

**Do physiotherapy students employ evidence-based practice in the management
of musculoskeletal disorders and sports injuries?**

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Science in the Department of Physiotherapy, University of the Western Cape**



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Evidence-based practice

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Musculoskeletal injuries

Sports injuries

Undergraduate students

Physiotherapy students

Physiotherapy management



DECLARATION

I declare that “*Do physiotherapy students employ evidence-based practice in the management of musculoskeletal disorders and sports injuries?*” is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Name: _____

Date: _____

Signed: _____



DEDICATION

This thesis is dedicated to my parents, Da Vinci and Anastasia Pharaoh, for the sacrifices you have made for me. Your spiritual guidance and positivity, irrespective of the challenges you have faced have always inspired me. You have served as my compass when I felt lost and reminded me that great tasks can be accomplished one step at a time.



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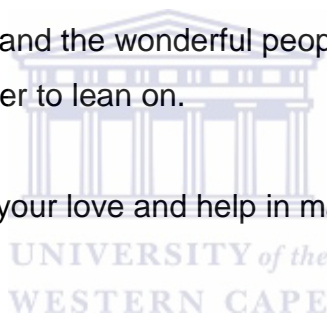
Thank you to the National Research Foundation for the funding provided to complete the study.

Thank you to all my family, friends and the wonderful people in my life for their love, support and always being a shoulder to lean on.

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ABSTRACT

Background: Musculoskeletal disorders (MSD's) and sports injuries are commonly sustained throughout the world daily. They are dominant in many countries, with considerable cost involvement and impact on quality of life. For this reason they need to be recognised as a necessary part of general practice. MSD's refer to a wide variety of diseases and disorders of the musculoskeletal system, such as degenerative and inflammatory conditions (arthritis), spinal and soft tissue disorders, osteoporosis and musculoskeletal injury. Managing these musculoskeletal conditions are a challenge and using the best available evidence should be the first the choice. All health professionals should have the ability to determine the best available evidence and thus strive to give their patients the best health care known to them. Evidence-based practice (EBP) is an important key in making this happen as it uses the best current evidence in the decision-making process regarding the care of patients. Literature highlights that health care professionals are expected to implement evidence-based practice (EBP); this means that newly graduated students and health care professionals alike are required to be confident in exercising this skill of EBP. When expecting EBP from students, educators need to realize that students have limited clinical experience. Therefore, they need the skills to acquire the best research evidence when applying the best treatment for patients. In introducing evidence-based practice, various research is aimed at evaluating the health professional's attitude and behaviour towards evidence-based practice (EBP). There is limited research regarding the actual implementation of EBP in everyday practice.

Aim: Therefore, the aim of the study was to determine if undergraduate physiotherapy students implement evidence-based practice in the management of musculoskeletal disorders and sports injuries. **Objectives:** The study had four objectives: i) To determine the most common treatment techniques used by students in the management of the conditions treated at the UWC clinic through data extraction of patient records in the clinic using a self-designed data extraction sheet, ii) To determine the knowledge and beliefs about EBP among undergraduate physiotherapy students through a survey, iii) To determine an evidence-based intervention strategy of one of the most common conditions seen through a systematic review and iv) To map the links between current practice, student beliefs and evidence-based information.

Methodology: The study used a predominantly quantitative approach with a few open ended questions and took place at a student training Physiotherapy clinic. The first phase was a retrospective document analysis study which consisted of data extraction of patient records for the period January 2009 to December 2011. The second phase used a mixed methods approach and consisted of a questionnaire with both closed and open-ended questions. It was completed by the 2012 registered fourth year students regarding attitudes and knowledge of EBP. The third phase consisted of a systematic review to identify the evidence for interventions used to manage one of the most common conditions identified. In the final phase and discussion of this thesis triangulation of the data was used by the researcher in order to formulate a picture of whether students apply evidence-based practice by using the data extracted from the patient folders in combination with the questionnaire survey of the participants and the systematic review. Data analysis for phases one and two was done using SPSS Statistical package software to determine frequencies and descriptive statistics. Phase two also had two open ended questions and this was analysed thematically and data was coded, themes allocated and responses counted. The systematic review focused on systematic reviews of treatments for low back pain and this was narratively described. The research project received ethical clearance from the University of the Western Cape Research Grants and Study Leave Committee (project registration number: 12/3/12), and permission to conduct the survey was obtained from the Head of Department. Informed consent was obtained from all participants, they were informed of the research process at the outset of the project, and kept up-to-date at every major stage. Questionnaires for surveys were accompanied by an information sheet explaining the background and reason for conducting the survey, and students gave written, informed consent following an opportunity to clarify the study details. **Results:** The results showed that males were predominantly seen at the physiotherapy clinic, and that the most common complaint was pain in the neck, shoulder and lower back area. The students most common treatment choice was soft tissue mobilisation and the use of heat for all three these areas of pain. The questionnaire responses were also captured using SPSS and frequencies and descriptive statistics employed. These results showed that although students knew what EBP was it was not clear that they knew how to implement it. The systematic review assessed and established the most common treatments used in literature for the treatment of lower back pain; and pain, function and disability were

the only outcomes considered. The only intervention that had a positive effect on the included outcomes was the use of manual therapy (spinal manipulation and mobilisation). In triangulating the data, it was shown that the students do not seem to use the same treatment choices as the literature indicates. **Conclusion:** The results show that there is very little link between the students choices of treatment for one of the common conditions highlighted and the current literature. It is therefore possible that although students understand the term EBP they do not show that they know how to use or implement the concept. **Implications for practice:** Institutions may need to be more vigilant about making provision for EBP in the curriculum as well as how it is implemented so that students can be comfortable with this practice. More randomised controlled trials and systematic reviews are necessary on physiotherapy interventions so that practice can be better informed. Finally, EBP is perhaps one way to promote a culture of life-long learning within the physiotherapy profession.



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CHAPTER 1

BACKGROUND AND LITERATURE REVIEW

1.1 Introduction

This chapter introduces the background and foundation of the thesis and also deals with the literature review. The literature review is combined in chapter one as chapter four consists of a detailed systematic review. The concept of evidence-based practice is explained and role of physiotherapy students. The aim, objectives and significance of the study are also stated here.

1.2 Background

Musculoskeletal disorders (MSD's) and sports injuries are commonly sustained throughout the world daily. According to Punnett and Wegman (2004), musculoskeletal disorders are prevalent in many countries, with considerable cost involvement and impact on quality of life. Therefore, musculoskeletal problems need to be recognised as an integral part of general practice (Jordan et al., 2010). These refer to a widespread range of diseases and disorders of the musculoskeletal system like degenerative and inflammatory conditions (arthritis), spinal and soft tissue disorders, osteoporosis and musculoskeletal injury (MacKay, Canizares, Davis & Bradley, 2010). Managing these musculoskeletal conditions are a challenge and using the best available evidence should be first choice.

All health professionals should have the ability to determine the best available evidence and thus strive to give their patients the best health care known to them. Thus evidence-based practice (EBP) is an important concept in making this happen. Health care professionals are expected to implement evidence-based practice (EBP) and this means that newly graduated students and health care professionals alike are required to be confident in exercising this skill of EBP (Olsen, Bradley, Lomborg & Norvedt, 2013). According to Sackett (2002, p. 10), "EBP is the integration of clinical expertise, patient values, and the best research evidence into the decision-making process for patient care. Clinical expertise refers to the clinician's cumulated experience, education and clinical skills. The patient brings to the encounter his or her

own personal preferences and unique concerns, expectations, and values. The best research evidence is usually found in clinically relevant research that has been conducted using sound methodology”. When expecting EBP, from students, educators needs to realize that students have limited clinical experience and thus the skills in acquiring the best research evidence becomes essential for the student in applying the best treatment for patients.

