but also stated more sensitive the RM. MCID 4 to 10 MCD 10.5 -15
Childs and Piva ⁶³ (2005) (n= 131)	Multi-centered randomized clinical trial. Patients with LBP had the Modified ODI implemented at baseline, 1 and 4 weeks.	Modified version ICC 0.78 (4 weeks)	Effect size 1.97 1 week 2.53 4 weeks	ROC 0.93 MCID 9 Comparable to Functional rating index
Müller et al ⁶⁵ (2004)	Literature review. Overview of which condition-specific tool to use.	Version 2.0 ICC 0.91 0.84 0.89 (n=22)	Floor effects yes Ceiling effects unknown	MCID 16 ROC (AUC)0.76 0.94 0.78
Davidson and Keating ⁶⁰ (2002) (n = 207)	Prospective, multi-site study with repeated measures of issuing the RM to patients with LBP at initial evaluation and at 6 weeks later.	Modified version ICC 0.84 (6 weeks)	SEM 6	No more responsive than the SF36, RM, Quebec Back Pain Disability scale and Waddell Disability Index. MCD 10.5 - 15

Table 2.2: Oswestry Disability Index Table of Analysis (continued)

Fritz and Irrgang ⁶⁸ (2001) (n=67)	Comparison of the ODI with Quebec Back Disability Scale for Acute LBP patients. Scales issued on day one and four weeks later.	Modified ODI 0.90 (4 weeks)	Effect size 1.12	ROC (AUC).94 MCID 4-6
Fairbank and Pynsent ⁶² (2000)	Systematic review of the ODI following its use in research over the past 20 years.	Version 1.0 r = 0.99 (24 hours) r = 0.91 (4 days) r = 0.83 (1 week) (n= 22) Version 2.0 R = 0.89 n = 183	Correlation with RM r = .77 (n= 500)	ROC 0.76 Version 1.0 Cronbach's α 0.71 Version 2.0 Cronbach's α 0.76, 0.87
Roland and Fairbank ⁵⁴ (2000) (n= 22)	Literature review on the comparison and provisions of evidence for the RM and ODI.	Version 2.0 r = 0.99 (24 hours) r = 0.91 (4 days) r = 0.83 (1 weeks) n=22	Effect size 0.8 Moderate with VAS r=0.62 and McGill Pain Questionnaire	ROC 0.76
Taylor et al ⁷⁸ (1999) (n=318)	Prospective cohort study. Patients with LBP or sciatica completed a questionnaire at 1 month pre-treatment then 2 -6 months post-treatment.	Version of ODI used not stated None given	None given	Moderate effect size 0.4

Table 2.2: Oswestry Disability Index Table of Analysis (continued)

Beurskens et al ⁶⁹ (1996) (n= 76)	Cohort of patients with non-specific LBP completed the RM and ODI before and after 5 weeks of treatment.	Original ODI None given	None given	ROC 0.76 Less sensitive to change MCID 4-10
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Note; Abbreviations: Oswestry Disability Index (ODI), Roland-Morris Disability Index (RM), Receiver Operator Curve (ROC), Minimal Clinical Important Difference (MCID), Minimal Change Detected (MCD), Visual Analogue Scale (VAS), Intraclass Correlation (ICC) , Standard Error of Measurement (SEM), reliability (r)

Table 2.3 summarizes the main findings from the reviewed studies.

Table 2.3: Key Findings

Psychometric properties	Roland-Morris	Oswestry Disability Index	Conclusion
Reliability	Roland-Morris (ICC) improves after 6 weeks.	Oswestry (ICC) improves after 24 h	Both tools are reliable.
Validity	Construct validity is highly correlated with the ODI	Construct validity is highly correlated with the RM.	Both tools are valid.
Responsiveness	MCID is 5.2. So a patient would have to change by 5.2 points on the scale to demonstrate they have improved in function.	MCID is between 9 and 16. So a patient would have to change by 9 to 16 points on the scale to demonstrate they have improved in function.	Both tools are responsive and it is important to note clinically what change in score needs to be detected to demonstrate a change in function.
Clinical Use	Mild to Moderate disability	High Disability	Tool needs to be selected based on the disability demonstrated by the patient on presentation to the clinic

Twelve studies evaluated the Roland-Morris Disability Questionnaire for reliability of measuring disability and its test–retest effectiveness. One of the main aspects of reliability is the ability of the questionnaire to provide consistent results over time. Test–retest reliability determines the stability of the instrument during repeated

measures.⁵³ Clinically, this means that the questionnaire needs to measure a patient functional outcome in the same way each time it is administered. Test–retest was evaluated as the Intraclass Correlation (ICC) score (the closer this score is to 1.0, the higher the correlation and, therefore, reliability) at different intervals ranging from the same day to 6 weeks. The reliability for the same day was ICC 0.91,^{54,58} for 1 week 0.88,⁵⁴ 3 weeks 0.83 to 0.86,^{54,59} 4 weeks 0.83 to 0.92, and 6 weeks 0.53 to 0.86.^{60,61} From this information, it appears that the Roland-Morris Disability Questionnaire has good reliability in test–retest performance when it is used at the beginning of clinicians' evaluations, and for up to 6 weeks following interventions to measure change in individuals.

Six of the nine studies that investigated the Oswestry Disability Index evaluated its reliability; test–retest capabilities were assessed from 24 h to 6 weeks. The reliability of ODI version 1.0 test–retest (ICC scores) at 24 h is 0.99,⁶² 1 week 0.83;⁵⁴ version 2.0 test–retest (ICC scores) at 24 h is 0.99,⁵⁴ 1 week 0.83;⁵⁴ and finally, the modified ODI version at 4 weeks is 0.78⁶³ and 6 weeks 0.84.⁶¹ Again, this shows good reliability in test–retest performance when used at initial evaluation and over the next weeks following interventions. The modified ODI version appears to demonstrate good reliability over an extended period of time.

From this information, it can be determined that the Roland-Morris Disability Questionnaire had slightly higher Intraclass Correlation (ICC) scores as the questionnaire was implemented multiple times over 6 weeks to establish test–retest reliability of the tool. Initially, at test–retest 24 h later, the Oswestry Disability Index appears to have a

higher ICC score. Overall, the scores are very close, so either questionnaire could be used clinically.

Validity is the ability of the questionnaire to measure what it is designed to measure.⁵³ In the clinic, this means that the questionnaire must accurately measure the person's disability and participation in day-to-day activities due to low back pain. Validity of the Roland-Morris Disability Questionnaire was harder to establish because, in many studies, relevant data were not presented. Construct validity, or the comparison of scores on the Roland-Morris Disability Questionnaire to other established questionnaires,⁵³ was scored in one study as 0.89 (closer to 1.0 means a significant relationship).⁶⁴ Roland and Fairbank⁵⁴ reported the construct validity against other tools (SF36, Sickness Index Profile (SIP), Quebec back scale and Oswestry Disability Index) as high. Müller et al. reported that known floor effects were not present, but ceiling effects were.⁶⁵ The effect size (ES) measures the practical significance associated with the strength between two variables (0.3 small effect size, 0.5 medium, and .0.8 large effect size). Davidson and Keating rated the effect size or strength between two variables as 3.7.⁶¹ Finally, the sensitivity was reported in two studies and ranged from 72% to 85%.^{66,67}

Only four studies of the nine presented data on validity for the Oswestry Disability Index. The effect size for the modified ODI version were reported as ranging from 1.97 at 1 week to 2.53 at 4 weeks.⁶³ Fritz and Irrgang reported the modified ODI effect size as 1.12⁶⁸ while Müller et al. reported floor effects but no known ceiling effects on the ODI version 2.0.⁶⁵ Finally, Fairbank and Pynsent reported that the Oswestry positively correlated with the Roland-Morris (n=500, p= 0.77).⁶²

Comparing the Roland-Morris Disability Questionnaire and the Oswestry Disability Index is difficult as there were different measurements of validity used in the studies reviewed. In the study by Müller et al.,⁶⁵ ceiling effects were present in the RM but absent in the ODI version 2.0, while floor effects were present in the ODI but not in the RM. Ceiling effect means that the measurement cannot exceed the limit or ‘ceiling’ that occurs due to the instrument itself. Floor effect is where the data cannot score below a certain limit or ‘floor’. Construct validity was consistent between both questionnaires as they were highly correlated with each other.^{54,62}

Responsiveness describes the questionnaires’ ability to detect a meaningful change that has occurred clinically; when change does occur, the questionnaire needs to detect that change accurately.⁵³ In the clinic, this relates to the minimal number of points that a patient needs to improve to demonstrate an overall improvement, and is known as the minimally clinically importance difference (MCID). MCID is the smallest amount of change that is beneficial or meaningful to the patient; it may not be statistically meaningful. The Roland-Morris MCID was found to 5.2 in one study,⁶⁵ and for the Oswestry was 9⁶³ and 16.⁶⁵ Clinically, this means a patient needs an improved score of 5.2 on the RM and between 9 and 16 on the Oswestry to demonstrate that they have improved in function to a degree that would be considered clinically meaningful. Another way of determining responsiveness is by an analysis of the receiver operating characteristic (ROC) curve, which is used to detect a change between subjects that have improved and subjects that have not improved.⁶¹ The Roland-Morris Disability Questionnaire had ROC scores from 0.74 to 0.78⁶⁵ (normal values: 0.50 poor accuracy;

0.70– 0.90 satisfactory; and .0.90 high accuracy). Sensitivity scores of 72% and 85%^{66,67} have been reported with a related specificity score of 82% and 77%, respectively.^{66,67}

The Oswestry Disability Index has ROC scores ranging from 0.76 to 0.94 for all versions.^{54,62,63,65,68} Beurskens et al.⁶⁹ reported that the Oswestry version 1.0 was less sensitive than the Roland-Morris, and Davidson and Keating reported that the modified Oswestry to be more sensitive or responsive than the Roland-Morris.¹³ Finally, Davidson and Keating found the modified Oswestry no more responsive than the Roland- Morris in detecting a meaningful change clinically.⁶¹

Overall, it appears that both questionnaires have similar responsiveness rates (ROC) of 0.76–0.78, but the modified Oswestry has two studies that report 0.94.⁶⁸ One study reported that the Oswestry was not as good as the Roland-Morris, but the ROC curve depends on the specificity and sensitivity.⁶² This is based upon an inherent assumption that the ‘true disability’ is known, which is difficult to justify.⁶²

Discussion

Both the Roland-Morris Disability Questionnaire and the Oswestry Disability Index are very similar assessment tools which measure a patient’s perceived level of disability arising from low back pain. Both questionnaires are supported by a number of studies conducted over the past 25 years. From this review, it is difficult to demonstrate conclusively which questionnaire may be better to use to measure disability associated with low back pain, as it is based on a judgment decision at the time associated with the patient presentation. From the results of this review, there is a high test–retest score for both questionnaires to support their reliability from test–retest on the same day to 6 weeks. Validity is also high for both questionnaires. In ceiling and floor effects, for the Roland-Morris, people score higher in the upper level of the distribution than in the top

half of the Oswestry Disability Index.⁵⁴ This means that the ODI may still demonstrate change in high levels of disability when maximal Roland-Morris are achieved. In contrast lower ODI scores may not discriminate where the Roland- Morris can.⁵⁴

The Roland-Morris Disability Questionnaire and the Oswestry Disability Index can be used clinically to guide decision-making because they provide reliable and valid information that is clinically pertinent. The Roland-Morris is most sensitive and appropriate for patients with mild to moderate disability, while the Oswestry Disability Index is most effective for persistent severe disability; the scoring for the latter questionnaire tends to be higher.⁵⁴ Both questionnaires should be considered clinically but not both administered on the same patient. Evaluation of the patient will guide decision-making on the most appropriate questionnaire to use, based on patient presentation of disability. Using an outcome tool such as the Roland-Morris or Oswestry for patients with low back pain will help the clinician support the assessment of function.⁷⁰ A unique contribution by Roland and Fairbank⁵⁴ supports the reliability and validity of both instruments. Following an expert panel meeting, the article recommended that the RM or the ODI be chosen for back pain as condition specific measurement tools as they have both been widely used for many years.⁵⁴

It may be difficult to determine clinically which self-assessment tool is appropriate for each patient before an evaluation is completed. A physical therapist could objectively assess a patient's physical disability as the patient walks into the treatment room, during the subjective assessment, or the objective part of the evaluation. The preliminary determination of mild, moderate or severe disability is then identified, and then the appropriate self-assessment tool can be selected and completed before any

treatment occurs. This scenario follows the framework of perceived assessment presented by Maitland to identify the SINS: severity, irritability, nature and stage of the symptoms presented by the patient.⁷¹ Severity denotes how acute the patient's symptoms are, and the ability of the patient to participate in activities. It also describes the patient's perception of symptoms.^{71,72} Irritability refers to symptom provocation in response to activity.⁷¹ Symptoms that are irritable require a small amount of activity to aggravate and reproduce the symptoms. The therapist determines the nature from the possible pathology, pain tolerance, and character and personality of the patient. Stage is again determined by the therapist as the stability and progression of the pathology or the duration of symptoms.²³ Symptoms of high severity, irritability, nature and stage would indicate using the Oswestry, while if these characteristics were rated low would indicate using the Roland-Morris.

The use of an outcome tool is beneficial to track patient progress, appropriate treatment effects, and patient satisfaction. The tool needs to be efficient and effective for clinicians to use. Future studies to determine which outcome tools, if any, clinicians are using in practice, and the process of decision-making associated with choosing a tool, would be of value. It would also be beneficial to understand what constitutes the mild to moderate definition of disability to further determine disability measurement in people with low back pain.

Limitations of this review include difficulty in applying review scores to the design quality of the studies, poor study designs, and no available design scale to evaluate these kinds of studies. It was also difficult to assess the clinical stability of the subjects used in the studies. One paper did not specifically state the version of the ODI used in the

study. It is important when using the instrument to provide this information to allow the reader to understand what was being asked of the patient and the reproducibility of the study. A further limitation when comparing the studies included varying duration of symptoms, e.g. acute, sub-acute, and chronic low back pain. The inclusion criteria were not altered to focus on one sub-group as this would have limited the number of studies included. Also, the test–retest interval of the questionnaires differed from same day to 6 weeks later; these were all included to retain as many articles as possible in this review.

Conclusion

The Roland-Morris Disability Questionnaire is most sensitive and appropriate for patients with mild to moderate disability while the Oswestry Disability Index is most effective for persistent severe disability.⁵⁴ Both questionnaires should be considered depending on the patient, as they will help support the clinician’s assessment of function and determine the patient’s level of disability.⁷⁰

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Chapter Three

A Qualitative Study: Clinical Decision-Making in Low Back Pain

Introduction

Low back pain (LBP) is the second most common neurological ailment in the United States.⁷⁹ The effects of LBP can lead to additional concerns, such as physical disability, missed work, long-term sick leave, and depression, making it a costly and complicated condition.⁸⁰ Many people suffering an acute episode do not recover completely.²⁸ A systematic review demonstrated that there was a 26% cumulative risk of reoccurrence of LBP within 3 months, and for 12 months the risk increased to 66-84%.¹² Following an acute episode, 2-7% of people may progress to chronic,⁸¹ making early management essential.²⁸

Effective LBP management is challenging due to the complexity and diversity of the diagnosis, and health care providers have choices in evaluation and intervention. Evidence-based practice guidelines^{13,14,17,23,39,49,81} and multiple diagnostic classification systems^{19-22,82} have been developed, but there is limited knowledge of how clinicians, such as physical therapists (PT), use these tools in clinical practice. One study evaluated the PT management of LBP following an evidence-based educational program and found there was very little difference in treatment post-training, highlighting a challenge associated with utilization of quality evidence into clinical practice.²⁴ When PTs evaluate a patient with LBP, they may or may not use a classification system or follow published evidence-based practice guidelines.

Classification Systems

Classification of patients, determined by signs and symptoms, is a main goal of the diagnostic process.³⁹ According to the literature, the most efficient strategies of management occur by using evidence-based sub-grouping methods to direct decision-making.^{13,17,23,39} The primary purpose of LBP classification systems is to specifically direct effective treatment to homogeneous subgroups.¹⁴

A survey of Orthopaedic Certified Specialist (OCS) PTs in the United States²² reported when managing LBP there is a variety of classification systems in use, including the general pathophysiological classification system, practice patterns used in the *Guide to Physical Therapy Practice*, Osteopathic system, Maitland, and North American Institute of Manual Therapy (NAIMT) Selective Tension model.²² However, there were only three classification systems identified with quality evidence supporting them. These include 1) treatment-based,¹⁹ 2) movement impairment,⁸³ and 3) McKenzie approach.²¹ These three classification systems form the basis for the present study because of their frequent application in clinical practice and support in the literature.

The classification system proposed by Delitto et al¹⁹ is a treatment-based classification system and provides sub-grouping for acute / nonspecific LBP. This system uses patient pain report, disability (measured by the modified Oswestry Disability questionnaire) and clinical findings to group patients into four treatment categories: mobilization, traction, immobilization and specific exercise. In the survey by Miller Spoto and Collins,²² 9% of the Orthopaedic Certified Specialists PT respondents reported using this classification system. Since this classification system was developed there has been some evidence to support using sub-grouping methods with nonspecific LBP to guide treatment interventions to improve patient outcomes, as well as evidence to support

the proposal that if initial clinical LBP signs and symptoms are treatment matched, the clinical outcomes are improved.¹³ In a study by Brennan et al.²⁸ initially matching interventions to the evaluation of LBP signs and symptoms reduced disability. This is important in the population of acute LBP sufferers, as many develop long term disability if they do not quickly recover.⁸⁴ Therefore, initial decision-making using sub-grouping to guide treatments could help prevent long term consequences of chronic pain leading to disability.

A second classification system is the movement impaired system, with impairment-based categories for mechanical LBP.⁸³ This system identifies the movement patterns that cause pain when moving. The physical examination involves the changes in patient's symptoms dependent on movement in the directions of rotation, flexion, and extension of the spine, and the clinical judgment of spinal alignment.⁸³ Seven percent of OCS surveyed reported using this system to classify their patients before interventions.²²

Finally, another widely used classification system is the McKenzie method.²¹ This method involves self-treatment, establishing direction of preference and progression of force.²¹ This classification system promotes patient "buy in" to treat the pathology rather than therapist intervention.⁴⁸ Direction preference is tested by repeated movements of the spine to end-range to identify pathologies and resolve the symptoms. Classifying patients with LBP using a mechanical evaluation to distinguish directional preference is supported in the literature.^{21,85,86} Self treatment using the direction preference with addition of force progression, if needed, is the key to the patient's recovery.²¹ This classification system was reported as being used by 32% of OCS physical therapists surveyed.²²

Although these classification systems to help determine interventions for LBP are readily available, they are not always implemented into clinical practice. For example, the system by Delitto et al.¹⁹ has been criticized for being too complex with multiple steps and considerations.¹³ In recent years, however, through research evidence this method of classification has been simplified to make the system more dynamic.¹³ The system has become more reliable which has allowed implementation into clinical practice without specific training.³⁵ Despite these improvements, however, there is still little evidence to support what is actually utilized in clinical practice by PTs. Additionally, there are known barriers to the implementation of new research evidence used into practice, including clinicians' skills in interpreting research, understanding research methods, and administration supporting research uptake.³⁶ The clinical decision-making process that PTs use to assess and determine intervention for patients with LBP is not clear.