In introducing evidence-based practice, various research is aimed at evaluating the health professional’s attitude and behaviour towards evidence-based practice (EBP) (Jette et al. 2003; Hadley et al. 2008; Akinbo et al. 2009). Jette et al. (2003) in their study among American physiotherapists concluded that younger respondents tended to express a more positive attitude towards implementing EBP because they had greater skills and confidence related to accessing and appraising information. Akinbo, Odebiyi, Okunola and Aderoba (2009) also supported the notion that younger physiotherapists had a more positive attitude but also highlighted that participants with higher degrees had a better attitude. This led them to conclude that the incorporation of EBP into the undergraduate curriculum in Nigeria needed more attention. According to Olsen et al. (2013) it appears that physiotherapy students, especially, struggle with the application of the principles of EBP in the clinical setting and “best practice” still has to be established when it comes to assimilating EBP to clinical undergraduate education. This is supported by Menon et al. (2009) who indicated that there is a growing realization that knowledge translation does not occur. Focused efforts at identifying and implementing the most effective knowledge translation strategies are thus required and added skills, such as the ability to appraise literature and identify best practice are needed to accompany traditional knowledge (Dawes et al., 2005). According to Dizon, Grimmer-Somers and Kumar (2012) before learning how to focus their decisions, health professionals first need to learn the essential foundational knowledge regarding the concepts of EBP. These concepts of EBP are searching and appraisal skills and use of research information (such as systematic reviews rather than textbooks only) as well as decision-making skills. These skills should be developed or obtained at an undergraduate level already. Dawes et al. (2005) state that the teaching of EBP should, as far as possible, be integrated into the clinical setting and routine care so that students not only learn the principles and skills, but learn how to incorporate these skills with their own life-

long learning and patient care. This provision of knowledge remains the responsibility of higher education institutions, but the challenge also lies in providing strategies in knowledge translation into practice. EBP if mastered effectively can in fact promote life-long learning which is essential to keep abreast of an ever-changing medical world.

1.3 Literature review

1.3.1 Burden of musculoskeletal disorders

The burden of musculoskeletal disorders can be measured in terms of the problems associated with them. These are: the pain or impaired functioning (disability) related to the musculoskeletal system, or in relation to the cause, such as joint disease or trauma (Woolf & Pfleger, 2003). These disorders are a diverse group and include a spectrum of conditions, from those of acute onset and short duration to lifelong disorders, including; osteoarthritis, rheumatoid arthritis, osteoporosis, and low back pain (Woolf & Pfleger, 2003). This group of conditions further contains a variety of inflammatory and degenerative disorders affecting the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels (Punnett & Wegman, 2004). Musculoskeletal conditions are widespread and their impact is universal. According to Brooks (2006) they are very common and have major consequences to the individual and society. They affect many people around the world, are the most common cause of severe long-term pain and physical disability (Woolf & Pfleger, 2003) and account for roughly 25% of patient complaints in the primary health care setting (Childs et al., 2005). Poorly designed work spaces are one of the reasons musculoskeletal disorders affects such a large population. People spend one-third of their adult life in hazardous work environments and as science, technology and industrialization has advanced so the physical occupational stresses have changed dramatically and none of the body systems that one uses today was designed for this purpose (Kumar, 2001). Therefore, due to these changes the demand for force exertion, repetition of activities or assuming postures for prolonged periods places stress on human physical systems, which is inherently unnatural and this has resulted in a range of accidents that can lead to personal injury (Kumar, 2001).

Many will therefore seek medical advice or treatment following injury at a primary health care level such as an out-patient facility. According to Holdsworth and Webster (2004) a quarter of general practitioner consultations are very often musculoskeletal in origin and physiotherapy is frequently the treatment of choice for these conditions. It is therefore evident that a large portion of the population would be positively affected if students could apply evidence-based practice. This would be a benefit to the public health concern related to musculoskeletal disorders.

1.3.2 Managing musculoskeletal disorders

In managing musculoskeletal disorders, evidence-based practice (EBP) has become an essential part of health practices and health organizations (Dizon et al., 2012). EBP has become so prominent in the health professionals career that continuing professional development has become insisted upon by professional health boards. A study by Heiwe et al. (2011) showed that dietitians, occupational therapists and physical therapists had a positive belief and attitude towards evidence-based practice. However, even though they showed a behavioural pattern that included awareness and use of evidence-based guidelines the findings indicated that despite the ambition of health care professionals to incorporate evidence-based practice in their work, it was not done due to various such as barriers to the implementation of EBP.

The main identified barrier for the use of evidence-based practice was lack of time (Heiwe et al., 2011). Similarly, Akinbo et al. (2009) found that insufficient time was also a barrier to the use of EBP in a study with Nigerian physiotherapists. This study believed that the increased amount of patients required to be seen was the reason for the lack of time. Other barriers that were highlighted included difficulty interpreting results and too much scientific information (Edwards et al., 2004 and Salbach, Jaglal, Korner-Bitensky, Rappolt & Davis, 2007), as well as inability to apply findings to individual patients (Jette et al., 2003, Salbach et al., 2007 and Akinbo et al., 2009).

Higgs and Titchen (1995) proposed that the ability of health professionals to reason knowingly and to justify their decisions and actions articulately is essential for

effective professional practice, and that these abilities largely define the concept of professional autonomy. Manske and Lahecka (2012) indicated that “a sound approach to sports physical therapy practice and clinical decision-making is the role of all sports therapists. Practicing EBM will help the sports physical therapist deal with the increasingly insurmountable growth of medical literature that is published” (p. 472).

1.3.3 Factors influencing physiotherapists to use evidence-based practice

According to Dannapfel, Peolsson and Nilsen (2013), positive attitudes, motivation to use research, and research-related knowledge and skills, are aspects that provide favourable conditions that are supportive to research use. The factors influencing how physiotherapists search and review the research literature vary. In a study conducted among physiotherapists by Salbach, Guilcher, Jaglal and Davis (2009) it was found that “the majority of physical therapists in stroke rehabilitation rarely search online bibliographic databases for research, they access research articles in other ways” (p. 1048). The findings of this study highlight the need for environments in which physiotherapists find themselves, to facilitate access to research both online and through memberships in professional organizations and also to promote involvement in research activities as part of the duties of a physiotherapist.

As mentioned before, literature has shown that barriers that influence the actual implementation of EBP do exist. Limited information exists for identifying barriers to implementing evidence-based practice by physiotherapy students. In the study by Manspecker et al. (2011) an Evidence-Based Teaching Model (EBTM) was an innovative teaching strategy implemented to determine its effectiveness in improving student knowledge, attitudes, and use of EBP concepts. Upon evaluation, the students highlighted barriers which included the challenge of time between evaluation and treatment and discrepancy between knowledge taught in class and research evidence. More recently, Olsen et al. (2013) reported that although students tried to search for evidence, they struggled to apply evidence-based practice. Barriers that this study has highlighted are lack of skills in critical appraisal which inhibited the development of EBP (Olsen et al., 2013). Prior to addressing factors such as time constraints one should perhaps address the lack of skills that is highlighted.

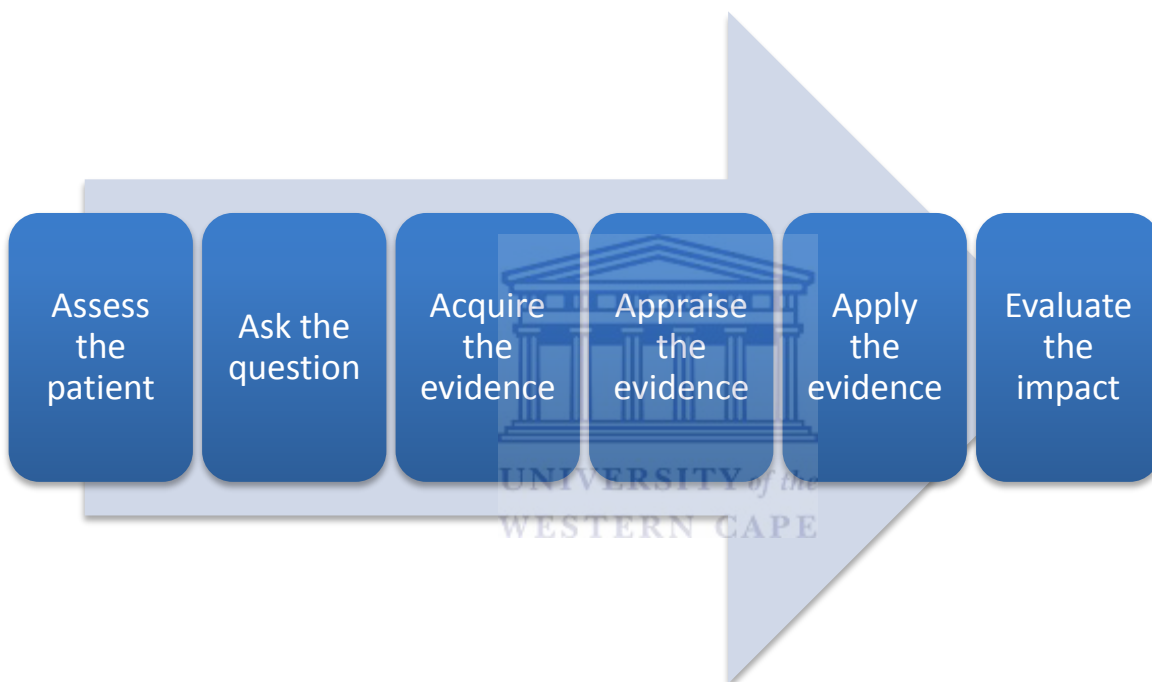
Literature highlights the importance of including evidence-based practice in the curriculum. However, encouraging educators to utilize an evidence-based approach in the curriculum may be a challenge if there is limited evidence to support the interventions that they propose works in their teaching. In a study conducted by Chipchase, Williams and Robertson (2007), factors influencing decision-making regarding curricular content as well as how evidence-based practice (EBP) is integrated into the teaching and learning framework in physiotherapy programmes was investigated. The findings of this study show that lecturers use a variety of knowledge sources in an effort to adapt to the principles of evidence-supported practice in their teaching area. These include research using a variety of methodologies which lecturers included in their course materials and reading lists. Further findings in this study also highlight how the principles of EBP need to be infused vertically and horizontally throughout the entire curriculum. The study also acknowledged the difficulty of teaching core clinical subjects early in a professional course when students may not have had an introduction to the concepts of foundational knowledge, such as statistics and research methods (Chipchase et al., 2007). These findings suggest that concepts such as EBP and associated foundational subjects such as statistics and research methods need to be introduced early in a programme and integrated throughout professional courses (Chipchase et al., 2007). Studies have also determined the impact of integrating EBP into the clinical education aspect of student curricula. According to Manspeaker, Van Lunen, Turocy, Ptibesh and Hankemeier (2011) behaviour change occurs over time and therefore it is essential that students in professional education are embedded with the knowledge and concepts so that EBP associated behaviours can be reflected in future practice.

1.3.4 Evidence-based practice

Evidence-based medicine can be defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996, p. 71). Dawes et al. (2005) proposed that the concept of evidence-based medicine be expanded to evidence-based practice to reflect the benefits of entire health care teams and organisations adopting a shared evidence-based approach. This concept evidence-based medicine,

or, more broadly, evidence-based practice (EBP), marks a move among health care professionals from emphasising actions based on the opinions of authorities to guide clinical practice, toward emphasising actions based on data, clinically relevant studies and research (Jette et al., 2003). It involves complex and thorough decision-making based not only on the available evidence but also on patient characteristics, situations, and preferences. Figure 1 summarizes the processes of evidence-based practice that should be applied.

Figure 1: Steps in EBP (Adapted from Stevenson, Lewis and Hay, 2004)



EBP is thus the result of health care practitioners having the ability to ask vital questions, acquire and interpret the findings and connect the information for use in everyday clinical practice (Stevenson, Lewis & Hay, 2004). It values and builds on clinical expertise, knowledge of disease, pathophysiology and it recognizes that health care is individualized and ever changing and involves uncertainties and probabilities (McKibbin, 1998). According to Jette, et al., (2003) the demand for and interest in applying evidence to physiotherapy practice has grown and the focus has seemed to move away from a knowledge based practice approach to a more evidence-based practice approach. The evidence base for physiotherapy is improving and this is highlighted by the increased number of systematic reviews and trials being published by physiotherapists. Mosely, Herbert, Sherrington and Maher (2002)

conducted a survey of the Physiotherapy Evidence Database (PEDro) and discovered a noteworthy body of high level external evidence (both randomised controlled trials and systematic reviews) that can be used to support decision-making about therapy for all sub disciplines of physiotherapy. According to the authors the amount of evidence is growing at a rapid rate and the quality of trials is increasing. Due to constant changes within medical science it is therefore necessary for health practitioners to keep abreast of and incorporate an evidence-based approach in their practice, especially with new research constantly emerging. Therefore, health professionals cannot solely rely on what they were first taught if they want to do the best for their patients (Glasziou, Burls & Gilbert, 2008).

However, it is evident that in order to use evidence-based practice there are various aspects to consider. These include both the clinical and research expertise of the therapist which is usually developed over time. In addition, consideration needs to be given to the patient and include the patient values and circumstances. Therefore, these basic skills should be incorporated at the undergraduate level in the health professional curriculum. If this is applied, the basic skills of using inquiry – searching, appraising, and applying research evidence to individual patients – should be taught early and applied as an integral part of learning. Opportunities to assist in the shift from experience and class teaching to evidence-based practice should be provided in the classroom and especially in the treatment of sports and musculoskeletal medicine at an undergraduate level.

1.3.5 Clinical reasoning and evidence-based practice

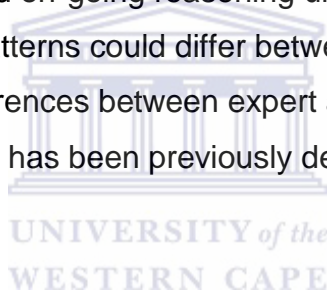
As indicated above, evidence-based practice involves basing clinical decisions and practice on the best available evidence. According to the steps involved in evidence-based practice, the health professional requires professional judgment and sound clinical reasoning. Clinical reasoning refers to the thinking and decision-making processes that are used in clinical practice (Edwards, Jones, Carr, Braunack-Mayer & Jensen, 2004). It can also be described as the process in which clinicians, interacting with others (patient, caregivers, health care team members), structure goals and develop health management strategies based on clinical data, patient choices, professional judgement and knowledge (Higgs, Jones, Loftus & Christensen 2000).

All health professionals require competence in decision-making and clinical reasoning is therefore important and relevant because every physiotherapist has to make decisions in their daily practice. Clinical decision-making is an ability that has been studied in health professionals (Wessel, Williams & Cole, 2006). This ability is an integral part of clinical practice and enables the clinician to effectively deal with clinical practice within the context of the constant changes occurring in medical science (Higgs, 1993).

Health professionals are accountable for their decisions to various stakeholders, including patients, caregivers, health sector managers, policy-makers and colleagues. An important aspect of this accountability is the ability to clearly articulate and justify management decisions in a manner appropriate to the audience. However, clinical decision-making is not a skill that can be simply explained, understood and recalled. According to Elstein and Schwarz (2002) diagnostic problems are often so complex that the correct solution is not always contained in the initial set of hypotheses. Therefore, understanding that the combination of knowledge, reasoning and skills in practice (Higgs, Richardson & Dahlgren, 2004) informs the clinical reasoning and decision-making processes and is valuable for health professional practice, development and education. Teachers then need to implement strategies which will promote student's clinical reasoning abilities and knowledge development (Terry & Higgs, 1993). It is important to understand how students think as this will affect their clinical decision-making skills as health professionals. According to Leach (2006) the evidence-based paradigm helps close the research – practice divide as well as guide clinical practice. However, he continues by saying that the possibility of practitioners integrating findings into clinical practice might only occur as a result of undergoing further education.

May, Withers, Reeve and Greasley (2010) describe three models of reasoning based on analyses of clinician and patient interactions and relevant to physiotherapy; they include pattern recognition, hypothetico-deductive or diagnostic reasoning and narrative reasoning. They describe hypothetico-deductive reasoning to involve information from the patient that is gathered and used to construct a hypothesis; which is then tested or a further hypothesis is constructed. The hypotheses should be confirmed by responses to treatment, thus the process involves repeated

reassessment. Continued hypothesis creation and evaluation take place as examination and management are continued and the various hypotheses are confirmed or negated (Edwards et al., 2004). Pattern recognition is a model of clinical reasoning that is based on recognition of patterns of clinical presentations and if the present patient has a similar presentation to patients seen previously, and the previous encounters involved a successful outcome, the management strategy is re-used (May et al., 2010). Lastly, narrative reasoning is a “process of enquiry, examination and reflective management” by which the clinician understands the patient’s problem, the patient’s perspective, and the context of that problem (Jones & Rivett, 2004, p. 5 in May et al., 2010). According to Edwards et al (2004) narrative reasoning seeks to understand the unique lived experience of patients—a reasoning activity that could be termed the construction of meaning. This model of reasoning demands collaborative reasoning between the patient and the clinician, effective communication by the clinician, and on-going reasoning until a plan of management is agreed upon. Clinical reasoning patterns could differ between expert and novice clinicians and evidence about differences between expert and novice physiotherapists’ clinical reasoning has been previously demonstrated (May et al., 2010).