Clinical decision-making process

There is evidence to suggest that the clinical decision-making process may change as the clinician gains experience, and that the process relies on skills in meta-cognition and reflection. A patient-centered approach is often used by experienced therapists, believing that it is more effective to guide patients than “do” for them.^{36-38,87} According to Jensen et al.³⁸ clinical reasoning and knowledge centered on the patient is a key to distinguishing an “expert” from a “novice” PT. The researchers found that the “expert” therapist used metacognition to link data to previous experience, and then applied the process of reasoning to determine an outcome. This finding was similar to what Higgs and Jones⁴⁵ described as primary elements of clinical reasoning. Reflection seemed to be the most important element from the study by Jensen et al.³⁸ to develop knowledge from

experience. Schön⁸⁸ describes five stages of reflection: 1) Knowledge in Action, 2) Surprise, 3) Reflection in Action, 4) Experimentation, and 5) Reflection on Action. The initial stage, Knowledge in Action, relates to the skill and knowledge the clinician acquires and demonstrates in a certain context. An unexpected problem provides the stage of Surprise, followed by the stage of Reflection in Action, which occurs during the interaction between the patient and therapist. Reflection in Action can inspire experimentation or the undertaking of a solution. Finally, Reflection on Action is when the clinician recollects the interaction with the patient and alters the decision-making process or expands on the clinical reasoning process.⁴¹

A “novice” PT was defined as one year or less clinical practice after graduating from an accredited physical therapy program.^{41,89} From the literature, an “expert” PT uses their own knowledge base, previous experience, meta-cognition and reflection in decision-making.³⁷ These definitions were chosen to be used as a starting framework for the study as there is little available research reporting the clinical reasoning process and skills used by PTs working with people with LBP. One study by Noll⁴⁸ described the clinical reasoning process used by an experienced PT employing the McKenzie classification system. The PT applied a clinical decision-making process of using biomedical knowledge integrated with clinical experience to develop schemes or familiar patterns to store patient presentations. This study suggested that the experienced PT used advanced clinical reasoning by organizing their knowledge and relying on clinical experience to make decisions to classify LBP. This concept of using clinical experience to form patterns to make decisions has also been raised by other researchers.^{42,45,90-92} May⁴² found that using pattern recognition as a clinical decision-making process relies on

previously successful patient treatment strategies applied to a current patient. Another option of clinical decision-making is a “forward reasoning process,” whereby the clinician forms a specific conclusion from multiple hypotheses.⁴⁶ This technique may help identify an expert from a novice PT^{37,47,93} Additionally, an expert PT using clinical reasoning skills may demonstrate an ability to move from evaluation outlines, be more successful at predicting patient outcomes, and allocate further time reinforcing patient education.³⁷

Given the limited published research revealing the decision-making process PTs use with patients with LBP, or what classification systems, if any, are used in clinical practice, a need for additional research was evident. The purpose of this qualitative study was to investigate what process PTs used when assessing and determining interventions for patients with acute/ non-specific LBP in outpatient settings.

Research Design

The qualitative method described by Strauss and Corbin⁹⁴ was used as a framework for data collection and analysis. A general framework was expected to emerge from the data that was “grounded” in the participants’ viewpoints and developed inductively.⁹⁴ A systematic approach of data collection and analysis, using constant comparison, was implemented to understand the clinical decision-making process.⁹⁴

Methods

Purposeful and theoretical sampling was used to select participants. Participants had to be a licensed PT with any level of experience, working in a hospital- based or private practice outpatient clinic with patients with acute/nonspecific LBP. Recruitment began in the first author’s place of employment, a hospital based outpatient clinic with five licensed PTs who routinely work with patients with acute/ non-specific LBP. The

study and inclusion criteria were verbally described to each PT (five total) and the PTs were asked if they were interested in participating in the study. Those that were interested were also asked to refer others who fit the inclusion criteria. Referred PTs were then contacted by the first author via phone, email or in person as appropriate, and screened for inclusion criteria. This snowball effect was implemented to recruit participants with varied experience levels and work settings. Ultimately there were 13 participants from either a hospital-based outpatient facility or private practice.

Because there is evidence to suggest that the clinical decision-making process may change as the PT gains experience, an effort was made to include PTs with a range of clinical experience working with patients with acute/ non-specific LBP. The study by Jensen et al³⁷ was used as a guide to classify experience level. Participants with 1 year or less since graduation from an accredited PT program were classified as novice,^{41,89} while PTs who managed patients with LBP over five years, completed further education about the lumbar spine region demonstrating and increased knowledge base in this area, held an orthopaedic specialist certification, and / or completed a transitional Doctorate in Physical Therapy (t-DPT), demonstrating an understanding of evidence-based practice, and included evidence of measuring patient outcomes were classified as experienced.

Ethical Concerns

Institutional Review Board approval was obtained for this multi-site study. All participants read and signed informed consent. Although the first author worked with three of the participants, she was not in a supervisory role.

Role of Funding Source

Funding was received from the Kentucky Physical Therapy Association to purchase a Dictaphone start up kit.

Data Collection

A semi-structured interview with each participant took place in Lexington, Kentucky between August 2009 and December 2009. The interviews were conducted by the first author at a site convenient to the participant, and lasted from 30 to 60 minutes until there was no new information obtained. Participants were asked about their decision-making process of clinical examination and intervention; see Appendix 3.1 for sample interview questions.

Questions were developed through literature review, first author's clinical experience, and the survey research by Miller-Spoto and Collins.²² Questions were constructed, sent out to a panel for review. The panel consisted of the first author's peers, who were experienced Physical Therapists (PTs) and worked with patients with LBP in Northern Kentucky and faculty members (with an interest in manual therapy) at the University of Kentucky. The questions were revised as needed. No panel member served as a participant in this study. During the interviews questions were followed by probes to elicit more in depth responses. Interviews were audio-taped and transcribed verbatim by the first author. Data collection continued until data saturation was reached.

If possible, each participant's work space was observed for posters, books, journals use of a computer or other resources that may have influenced the participant's decision-making process. Work space included participant's office, desk, treatment rooms, and/ or clinic space as identified by the participant. These observations were reported as field notes.

Data Analysis

All data was initially analyzed by the first author, who is an experienced PT and has worked with patients with acute/ non-specific LBP for 15 years. The data analysis

procedure followed the method detailed by Strauss and Corbin.⁹⁴ Data analysis occurred concurrently with data collection to allow for a process of constant comparison of interview responses. After each interview, the first author transcribed the interview and began open coding. Open coding is a process of breaking the data down into its smallest parts.⁹⁴ By using a qualitative data management software (NVivo 8 QSR International), each unit (sentence or phrases) of data were examined for meaning and assigned a code. If at all possible, codes were exact words or phrases used by the participants. As the first author completed and transcribed additional interviews, each subsequent interview was coded using the same process. Data was collected and coded until no new information emerged. Saturation was considered to have occurred after nine interviews but an additional four interviews were completed to ensure depth of data. A total of 43 initial codes were identified. These initial codes were then sorted into potential categories by the first author. At this time, the second author began to serve as an external auditor. An external auditor is typically a person who has not been involved in data collection and helps determine if the findings are sustained by the data.^{95,96} The second author is an experienced qualitative researcher and health care provider but does not have a clinical background in PT or acute/ non-specific LBP. The second author examined codes and categories established by the first author for consistency and accuracy, working with the first author until 100% agreement was achieved. Ultimately, 21 categories emerged.

The categories were examined to understand how each related to the others in a process called axial coding.⁹⁴ The first author related each category to relevant factors such as experience level and education of PTs. Four distinct preferences of decision–

making emerged from the data. Again, these findings were confirmed by the second author with 100% agreement and a Kappa score of 0.80.

Finally, through selective coding, the first author identified an emergent framework describing the process of clinical decision-making used by the participants. The process was focused on refining the emergent framework.⁹⁴ During selective coding, no new concepts appeared. See Table 3.1 for an example of the progression from open coding to selective coding.

Table 3.1: Examples of the Coding framework

Initial Codes	Categories	Preference	Supporting Quotations
Hypothesis based reasoning	Evidence-based practice	Evidence-based practice	“You learn from what you see in the clinic, your experience to go together is part of evidence-based practice, taking the scientific evidence, your clinical judgment and the patient in front of you to come up with evidence-based practice”. (Shane)
Patient guided decision-making	Research – current literature		
Day to day decisions			
Use the literature			
Journal articles guide treatment			

In addition to external auditing by the second author, additional methods of trustworthiness were used to reflect the quality, consistency, and authenticity of the findings.^{95,97} Because the first author was an experienced PT, she worked to set aside, or bracket, her biases and assumptions related to diagnosis and intervention of patient with LBP to allow identification of the emergent framework. Triangulation was achieved by

using multiple data sources including interview and observations, and comparing findings to the extant literature. Member checking was implemented to validate the transcribed interviews; participants were sent the transcripts and then editing was allowed as appropriate. The transcript was then returned to the first author for open coding. Finally, an audit trail was maintained through field notes, memos and the use of the qualitative data management software.

Results

There were 13 participants in this study, and their backgrounds reflected a variety of experience and education levels (see Tables 3.2 and 3.3).

Table 3.2: Summary of Participant Demographics

Characteristic	Sample
Participants	n = 13 (8 Males 5 Females)
Years in an Outpatient setting working with patients with low back pain	2 months to 22 years Mean 7.25 years (SD 6.083)
Degree	Bachelor's in Physical Therapy n = 4, Master's in Physical Therapy n= 8 Entry level Doctor of Physical Therapy (DPT) n=1 Transitional-DPT completed by 7 of the 13
Other Certifications	Orthopaedic Certified Specialists n=1

Table 3.3: Individual Participant Characteristics

Participant	Gender	Experience	Degree	Decision-making Preference	Work Setting	Resources Used
Caroline	F	Novice	Masters	Identifying Root Cause	Hospital-based outpatient	None
Mark	M	Experienced	Bachelors	Identifying Root Cause	Hospital-based outpatient	Special Test book Research journals
Karen	F	Experienced	Masters T-DPT	Identifying Root Cause	Hospital-based outpatient	General Anatomy books Hesch NAGS and SNAGS book Mulligan Lumbar spine - McKenzie
Henry	M	Experienced	DPT	Eclectic	Private practice	Journal Research article Netter
John	M	Experienced	Bachelors	Eclectic	Hospital-based outpatient	None
Paul	M	Experienced	Masters T-DPT	Eclectic	Private practice	Peers Journal articles
Samuel	M	Novice	DPT	Eclectic	Private practice	Journal articles

Table 3.3: Individual Participant Characteristics (continued)

Jane	F	Experienced	Bachelors T-DPT	Experience- based	Hospital- based outpatient	Mentor
William	M	Novice	Masters	Experience- based	Private practice	Peers Mentor Journal Articles
David	M	Experienced	DPT	Evidence- based	Private practice	Maitland books Orthopaedic clinical reasoning books Mentor
Sarah	F	Experienced	Masters T-DPT	Evidence - based	Hospital- based outpatient	Mentor Research articles
Shane	M	Experienced	Masters T-DPT	Evidence- based	Private practice	Peers Continuing education
Susan	F	Experienced	Bachelors T-DPT	Evidence- based	Hospital- based outpatient	Research articles

Based on the literature, participants were labeled as novice or experienced. Four decision-making preferences of PTs working with patients with LBP emerged from the data: 1) Identifying the Root Cause, 2) Eclectic Approach, 3) Experience-based

management, and 4) Evidence-based management. Each PT in the study emerged as having one of these preferences for decision-making. Each preference is described below, with direct quotations from participants provided as support. Pseudonyms have been used for the participants.

Identifying the root cause

Mark, Karen and Caroline, whose level of experience ranged from 2 months to 11 years, expressed this preference. These clinicians, who all worked in a hospital-based outpatient therapy service, tended to identify signs and symptoms from the subjective history and physical examination, and then used the information to find the root cause of the LBP, rather than just treating the symptoms. Mark described it this way: *“I don’t treat symptoms. I like to go through and do a root analysis of where the problem is coming from and I want to treat what is actually wrong, not just the symptom.”*

These clinicians initially questioned if the symptoms were musculoskeletal or non- musculoskeletal, using hypothesis based reasoning that helped lead to intervention. According to Karen, *“I have a loose classification and I try to figure out if it is a disk problem, if it is an arthritic problem, I am trying to figure out the underlying cause mostly, is what I am trying to figure out. If I can get to what is underlying cause of the problems then I figure everything is going to be much more successful”*.

These clinicians preferred to complete the whole evaluation and identify the problem first, before determining which intervention to use, as described by Caroline: *“So if I found an aggravating or relieving factor during the examination, I would definitely think of those positions that caused or provided relief and I would want to start my treatment there. So if, say extension provided some relief during the examination then I may start with some gentle extension exercises especially if it was a disc involvement or*

something like that you just treat whatever you find. If I found muscle weakness, like abdominal weakness or lower extremity weakness I would start there”.

One of these therapists (Karen) did report using a classification system, but in this instance, she used the McKenzie Approach and Hesch method as a “loose” model of classification to determine the cause of the problem, and relied more heavily on the classification systems as interventions to treat the cause.

Eclectic approach

This preference was described by three experienced PTs (Henry, John and Paul) and one novice (Samuel). Three of the therapists worked in a private practice setting and the other worked in a hospital-based outpatient setting. The experienced PTs had completed many different continuing education classes over the years, resulting in a “hodgepodge” or eclectic approach to decision-making. Different theories had merged and the clinicians could no longer identify where they had learned them. John stated, *“No, it is such a hodgepodge with me that I don’t really do that; I still don’t know, like I say after taking a whole lot of courses, it all kind of merges together at some point so I don’t really delineate any particular form”.*

Different treatment techniques were also integrated, so pieces from multiple classification systems were used to identify the patient’s problems and then treated accordingly.

The novice PT, Samuel, reported starting with the treatment-based classification system, but the patients he sees in the clinic do not always fit that system so he relies on other approaches that he has learned. Paul concurred; *“The main framework I use is Delitto’s treatment-based classification but I also I do now use some of the Tom Boers work following a class I took”.*

An eclectic approach was also used to describe the clinician's patient population not "fitting in" to a particular classification system. This was a challenge for both the novice and experienced PTs. There did not seem to be one approach that covered all the patients with LBP the clinicians were seeing, so they treated with a range of approaches instead. Samuel stated, *"I try to be organized and I try to fit them into the rule but I have always said this, I don't think everybody fits into the current classification system. The classification is good as a guide and provides guidelines but once I was out of school, patients did not fit in the system and it is not clear cut like it was taught in school. I use it as a guide but I don't necessarily stick to it 100%".* Henry said, *"Initially the way I think about it, is basically how I think the low back pain classification is that has come up at least I believe I have kind of learned through school is the stabilization category, the mobilization, specific movement and then traction. Since then I have been in my first year of being a working therapist and then a couple of these courses I have taken I have deviated slightly in terms of incorporating new things into that because everyone does not fit that mould so sometimes you need to say ah we need to do this plus we will try something different."*

Experience-based management

This preference was described by two PTs, one with 11 years' experience working in a hospital-based outpatient setting (Jane) and the other with a year experience working in private practice (William). Jane discussed a forward thinking pattern as well as reflection to determine a "classification of diagnoses" in her thought patterns as she was going through the examination process. *"I have a mental template, so that is how I teach my students to do it too when they come through here, you have your own template that you have developed and so you are going through the same categories each time*

then that will cue you where to go from there but I don't have a specific form that because again I think that would be hard as depending on what your decision-making tree starts".

Likewise, William referred to decision-making in the same way, using previous limited experience as a guide to diagnosis and classification of current patients. *"It has just been kind of based on experiences. I have only been out for a year and a half now but it is just building based on experience"*. Both Jane and William discussed knowledge of the treatment-based classification system and clinical prediction rules, and using them if their patient's fit the sub-grouping. Jane reports using the McKenzie Approach loosely as a classification system, more to determine an exercise direction rather than a specific McKenzie classification.

Evidence-based management

Finally, an evidence-based approach towards LBP management was discussed by four experienced PTs (David, Sarah, Shane and Susan) with a range of clinical years in outpatients from 7 to 22. This preference was particularly noted by the therapists who worked in private practice (50%) or who had completed a t- DPT (100%). After completing the t-DPT program there was a sense of understanding evidence-based practice and its importance in clinical application. Shane stated, *"You learn from what you see in the clinic, your experience is part of evidence-based practice, taking the scientific evidence, your clinical judgment and the patient in from of you to come up with evidence-based practice."*

Day to day decisions were guided by current research and experience, using the treatment-based classification system and clinical prediction rule. Shane went on to say, *"The basic classification system that we utilize are the four main kind of treatment*

groups; stabilization group, manipulation group, traction group and directional preference exercise group so I mean that is kind of my broad framework that I am looking at when an individual comes in and recognizing that like most models it is rare that I find someone that fits in one or if they fit in one sub-group one time then they fit in the second one the next time or they may fit in two the next time so that is the general classification system that we utilize here”.

Susan stated; *“So basically the classification scheme that I learned a long time ago, I think they had seven main categories at that time so it was flexion, extension, lateral shift, immobilization, mobilization, traction those kind of things so, again you start to kind of form some sort of ideas based on those things, so that is what I am looking for is to when I do the exam I am starting to form now the four that they look at.”*

Sarah stated, *“I like to use an evidence-based approach so I use an outcome measure like the modified Oswestry Disability Index so that I can see if I am making a difference and after a couple of weeks if I am not sure the patient is making a change then I like to retest.”*

The therapists with this preference reported using the treatment-based approach, clinical predication rules for manipulation, Maitland and Paris classifications. The McKenzie Approach was used as an intervention, in the form of directional preference exercises, but the classification was not described as being used during data collection but only as an intervention.