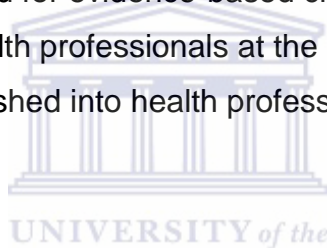


EBP therefore, concentrates on using evidence from a portion of the health care literature for clinical decision-making (McKibbin, 1998). This approach to health care is when health professionals use the best evidence possible, this is the most appropriate information available, to make clinical decisions for individual patients (McKibbin, 1998).

1.3.6 Evidence-based practice in physiotherapy education

A commendable aim of physiotherapy practice is to provide the appropriate assessment and treatment, to the appropriate client at the appropriate time (O’Brien, 2001). This aim of practice then requires a health practitioner to be both responsible and professional. Due to this demand of responsibility in the professional role, expectations of physiotherapists have increased (Terry & Higgs, 1993). Teaching evidence-based care is therefore implemented in order to encourage future physiotherapists to apply this methodology to everyday patient care. One of the main

goals of educating future physiotherapists is to ensure they become competent professionals who provide their patients with effective care. Physiotherapists involved in education are faced with the challenge of meeting demands such as the upkeep of professional practice from the physiotherapy profession and the increased amount of potential patients in the medical community; the need to teach reliable decision-making and the appropriate involvement of patients in the decision-making process (Terry & Higgs, 1993). While theoretical principles are taught in the classroom, the evidence that a consistent method of applying evidence-based principles in clinical education has not yet been established. In order to be successful, a comprehensive education in evidence-based care must include continuity between theory and practice. However, little work has been undertaken to examine how allied health professionals (Stevenson et al., 2004) and undergraduate students encompass and practically apply EBP and how they understand the concept. Long et al. (2011) stated “despite the consensus on the need for evidence-based clinical practice and evidence-based training of the health professionals at the undergraduate level, there is a lack of rigorous research published into health professional educational processes and outcomes” (p.9).



Physiotherapy is an integral part of the current health care delivery system and as first contact practitioners, referral from a medical practitioner is not required legally or ethically before physiotherapy services can be provided. Physiotherapists work as autonomous professionals and often work in teams with other health professionals such as physicians, nurses, social workers and psychologists (Heiwe et al., 2011). It thus becomes important to ensure that physiotherapy students can make informed evidence-based decisions. Physiotherapy education should strive to prepare students to be autonomous practitioners who are also able to work as part of a team. They need to be equipped to undertake a comprehensive assessment of patients, formulate a diagnosis, plan and implement a therapeutic programme where appropriate, and evaluate the outcome of any intervention. Therefore, by the time physiotherapy students graduate they need to be confident in using the best available evidence to inform their practice. Physiotherapy interventions occur in various settings including outpatient clinics and encompass a variety of clinical specialties to meet the unique needs of different patient groups. This research

focused on physiotherapy students working in clinical settings within the musculoskeletal area of physiotherapy.

1.4 Aim of the study

The aim of the study was to determine if undergraduate physiotherapy students implement evidence-based practice in the management of musculoskeletal disorders and sports injuries.

1.5 Objectives of the study

1. To determine the most common treatment techniques used by students in the management of the conditions treated at the UWC clinic through data extraction of patient records in the clinic using a self-designed data extraction sheet.
2. To determine the knowledge and beliefs about EBP among the undergraduate physiotherapy students through a survey.
3. To determine an evidence-based intervention strategy of one of the most common conditions seen through a systematic review.
4. To map the links between current practice, student beliefs and evidence-based information.

1.6 Significance of the study

In physiotherapy education, implementation of EBP places additional demands on physiotherapists to apply credible evidence to individual client situations through searching related evidence, using clinical judgments, and considering client values and system resources. Many physiotherapists are aware of EBP principles and the range of resources that are available to support the application of EBP in clinical practice. However, there is still a concern that in many instances, physiotherapists continue to base their clinical decisions on knowledge they have acquired during their entry-level training rather than considering the contemporary evidence when selecting the best course of management for a patient. Thus, there is a need for the development for clinicians who research. Without current best evidence management

plans may become out of date, to the detriment of patient care (Murray, Murray, MacKenzie & Coleman, 2005). Having identified the need, there is the need for evidence that undergraduate and qualified practitioners are translating the information into practice. Currently there is not much research on the use of EBP among undergraduate physiotherapy students in clinical practice (Olsen, et al., 2013). Thus, in understanding the ways in which undergraduate students do or do not apply the skills they have obtained is important for physiotherapy educators as well as the physiotherapy profession in finding methods to change behaviour.



CHAPTER 2

METHODOLOGY

2.1 Introduction

This chapter deals with the research methodology that was used and the collection and analysis of the data is also discussed. This study consisted of four phases: phase one described the retrospective data extraction, phase two was the completion of the evidence-based medicine questionnaire, phase three dealt with assessment of best evidence-based interventions for the conditions seen at the physiotherapy clinic and the final phase portrayed the methodological triangulation. The statistical analysis of the first and second phase will be explained.

2.2 Research design

The study used a mixed methods research design with a predominantly quantitative approach and a qualitative approach with few open ended questions. The first phase was a retrospective document analysis which was quantitative in nature and consisted of data extraction of patient records for the period January 2009 to December 2011. The second phase consisted of a questionnaire with both open and closed-ended questions which was both quantitative and qualitative in nature; this was completed by the 2012 registered fourth year undergraduate physiotherapy students. The third phase consisted of a systematic review to identify the evidence for interventions used to manage one of the most common conditions identified. In the final phase triangulation of the data was used by the researcher in order to formulate a picture of whether students apply evidence-based practice by using the data extracted from the patient folders in combination with the questionnaire survey of the participants and the systematic review.

2.3 Research setting

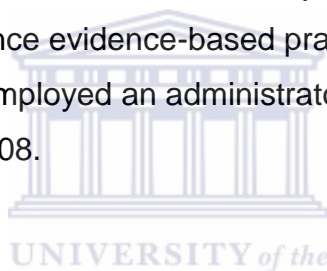
Data collection was undertaken at an on-site physiotherapy clinic at a local university in the Western Cape and the physiotherapy department of the same institute. The physiotherapy clinic is situated in the university's health centre. The 4th year physiotherapy students rotate through the on-site clinic as part of their clinical rotation

in their final year of study. The students are thus responsible for the assessment and treatment of the patients seen at the clinic under the supervision of a clinical supervisor. Data was collected with the use of a data extraction sheet from the patient files of the patients who had attended the clinic over a three year period (2009 – 2011).

2.4 Population and sampling

2.4.1 Phase 1: Retrospective study: Patient folders

The study population included all the patients who were treated at the UWC Physiotherapy clinic from January 2009 – December 2011. Convenient sampling of all available records was thus employed. Data extraction was used to determine the nature and type of the conditions treated. The last three years of patients seen at the clinic were included in the study since evidence-based practice is a recent addition to the curriculum and the clinic had employed an administrator who ensured accurate filing of all patient records since 2008.



2.4.2 Phase 2: Completion of the evidence-based medicine questionnaire: Students

All final year undergraduate physiotherapy students (n= 36) registered for the 2012 academic year were invited to participate in this aspect of the study and complete the questionnaire.

2.4.3 Phase 3: Assessing the evidence-based interventions for one of the conditions seen at the Physiotherapy clinic

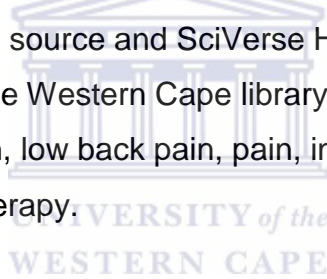
2.4.3.1 Systematic review

The data extraction of the patient folders revealed that the three most common areas that received treatment were the cervical spine, the lumbar spine and the shoulder. In the further examination of the data the lower back area was described as low back pain. The researcher decided to focus the review on finding out the common treatments for low back pain. Research shows that low back pain is a great concern.

Low back pain is a massive source of ill health throughout the world (Hoy et al., 2010) and is a chief health and socioeconomic problem in western countries (Woolfe & Pflieger, 2003). A systematic review was done to determine what the common modes of treatment were for lower back pain. An initial search indicated that there were several systematic reviews addressing specific aspects of physiotherapy interventions for low back pain. It was thus decided to conduct a systematic review of systematic reviews.