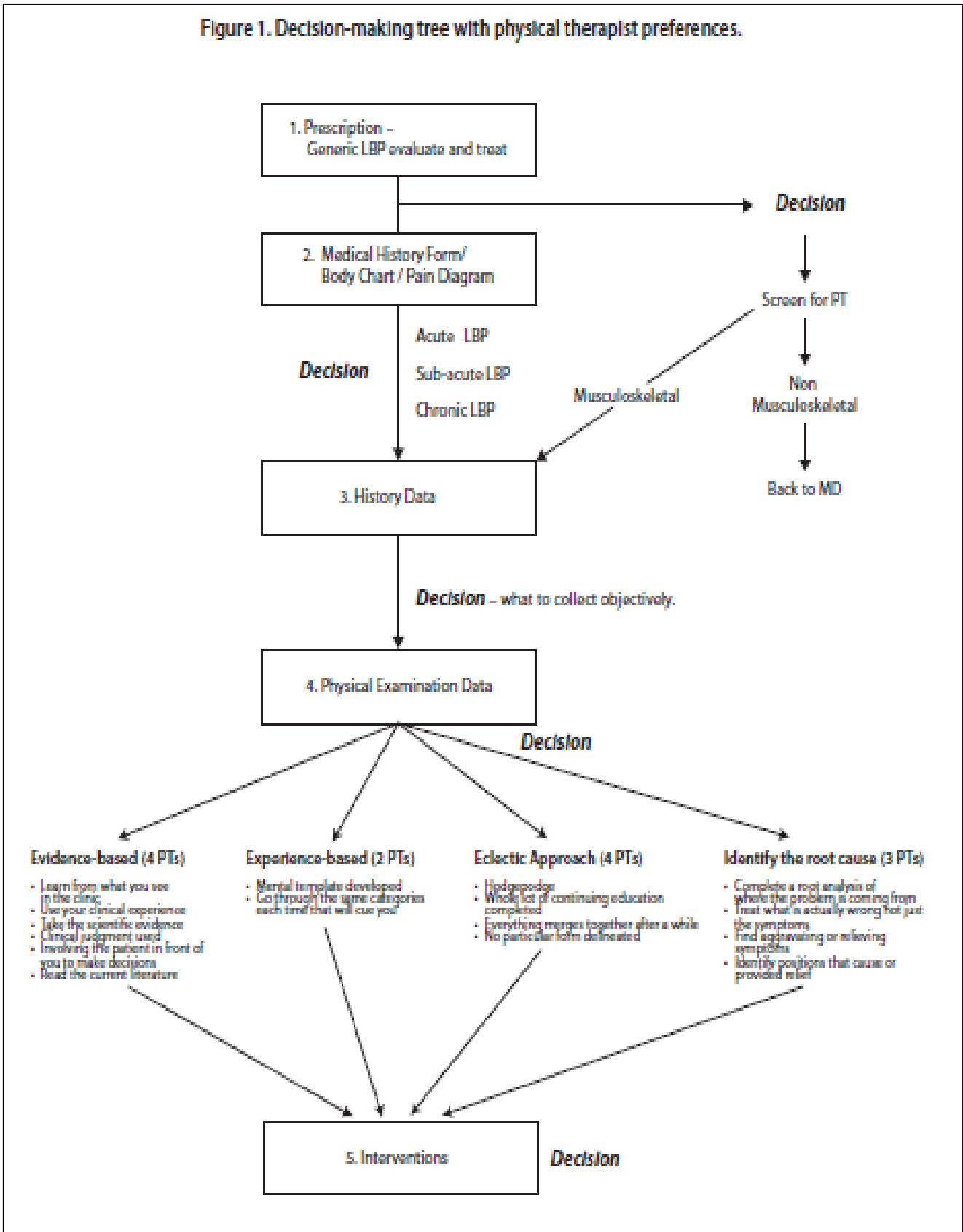
Decision-making Process

The four preferences guided decision-making and differed for each PT depending on factors such as education and experience. Despite these preferences, however, there was a common tendency of all of the PTs to follow a similar underlying evaluation

process for patients with LBP. Each therapist reported that their decision-making process began with a generic prescription of LBP and the completion of a medical history form/ body chart and/or pain diagram to determine if the individual was appropriate for PT services, which led to collection of subjective and physical examination data. Based on this information, the PT's preferences emerged to guide intervention. Figure 3.1 demonstrates the decision-making tree used by all of the participants.

Figure 3.1:

Figure 1. Decision-making tree with physical therapist preferences.



Classification Systems and Other Decision-making Resources

The clinicians reported using a wide variety of classification systems (Table 3.4).

Table 3.4: Classification systems reported to be used as decision-making guides for patients with low back pain.

Classification System	Number of PTs Using this Classification System in Decision-making
Treatment-Based (Delitto, Erhard and Bowling)	9
Maitland	2
McKenzie	2 specifically described using the McKenzie Approach in their decision-making of direction preference for interventions but the therapists did not discuss a diagnostic classification of Derangement, Dysfunction and Postural Syndromes when evaluating the patient. 10 PTs used this approach as an intervention.
Clinical Prediction Rules for manipulation	9
Paris	1
Hesch	1
Total Motion Release	1
Strain Counterstrain	1

Although three are most frequently used, as many as eight different classification systems were noted by the PTs in this study. Some of the classification systems were actually used as intervention rather than for diagnostic purposes. For example, one PT reported using the McKenzie approach but did not describe any of the syndrome categories for diagnostic purposes; instead he reported using the flexion and extension

exercises as an intervention. Total motion release and Strain counterstrain were reported as classification systems used by one experienced therapist in the study. These were not reported in the Miller Spoto and Collins²² survey and are not “true” classification systems. When the PT was probed further, a diagnosis was not determined and the manual therapy techniques were used as an intervention to treat the pain for LBP.

Observations of the clinicians’ workspaces revealed some posters related to LBP, but none of the participants reported using these as resources for decision-making. Participants were asked about their use of reference books and other resources such as the Internet when making decisions. Many of the therapists reported having access to the Internet at work and used this as a resource. The majority of therapists (62%) who preferred the Evidence-based Management and the Eclectic Approach reported having journal articles, continuing education manuals, and the following books on hand: Orthopaedic Clinical Examination (Cleland and Netter), Clinical reasoning for Manual Therapy (Jones), and the Maitland books. Those therapists had more experience (3 months to 26 years) and discussed having a specific mentor who guided them, both past and present, in furthering their manual therapy skills, and career decisions to advance their skills and to make more complex intervention decisions. The therapists who preferred Identifying the Root Cause referred to general anatomy books, special test examination books, Hesch, Manual therapy ‘NAGS, SNAGS and MWMs’, (Mulligan), and Lumbar Spine (McKenzie) to help them with their decisions-making.

Novice therapists had a different approach to using resource materials for decision-making. One novice therapist²² reported not using any books or other resources to help guide her decisions, which seemed to fit with her focus on treating symptoms.

Another novice therapist reported relying on research articles and peers to help guide decisions. Three novice therapists discussed the importance of peer meetings and case study discussions as helping them with the decision-making process as well as having a mentor within the clinic that helped guide them professionally and with the day to day patient problems. Overall, mentoring was a common resource used by many of the clinicians that made a difference in the development of skills and knowledge need to evaluate and treat patients with LBP.

Outcome measures

During the interviews, eight of 13 PTs discussed using an outcome measure as part of their decision-making process to identify the functional ability of the patient to set goals. When probed with further questioning 100% of the eight PTs reported using the Modified Oswestry Disability index. Seven of the PTs worked in private practice setting and one therapist worked in a hospital-based setting. Three of the 13 PTs worked in hospital-based setting reported that they used the modified ODI in the past, but it became too time consuming given the completion of paperwork now required by clients on admission and they have stopped using it. The final two of the 13 PTs worked in a hospital-based setting, and reported not using any outcome measures for patients with LBP.

Use of outcome measures was not an initial question in the interview so as each PT discussed the use then further questioning on support for why they use the modified ODI continued. Responses included: the outcome measure is reliable, valid, used in the research, it is free, focuses on function, common, the “gold standard”, used for many years, and can be used in goal setting to determine progress towards functional goals.

Some of the reasons for not using the modified ODI were: time, not appropriate for caseload, and decreased patient satisfaction with services filling out the questionnaire.

Discussion

The purpose of this study was to investigate a framework or process that PTs use when examining and selecting an intervention for acute/ nonspecific LBP in outpatient settings. The findings suggest that all of the participants engaged in a similar, initial decision-making process for evaluation, but then moved toward a preferred method of decision-making in order to determine effective intervention. Experience, education, and other aspects of the PTs' backgrounds influenced their preferred decision-making style, and use of resources such as classification systems varied broadly depending on experience level.

Although evidence-based guidelines and a number of classification systems are readily available for the evaluation and treatment of patients with LBP, the PTs in this study did not routinely rely on these resources. Even when some of the therapists verbalized using one of the classification systems, they went on to describe moving straight from the findings from the history and physical examination into interventions without identifying the specific diagnostic classification.²¹ For example, some of the therapists reported using the McKenzie²¹ examination approach where they assessed an individual's directional preference and then used that preference to begin the intervention of specific exercises. For example, if someone responded well to the lumbar extension direction, extension exercises would be the desired treatment. From the interviews in this study, the participants reported using the McKenzie method as a treatment method for exercise directional preference, but then did not incorporate the three classification sub-groupings (Postural, Dysfunction and Derangement) associated with this approach for

diagnosis. Additionally, the therapists discussed that in some cases of LBP, one specific classification system was not applicable and consequently, there was not one specific intervention that was appropriate. Instead, the PT relied on an eclectic combination of treatments to obtain favorable outcomes. This need for an eclectic treatment approach may have been related to the outpatient setting, since many of the therapists reported the patients were not referred early enough to benefit from the acute classification systems, forcing them to use different approaches.

Although LBP is normally classified as acute (less than 6 weeks), sub-acute (6-12 weeks), and chronic (greater than 12 weeks), it was interesting to note that 10 of the 13 PTs did not specifically think in these terms as they prepared to assess the client. Other than that, the PTs in this study tended to follow a similar decision-making process. In all of the clinical settings used in this study, PTs received generic physician referrals for evaluation and treatment of LBP. After screening for appropriateness for PT services, a medical history form and/ or body chart was then completed, allowing the patient to describe their symptoms, prior to patient interview. Finally, a physical examination was completed. Only 9 out of 13 therapists discussed knowing the treatment-based classification system identified patients who were acute (<16 days), fulfilled the clinical predication rule for manipulation, and treated accordingly. These nine therapists came from a range of backgrounds; three were novice and six were experienced; three therapists worked in a hospital-based outpatient setting and six worked in private practice clinics; one had completed an entry level Masters in PT, two had completed an entry-level DPT program, and six therapists had completed a t-DPT program in the last 2 years.

Despite these disparate backgrounds, all of the PTs followed this similar process of evaluative decision-making, no matter which preference or classification they used.

Although the *Guide to Physical Therapist Practice*³⁹ was designed to describe and outline PT practice and outline a patient/client model for practice in the USA, and to categorize patient problems in a standard way,²² it did not emerge as an essential resource to the PTs in this study. One interview question was specifically designed to target the use of the *Guide to Physical Therapy Practice*³⁹ in decision-making and only one experienced therapist working in a hospital-based outpatient department reported using the *Guide*. For instance, one participant described that the *Guide* was not used as a diagnosis tool but rather for coding, billing/ reimbursement, and for communicating with another therapist when transferring a patient. In this study, the *Guide* did not influence decision-making in the area of LBP.

Background, experience, and mentorship were factors that potentially impacted the decision-making process. Physical therapists who had completed an entry-level or transitional DPT program, engaged in continuing education in the area of LBP, or held a specialist certification, had additional knowledge of evidence-based treatment for patients with LBP. These therapists were more aware of the clinical predication rules³⁰ and treatment-based classification sub-grouping,^{13,19,28} and reported using them to classify acute LBP. This finding differed from the study by Stevenson et al.²⁴ who found that PT management of LBP following an evidence-based educational program differed little from the PT's treatment of LBP before the PT attended the educational program; and although the novice clinicians in this study were aware of the clinical prediction rules and classification systems from their recent education, they seemed to not yet have the

clinical experience to apply them. The novice clinicians relied less on experience and instead focused on treating clinical signs and symptoms to decrease pain and increase function.

The clinical reasoning process used by the therapists in this study seemed congruent with many of the reasoning concepts presented in the current literature, such as using hypothesis testing, previous clinical experience, pattern recognition and forward reasoning, and reflection when making clinical decisions.^{38,42,45,88} For instance, hypothesis testing was specifically referred to by one PT, who stated that the use of a classification system “is all hypothesis-based reasoning, hypotheses driven reasoning”. Participants from the Experience-based Management preference reported relying heavily on previous experience and pattern recognition for clinical decision-making, as one participant stated that they had a “template in their head from previous patients” and another relied on previous clinical experience with patients to help form a guideline on how they were going to determine interventions. Reflection on Action, the process of clinical reflection after a patient interaction,⁸⁸ was demonstrated by both novice and experienced therapists. The therapists reported reflecting on experiences with previous patients with similar conditions or presentations of LBP. One therapist reported that “you learn from what you see in the clinic, and your experience to go together is part of evidence-based practice, taking the scientific evidence, your clinical judgment and the patient in front of you to come up with evidence-based practice”. Additionally, the clinical reasoning processes of meta-cognition, applying knowledge, and integrating clinical experience as well as reflection was described by the clinicians with the evidence-based, eclectic and experience-based preferences. While concepts related to the

clinical reasoning process have been articulated in the literature, none have specifically examined PTs working with patients with LBP. The process described by the PTs in this study suggested that clinical reasoning differed with experience level and background, and that the PTs relied on a variety of reflective and meta-cognitive skills.

Outcome measures were discussed as an added component of decision-making to determine the functional ability of the patient during the evaluation as well as a useful tool to use in goal-setting. 62% of PTs reported using outcome measures in this study and 100% of them reported using the modified ODI only. Liddle⁵⁰ identified barriers, as to why therapists do not use clinical outcome measures are: time limitation and lack of emphasis or availability of specific outcome measures. In this study, barriers to using outcome measures for patients with LBP were identified as: time, the outcome tools are not appropriate for the PT's caseload, and decreased patient satisfaction with services through filling out the questionnaires. Time seems to be a leading factor for not using outcome tools but further work is needed on a large representation of PTs to identify further reasons or confirm the current findings for not using outcome measures.

In summary, four decision-making preferences used by the PTs emerged from the data; identifying Root Cause, Eclectic, Experience-based and Evidence-based. The thirteen PTs followed one of the preferences and discussed elements in their decision-making that supported these processes. From the decision-making preference a decision is made in regard to intervention. Experience and the PTs background played a role in decision-making regarding using previous patient cases to follow to help classify current patients to decide on their interventions and treatment.

Limitations

The first author is an experienced PT with many years of clinical experience working with patients with acute LBP. She has taken post-graduate training in the McKenzie method²¹ to categorize patient with LBP, and was also aware of all of the classification systems. This expertise may have inadvertently led to bias during both data collection and analysis. Additionally, the first author had a peer relationship with some of the participants; although this relationship was not supervisory, it may have led to bias or reluctance on the part of the participants to speak truthfully. These concerns were mitigated by not discussing any research ideas with peers before the data was collected; keeping interview questions broad and using probes to enable participants to give additional information that the researcher may not have anticipated; keeping a journal of researcher biases; and meeting regularly with the second researcher (who had experience with qualitative research) to discuss biases.

Although in some cases the therapist's work spaces were observed to determine what other resources were used to help guide decisions, not all resources were observed. Some therapists may access additional resources in another environment, such as home, Internet or library, none of which were observed as a part of this study. Consequently, the observations of work space were limited in its utility as a method of triangulation.

Finally, this study was not intended to reflect the decision-making process of all PTs. These PTs were not observed while interviewing, evaluating, or treating patients with acute/ nonspecific LBP, and the patient case notes were not reviewed. Although theme saturation occurred after nine interviews, it is possible that additional PTs from other settings could generate new responses and add to this emergent decision-making

model. Future research could build upon this study to continue to refine the emergent decision-making model presented here.

Conclusions

This study has provided a deeper understanding of the decision-making process some PTs utilize when managing patients with LBP. While classification systems were understood by PTs, experience, education, and other aspects of the PTs' backgrounds influenced their preferred decision-making style. Insights into these preferences PTs may lead to future studies to determine a standardized classification system.

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Chapter Four

Practice Patterns of Physical Therapists Treating Patients with Low Back Pain: A Survey of Physical Therapists in the Commonwealth of Kentucky

Introduction

Low back pain

Low back pain (LBP) is a common musculoskeletal complaint and is the reason nearly 50% of all patients seeks care in outpatient physical therapy clinics.¹³ LBP can lead to physical disability, which is a major cause of time off work every year. Consequently LBP is costly and a common occurrence in primary care, especially as many people suffering an acute episode do not recover completely and a significant number of this population commonly progress to chronic or recurrent LBP.¹³ In the United States it is reported that annual direct costs of LBP are between \$33 and \$50 billion per year⁸ and are rising by 7% per annum.⁹ It is argued that effective physical therapy LBP management has been elusive, due to physical therapists trying to treat LBP as a homogeneous condition.¹³ While evidence-based practice (EBP) guidelines have been developed for patients experiencing LBP, there is little evidence to demonstrate changes in physical therapists' clinical practice to implement these guidelines.

Classification of patients, determined by signs and symptoms, is the first goal of the diagnostic process related to LBP.³⁹ According to the *Guide to Physical Therapy Practice* and best practice guidelines, the most efficient strategies of management are based on using effective sub-grouping methods to direct decision-making.^{13,17,23} As the profession of physical therapy has moved towards autonomous practice, diagnosis has become a key element of applying EBP.^{23,39} EBP is based on clinical decision-making using the most current research evidence integrated with clinical expertise and patient

values;²³ it underpins the provision of efficient and effective health care.²⁴ Physical therapists have a considerable role in clinical decision-making with patients as an integral part of direct access to physical therapy, not least as the expected model of patient management should include a diagnosis.^{22,39}

Classification systems

In the treatment of LBP there are currently three prominent classification systems with quality evidence of support in the literature:

1. McKenzie approach,²¹
2. Treatment-based classification system,¹⁹
3. Movement impairment approach.^{20, 83}

The McKenzie method involves self-treatment, direction of preference, and progression of force.²¹ This classification system promotes patient “buy in” to treat the pathology, rather than therapist intervention.⁴⁸ Directional preference is tested by repeated movements of the spine to end range to identify pathologies and to resolve the symptoms. Self-treatment using the direction preference with addition of force progression, if needed, is the key to the patient’s recovery.²¹ A treatment-based classification system for sub-grouping acute / nonspecific LBP has been proposed by Delitto, Erhard and Bowling.¹⁹ This system uses patient pain self report, disability (measured by the modified Oswestry questionnaire), and clinical findings to group patients into one of four treatment categories: mobilization (manipulation), traction, immobilization, or specific exercise.¹⁹ Since its initial development this classification has been utilized extensively over subsequent years; evidence now exists to support using sub-grouping methods with acute non-specific LBP to guide treatment interventions to improve patient outcomes.²⁸ The final classification system is the movement system impairment-based categories for

mechanical LBP,⁸³ which is comprised of two parts: physical examination and subjective history of LBP. The physical examination is directed at assessing/investigating changes in patient's signs and symptoms dependent on movement in the directions of rotation, flexion, and extension of the spine, as well as the clinical judgment of spinal alignment.⁸³

Classification systems are available to guide decision-making in managing LBP, and have been the focus of a number of research studies in recent years.^{13,21,22,28,86} The past literature has been dedicated to the development, and reliability and validity testing of classification systems.^{17,35} Further evidence supports the proposal of a treatment-based classification system that matches initial clinical LBP signs and symptoms to treatment can help improve clinical outcomes.²⁸ Brennan et al.,²⁸ reported when sub-grouping signs and symptoms of LBP to match interventions, outcomes can be improved. This was demonstrated in a randomized controlled trial where patients were classified using an algorithm of the treatment-based system and treatment "matched", as disability levels were lower at 4 weeks and 1 year when compared with patients who were not treatment matched.²⁸

Barriers to clinical implementation

Although an evidence-based classification system for acute/ non specific LBP to determine interventions is available for physical therapists, it is not always implemented into clinical practice. Evidence suggests that barriers exist to the integration of new research evidence and application to clinical practice. This includes: lack of time, clinicians' skills in interpreting research, understanding research methods, skepticism about the value of research, isolation from literature sources, lack of personal skills in searching the literature, and administration supporting research integration.³⁵⁻³⁸ For example; some criticisms in the past have been that the Treatment-based classification

system¹⁹ is complex, with multiple steps and considerations. As a result, in recent years, this method of classification has been simplified to make the system more dynamic and reliable, allowing implementation into clinical practice without specific training.^{13,35}

The process of considering the use of classification systems requires the physical therapist to be familiar with the classification system methodology, and to use their own clinical decision-making skills to determine where the patient fits into the sub-groups. This is a challenging process for physical therapists but one that could potentially determine how the patient will benefit from the interventions chosen. In acute LBP, a clinical prediction rule has been established that identifies patients with less than 16 days since onset of pain fits a sub-group of manipulation. This clinical prediction rule has been shown to provide improved outcomes.³⁰ Sub-grouping patients is an advantage because the decision-making framework leads the PT towards an initial intervention for the patient. A previous traditional approach to patient care, used by PTs, in order to solve a patient's problem was to dictate treatment, and assume the treatment would be accepted by the patient.⁸⁸ Recently, patient care has transitioned to a patient-centered approach that involves the patient in their care and encourages the patient to take ownership of their progression. Such a patient-centered approach is employed by experienced therapists, who believe that during patient care it is more effective to guide and educate patients than "do" for them.^{41,42,88} This leads the experienced therapist to demonstrate different clinical decision-making skills that can make a difference in a patient's care, and ultimately the outcome of the physical therapy encounter.

Experience of Practicing Physical Therapists

Clinical reasoning and knowledge centered on understanding the patient's condition is the key to distinguishing an "expert" from a "novice" clinician.⁴¹ It has been

demonstrated that the “expert” therapist combines the data collected during the clinical examination with previous experience; they then apply the process of reasoning to determine an outcome by meta-cognition.³⁷ Meta-cognition is a higher level of thinking involving the understanding and awareness of one’s own cognitive process, and is a key element of clinical reasoning.⁴⁵ Reflection is an important element that allows the development of knowledge from experience and continued learning to support the expert therapist in their clinical decision-making.³⁷ An expert physical therapist using clinical reasoning skills will demonstrate an ability to: digress from frameworks of evaluation, use reflection to produce an evolving patient-centered, dynamic, multidimensional knowledge base, predict patient outcomes more successfully, and spend further time reinforcing patient education.^{37,87}

Experienced clinicians use advanced clinical reasoning by organizing their knowledge and relying on clinical experience to make decisions to classify LBP.⁴⁸ Overall, there is little research that has examined the clinical reasoning process and skills used by physical therapists in choosing to use a classification procedure to identify treatments for people with LBP. In addition, there is little published research revealing what classification systems, if any, physical therapists are using in clinical practice. There is also a lack of evidence supporting the clinical reasoning skills physical therapists utilize when they interview patients with LBP and formulate their intervention strategies. Therefore, there is a need to understand the decision-making process used by physical therapists in evaluating and determining interventions for LBP patients.

Outcome measures for LBP

There are many outcome measures for LBP available for clinicians to understand a patient’s self report of their physical disabilities. Outcome measures are used to

demonstrate effectiveness of treatment and measure patient progress. It can be used to assess the physical limitations a patient describes, and for goal setting for the patient and/or physical therapist. Two standard disability outcome measures used for patients with LBP are: the Oswestry Disability Index (ODI) and Roland-Morris Disability Questionnaire (RM). Both measures have been used for over 20 years and are deemed reliable and valid.^{53,54,56,98} Both tools can be used at initial evaluation, during treatment, and at discharge as they have been established as valid over time to assess a patient's progress with interventions.^{54,58-61} From a systematic review and further commentary,^{99,100} it was demonstrated that the RM is appropriate for collecting self report outcome data for patients with mild to moderate LBP, while the ODI is applicable for patients with severe disabling LBP. The challenge to physical therapists is how to determine if a patient has acute or chronic LBP as the patient comes into the clinic without an examination or with a referral for LBP without diagnosis. Even though outcome measures such as the RM and ODI have been shown to be valid and reliable tools several barriers have been identified as to why therapists do not use clinical outcome measures, including: time limitation, lack of emphasis, and availability of specific outcome measures.⁵⁰ In addition, there is little information on what outcome measures are currently used in every day practice. Identifying what outcome measures are used clinically, if any, is important to determine a baseline of current practice. It is also important for physical therapists to choose the best outcome measure, either subjectively or numerically, to demonstrate patient improvements. Exploring what outcome tools, if any, are used in practice will provide baseline information on what LBP outcome tools are currently used, as well as identify further barriers to their use.

Survey research

In a survey in Britain and Ireland conducted by Foster (with a 58.3% response rate),¹⁰¹ physical therapy management of LBP was studied; the most popular approaches used by physical therapists to treat LBP was found to be Maitland mobilization and the McKenzie method. A classification using these methods would have occurred first in order to inform intervention, but this can only be inferred as the focus of the survey was on treatment.

A subsequent survey in Northern Ireland reported the most common physical therapy treatment for patients with LBP was advice (89%), McKenzie treatment (70%), Maitland mobilizations (42%), and interferential therapy (30.3%).¹⁰² Finally, a similar survey in Thailand reported hospital-based physiotherapists used hot packs (64%), ultrasound (61%), and mechanical traction (61%), while university-based hospitals and private clinics used manual therapy for patients with LBP.¹⁰³ The reported response rate with this population of PTs was 77.2%. While each of these surveys identified current treatment management of people with LBP, none to date have attempted to identify the process physical therapists used to determine their decision-making in LBP.

A survey by Miller-Spoto²² reported 76% of Orthopaedic Certified Specialists used a classification system in decision-making when evaluating people with LBP. Of these, 38% used a general pathophysiological classification system, 32% used the McKenzie system, 9% treatment-based classification, 7% movement impaired classification system, 7% *Guide to Physical Therapy Practice* and 3% the *Quebec Task Force* scheme. Half of the respondents (50%) who used a classification system reported using more than one system.²² From this survey, it was concluded that while both the treatment-based (Delitto) and movement impaired classification (Sharmann) systems

have the greatest support in the literature (at that time), only 9% and 7% respectively were used by Orthopaedic Certified Specialists.²² Other classification systems were reported being used by another 70% of clinicians but those systems do not have as much evidence to support them. Thus, even in a group of specialists, relatively few used evidence supported classification systems in managing patients with LBP. The results of the Miller-Spoto²² study also demonstrate the difficulty clinicians have in accessing research literature and the implementation of the information into practice. At the time of the survey there were 977 Orthopaedic Certified Specialists, but there was a limited response rate of the survey of 30% (n= 253). Therefore, the generalisability of these findings is perhaps limited. The response bias may mean that the prevalence of actual use of classification-based systems is even less than indicated by the survey results. The purpose of the current study was to survey physical therapists, with and without specialist certifications, who manage patients with LBP. The majority of therapists who treat patients with LBP do not hold specialty certifications. Surveying the general population of physical therapists, will provide a better understanding of classification systems used in routine general practice.

From the previous research, PT survey response rates examining physical therapy vary from 30 – 77 %. For a postal survey, response rates can be expected to be as low as 20% to 45%.^{104,105} Response rates can be improved to 50 -70% if the survey design and implementation are well designed and planned.¹⁰⁶ For the purpose of this study an expected response rate of 30% was chosen *a priori*.²²

The purpose of this study was to determine what patient classification procedures physical therapists use as a guide for interventions when treating patients with LBP: by

establishing current practice (currently unknown), and documenting the classification systems and patient outcomes tools used in practice in this region.

Purpose

1. Identify the lumbar spine classification system(s) that physical therapists use in Kentucky
2. Determine barriers that affect the use of classification systems.
3. Identify what outcome measures, are used by physical therapists in Kentucky when treating patients with LBP.
4. Determine barriers that affect the use of outcome measures.

Methods

Survey Design

A mail survey tool was developed by the primary author to collect both quantitative and qualitative data relevant to classification systems used by physical therapists working with people with LBP. Survey items included both open and closed-ended questions based on a literature review, a qualitative study, and other previous surveys. Open ended questions (questions with blank areas to allow the respondent's own words to be used) were designed to allow the participant to provide deeper insight and greater information on the question topic. For example; if the response to the initial question concerning use of a classification system was "No", a subsequent question "*Why do you not use a classification system?*" was asked to provide further information. Closed ended questions provided the respondent with a set choice of answers, for example; 'Classifications systems are useful when treating patients with LBP in the clinic': Strongly agree, Agree, Neutral, Disagree, and Strongly disagree.

Survey appearance was considered and Dillman's recommendations for clarity were implemented.¹⁰⁶ Arial font of 11 point was used to present a clear readable survey. Spaces were left to allow the respondent to insert their answers, as well as to provide space between questions. Check boxes were used where appropriate to provide an easy to complete survey.

Survey items were designed to fulfill the aims of this study and focused on the following areas:

1. what classification-based systems are currently being used in practice;
2. barriers to implementing a classification system in to their practice.
3. documentation of continuing education relating to the lumbar spine;
4. the use of outcome tools for patients with LBP;
5. barriers to the use of outcome measures in their practice.

In addition, items determining the physical therapists' percentage of day spent managing patients with LBP, specialist certification, years of practice, and open-ended qualitative questions were included. For the closed-ended questions, a Likert scale of 1 - 5 was used.

The survey tool underwent a pretesting procedure using a convenience sample of peers. The convenience sample of peers (n=4), which helped with the initial question testing from the previous qualitative study (Chapter 3) and who either worked with, or had a research interest in, LBP, reviewed and provided feedback to the questions on the survey tool. Specifically, the peer group provided feedback related to the ease of completing the survey, and the time taken to completion. This information was used to revise the survey, to improve time to completion, and improve potential response rate. The tool was also reviewed by two faculty members at the University of Kentucky who

have a manual therapy interest and provide input and feedback on the survey tool. The tool was also reviewed by a Director of Survey Research at the University of Kentucky who evaluated its overall format, question construction, and cover letter design. Finally, the survey tool was reviewed by an international expert in the field of survey design for physical therapists working with LBP. The survey tool underwent content validity testing, by the previously mentioned reviewers, to ensure all aspects of decision-making by physical therapists involved in the management of LBP are included in the tool. The survey (Appendix 4.1) was the final version used in this study.

While there has been a significant increase in technology, the current literature still supports the mail survey method as yielding a higher response rate by up to 20% when compared to web-based surveys.^{106,107} The survey method followed the delivery sequence file (DSF) outlined by Dillman et al.,¹⁰⁶ This included: mailing a questionnaire with the first cover letter (Appendix 4.2), and 4 weeks following the original mailing, the whole package was resubmitted to non-responders with a second cover letter (Appendix 4.3). The sending of an introductory postcard was also implemented based on suggestions from the literature.¹⁰⁶ This postcard was sent one week beforehand to introduce the survey, increase credibility and prepare the individual's expectation for the survey (Appendix 4.4).¹⁰⁶ A stamped-return envelope was provided, and each letter used a first class stamp instead of bulk mailing. The address of the respondent was hand written on the front to make the letters more personal. These were techniques suggested by Dillman¹⁰⁶ and a Cochrane review to improve return rate.¹⁰⁸

The initial questionnaire had a tracking number on the back of the survey that correlated with a main list to verify addresses. The second mailing did not include a verification number on the back as there were only two mailings of the questionnaire.

A postcard was administered at the end of the data collection period to non-responders to identify (via check box) if they were not interested in the survey, afraid of loss of confidentiality, did not receive the survey, or did not work with patients with LBP (Appendix five). This procedure provided further information on the non-respondent group as well as produced more confidence in the data provided by those who had completed the survey.

Sampling framework

The purpose of this study was to collect preliminary data by targeting groups of clinicians that were most likely to treat the patient population of interest. Therefore, a convenience sample of physical therapists who worked with patients with LBP in the Commonwealth of Kentucky was selected for the study. This group was identified by purchasing the listing of clinicians from the Kentucky State Board of Physical Therapy. From the listing of 2673 physical therapists, 250 were identified if they had an outpatient setting address in Kentucky and/or if the primary author recognized from previous knowledge that the PT worked in the outpatient setting.

Inclusion criteria; Licensed physical therapists with or without orthopaedic certification, currently treating patients with LBP in the last 6 months, and practicing in either an outpatient hospital-based or private practice setting.

Exclusion criteria: Physical therapists who did not currently work with patients with LBP or did not work in Kentucky.

IRB approval was received from the University of Kentucky. Informed consent was demonstrated if the individual returned the survey.

Data Analysis

Statistical analysis included a descriptive analysis using PASW/SPSS 19 (Chicago, IL) software. Variables of interest in the study were: years of experience, type of post-graduate degree, orthopaedic certifications, use of classification systems and outcome measures. Factor analysis was completed on the Likert scale questions leading to further analysis of cross tabulations. Logistic regression analysis explored the probability of using classification systems through the variables : years of experience (divided into novice 0-5 years, medium 6-15 yrs, and experience >16yrs.), type of post-graduate degree (Bachelors, Masters, Doctorate or Transitional physical therapy degree), and classification systems (McKenzie, Treatment-based, Movement impaired, *Guide to PT Practice*, or Pathophysiology) to see if any prediction could be made. Cross-tabulations were completed on the categorical data as well as Pearson Chi-square tests to determine any associations between the categories. The Pearson Chi-square test was also used on the Likert scale question responses for the outcome measures. Demographic data were analyzed using percentages.

Qualitative data, which consisted of responses from the open ended survey questions typed verbatim, were compiled and analyzed. Significant words or phrases were identified and, labeled with a code. These codes were then organized into categories by four of the study authors' independent from one another. The four groupings of categories were compared, redundancies eliminated, and the final list of categories were reviewed by all four team members to determine agreement.⁹⁵ This process of peer

review was used as an aspect of verification to ensure trustworthiness of the data collected.

An audit trail was maintained which included responses to the open-ended questions from the survey, document analysis, and personal notes. The importance of putting aside any biases or assumptions during analysis was recognized as well as the importance of remaining open to multiple interpretations of the data and reflecting the data appropriately, so that the themes could emerge during the analysis. This was addressed by independent analyses by different team members and further consensus towards agreement as necessary. Based upon this process, 100 % agreement (Po: 1.0) was achieved with all themes (Kappa score of 1.0).

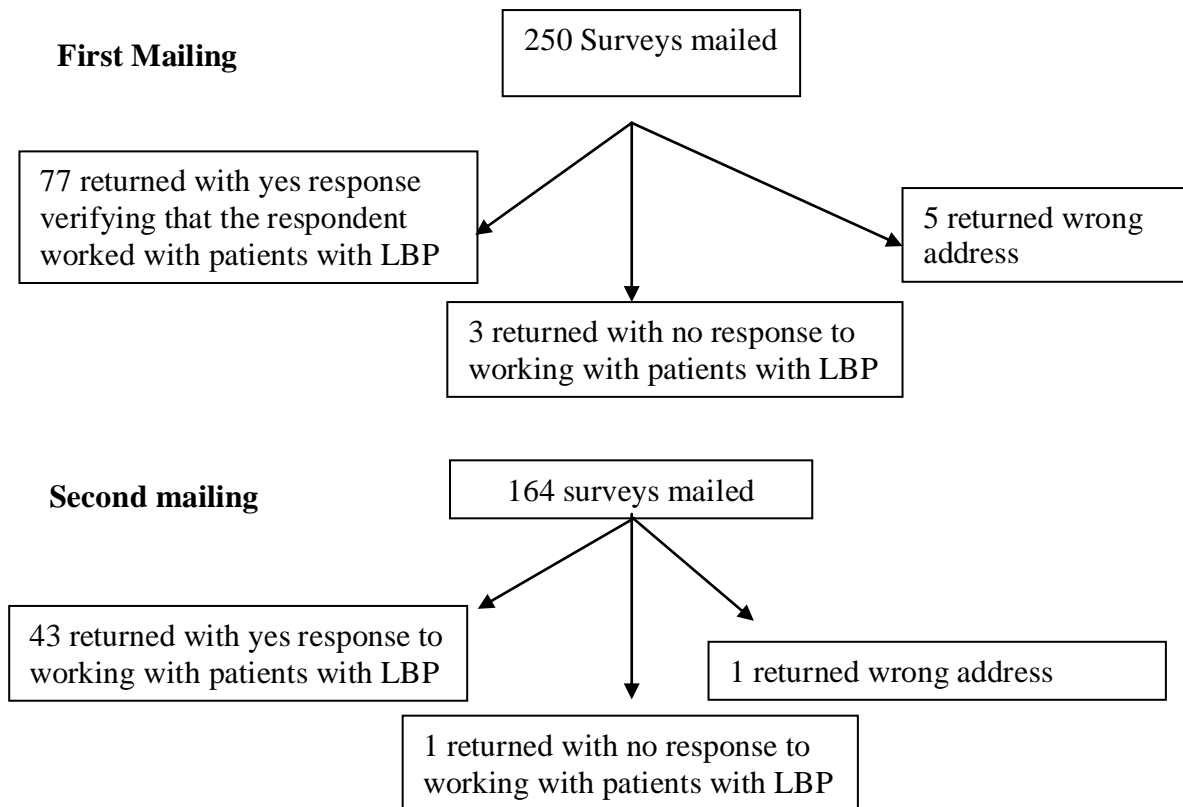
Results

Respondents

The response rate to the survey was 48% (n=120); 96.6% of respondents reported they worked with patients with LBP (n= 116), had seen at least one case of LBP in the last 6 months, and therefore completed the entire questionnaire.