2.4.3.2 Search strategy

A systematic literature search was performed using the following databases: Academic search complete, Biomed Central, CINAHL, Cochrane Library, Academic search premier, Google scholar, Healthsource: Nursing/Academic edition, Medicines complete, MEDLINE (EbscoHost), Science Direct, MEDLINE (PubMed), Rehabilitation and Sports Medicine source and SciVerse Hub. These databases were accessed using the University of the Western Cape library website. The following search terms were used: back pain, low back pain, pain, interventions, physical activity, physiotherapy, physical therapy.



2.4.3.3 Level of evidence and methodological appraisal

Hierarchies of evidence have been defined differently in literature depending on which author is quoted. The Centre for Evidence-Based Medicine, "levels of evidence" was first produced in 1998 for *Evidence-Based On Call* to make the process of finding appropriate evidence feasible and its results explicit. In this classification, systematic reviews introduces each main level, for example, 1a is a systematic review of randomised controlled trials (RCT's) and 2a is systematic review of cohort studies. This classification can be seen in Table 1. This is different from other classifications.

Table 1: Levels of evidence for CEBM

Level of evidence	Study design
1a	Systematic Review of Randomised Controlled Trials
1b	Randomised Controlled Trials (with narrow confidence level)
1c	Case Series
2a	Systematic review homogeneity cohort studies
2b	Individual cohort study (including RCT)
2c	Outcomes research ecological studies
3a	Systematic reviews of case controlled studies
3b	Individual case control study
4	Case series
5	Expert opinion

Another method of interpreting the levels of evidence and which was applied in this study was the definition according to the National Health and Medical Research Council Hierarchy of Evidence (NHMRCH). Table 2 indicates the levels of evidence used for this study and the highest level of evidence was used which is systematic reviews. Each article was assigned to two reviewers, who both checked the findings. The two reviewers independently read and identified the level of evidence of their assigned article. If consensus about the level of evidence could not be reached, the supervisor was asked to intervene.

Table 2: Levels of evidence according to National Health and Medical Research Council (2000)

Level of evidence	Study design
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly-designed randomised controlled trial.
III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series (post-test or pre-test/post-test).

2.4.3.4 Method of appraisal

The researcher and the research assistant independently performed the quality assessment of each article using the Critical Appraisal Skills Programme (CASP) tool (CASP UK, 2010). The CASP tool aims to assist individuals to develop the skills to find and make sense of research evidence, helping them to put information into the practice (Huić, 2008). The CASP tools are readily available on the internet. The criteria for considering studies are highlighted in the protocol of the systematic review (Appendix F). According to the CASP tool to evaluate systematic reviews, there are 10 questions designed to assist the researcher to think about the broad issues such as if the study is valid, what the results are and if the results will help locally. Each item could be scored “yes”, “no” and “can’t tell”. Any disagreement was resolved by consensus. Studies that fulfilled greater than or equal to 5 criteria were considered of

a higher quality and included in the review. Table 3 indicates the questions used in the CASP tool for assessing systematic reviews.

Table 3: Critical Appraisal Skills Programme (CASP)

	Yes	Can't tell	No
1. Did the review ask a clearly-focused question?			
2. Did the review include the right type of study?			
3. Did the reviews try to identify all relevant studies?			
4. Did the reviewers assess the quality of the included studies?			
5. If the results of the studies have been combined, was it reasonable to do so?			
6. How are the results presented and what is the main result?			
7. How precise are these results?			
8. Can the results be applied in the local population?			
9. Were all the important outcomes considered?			
10. Should policy or practice change as a result of the evidence contained in the review			

2.4.4 Phase 4: Methodological triangulation

Phase four in this study consists of methodological triangulation to illustrate a picture of what is happening. According to Thurmond (2001), methodological triangulation can be classified into two types—within-method triangulation and between- or across-method triangulation. Researchers using within method triangulation use at least two data-collection procedures from the same design approach (Kimchi, Polivka & Stevenson, 1991). For quantitative approaches, the procedures could consist of administering survey questionnaires and using pre-existing information from a database. Researchers using between- or across-method triangulation employ both qualitative and quantitative data collection methods in the same study (Boyd, 2000; Denzin, 1970; Kimchi et al., 1991). In the current study within method triangulation was used, using information from a retrospective document data extraction, a survey questionnaire and a systematic review.

2.5 Data collection methods

2.5.1 Phase 1: Retrospective patient profile

A data extraction sheet was designed based on literature and was used to extract the necessary patient information from the patient files (Appendix D). The data sheet extracted the following information: year the patient was treated, the patient's age, the patient's gender, occupation, sport involved in, diagnosis or patient's condition, the date of the first assessment, the date of the last assessment, the management the patient received on the first treatment and then the management received on the last treatment. The patient files used were of patients who attended the clinic for the period January 2009 to December 2011. A pilot study was done to ensure that the data captured during this stage was reliable. During the pilot study two reviewers captured the same data on a data capture sheet and the results were compared to assess whether the information was the same. The pilot study showed that two reviewers could extract the same information from the same files. However, after consultation with an expert in the area it was decided to change the data extraction sheet to extract more information from the files. The following changes were suggested: the payment type (how the patient had paid for the session), the area of pain, the symptoms the patient presents with, cause of or mechanism of injury, nature

of the injury, discharge date, differences from the first treatment and the number of treatments the patient received for the particular condition and lastly, the choice of treatment. Following the pilot study, the data extraction sheet was then used to extract the information from the patient folders.

2.5.1.1 Validity

Face and content validity of the data analysis sheet was achieved by asking experts in the area of document analysis as well as in the area of musculoskeletal injuries to comment on the data capture sheet. In addition, the researcher and 2 other individuals assessed five patient folders independently and compared the information retrieved from the folders. This process helped to identify if the information extracted was clear and if the information recorded under the headings were the same.

2.5.1.2 Reliability

Inter-rater reliability was employed to ensure reliability of the data extraction sheet. The researcher and the research assistant independently used the data extraction sheet to extract data from the patient folders and compared findings to ensure that the information retrieved was similar. Cohen's Kappa coefficient was the statistical measure used to measure inter-rater agreement.

2.5.2 Phase 2: Students knowledge, skills and beliefs of evidence-based practice

Data collection was done via an existing questionnaire (Appendix E) namely the "Critical Appraisal of Medical Literature and Evidence-Based Medicine: Participants knowledge and needs assessment detailed training needs analysis form" (Hadley, Hassan & Khan, 2008). The questionnaire was developed to measure allied health care professionals and complementary and alternative medicine health care practitioners' basic knowledge, skills and beliefs concerning the main principles of EBP including questions from previously published and validated questionnaires. The questionnaire included questions relating to the participants self-assessment of their literature searching behaviour, their self-perceived knowledge of their own critical

appraisal skills and beliefs. Multiple choice answers and six-point Likert scales were used to measure responses. However, participants were instructed to tick a box if they did not understand the question. Questions about knowledge included statements relating to how confident the participants feel about assessing research methodology. The statements address perceived self-confidence in interpreting statistical tests, evaluating bias and assessing sample size. Answers were scored from '1' not confident at all to '6' very confident. Items on beliefs about EBP included statements such as 'EBP is essential in my practice', 'clinical judgement is more important than EBP' and 'I feel that I need more training in EBP'. Participants scored their answers on a range from '1–6', with '1' indicating that they disagreed strongly with the statement and '6' suggesting that they agreed strongly with the statement (Hadley et al., 2008). Face and content validity of the questionnaire was achieved by asking experts in the area of EBP to remark on the questionnaire. The feedback included recommendations to remove the initial background questions from the questionnaire as it asked about the profession, the participant's qualifications and how long they had been qualified. As the questionnaire was completed by undergraduate students this was not appropriate. It was also recommended that evidence-based medicine was changed to evidence-based practice. Two open ended questions about the participant's rationale behind their treatment choices and what their understanding of EBP was used instead of one open ended question asking about the participants understanding of EBM. The adaptations were made by the researcher and the questionnaire served to further explore the rationale behind the treatment choices of the undergraduate physiotherapy students. Validity was ensured due to the original questionnaire having only used valid and published questions.