Figure 4.1 is a flow chart of the survey implementation process.

Figure 4.1: Documentation of the Distribution of Surveys



Summary: A total of 120 surveys were returned (48% response rate); 116 of these responded with a “yes” to treating patients with LBP in the last 6 months.

Two hundred and fifty physical therapists were identified from the Kentucky State Board listing as either having an outpatient work site, or were known to work in an outpatient setting. From the first mailing 77 surveys were received; the second mailing resulted in return of an additional 43 surveys. The overall response rate was 48%.

63.8 % of respondents worked in private practice (n= 74), 23.3% worked in a hospital based outpatient facility (n=27), 2.6% (n=3) work in both hospital and private practice, and 10.3 % (n=12) reported working in another setting (see Table 4.1).

Table 4.1: Demographic data of physical therapists that treated patients with low back pain

Variable	Percentage
Gender	Male 51.7% (n= 60), Female 48.3% (n=56)
Years as a PT	1 – 39 years (mean 14.5 yrs, SD 9.45)
Work Setting	Private practice 63.8% (n = 74) Hospital-based 23.3% (n = 27) Both 2.6% (n = 3) Other: 10.3% (n = 12)
APTA Members	Yes = 75.9% (n = 88) No = 24.1% (n = 28)
Physical therapy degree	Bachelors = 44.8% (n = 52) Masters = 44.0% (n = 51) T-DPT = 28.5% (n = 33) DPT = 15.5% (n = 18) PhD = 0% (n = 0) More than one degree = 30.2%

Table 4.1: Demographic data of physical therapists that treated patients with low back pain continued.

Hold an Orthopaedic Certification	Yes = 35% (n = 41) No = 65% (n = 75)
Type of Orthopaedic Certification	Orthopaedic Certified Specialist = 23% (n = 27) McKenzie = 7% (n = 8) NAOIMT = 0% (n = 0) Paris = 2% (n = 2) Other = 3% (n = 3) More than one certification = 3.5%

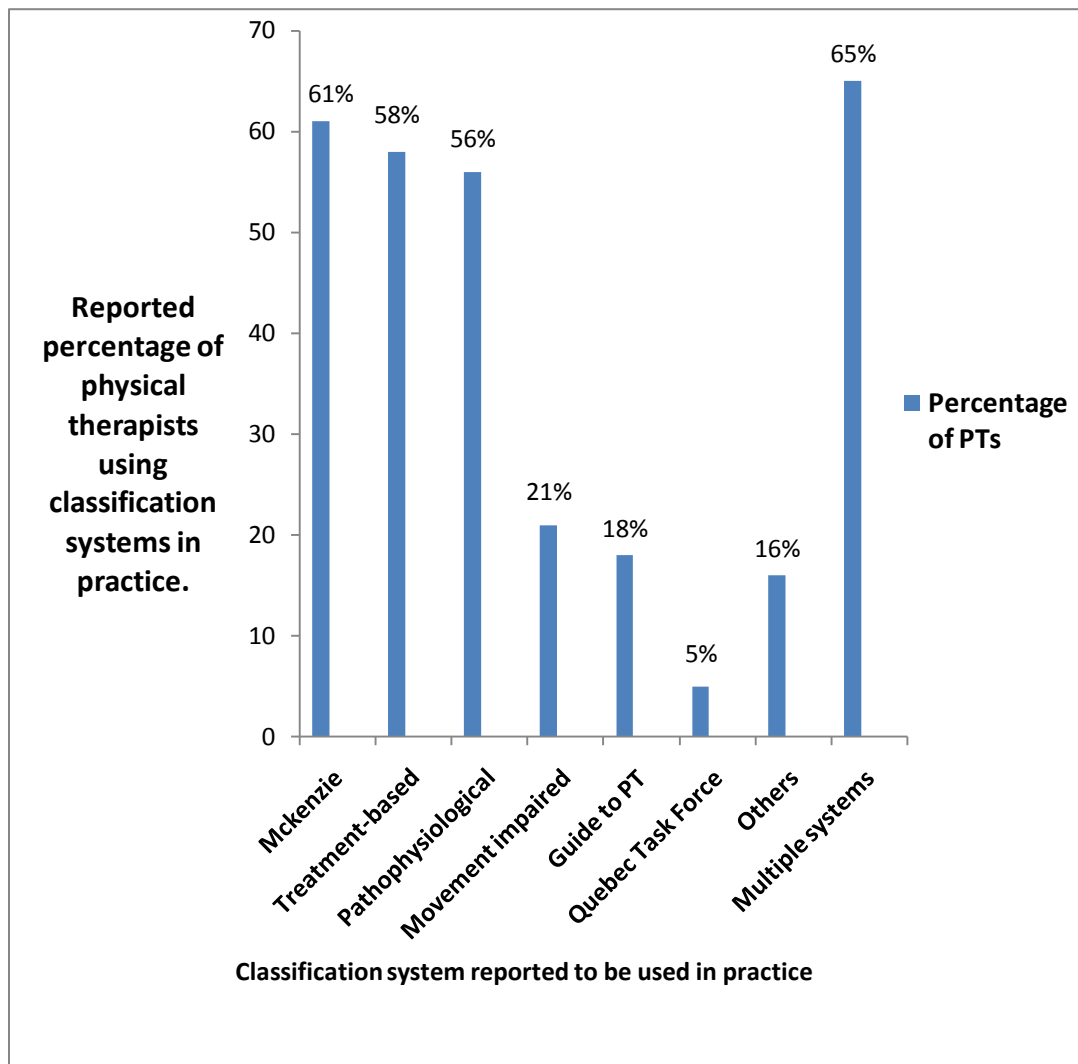
It was expected that the Kentucky State Board of physical therapist licensing address list would have the most current address for physical therapists practicing, but several envelopes were returned due to physical therapists having moved.

When following up with non-responders, 4% of the prepaid postcards sent to non-responders were returned out of the 130 sent. The respondents who returned the cards reported the following reasons for not returning the survey: they did not receive the survey mailing (n=2), they were not interested in the survey (n=2), and they do not work with patients with LBP (n= 1). There were also 6 surveys returned with the wrong address and 4 surveys were returned by physical therapists that did not work with patients with LBP. Considering the small number of postcards returned from non-responders, the postcards provided limited information on the wider group.

Classification systems

86.2% (n= 100) of the total respondents (n = 116) reported that they used classification systems with 65% (n= 65) of the 100 reporting using multiple systems. The classifications systems that were reported were: McKenzie 61% (n=61), Treatment-based classification system 58% (n=58), Pathophysiological 56% (n=56), Movement Impaired Approach 21% (n=21), *Guide to PT Practice Pattern* 18% (n= 18) and Quebec Task Force 5% (n=5). Other classification systems that were reported as being used 16% (n=16) included; Cyriax, clinical prediction rule, Maitland, Hesch, Mulligan, postural restoration, North American Institute Orthopaedic Manual Therapy, muscle energy technique, and a combined eclectic approach (Figure 4.2). It must be noted that the clinical prediction rule is part of the treatment-based classification system but some PTs reported this as a separate system.

Figure 4.2: Bar Chart demonstrating the Classification systems reported being used in practice



Note: Responses were not mutually exclusive therefore supporting use of multiple systems and an “eclectic approach”.

Logistic regression analysis to explore whether years of practice predicted use of classification system and type of classification system demonstrated no significance. The association between post-graduate physical therapy degree and type of classification system was statistically significant for the treatment-based classification system. Here,

P<0.025 is less than 0.05 therefore the analysis applied is significantly good enough in predicting the outcome variable. Results of both regressions are presented in Table 4.2.

Table 4.2: Logistic Regression: Years of practice and type of degree predicting use of classification System

	McKenzie	Treatment- Based	Movement Impaired	Guide to Physical Therapy Practice Pattern	Pathophysiological
Years of Practice ¹	.179	.408	.073	.619	.866
Type of Post- Graduate degree ²	.330	.025*	.090	.769	.304

Note: These represent p-values for testing whether the variable has a non-zero effect on the use of each classification system.

* represents a significant result. Significance level p=0.05

¹ Years of practice were coded as: Novice 0-5 years, Medium 6-15 yrs, and Experience >16yrs.

² Type of Post-graduate degrees were coded as: Bachelors, Masters, Doctorate, and Transitional-DPT.

Agreement was reported by 63.8% (n=74) of physical therapists surveyed to the statement “classification systems were useful when treating patients with LBP” in the clinic, with 67.2% (n=78) reporting that they agreed that when “using a classification system it makes choosing an intervention easier”.

While 47.4% (n=55) agreed that “classification systems are learned through post-graduate training”, 72.4 % agreed that “classification systems are learned through continuing education and 50% (n=58) through reading the literature”. Only 44.0% (n=51) reported “learning classification systems for patients with LBP through physical therapy school”. Just over half of the respondents (52.6 %; n=61) disagreed with the statement that “classification systems are difficult to use with patients with LBP”, while similarly 56.0% (n=65) agreed that “using a classification system improves outcomes with patients with LBP”.

Barriers or reasons identified for not implementing classifications systems were explored through open responses. Examples of the coding framework developed during the analysis process, with supporting quotations, that was used to determine the barriers to classification systems and outcome measures are shown in Table 4.3.

Table 4. 3: Examples of survey responses

Examples of Initial Codes	Final Categories	Number of Participants who Made the Comment	Supporting Quotations
Not familiar with the classification system No training	No training/ lack of knowledge	6	“No formal education equals lack of understanding equals lack of use”.
Seems like patients don’t always fit into the categories No method of classification covers every patient	Classification systems are too limiting / lack of specificity	4	“Patient impairments and treatment specifics to patient needs”. “I believe that while classification systems are useful, you need to treat each patient specifically and not throw them in to a treatment just because they fit into it”. “Seems like patients don’t always fit into the categories”.
Time consuming Time spent vs change of treatment or approach	Time	16	“Time considerations are primary reason. You get paid the same amount whether you spend more time doing extra tests or not. There is just not enough time in real world clinic for extra stuff that is absolutely necessary.”

Table 4. 3: Examples of survey responses (continued)

Laziness	Habit/ Laziness	3	“I really just get lazy at times”. “Habit; Not in consistent habit of using tools”.
Lack of administrative support	Lack of Administrative support	3	“I sometime have problems getting other staff to implement the outcome measures when I am not there or on a visit where I am not seeing a patient”. “Changing clinical habits takes repetition/ time and the assistance of support staff”.

Final barriers identified from the qualitative data included:

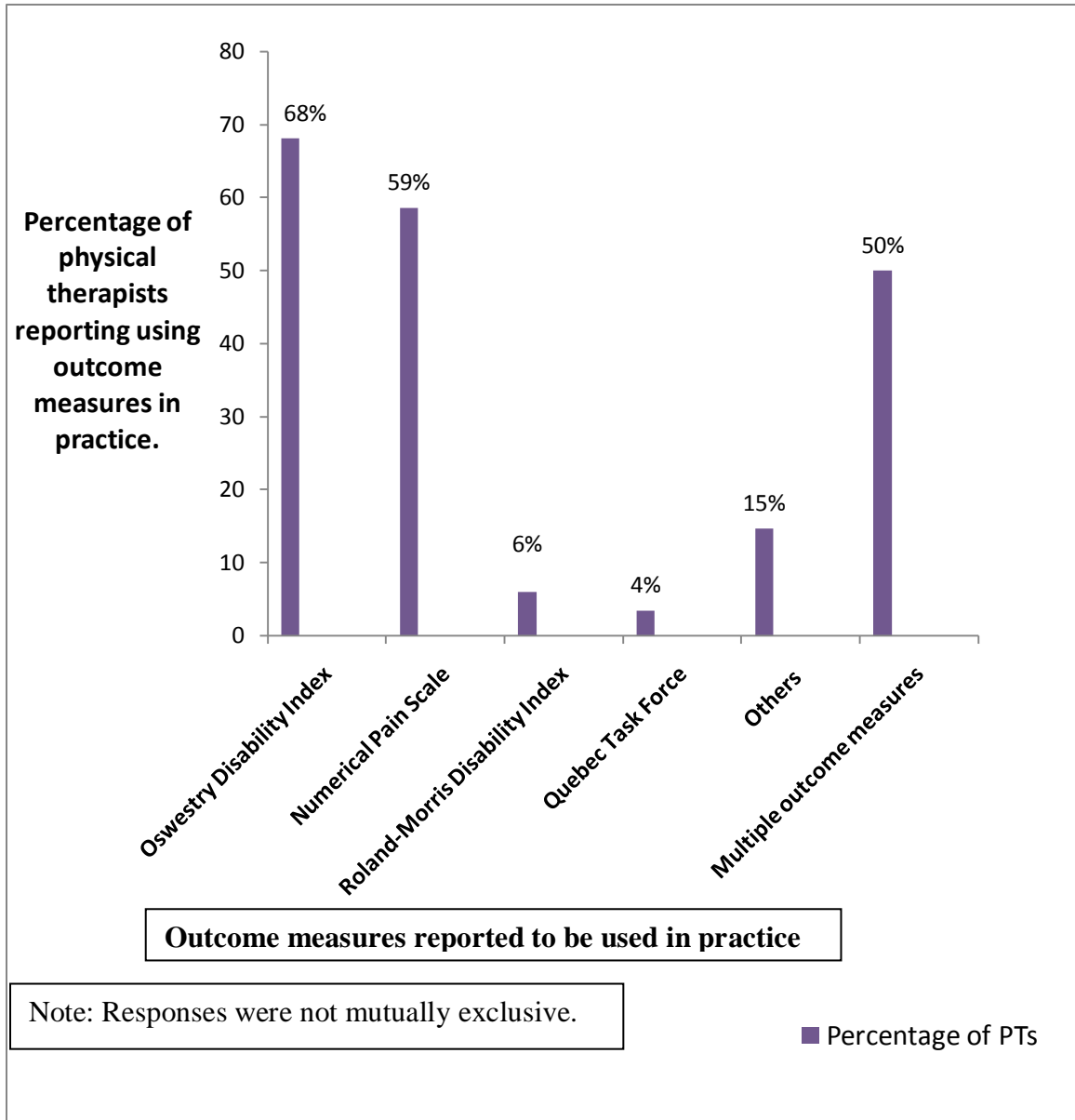
- no training or lack of knowledge (n=6),
- classification system are too limiting and lack of specificity (n=4),
- systems are not useful (n=3),
- use own judgment and not part of clinical routine (n=2).

Outcome measures

84.5% (n=98) of physical therapists reported using outcome measures to help with their clinical decision-making. The outcome measures reported to be used are; Oswestry Disability Index 68.1% (n=79), Numeric pain scale 58.6% (n=68), Roland-Morris Disability Questionnaire 6.0% (n= 7), Quebec Task Force 3.6% (n=4) and ‘others’ 14.7% (n=17) were reported. The last category included: Fear Avoidance Behavior

Questionnaire (n=9), McGill Pain Questionnaire (n=1), Global rating of Conditioning Change (n=4), Functional Assessment Inventory (n=1), and Waddell's (n=2) (Figure 4.3).

Figure 4.3: Bar chart representing use of outcome measures reported being used in practice by physical therapists.



Further analysis, through cross tabulation of four of the Likert-response questions demonstrated that there was a statistically significant correlation between expressed agreement for “outcome measures are difficult to use with patients with LBP” and “I don’t have time to use outcome measures” ($p < .0001$). Responses to “Outcome tools improve my outcomes with patients with LBP” and “levels of disability are identified using outcome tools with patients with LBP” had an association, but not a strong one ($p < .0001$). Responses to “Outcome measures are difficult to use with patients with LBP” and “outcome tools improve my outcomes with patients with LBP” demonstrated a significant association, with many respondents reporting that while outcome measures are hard to use, they are still useful tools to improve outcomes ($p < .001$). Finally, cross tabulation of responses to “I don’t have time to use outcome measures” and “outcome tools improve my outcomes with patients with LBP” demonstrated that while respondents sometimes had no time to implement the measures, they agreed that outcomes are improved with using the tools ($p < .0001$).

Barriers or reasons for not using outcome measures, identified from analysis of the open response data included:

- time (n=16),
- patient difficulty (n=7),
- habit/laziness (n =5) ,
- lack of knowledge/ training (n= 6),
- too constraining (n=5) ,
- lack of administrative support (n= 3),
- tools are not useful in making clinical decisions (n= 3),

- potential for marketing (n= 3).

These barriers were also supported by the quantitative data that demonstrated a significant relationship of agreement between “outcome measures are difficult to use with patients with LBP” and “I don’t have time to use outcome measures” ($p < .0001$).

Other findings

Seventy-seven physical therapists (66.4%) surveyed reported being aware of the *Guide to PT practice* pattern LBP would fit into, but only 31.0% (n=36) reported using it. This is interesting to note as 75.9% (n=88) of the physical therapists reported being American Physical Therapy Association (APTA) members. Reasons for not using the *Guide to PT practice* included; lack of knowledge, too broad, too complicated, lack of time or access to the guide. Cross tabulation comparison of the variables “know *the Guide to PT practice*” and “use *the Guide*” demonstrated there was an association ($p < .0001$) between the categories and that while physical therapists are aware of the *Guide to PT practice* they are not using it in practice.

The *International Classification of Functioning, Disability and Health (ICF)* framework was reportedly unknown by 67.2% (n= 78) of physical therapists and therefore was not used in practice. The cross tabulation comparison of the variables “aware of ICF” and “use of ICF” demonstrated an association between these variables ($p < .0001$), few physical therapists were aware of the ICF classification and only a few used it.

Discussion

The purposes of the survey were to identify the lumbar spine classification system(s) that physical therapists use in Kentucky, determine barriers that affect the use of classification systems, identify what outcome measures are used by physical therapists in Kentucky when treating patients with LBP, and to determine barriers that affect the use of outcome measures. The principal findings of this survey were classification systems and outcome measures are reported as being widely used in physical therapy practice in the Commonwealth of Kentucky, but not by all clinicians. Barriers were reported, for use of both classification systems and outcome measures that provide insights as to why current evidence-based guidelines are apparently not more widely applied in practice. This information is vital for future research that will examine these barriers in greater detail in order to formulate potential solutions to more effectively integrate research evidence into routine clinical practice.

Classification systems

Physical therapists in this study tended to use more than one classification system. It was demonstrated that of the 86% (n =100) of physical therapists who reported using a classification system in decision-making for patients with LBP, 65% (n= 65) of them reported using more than one system. Similarly, a previous survey²² of Orthopaedic Certified Specialists reported 76% of respondents using a classification system, with 50% using more than one. Physical therapists may rely on more than one classification system for a variety of reasons, such as patients not fitting clearly into one system, or intervention from multiple systems being appropriate for the individual patient. A recent article by Stanton et al.,¹⁰⁹ further investigated the treatment-based classification system, and reported that 25% of the participants met the requirements of more than one sub-

group of the algorithm. This would lead to a physical therapist either basing treatment upon both of the sub-groups identified, or looking to other classification systems to help direct treatment. The study also discussed that another 25 % of participants did not meet any of the criteria for sub-grouping in that algorithm; again, this would lead to a physical therapist looking at alternative classification systems to help guide treatment.

While the range and type of classification systems reported to be used in practice by the responding physical therapists matched a previous survey,²² the level of reported use was higher for each of the classification methods: McKenzie method from 32% to 52.6%, treatment-based classification system 9% to 50%, pathophysiological 38% to 48.3%, and movement impaired approach 7% to 18.1%. The apparent increased use of these methods could be due to new research reported in the literature over the past two years, increased awareness of these methods through marketing in publications, the number of physical therapists completing the Transitional DPT, and learning about evidence-based interventions through continued professional development in conferences. Additionally, these differences may simply reflect differences in the populations surveyed: respondents to this survey who work in an outpatient setting may have been (more) familiar with these methods and already implementing them. One other factor that may have affected the current studies results was that the response from private practice was higher than hospital-based physical therapists. In private practice there may be more support from peers to implement classification systems, attend certain continuing education that emphasizes classification systems, or have better access to the internet or current literature. This was demonstrated in our previous study, (Chapter three), where physical therapists working in certain private practice settings were able to

attend continuing classes together, practice the new information learned, as well as participate in case study presentations to help reinforce learning. The use of research articles, current literature, and the use of the internet was also discussed as references used in decision-making rather than textbooks (Chapter three). It also needs to be noted that only 35% of the physical therapists responding to this survey held some kind of Orthopaedic Certification. This was much less than reported in previous research, and thus the current sample represents a broader sample of physical therapists who treat patients with LBP without a 'specialist' certification. As a result, the current findings are more reflective of routine care, rather than care by certified specialists. It is also important to note that the 'non-specialists' generally report a higher use of classification systems. The previous survey, using only Orthopaedic Certified Specialists physical therapists, was based on the explicit assumption that a certification would encourage use of evidence-based practice; however in the current study that was not the case. Rather, while only a relative few physical therapists had an orthopaedic certification, many more relied upon the use of a classification system.

A main barrier to use of a classification system that was reported in this study was a lack of training or lack of knowledge, supporting the view that barriers remain towards the use of classification systems in routine practice. Such lack of opportunities are reflected and reported limited familiarity and lack of awareness of guidelines as main barriers cited in the medical literature.¹¹⁰

In contrast, treatment guidelines are more likely to be implemented if they are easy to understand, do not require specific resources, and can be easily tried.¹¹⁰

Interventions targeted at health professionals that involve active participation and include

the professional directly in the learning process have been demonstrated to be more successful.¹¹⁰ The use of educational materials and meetings that use face to face contact, as well as written and/ or web-based activities, are interventions that have been shown to promote awareness and implementation.^{110,111} Implementation of guidelines into practice is complex and can encounter resistance to change from professionals.¹¹² This may be due to high stress levels reported in health professionals which in turn leads to lack of practice change.¹¹² There continues to be a need to translate research into practice, and as an important element of this, to find strategies to help implement changes by health professionals in practice.

Two other barriers that were noted in the current study were that classification systems were too limiting and lack specificity. These findings are supported by previous case reports that examined the difficulty associated with patients fitting more than one sub-group or not fitting at all.^{109,113,114} This speaks to the diverse nature of non-specific LBP, and the idea that such patients may not respond to just one treatment.^{109,115} Notwithstanding the benefits of classification approaches, patients have individual needs and should be examined holistically to determine a treatment for the “whole” body.¹¹⁶ Determining the contextual factors, including environmental and personal factors, will help with decision-making by building a larger picture of the individual. The awareness of such information for an individual patient may complicate the clinical picture for an individual, and preclude an easy “fit” into a sub-grouping, or them fitting more than one sub-group. Such complexity presents challenges with the implementation of a relevant classification system, that clinicians may not have the experience, time, or knowledge to deal with in their practice. Similarly, co-morbidities may be present in patients that will

influence decisions, making clinical guidelines hard to follow, and leading to reports of systems not being useful and therefore not being implemented.¹¹⁰

Discussion in the medical literature regarding the problem of “resistance to change due to a lack of agreement” with clinical guidelines may also help to explain non-implementation.¹¹⁰ Age or experience level also has an influence as it has been determined that less experienced physicians are more likely to follow clinical guidelines than those who are more experienced.^{110, 117-119} Clinicians may use their own experience, and patient preferences, that may conflict current guidelines, therefore causing the therapist to doubt the applicability of the research evidence.¹¹² This can lead to a resistance to change and the lack of implementation of evidence into practice. In the current study, this was reflected in the some of the physical therapists’ responses to the open qualitative questions, when they stated they “use their own judgment and classification systems are not part of their clinical routine”. These responses were exclusively from the 14 % of physical therapists who reported “did not use a classification system, they had more experience, and have used treatment patterns in the past that have provided desired treatment outcomes; thus, they do not see the need to change their current practice patterns. In the 86% of physical therapists who reported using a classification system, an association between years of experience and the use of a classification system was demonstrated in 6-10 years’ experience and 20+ years of experience. Both of these groups had a higher number of physical therapists reporting using a classification system reflecting that from the majority of respondents, experience level can lead to increase use of classification systems.

Miller-Spoto's survey²² found factors that influenced the individual clinicians' choice of classification system were continuing education, graduate education, philosophy of care, and research. This survey supported the factors of continuing education, graduate education (physical therapy school), and adds "reading the research literature". Previously, it was demonstrated that clinicians have difficulty in accessing research literature and then implementing the information into practice.²² Reading the literature was an additional criteria that was not discussed in the survey from 2008²² and it seemed to be a common practice from our survey. In the past three years there has been an increase in technology to implement electronic medical records as well as provide connection to the internet in the clinical setting to access the specific information clinicians need to provide information to patients quickly. For example, the APTA has podcasts available to allow therapists to listen to clinical information. The Physical Therapy Journal includes "the bottom line" as part of its required manuscript structure to summarize an article, and enable the clinician to learn the relevant information quickly. Evidence-based websites are available to search databases for information related to clinical practice. Databases can be accessed and key words can be saved so that the latest articles in the research can generate emails to provide up to date information weekly or monthly to the clinician. Finally, websites are available to access information to provide education to patients to help them understand their diagnoses, and how they as the patient can be proactive in their treatment to improve outcomes. From the respondents in the current survey, 30% reported having more than one physical therapy degree, with 28.5% having a transitional doctorate degree. This would account for this survey's population identifying "reading the literature" as a means of influencing practice, as the transitional

doctorate degree (in keeping with similar higher degrees) teaches students how to search the literature, develop clinical questions to answer from the literature, as well as how to use the literature in practice. Another change over the past few years in the Commonwealth of Kentucky is the requirement of documented educational hours for renewal of licenses. This has mandated physical therapists to attend seminars, conferences, and continuing education classes, all of which should provide recent evidence on topics for physical therapists to gain an increased knowledge base, while completing continuing education credits. Finally, the current survey had more responders from private practice compared to hospital-based outpatient physical therapy clinics 63.8% (n = 74) to 23.3% (n = 27) respectively. Access to the Internet and/or literature may be supported more in this practice setting therefore reinforcing the difference in practice of physical therapists in private practice reporting keeping current with research.

Outcome measures

Our findings demonstrate the main outcome measures used for assessing LBP in the Commonwealth of Kentucky were the Oswestry Disability Index (ODI; 68.1%), and the Numeric Pain Scale (58.6%). Both the Roland-Morris Disability Questionnaire (6%) and Quebec Task Force (3.5%) had a very small use in practice. Other outcome measures were reported as being used in practice (14.7%) and included; Fear Avoidance Behavior Questionnaire, McGill Pain Questionnaire, Global Rating of Conditioning Change, Functional Assessment Inventory, and Waddell's. The high use of the ODI (50%) has also been reported in a previous study of Australian physical therapists who managed orthopaedic conditions.^{120,121}

Our study further supports previous research that reported time is still the main barrier for not using an outcome measure, and thus demonstrates that physical therapists

have still not been able to address this particular barrier to implementation into practice. Previous studies have found that the perceived barriers for not using outcome measures include: time limitation, lack of emphasis, and availability of specific outcome measures.^{101,120} In a previous survey of health care professionals, including physical therapists, 59.4-86% reported a lack of time to implement research findings as well as implementing outcome measures with patients in practice.^{50,120,126,127} Further evidence in health professional literature also suggests the barrier of lack of time from implementation of an evidence-based outcome measure in practice to assess ability quantitatively.^{120,122,125}

In this study further barriers to using outcome measures were reported in the qualitative data including; patient difficulty, habit/laziness, lack of knowledge/ training, too constraining, lack of administrative support, tools not useful in making clinical decisions, and potential for marketing using the outcome information. These barriers are also reported in the literature as barriers to implementing evidence-based practice.^{120,121} Advisors (80%), no knowledge (55%) and superiors' lack of interest in evidence-based medicine (46%), were barriers identified in a survey sent to Swedish physical therapists that focused on their attitudes, knowledge, and behavior towards evidence-based practice. Identifying and overcoming these barriers are essential to the implementation of clinical guidelines (including use of outcome measures) into practice; this needs to be further studied, as similar barriers exist in other areas of the country as well as internationally. Teaching physical therapists how to use outcome measures must be integrated in clinical reasoning processes, and an initial focus in physical therapy training so that awareness is increased, and in turn the likelihood of implementation.¹²⁸ Case studies are ideal tools to

demonstrate critical thinking, analyzing complex patients, and implementing outcome tools to track progress of how to make decisions on an individual, and to assess the student's skills in this area.

The main consideration from the results of this survey is how the implementation of current evidence can be better incorporated into practice, and what ways are available to disseminate information to clinicians to help them apply such information to practice. It has been reported that 55% of physicians do not adhere to best evidence-based practice.¹²⁹ The current survey, which included 76% APTA members, demonstrated a lack of implementation of the Association's own recommended *Guide to PT Practice*. The *Guide for PT Practice* is available online for APTA members, but from the current study it appears that lack of availability remains a perceived barrier to its use. This would support the results of Miller-Spoto's survey demonstrating the difficulty clinicians have in accessing research literature and in turn the implementation of relevant research information into practice.²² Although 'reading the literature' was reported as a way of learning new methods, gaps clearly remain in application to practice as indicated by multiple studies in the literature on applying evidence in practice.^{35-38,120,122,125} Application of database searching and critically analyzing journals to apply to the care of individual patients is an area that needs to be targeted to help clinicians in practice; using continuing education events and activities may be the most beneficial strategy to address this need.

Recommendations from this study are for clinicians to attend continuing education that helps them apply research evidence into practice. These continuing education classes would be of more value if they include case studies, complex patient

reviews with decision-making guidance that will increase the ability to discuss simple and difficult cases, reflect on previous cases and experience to then develop ways to apply the new knowledge to practice. Clinical settings can implement journal clubs and peer mentoring to provide support within the clinic to help guide the implementation of evidence-based practice. Administrative support to help mentor novice and experienced clinicians with the change of practice that will develop would help foster a cohesive clinic and environment for learning.

Strategy for implementation for classification systems and outcome measures

Another way of implementing classification systems and outcome measures into practice is to provide education on a specific classification system and the use of an outcome measure to a clinical practice, and then starting to apply the algorithm consistently to appropriate patients who seek treatment at that clinic. Outcome measures can be used to track patient outcomes of each physical therapist as well as patient progress. Peer support can be encouraged to help the physical therapist learn the sub-grouping of the classification system and work through problems in practice. The data from this implementation can then be analyzed to see if the education was successful: if patients were successfully fit into the algorithm, and whether appropriate interventions were identified to treat low back pain successfully. Additionally, analyzing the process of using education, implementing the information, and reflecting on the patient outcomes, if successful, can then be applied to other clinics to help clinicians practice the new evidence they are learning.

Limitations

A convenience sample of physical therapists was used in the current study; the results of this study therefore have limited generalizability as these are only representative as a sample of physical therapists in Kentucky. These results cannot be generalized as responses of all of the physical therapists in the Commonwealth of Kentucky, nor to the larger population of physical therapists in other states. Also, the results can only be applied to the practice setting of outpatient physical therapy in the Commonwealth of Kentucky. Physical therapist responses may also reflect the diverse socioeconomic, geographic (rural/ urban) and demographic characteristics demonstrated in the Commonwealth. A second limitation is that this study relied on physical therapists' self-report responses. This study presented the classification systems and outcome measures *reported* as being used in practice, but we did not specifically follow any of the physical therapists to observe what was actually used in practice. The relationships between classification systems and outcome measures used with years of experience or degree were explored, but the sample size was relatively small for analysis purposes. The sample demonstrated a small bias due to the selection process of mailing to business addresses that represented an outpatient clinic. From the responses, more private practitioners responded to the survey compared to hospital-based outpatient physical therapists, and more male respondents than female. This may reflect more males working in private practice than hospital-based outpatient clinics as well as a male dominance in the area of manual therapy.

Future Implications

This is the first known survey study to document current practice of physical therapists' use of classification systems and outcome measures for treating LBP on a

local level in the Commonwealth of Kentucky. This represents a first stage, which provides a basis to develop the survey further at a national level to see if the same classification systems or outcome measures are used in other regions of the country. While the survey provides important information regarding the utilization of classification systems it must be noted that the responses are not actual observations of what the individuals were actually using in practice, but rather their reported summary of their practice. Future studies need to address documentation of patient outcomes via patient medical records or therapy notes. Comparison of perceived use of classification systems to patient records would provide a closer approximation of the true utilization.⁵⁰ Observing patient outcomes of physical therapists that use both classification systems and outcome measures could demonstrate a difference in practice pattern, and if one physical therapist has higher patient outcomes levels compares to another therapist. Observing these differences in practice patterns can assist with mentoring between therapists to identify useful tools that one therapist may use to help make decisions on a patient and provide further information on their progress. Future directions are to implement a national survey to determine if the results of this survey are supported on a larger scale, and in different regions of the county.

Survey tool

The response rate to the survey was adequate and larger than expected compared to similar studies, which means the topic was of interest to the respondents and the survey reached the appropriate physical therapists. Dillman's method of following up to try and increase response rate seem to yield a higher number on the second mailing. The postcard follow up to non-responders was limited, as only five physical therapists responded. Reasons for not completing the questionnaire were; not interested in the topic (two

respondents), did not recall receiving a survey (two respondents) and do not have enough time to complete the survey (one respondent).

There are several recommendations that I would incorporate in the future. I would recommend including an online version of the survey in addition to the mailed survey, as long as access to email addresses was available and storage of data was secure. This should help increase the response rate further. It would also make it easier for the responders to complete the survey, ensure that the survey reaches the intended person, and provide a more financially prudent mechanism of data collection. In addition, it would be more ecologically justifiable, and would potentially provide a quicker response.

The use of the “neutral” response in the Likert scale could be removed to force the individual completing the survey to make a decision. In this study the “neutral” response was the final outcome response to two statements. When “neutral” is the final answer to a statement the question does not have a concluding answer. As “neutral” was not frequently used as an answer to these questions the questions do not need to be analyzed further should this survey be used in the future.

Further research may include observational studies using different learning techniques and media that best suit clinicians treating patients with LBP, or simulating vignettes using current practice guidelines to try and determine difficulties in implementing evidence in practice. Studies can also implement mixed methods to develop a deeper understanding of an individual’s LBP to further refine sub-grouping in algorithms to encompass the different facets described so that clinicians don’t feel limited in the application of the classification systems. Blending the classification systems seems to allow the clinician to make an improved decision on the individual’s problem that then

leads to hopefully better interventions. Further studies in this area to actually observe how the therapists are “blending” their decisions to use multiple classifications systems, and what is influencing their decisions, is important to clarify the decision-making process, or identify potential problems with the classification system.

Conclusions

Classification systems are being used for decision-making in physical therapy practice for patients with LBP. In most cases more than one system is being used. Lack of knowledge and training in classification systems seems to be the main barrier to the use of classification systems in practice. Outcome measures are being used to help in clinical decision-making for patients with LBP. Specifically, the Oswestry Disability Index and Numerical Pain Scale were most commonly used. The main barrier to their use identified here was lack of time; this needs to be considered and overcome to help with implementation in practice. Continuing education and reading the literature were identified as important key tools to teach evidence-based practice to physical therapists in practice and influences implementation for change in practice.

Chapter Five

Overview

Low back pain (LBP) is a common musculoskeletal problem, affecting 75 - 85% of adults in their lifetime,¹ and producing a significant economic burden for the healthcare system.²⁻⁸ In 2007, direct costs of LBP in the USA were estimated to be over \$33 billion dollars annually and up to \$50 billion when lost days at work and disability were included.^{9,130} In 2006, 52.3% of total spine-related expenditures were for outpatient services, representing the largest of all service categories. In outpatient physical therapy services, LBP accounts for 50% of all patients seeking care.^{131,132}

Effective physical therapy (PT) management of patients with acute, non-specific low back pain requires an awareness of the most current evidence and guidelines to treat patients more efficiently and effectively with respect to resources and costs.

While multiple classification systems are available to guide decision-making for patients with LBP,^{9,13} a single effective conservative treatment approach for LBP is not available. This may be due to the presence of heterogeneous group population² or to the inappropriate use of existing classification methods. Classification based on clinical examination data is purported to be more advantageous because it identifies sub-groups and guides treatment choices² of homogenous groups with LBP, resulting in more efficient treatment and improved clinical outcomes.^{2,16-18} There is limited research examining the clinical reasoning process physical therapists actually use in the classification procedure to identify treatments for people with LBP.