2.5.3 Phase 3: Systematic review

A review protocol (Appendix F) was developed following the formulation of a specific, targeted research question that identified the population, intervention and outcomes (PIO) that the review would evaluate. The population included patients with lower back pain and the interventions included all physiotherapy treatment interventions. The outcomes were Pain, Level of Disability and Functional Disability and the outcome measures were visual analogue scale (VAS) and/or numeric pain scale for the measurement of pain, the Roland Morris Disability Questionnaire to determine the

level of the patient's disability and the Quebec Back Pain Disability scale to measure functional disability. The methodological quality of studies was determined independently by two reviewers using quantitative method critical appraisal tools to exclude poor quality studies. These tools were used to score the pool of articles in order to determine which studies to include in the review. Finally, a modified data extraction form (Appendix H) was used to extract the data from the studies, using criteria that were determined prior to the data extraction. Due to the lack of homogeneity between the outcome measures and the interventions meta-analysis was not possible.

2.5.4 Phase 4: Methodological triangulation

This phase consisted of data sources triangulation from phase one, two and three in order to illustrate a picture of what is happening. According to Thurmond (2001), data source triangulation can be used to reveal atypical data and to identify similar patterns, thus increasing the credibility of the data. In this study the data were obtained from patient records, students and literature, thus allowing the researcher to try and illustrate a trend from different sources and suggest a conclusion. This process also assists in providing a clearer understanding of the problem being investigated.

2.6 Data analysis

2.6.1 Phase 1: Retrospective patient profile

Data was entered into an excel sheet and then exported into SPSS Statistical Package version 21. Descriptive statistics were used to present data in the form of percentages and frequencies. There were many areas of pain identified in the profile. It was quite challenging to identify the diagnosis of the patient condition, as they were poorly recorded and documented by the students. A total of 785 patients were seen at the clinic for the period January 2009 to December 2011. The areas that were identified as the common areas treated at the clinic were the cervical spine, lumbar spine and shoulder. Cross tabulation was employed to assess the use of a particular treatment choice to the area that received treatment. Soft tissue mobilisation was a popular choice of treatment as it was mostly used to treat all the conditions seen.

2.6.2 Phase 2: Students knowledge, skills and beliefs of evidence-based practice

The quantitative data obtained from the questionnaire was entered into a Microsoft excel sheet and exported for analysis with SPSS. Descriptive statistics were employed to analyse the data. Frequencies were run to determine the demographic information. Open ended questions were thematically analysed. Data was coded, themes allocated and responses counted.

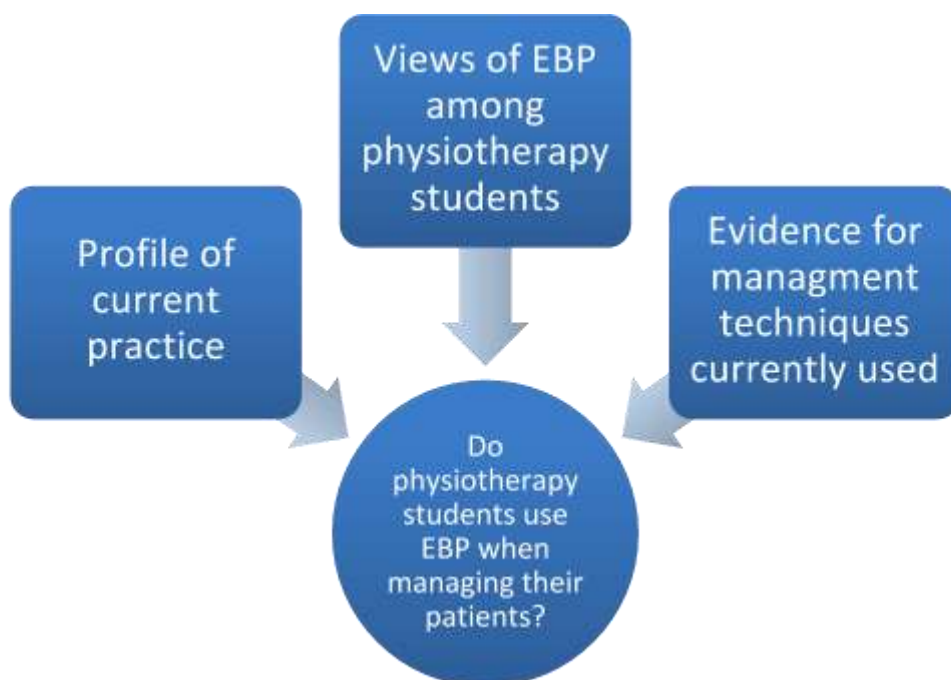
2.6.3 Phase 3: Systematic review

The review assessed and established the most common treatments used in literature for the treatment of lower back pain. The decision to review low back pain was based on the findings in phase one and the fact that Woolf and Pfleger (2003) described low back pain to be a huge health and socioeconomic problem in western countries. They also stated that although back pain is very common its prevalence varies according to the definitions used and populations studied. The reviews of both local and international literature aimed to determine the most effective evidence-based injury prevention strategies and injury treatment strategies in the management of lower back pain. In terms of data analysis for the systematic review, the data was not similar in patient population, symptoms, interventions, outcome measures and classification of low back pain. This made statistical pooling unsuitable, and thus studies were summarised in a narrative form.

2.6.4 Phase 4: Methodological triangulation

The results of the data in phase one, two and three were collated and triangulated to focus on answering the research question namely whether undergraduate physiotherapy students implement evidence-based practice in the management of musculoskeletal disorders and sports injuries. Figure 2 below indicates how data will be triangulated to answer the question.

Figure 2: Triangulation of data



2.7 Ethical considerations

This research project received ethical clearance from the University of the Western Cape Research Grants and Study Leave Committee (project registration number: 12/3/12) (Appendix A), and permission to conduct the survey was obtained from the Head of Department. Informed consent was obtained from all participants, they were informed of the research process at the outset of the project, and kept up-to-date at every major stage. Questionnaires for surveys were accompanied by an information sheet (Appendix B) explaining the background and reason for conducting the survey, and students gave written, informed consent (Appendix C) following an opportunity to clarify the study details.

CHAPTER 3

RESULTS

3.1 Introduction

This chapter describes the quantitative results of the demographics of the population with regard to the patient folders as well as the most common injuries seen at the clinic. The quantitative and qualitative results from the evidence-based practice questionnaires, the results from the systematic review and the methodological triangulation are also discussed here.

3.2 Phase 1: Retrospective patient profile

Over this period of time a total of 785 patient clinic folders were assessed with 216, 276 and 293 for the respective years of 2009, 2010 and 2011. Table 4 highlights the demographic profile of the patients. The majority of the patients seen at the clinic were male (53%) and 48% of the patients frequenting the clinic were students. The mean age of the patients seen at the clinic was 30 years old (SD=12.3).

Table 4: Demographic profile of patients

	Variables	N	%
Gender	Male	414	53%
	Female	344	44%
	Not indicated	27	3%
Age	Mean	30.11 (12.3)	
Occupation	Student	380	48%
	Staff (Admin)	110	14%

	Staff (Lecturer)	14	1.8%
	Staff (Technical services)	6	0.8%
	Professional sportsman/woman	2	0.3%
	Coach	4	0.5%
	Community member	100	12.7%
	Staff (but also a student)	1	0.1%
	Not Indicated	168	21%
Payment type	Medical aid	164	21%
	Cash	386	49%
	Sports club	188	24%
	Not indicated	43	5%
	Cash and Sport club	4	1%

3.2.1 Areas of pain that were treated at the clinic for the period 2009 to 2011

The three commonly treated areas of pain that were seen at the clinic were in the area of the cervical spine (n=138), lumbar spine (n=114) and the shoulder (n=97) (Table 5). A wide variety of painful areas were identified and recorded. These areas were then grouped together. The lumbar and cervical spine (included pain in the identified area as well referred pain). The shoulder included injury sustained to muscles, ligament as well as the joint and the upper limb referred to all injuries sustained in the elbow wrist and hand. For the lower quarter, the hip and groin were grouped under the hip. The feet and toes were grouped along with the ribs; chest, patients who had more than one injury, patients whose injury was not recorded and pain in the shin area were labelled as "other". Soft tissue referred to all the muscular injuries that were seen. Headaches and pain in the area of the head were referred to as head. In the knee and ankle all injuries to the ligaments and joint were grouped respectively.



Table 5: The areas of pain treated at the clinic

Area of pain	N	%
Cervical spine	138	17.6
Lumbar spine	114	14.5
Shoulder	97	12.4
Upper limb	31	3.9
Hip	10	1.3
Soft tissue	79	10.1
Other	131	16.7
Head	24	3.1
Knee	82	10.4
Ankle	70	8.9
Missing data	9	1.1

3.2.2 Management of the most common areas seen at the clinic

The most common treatment choices were soft tissue mobilisation (n=577), heat (n=447), stretches (n=390), education (n=298), strengthening exercises (n=249), joint mobilisation (n=241) and ice (n=96). Rarely chosen treatment options included strapping (n=32), home exercise programme (n=22), treatment not recorded (n=16), dry needling (n=15), range of motion exercises and referral to another health professional (n=14), neural mobilisation (n=10), balance and proprioception exercises (n=6), breathing exercises (n=2) and issued crutches and crutch mobilisation (n=1). A summary is reflected in Figure 3 below. Treatment choices specifically used in the management of patients with pain in the lumbar area, cervical spine and shoulder area are reflected in Figures 4, 5 and 6. When comparing the top treatment choices for each area, soft tissue mobilisation (n = 92 in the lumbar spine, n = 130 in the

cervical spine and n = 66 for the shoulder) was the most common choice for all three highlighted areas of pain. This was followed by the use of heat (n = 99 in the cervical spine, n = 85 in the lumbar spine and n = 58 in the shoulder area). Further treatment choices for the lumbar spine were stretching (n = 64), mobilisation (n = 58), education (n = 41), strengthening exercises (n = 33) and electrotherapy (n = 23). For the cervical area the following treatments were further chosen stretching (n = 98), mobilisation (n = 59), education (n = 54), electrotherapy (n = 30) and strengthening exercise (n = 21). Lastly, the shoulder treatment choices were electrotherapy and stretching (n = 43), education and mobilisation (n = 41), strengthening exercises (n = 32) and ice (n = 14).