Classification systems are available to use for LBP to help guide the decision-making process but therapists practice patterns may not demonstrate their use, or a

combination of these systems may be implemented. Little published research reveals what specific classification systems, if any, physical therapists use in clinical practice. Making appropriate decisions early can affect long-term cost effectiveness of treatment of LBP. This is important in management of patients with LBP as guidelines have suggested that “90% of acute LBP cases will recover within six weeks” so early intervention is important to help the other 10% that do not resolve and have long term health issues.⁴⁹ If effective early decisions are made then there will be a reduced potential for long term disability²⁸ and associated increase in health care costs.

Outcome measures provide an understanding of a patient’s self report of their physical disabilities associated with LBP. Two gold standard disability outcome measures used for patients with LBP are: the Oswestry Disability Index (ODI) and Roland-Morris Disability Questionnaire (RM). Both measurement tools have been used over the past 20 years and have undergone tests for reliability and validity.^{54, 55} Both tools can be used at initial evaluation, during treatment, and at discharge as they have been established as valid over time to assess a patient’s progress with interventions.^{54, 55} It is important to choose an outcome measure to assess subjective information reliably to provide support for a patient’s treatment and demonstrate improved patient outcomes. Exploring what outcome tools, (if any), are used in practice provides baseline information as to the LBP outcome tools currently employed in current practice.

Current literature suggests many barriers exist regarding the acceptance of new research evidence and its application to clinical practice. This includes: limited clinician skill in interpreting research, lack of time, skepticism about the value of research, isolation from literature sources, poor understanding of research methods, lack of

personal skills in searching the literature and of administration supporting research uptake.³⁵⁻³⁸ If classification systems and outcome measures are not used in practice it is important to identify the barriers that exist to their use, to inform better approaches to disseminate information to clinicians and help them apply the research to practice.

The following sections will summarize the relevant findings from this research, discuss what classification systems and outcome measures are used in the Commonwealth of Kentucky, and describe the reported barriers to their use. The primary purpose of this dissertation was to examine the use of outcome measures and classification systems in clinical decision-making in acute non specific low back pain. The major aims and findings are examined in Chapters 2 to 4: this Chapter will discuss implications to clinical decision-making for patients with LBP. We will also provide a guide to determine which outcome tool, from the RM and ODI, to utilize for patients with LBP to collect self reported data. In conclusion, the clinical implication of the findings will be presented as well as recommendations for future direction of research.

The purpose of this dissertation was:

1. To determine the psychometric properties of two well established outcome measures for LBP, the ODI, and RM and determine their applicability to different types of patient depending on their level of disability.
2. To understand the process of decision-making physical therapists use when assessing and determining interventions for patients with acute/ non-specific LBP in outpatient settings through qualitative review.
3. Identify and document baseline information on the classification systems physical therapists use to help guide their decision-making process when treating patients with LBP. The current systems being used to document treatment will be presented as well as barriers as to why they are not being used. The outcome tools

utilized in practice, and barriers to using outcome measures for patients with LBP will also be presented.

Aims and Major Findings

Specific Aim 1: To determine the psychometric properties of two well established outcome measures for LBP, the ODI and RM, and determine their applicability to different types of patient depending on their level disability.

The Roland-Morris Disability Questionnaire (RM) and the Oswestry Disability Index (ODI) are similar assessment tools, which measure a patient's perceived level of disability arising from low back pain. Both questionnaires should be considered depending on the level of patient's disability and the distinction between levels will be presented below. These measures help support the clinician's assessment of function and determine the patient's level of disability.⁷⁰ From the systematic review, choosing which questionnaire to use is based on a judgment decision at the time associated with the patient presentation. Disability is determined based on a judgment decision by the therapist to classify the patient, specifically acute versus chronic symptoms. The classification will range from mild to moderate to severe disability. Both questionnaires are reliable, with high test-retest scores on the same day and through to 6 weeks. Validity for both questionnaires was found to be high, as demonstrated by the construct validity being highly correlated with each other. Therefore the ODI is able to demonstrate change in high levels of disability (or those with chronic disability) where as the RM can better provide information on acute disability or acute symptoms on low back pain.⁵⁴

The RM and the ODI can be used clinically to guide decision-making because they provide reliable and valid information that is clinically pertinent. Both questionnaires should be considered clinically but should not be both administered on the

same patient as different levels of disability are determined. Therapist observation of the patient's disability as they enter the clinic and from reading the intake form will determine if the patient presents with acute or chronic LBP. This guides decision-making on the most appropriate questionnaire to use. The RM is most appropriate for patients with mild to moderate disability while the ODI is for persistent, severe disability.⁵⁴

Specific Aim 2: To understand what process of decision-making physical therapists use when assessing and determining interventions for patients with acute/ non-specific LBP in outpatient settings.

The study findings suggest that all of the participants engaged in a similar, initial decision-making process for evaluation, but then moved toward a preferred method of decision-making in order to determine effective intervention. Experience, education, and other aspects of the physical therapists' backgrounds influenced their preferred decision-making style, and use of resources such as classification systems varied broadly depending on experience level.

There was a common tendency of all of the physical therapists to follow a similar underlying evaluation process for patients with LBP. Each therapist reported that their decision-making process began with a generic prescription of LBP and the completion of a medical history form/ body chart and/or pain diagram to determine if the individual was appropriate for physical therapy services. This led to a collection of subjective and physical examination data. Based on this information, four physical therapy preferences emerged to guide intervention.

Four decision-making preferences used by the physical therapists emerged from the data: identifying root Cause, eclectic, experience-based and evidence-based. These preferences guided decision-making and often differed for each physical therapist depending on factors such as education and experience.

1. *Identifying Root Cause* was determined by clinicians, who tended to identify signs and symptoms from the subjective history and physical examination, and then used the information to find the root cause of the LBP, rather than just treating the symptoms. These clinicians initially questioned if the symptoms were musculoskeletal or non- musculoskeletal, using hypothesis based reasoning that helped lead to intervention. These clinicians preferred to complete the whole evaluation and identify the problem first, before determining which intervention to use.
2. *Eclectic Approach* was described by experienced physical therapists who had completed many different continuing education classes over the years, resulting in a “hodgepodge” or eclectic approach to decision-making. Different theories had merged and the clinicians could no longer identify where they had learned them. Different treatment techniques were also integrated, so pieces from multiple classification systems were used to identify the patient’s problems and then treated accordingly. An eclectic approach was also used to describe the clinician’s patient population not “fitting in” to a particular classification system.
3. *Experience-Based Management* was described by discussing a forward thinking pattern, as well as reflection, to determine a “classification of diagnoses” the physical therapist was going through the examination process. “Mental templates”

were discussed using previous experience as a guide to diagnosis and classification patients.

4. *Evidence-Based Approach* towards LBP management combined clinical experience, scientific evidence and clinical judgment to produce evidence-based practice that was applied in the clinic. Day to day decisions were guided by current research and experience, using the treatment-based classification system and clinical prediction rule.

During the study interviews the use of outcome measures was described as an added component of decision-making to determine the functional ability of the patient during the evaluation as well as a useful tool to use in goal-setting. 62% of physical therapists reported using outcome measures in this study, and 100% of these reported using the modified ODI only. Liddle⁵⁰ identified barriers, as to why therapists do not use clinical outcome measures including: time limitations and lack of emphasis or availability of specific outcome measures. In our study, barriers to using outcome measures for patients with LBP were identified as: time, the outcome tools are not appropriate for the physical therapists caseload, and decreased patient satisfaction with services because they had to spend time completing the questionnaires. Time seems to be the primary factor for not using outcome tools, but further work is needed on a larger representation of physical therapists to identify additional reasons for not using outcome measures for patients with LBP and to confirm these current findings.

Although evidence-based guidelines and a number of classification systems are readily available for the evaluation and treatment of patients with LBP, the physical therapists in this study did not routinely rely on these resources. Background, experience,

and mentorship were factors that potentially impacted the decision-making process. Physical therapists that had completed an entry-level or transitional DPT program, engaged in continuing education in the area of LBP, or held a specialist certification, had additional knowledge of evidence-based treatment for patients with LBP. These therapists were more aware of the clinical prediction rules³⁰ and treatment-based classification sub-grouping,^{13,19,28} and reported using these to classify acute LBP. Novice clinicians in this study were aware of the clinical prediction rules and classification systems from their recent education, but they did not yet have the clinical experience to apply them. The novice clinicians, understandably, relied less on experience and instead focused on treating clinical signs and symptoms to decrease pain and increase function.

Experienced therapists have been found to use their knowledge base, hypothesis testing, previous clinical experience, pattern recognition and reflection when making their decisions.^{38,40,42,45} With respect to the current study, four decision-making preferences used by the physical therapists emerged from the data: Identifying Root Cause, Eclectic, Experience-Based, and Evidence-Based. From the decision-making preference a decision is made in regard to intervention. Experience and the physical therapists background played a role in decision-making, including using previous patient cases, as references, to help classify current patients to decide on their interventions and treatment. This study provided a deeper understanding of the decision-making process some physical therapists utilize when managing patients with LBP. While classification systems were understood by physical therapists: experience, education, and other aspects of the physical therapists' backgrounds influenced their preferred decision-making style. Insights into these

preferences may lead to future studies to determine how patients are classified and how therapists determine interventions.

Specific Aim 3: Identify and document baseline information on the classification system processes that physical therapists use, if any, to help guide their decisions when treating patients with LBP. Classification systems used are identified and barriers as to why they were not being used are listed. Also, outcome tools used in practice are documented and barriers to using outcome measures for patients with LBP are identified.

Classification systems are being used in practice for decision-making in patients with LBP. We found 86% (n =100) of physical therapists reported using a classification system in decision-making for patients with LBP with 56% (n= 65) reporting using more than one system. From these respondents, 35.3% (n=41) held a specialist orthopedic certification, which supports previous research in Orthopedic Certified Specialists where 76% reported using a classification system, and 50% stated using more than one classification system.²² For the therapists who reported not using a classification system, lack of knowledge and training seemed to be the common theme or main barrier to the implementation in practice.¹⁰⁹

Outcome measures are being used in practice to track patient outcomes for patients with LBP, specifically, the Oswestry Disability Index and Numerical Pain Scale. Our study further supports that time is still the main barrier for not using an outcome measure. This supports that physical therapists have still not addressed the barriers to

implementation of outcome measures into practice. Further barriers to not using outcome measures reported in this study were: patient difficulty, habit/laziness, lack of knowledge/training, too constraining, lack of administrative support, tools are not useful in making clinical decisions, and potential for use in marketing services.

Continuing education and reading the literature were identified as important key tools that therapists use to learn and implement classification systems in practice. Lack of time needs to be considered and overcome to help with implementation of current research in practice. The *Guide to Physical Therapy Practice* is known and available to APTA members, but the current study reported that it is not used in practice thought this survey.

Future Directions

This research was the first to document practice patterns used by physical therapists in Kentucky and provided important information regarding the utilization of classification systems and outcome measures. However, it must be noted that the responses were self-reported and not actual observations of what the individuals were using in practice. Future studies in this area need to address documented patient outcomes via review of patient medical records or therapy notes. Comparison of perceived use of classification systems to patient records would provide a clearer picture of the true level of utilization. Observing patients' outcomes when treated by physical therapists using both classification systems and outcome measures would also demonstrate if there is any difference in practice when both tools are implemented.

Further research may include observational studies (using case studies or vignettes) to simulate current practice guidelines and try to determine difficulties in

implementing evidence in practice. Studies can also implement mixed methods to develop a deeper understanding of an individual's LBP to try and further develop sub-grouping in algorithms to broaden the groups to encompass the different facets described by patients, so that clinicians don't feel limited in the application of the classification systems. Blending the classification systems seems to allow the clinician to make an improved decision on the individual's problem, which then informs a better approach to interventions. Further studies in this area to actually observe how the therapists are "blending" their decisions to use multiple classifications systems and what is influencing their decisions, will be important to further determine the decision-making process or identify potential problems with the classification system.

Another study method would be to meet with a local clinic and discuss with the staff what classification systems they use. Provide a continuing education course on one classification system and then document implementation and collect outcome measure data to understand how a classification system is implemented, barriers in practice and outcomes associated with the implementation of one system.

Final Conclusions

Patients' with LBP are classified by 86 % of physical therapists in the Commonwealth of Kentucky, with 65% reporting using multiple systems. Educators can benefit by using this information to refine their emphasis on informing students that classification systems are available to be used for patients with LBP to guide decisions. These systems can be used as a guide to classify patients. It is also important to discuss the challenges with sub-grouping and an awareness that patients may not fit clearly into one system leading to interventions from multiple systems being more appropriate for an

individual as difficulty with sub-grouping patients with LBP is reported to determine interventions. This difficulty with sub grouping supports a recent article by Stanton et al.,¹⁰⁹ that further investigated the treatment-based classification system, and reported that 25% of the participants met the requirements of more than one sub-group and another 25% of participants did not meet any of the criteria for sub-grouping in that algorithm. This would lead to a physical therapist either basing treatment upon both of the sub-groups identified, or looking to other classification systems to help guide treatment. Further work is needed to develop sub-grouping categories to address this.

Oswestry Disability Index is used by 68% of physical therapists in the Commonwealth of Kentucky as an outcome measure and a way of recording the treatment progress of a patient with LBP. From study one the Roland-Morris Disability Index is recommended to be used for patients with mild disability with LBP and the Oswestry Disability Index for moderate to severe disability. Educators need to be aware of this when advising students on what outcome measure to use with each patient. Administration support is very important to ensure that outcome measures are available to be implemented with patients with LBP. Also, clinician's administering the questionnaires needs to consider the acuity of the LBP and the disability level through observation of the history or clinical presentation to choose the correct outcome tool.

Appendix 2.1: Roland-Morris Disability Questionnaire
US English version of the Roland-Morris disability questionnaire

When your back hurts, you may find it difficult to do some of the things you normally do.

This list contains some sentences that people have used to describe themselves when they have back pain. When you read them, you may find that some stand out because they describe you *today*. As you read the list, think of yourself *today*. When you read a sentence that describes you *today*, mark the box next to it. If the sentence does not describe you, then leave the space blank and go on to the next one. **Remember, only mark the sentence if you are sure that it describes you *today*.**

1. I stay at home most of the time because of the pain in my back.
2. I change position frequently to try and make my back comfortable.
3. I walk more slowly than usual because of the pain in my back.
4. Because of the pain in my back, I am not doing any of the jobs that I usually do around the house.
5. Because of the pain in my back, I use a handrail to get upstairs.
6. Because of the pain in my back, I lie down to rest more often.
7. Because of the pain in my back, I have to hold on to something to get out of a reclining chair.
8. Because of the pain in my back, I ask other people to do things for me.
9. I get dressed more slowly than usual because of the pain in my back.
10. I only stand up for short periods of time because of the pain in my back.
11. Because of the pain in my back, I try not to bend or kneel down.
12. I find it difficult to get out of a chair because of the pain in my back.
13. My back hurts most of the time.
14. I find it difficult to turn over in bed because of the pain in my back.
15. My appetite is not very good because of the pain in my back.
16. I have trouble putting on my socks (or stockings) because of the pain in my back.
17. I only walk short distances because of the pain in my back.
18. I sleep less because of the pain in my back.
19. Because of the pain in my back, I get dressed with help from someone else.
20. I sit down for most of the day because of the pain in my back.
21. I avoid heavy jobs around the house because of the pain in my back.
22. Because of the pain in my back, I am more irritable and bad tempered with people.
23. Because of the pain in my back, I go upstairs more slowly than usual.
24. I stay in bed most of the time because of the pain in my back.

Appendix 2.2: Oswestry Disability Questionnaire

Oswestry Low Back Pain Disability Questionnaire

Instructions

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE box in each section for the statement which best applies to you. We realise you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement which most clearly describes your problem.

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 without causing extra pain
- I can look after myself normally but it causes extra pain
- 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 self-care
- I do not get dressed, I 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 placed eg. 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 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 from walking more than 2 kilometres
- Pain prevents me from walking more than 1 kilometre
- Pain prevents me from walking more than 500 metres
- I can only walk using a stick or crutches
- I am in bed most of the time

Appendix 2.1(continued)

Section 5 – Sitting

- I can sit in any chair as long as I like
- I can only sit in my favourite chair as long as I like
- Pain prevents me sitting more than one hour
- Pain prevents me from sitting more than 30 minutes
- Pain prevents me from sitting 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 for more than 1 hour
- Pain prevents me from standing for more than 3 minutes
- 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 gives 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 eg, sport
- Pain has restricted my social life and I do not go out as often
- Pain has restricted my social life to my home
- I have no social life because of pain

Section 10 – Travelling

- I can travel anywhere without pain
- I can travel anywhere but it gives me extra pain
- Pain is bad but I manage journeys over two hours
- Pain restricts me to journeys of less than one hour
- Pain restricts me to short necessary journeys under 30 minutes
- Pain prevents me from travelling except to receive treatment

Appendix 3.1: Sample Interview questions

Preparation for the patient interview;

The front desk announces your new patient with low back pain is here. Take me through all the steps you do as you are preparing for the interview.

What ideas do you generate about the person with low back pain before the interview?

Examination process

Describe the thought process involved during the patient interview?

What other factors do you take in to consideration when considering patients with low back pain?

How do you determine treatments?

Does your examination form or documentation system guide your questioning of the patient or influence your decisions?

What guides your decisions the most?

Continuing education

Describe any postgraduate education or resources that may help you clinically with patients with acute low back pain.

What has influenced you the most in your practice in dealing with assessment and treatment of acute low back pain?

Appendix 4.1:
Copy of the survey sent to physical therapists in Kentucky.

Survey

1. Have you seen at least one case of a patient with low back pain in the last 6 months?

Yes No

If No, please do not fill in any further questions and return the questionnaire to us in the envelope provided. Your response, even to this one question is valuable to us if you do not treat patients with low back pain. Thank you.

If Yes, please continue below.

2. In your current professional practice, what percentage of an average day (last six months) is spent treating patients with low back pain? (Please check one)

0- 25% 25 – 50% 50 – 75% 75 -100%

3. Do you use a physical therapy low back pain diagnosis classification system (see below) when managing patients with low back pain?

YES → NO GO TO Q 7

4. **If yes**, which diagnostic system or systems do you use as a method of classification for patients with low back pain in your practice? (Please check all that apply)

- McKenzie
 Treatment-based/ Delitto (i.e. Mobilization, Immobilization, Traction etc)
 Quebec Task Force
 Movement Impairment/Sahrmann
 Practice Pattern (Guide to Physical Therapy Practice)
 Pathophysiologic (i.e. Facet Joint Impingement, Hypomobility, Hypermobility)
 Other(PleaseSpecify)_____

5. **If yes**, how did you learn about the classification system(s) that you use? (Please check all that apply)

- Physical Therapy School
 Post graduate training / Fellowship/ Residency
 Continuing education/ Course/ Seminar
 Reading the literature / Research on your own
 Mentor
 Other (Please Specify)_____

6. **If No**, why do you not use a classification system?

Please mark your level of agreement with the following statements using the scale below. Circle the number that corresponds with your answer.

7. Classifications systems are useful when treating patients with low back pain in the clinic.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

8. Classifications systems are difficult to use with patients with low back pain you evaluate in the clinic.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

9. Classification systems for people with low back pain are learned during physical therapy training.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

10. Classification systems for people with low back pain are learned through post-graduate training or continuing education.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

11. The people I see in the clinic do not fit into a classification system.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

12. Using a classification system for people with low back pain makes choosing an intervention easier.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

13. Using a classification system improves outcomes for people with low back pain.

5	4	3	2	1
Strongly agree	Agree	Neutral	Disagree	Strongly Disagree

14. Are you aware of the *Guide to Physical Therapy Practice* classification system when managing patients with low back pain?

YES NO

15. Do you include the *Guide to Physical Therapy Practice* classification system when managing patients with low back pain?

YES NO

If No, why not?

16. Are you aware of the *International Classification of Functioning, Disability and Health* (ICF) model?

YES NO → GO TO Q19

17. If yes, do you incorporate the ICF model when evaluating patients with low back pain?

YES NO

18. IF YES: How do you incorporate the ICF model in your evaluation of patients with low back pain?

19. Do you use a computerized documentation system in your practice?

YES NO → GO TO Q 21

20. If yes, which documentation system do you consistently use in your practice?

ReDoc CarePoint Therapy management systems
 Physical Therapy software WebPT
 Care Manager ClinicSource
 Other
(Please Specify) _____

21. Do you use any reference materials when preparing to evaluate a patient?

YES NO → GO TO Q 23

22. If yes, which reference materials do you use when preparing to evaluate a patient?
(Please check all that apply)

Text books Posters
 Post graduate/ continuing education course notes Peer review
 Other (Please specify) _____

23. Can you please indicate over what period you have read at least two peer-reviewed journal articles or a book chapter on evaluating people with low back pain in the last _____. (Check all that apply)

30 days 3 months 6 months Year
 Other (Please Specify) _____

24. Do you use any outcome tools to help with your clinical decision-making? (Please check one)

YES NO → GO TO Q 29

25. If yes, Please check all of the tools you use?

Oswestry Disability Index, Rowland-Morris Disability Questionnaire
 Quebec Task Force Numerical Pain Scale
 Other (Please Specify) _____

26. If yes, why do you use a outcome measure?

27. If you use more than one tool describe how do you determine which tool to use?

28. Do you use the outcome tools to guide any goal-making decision for the patient? (Please check one)

Yes No
How?

Please mark your level of agreement with the following statement using the scale below. Circle the number that corresponds with your answer.

29. Outcome tools are difficult to use with patients with low back pain you evaluate in the clinic.

5 4 3 2 1
Strongly agree Agree Neutral Disagree Strongly Disagree

30. I don't have time to implement outcome tools in my clinical practice.

5 4 3 2 1
Strongly agree Agree Neutral Disagree Strongly Disagree

31. Outcome tools improve my outcomes with patients with low back pain

5 4 3 2 1
Strongly agree Agree Neutral Disagree Strongly Disagree

32. Levels of disability are identified using outcome tools with patients with low back pain.

5 4 3 2 1
Strongly agree Agree Neutral Disagree Strongly Disagree

33. Are there any other reasons for not implementing an outcome tool?

34. Describe all the data you collect on a patient with low back pain. Please check as many as apply.

- | | | | |
|--------------------------|--|--------------------------|---------------------------|
| <input type="checkbox"/> | Prescription | <input type="checkbox"/> | Body Chart |
| <input type="checkbox"/> | Medical History Form | <input type="checkbox"/> | Observations |
| <input type="checkbox"/> | Subjective history (Symptoms) | <input type="checkbox"/> | Oswestry Disability Index |
| <input type="checkbox"/> | Rowland Morris Disability Questionnaire | <input type="checkbox"/> | Special tests |
| <input type="checkbox"/> | Medications | <input type="checkbox"/> | Depression screens |
| <input type="checkbox"/> | Palpation results | | |
| <input type="checkbox"/> | Physical Examination | | |
| <input type="checkbox"/> | Radiology- X-rays, MRI, EMG, Nerve Conduction studies, | | |
| <input type="checkbox"/> | Other describe: _____ | | |

35. Rank up to 10 those Treatment Modalities used in treatment of Low Back Pain in your clinical practice.

Rank 1: most often, 2: second most often etc

- | | | | |
|--------------------------|--|--------------------------|--------------------------------|
| <input type="checkbox"/> | Superficial moist heat (Hot packs etc) | <input type="checkbox"/> | Pulsed Short-Wave Diathermy |
| <input type="checkbox"/> | Ultrasound | <input type="checkbox"/> | Iontophoresis |
| <input type="checkbox"/> | T.E.N.S – Home use | <input type="checkbox"/> | T.E.N.S – Hospital/ clinic use |
| <input type="checkbox"/> | Interferential Current | <input type="checkbox"/> | Russian Current |
| <input type="checkbox"/> | High Volt Current | | |
| <input type="checkbox"/> | Ice | <input type="checkbox"/> | Laser |
| <input type="checkbox"/> | Other: (Please Specify) | | |
-

36. Rank up to 10 those Methods used in treatment of Low Back Pain in your clinical practice.

Rank 1: most often, 2: second most often etc

- | | | | |
|--------------------------|------------------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> | Manipulation | <input type="checkbox"/> | Stabilization exercises |
| <input type="checkbox"/> | Mechanical Traction | <input type="checkbox"/> | Manual Traction |
| <input type="checkbox"/> | Specific exercises | <input type="checkbox"/> | McKenzie Approach |
| <input type="checkbox"/> | Movement Impaired Approach | <input type="checkbox"/> | Maitland Approach |
| <input type="checkbox"/> | Cyriax Approach | <input type="checkbox"/> | Mulligan Approach |
| <input type="checkbox"/> | Strain Counterstrain | <input type="checkbox"/> | Back Support/ Corset |
| <input type="checkbox"/> | Hydrotherapy | <input type="checkbox"/> | Relaxation |
| <input type="checkbox"/> | Soft tissue massage | <input type="checkbox"/> | Osteopathic Approach |
| <input type="checkbox"/> | Adverse Mechanical /Neural Tension | <input type="checkbox"/> | Total Motion Release |
| <input type="checkbox"/> | Other: (Please Specify) _____ | | |

The next series of questions are designed to help us with data analysis.

37. How many years have you been practicing physical therapy?

_____ Years

38. Are you....? (Please check one) Male Female

39. Are you an APTA member?

YES NO → GO TO Q 42

40. If yes, Please list what sections do you belong to?

41. Please list any special interest groups you belong to?

42. What degree(s) in physical therapy do you hold? (Check all that apply)

- Bachelors T-DPT Masters DPT PhD
 Other _____

43. Do you currently hold a specialist orthopaedic certification?

YES NO → GO TO Q 45

44. If yes, which certification do you hold? (Please check all that apply)

- Orthopaedic Certified Specialist (OCS)
- McKenzie
- NAOIMT
- Paris
- Other _____

45. Have you received any specific continuing education in the area of low back pain?
(Please check one)

- YES NO

IF YES: Please check all that apply;

- | | | | | |
|-----------------------------|---------|-----|-----|-------------|
| McKenzie | A | B | C | D |
| Evidence-based lumbar spine | | | | |
| Maitland | MT2 | MT3 | | |
| Other | _____ | | | |
| NAIOMT | Level I | II | III | Other _____ |
| Paris | S1 | S2 | S3 | S4 |
| Other classes: | | | | Other _____ |

46. Have you completed any residency programs?

- YES NO

If YES which one(s)

47. Do you work in.....? (Please check one)

- Private practice Hospital-based outpatient facility
- Both
- Other (Please Specify) _____

Open ended questions

When you prepare to evaluate a patient with low back pain, what initial thoughts do you have to plan your evaluation from the subjective data collected?

What primarily influences the interventions you use when managing patients with low back pain?

Describe how you reflect on and consider the information you collected on a patient with low back pain to determine your goals for treatment?

What is the primary purpose of the physical therapy diagnosis in people with low back pain?

**THANK YOU FOR TAKING THE TIME TO COMPLETE THIS
QUESTIONNAIRE I REALLY APPRECIATE YOUR RESPONSE
If you are interested in the results please contact me and I will send you a draft.**

Appendix 4.2: First Cover Letter

Date

Dear Physical Therapist:

I am writing to ask for your help in understanding the decision-making process physical therapists use when examining people with low back pain in the Commonwealth of Kentucky. The best way we have of learning about this issue is by asking physical therapists who work with people with low back pain to share their thoughts and opinions. This research study is part of my doctoral studies in the Rehabilitation Science PhD program at the University of Kentucky.

You are one of only a small number of physical therapists that have been selected to help with this study based on being on the state physical therapy licensing board list for Kentucky.

To make sure we hear from physical therapists that work with people with low back pain, please only complete the enclosed questionnaire if you work with low back pain patients. If you do not work with patients with low back pain please indicate so in question one and return the questionnaire.

The questionnaire should only take 15 minutes to complete and your responses to the survey will be kept confidential. When we write about the study you will not be identified.

Although you will not get personal benefit from taking part in this research study, your responses may help us understand more about decision-making in physical therapists and if classification-based sub-grouping determines interventions for people with low back pain.

We hope to receive completed questionnaires from about 400 people, so your answers are important to us. Of course, you have a choice about whether or not to complete the questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time.

There are no known risks to participating in this study. If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

Thank you in advance for your assistance with this important project.

To ensure your responses will be included, please use the enclosed postage-paid envelope to return your completed questionnaire.

I hope you enjoy completing the questionnaire and look forward to receiving your response.

Many Thanks,

Claire Davies PT, DPT

Dept. of Rehabilitation Science/College of Health Science, University of Kentucky

PHONE: 859-543-0139

E-MAIL: Claire.davies@uky.edu

Appendix 4.3: Second Cover Letter

Date

Dear Physical Therapist:

Recently, we sent you a questionnaire for a research study asking for your help in understanding the decision-making process physical therapists use when examining people with low back pain in the Commonwealth of Kentucky. Since we sent out a limited number of surveys, your response is critical to the accuracy of the results. Many individuals have been kind enough to help us with the project by sending in their completed survey. If you were one of them, this is our way of saying, "Thank you". If you were unable to complete the survey, we would be most grateful if you would do so now. This questionnaire should only take 15 minutes to complete and your response will be confidential. Your information was obtained based on being on the state physical therapy licensing board list for Kentucky.

It is quite possible that you did not receive our original request in the mail. Therefore we have enclosed another copy of the survey and offer the following brief explanation of the importance of this questionnaire.

Decisions physical therapists make in determining interventions for people with low back pain are very important to enable the individual to progress quickly in recovery, help decrease healthcare costs and prevent low back pain from becoming chronic. Claire Davies PT, DPT as part of her Doctoral studies is conducting a study to learn how physical therapists make their decisions and if they use any specific classification system. Your participation is very important to help understand the decisions physical therapists make in the management of people with low back pain. **Your response is essential to ensure that we have adequate representation from physical therapists working with patients with low back pain.**

Of course, you have a choice about whether or not to complete the questionnaire, but if you do participate, you are free to skip any questions or discontinue at any time. There are no known risks and you will not receive any personal benefit from taking part in this study.

If you have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

Please mail your completed questionnaire in the enclosed postage-paid envelope as soon as possible.

Thank you very much for your help and I hope you enjoy completing the questionnaire and look forward to receiving your response.

Many Thanks,

Claire Davies PT, DPT

Dept. of Rehabilitation Science/College of Health Science, University of Kentucky

PHONE: 859-543-0139

E-MAIL: Claire.davies@uky.edu

Appendix 4.4: Postcard to introduce the study to potential respondents.

Dear

I am writing to ask for your help in understanding the decision-making process physical therapists use when examining people with low back pain in the Commonwealth of Kentucky. I am interested in understanding decisions made by physical therapists. In the next few weeks you will receive a survey through the mail. Your responses will help me with this process. My questions will take about 15 minutes, so please give me a hand. Thank you in advance for your help.

Cordially,

Claire Davies PT, DPT

Dept. of Rehabilitation Science/College of Health Science, University of Kentucky

Appendix 4.5: Follow-up survey postcard to non-responders

Dear

I recently sent out a survey asking for your help in understanding the decision-making process of physical therapists when examining people with low back pain. I am trying to understand the reasons for non completion of the survey. Please could you check the appropriate box.

- Did not recall receiving a survey
- Not interested in the topic to complete the survey
- Not involved in examining patients with low back pain
- Do not have enough time to complete the survey
- Believe I have returned the survey
- Survey was too intrusive

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Vita
Claire C. Davies

General Information

Date of Birth: 30th January 1972

Place of Birth: Leamington Spa, England.

Education Institutes Attended:

Institution	Location	Dates	Major	Degree
University of Kentucky	Lexington, KY	2006- present	Rehabilitation Science	
Simmons College	Boston, MA	2006	Physical Therapy	T- DPT
Sheffield Hallam University	Sheffield, England	1994	Physiotherapy	Bsc (Hons)

Professional positions held:

Dates	Title	Institution
2008 – present	Staff Physical Therapist	Central Baptist Hospital, Lexington, KY
2004 – 2008	Outpatient Rehab Services Manager	Central Baptist Hospital, Lexington, KY
2003 – 2004	Physical Therapist	Theratech Staffing. Northern KY
2000 – 2003	Clinical Coordinator	Frankfort Regional Medical Center. Frankfort. KY.
1998 – 2000	Outpatient Physical Therapist	Frankfort Regional Medical Center. Frankfort. KY.
1997 – 1998	Inpatient Physical Therapist	Frankfort Regional Medical Center. Frankfort. KY.
1996 – 1997	Senior II Outpatient Physical Therapist	Kidderminster. England
1995 – 1996	Senior II Outpatient Physical Therapist	Derriford Hospital. Plymouth. England.
1994 – 1995	Rotational Staff Physical Therapist	Derriford Hospital, Plymouth. England.

Teaching Experience

University of Kentucky, Lexington, KY. 2007 – Present

T- DPT program

Evidence-based Practice (PT 902)

Health Promotion (PT 904)

Clinical decision-making for patients with Complex problems I (PT 908)

Clinical decision-making for patients with Complex problems II (PT 910)

Special elective – Cervical spine mobilizations with Dr Neil Tuttle (Australia)
Entry level DPT program
Public Health and Wellness (PT 770)
Clinical Decision-making for patients with Complex problems (PT 860)
Introduction to Physical Therapy and Bioethics (PT 834)
Advanced Manual Therapy (PT850)
Pediatrics lab – elective (PT655)

Certifications

Physical Therapy Licenses

1994 – present PH.47852 England

1998 - present # 3662 Kentucky

2007 - present # 11572 Ohio

2010 – Lymphology Association of North America certification (LANA)
recertification

2006 ASTYM treatment certified.

1998 APTA Clinical Instructor

Professional Publications:

Davies CC, Howell D. A qualitative study: Clinical decision-making in low back pain. Accepted for publication in *Physiotherapy Theory and Practice* February 2012.

Davies CC, Brockopp D. Use of ASTYM treatment on Scar Tissue Following Surgical Treatment for Breast Cancer: A Pilot Study. *Rehabilitation Oncology*. 2010;28(32): 3-12.

Davies C, Nitz, AJ. A review of the psychometric properties of the Roland-Morris Disability Questionnaire compared to the Oswestry Disability Index. *Physical Therapy Reviews*. 2009 (14);6:399-408.

Abstract Presentation

Davies CC. ASTYM® use on scar tissue following mastectomy. *Combined Sections Meeting, Nashville, TN. 2008. Poster presentation. Reprinted in the Journal of Women's Health Physical Therapy.*

Davies CC, Howell D. A qualitative study: Clinical decision-making in Low Back Pain. *KPTA Fall Conference, Louisville, KY. 2010. Poster presentation.*

Davies CC, Howell D. A qualitative study: Clinical decision-making in Low Back Pain. *Combined Sections Meeting, New Orleans, LA 2011. Poster presentation. Reprinted in the Research Section Journal.*

Davies CC, Brockopp D. Use of Manual Therapy on Scar Tissue Following Surgical Treatment for Breast Cancer: A Pilot Study. Evidence-based Practice Symposium, Lexington, KY. 2011. Platform presentation.

Davies CC. ASTYM[®] use on scar tissue following mastectomy. *Washington State Physical Therapy Spring Conference Oregon, WA. 2008. Poster presentation.*

Davies CC, Nitz AJ. A review of the psychometric properties of the Roland Morris Disability Questionnaire compared to the Oswestry Disability Index. *Clinical and Translational Science Conference, Lexington, KY. 2009.*

Davies CC, Howell D. Understanding the process involved in physical therapists decision-making when assessing and determining interventions for individuals with acute low back pain. *Department of Physical Medicine and Rehabilitation Annual Resident Research Day, Lexington, KY. 2009.*

Continuing Education class

Oncology Section Task Force on Breast Cancer Outcomes: Clinical Measures of Upper Extremity Function in Individuals Treated for Breast Cancer: Review of Available Measures and their Psychometric Properties. Accepted for CSM Chicago 2012.

Voluntary Special Interest Groups

Oncology Section Task Force on Breast Cancer Outcomes: Clinical Measures of Upper Extremity Function in Individuals Treated for Breast Cancer: Review of Available Measures and their Psychometric Properties.

Awards

2011 Nursing and Allied Health Research Award. Central Baptist Hospital, Lexington, Kentucky.

Grants

May 2009 Small grant from the Kentucky Physical Therapy Association to fund the Understanding the process involved in physical therapists decision-making when assessing and determining interventions for individuals with acute low back pain study.

April 2011 Small grant from Performance Dynamics awarded for the study: ASTYM treatment on scar tissue following Breast Cancer surgery: a quasi-experiment.

Claire C. Davies