Figure 3: Treatments performed by physiotherapy students

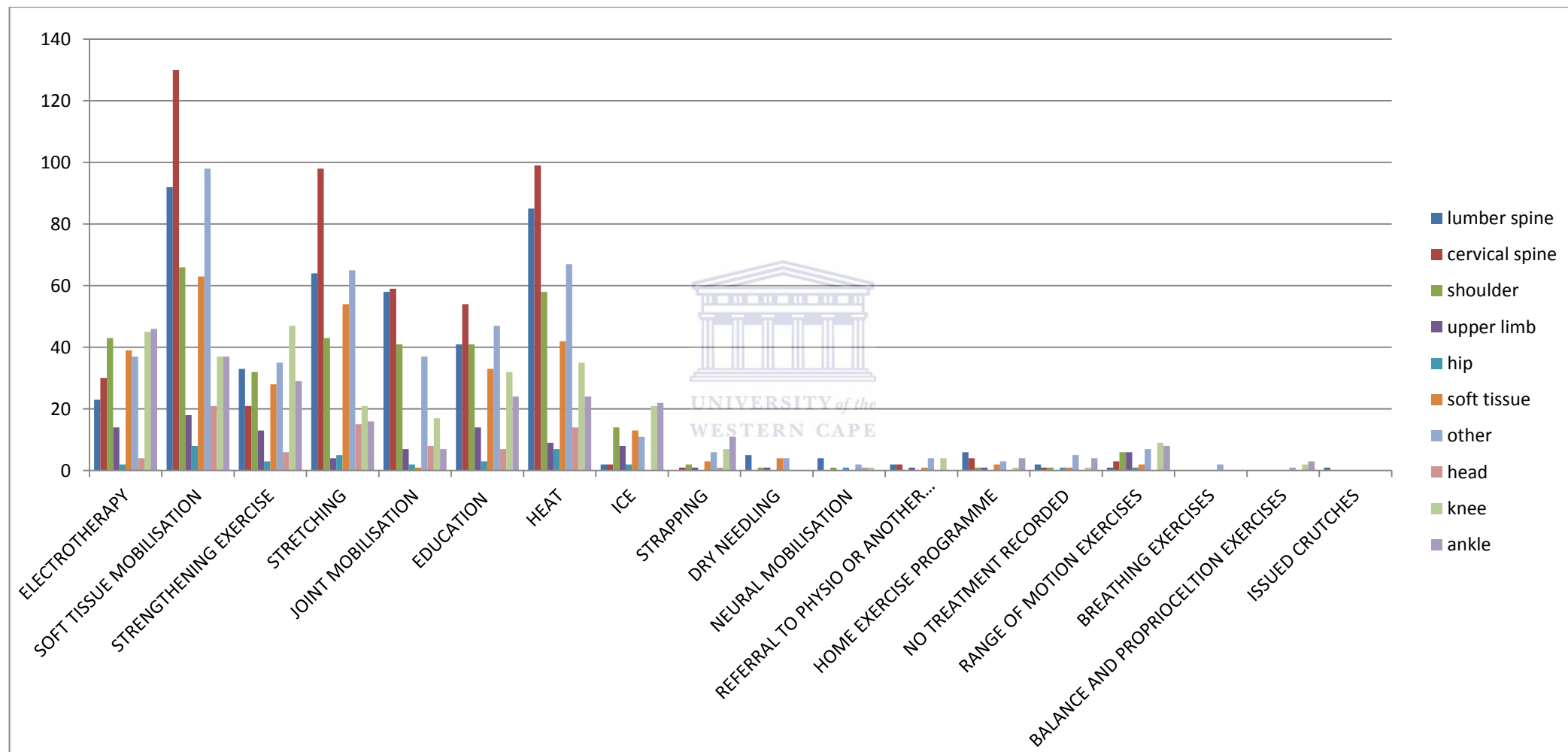


Figure 4: Treatment choices for the lumbar spine

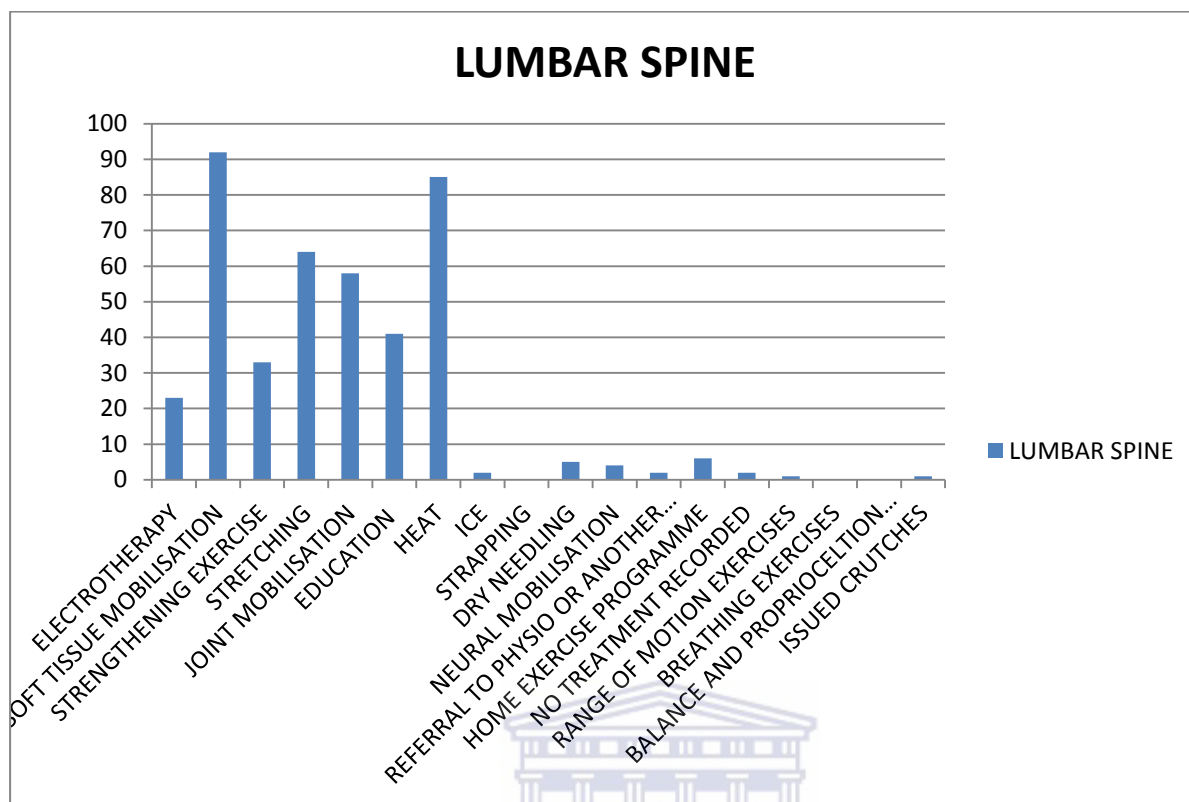


Figure 5: Treatment choices for the cervical spine

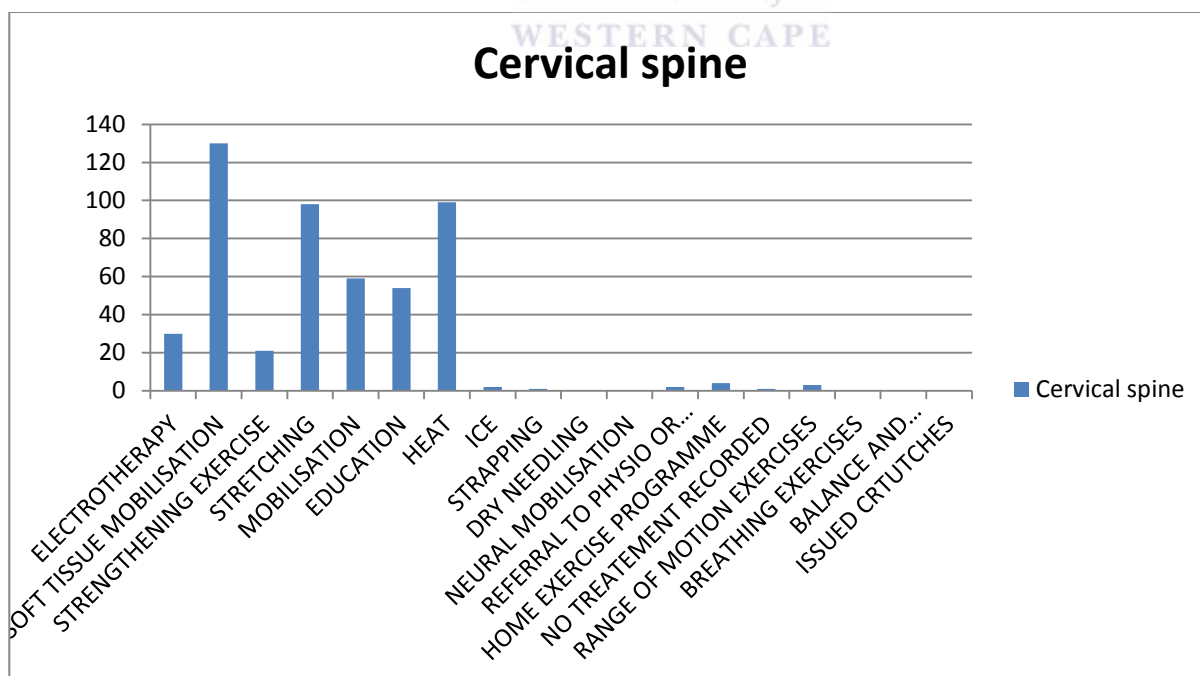
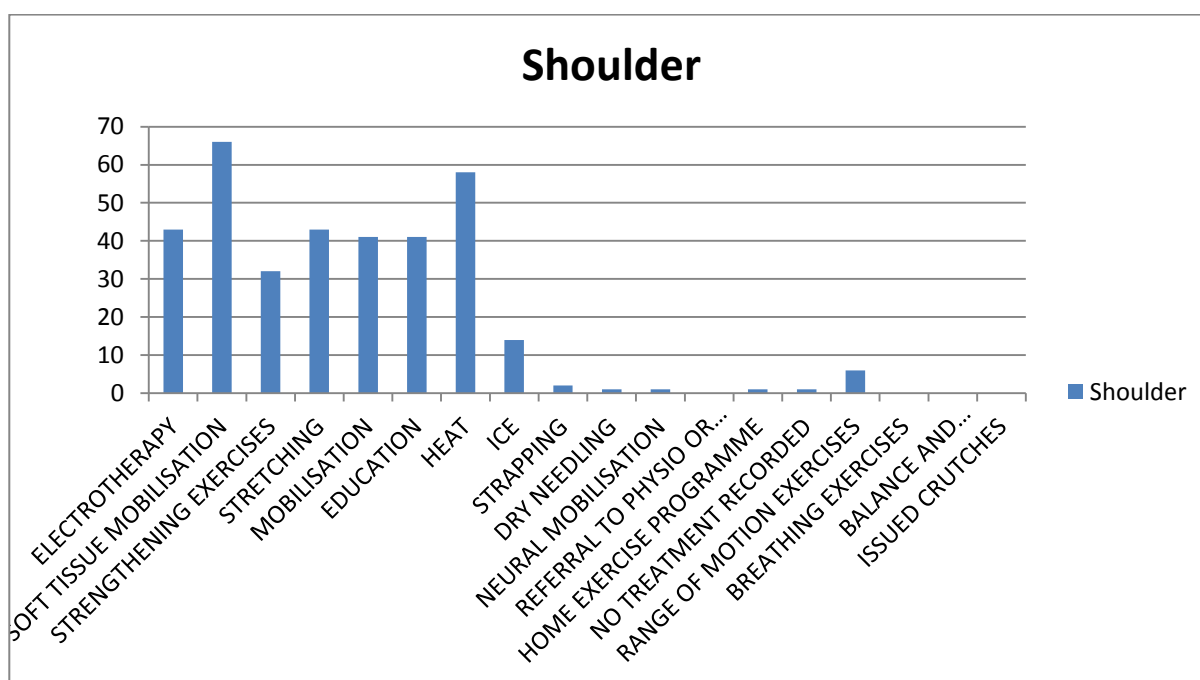


Figure 6: Treatment choices for the shoulder



3.2.3 Summary: Phase 1

During the first phase of this study, the patient folders were examined. Male patients were predominantly seen at the physiotherapy clinic and the most common complaints were in the lumbar, cervical spine and shoulder regions. The student's most common treatment choice was the use of soft tissue mobilisation and heat for all the previously mentioned conditions. Further choices made for treatment of injuries in the lumbar spine were stretches, mobilisation of the spine, education, strengthening and the use of electrotherapy modalities. In the cervical spine stretching, mobilisation, education, electrotherapy and strengthening exercises were the treatment choices that followed. Finally, treatment choices for the shoulder were: electrotherapy, stretches, education, mobilisation, strengthening and the application of ice.

3.3 Phase 2: Student’s knowledge, skills and beliefs of evidence-based practice

During phase two, thirty six undergraduate fourth year students were invited to complete the evidence-based practice questionnaire, and twenty seven responded yielding a response rate of 75%. Of the participants, 22.2% (n=6) were males and 77.8% (n=21) were female.

Exposing students to research and evidence-based practice prior to expecting them to be able to implement it is essential. Table 6 represents the respondent’s exposure to research and evidence-based practice (EBP) and their use of literature. It is evident that all students had the relevant exposure to research and skills needed to incorporate EBP during their clinical education.

Table 6: Students research skill exposure

Skill	Response rate	Module
Have personally conducted research	100%	PHT 404 (Research project, IV year module)
Previously attempted statistics	100%	Measuring Health and Disease (III year module)
Previous epidemiology training	100%	Measuring Health and Disease module (III year module)
Research methods training	100%	PHT 404 (Research project, IV year module)
Literature appraisal workshop	100%	PHT 404 (Research project, IV year module)

The majority of the respondents had access to literature in some form (84.6% access to a medical library and 100% indicated access to the internet) and they had recently searched for literature in the form of published evidence prior to completing the questionnaire (92.3%). As sources of obtaining information and access to information, 92.3% indicated that they had access to their own personal computers and 96.2% had access to the internet with 42.3% having this access at the University. When expecting students to implement evidence-based practice, understanding what they use the computer for can assist in formulating interventions to guide the process.

3.3.1 Collection and dissemination of evidence

With regard to the collection and dissemination of evidence in their clinical practice, 29.6% (n=8) of the respondents searched for literature more than once a week and every one to two weeks, 18.5% (n=5) searched every 3-4 weeks and 22.2% (n=6) less than once a month. 51.9% (n=14) of the students indicated that they only kept up to date with professional literature by reading for specific information. In terms of the material read to find information about evidence to inform their practice 85.2% (n=23) read journal review articles and 88.5% (n=24) consulted textbooks and internet resources. This is represented in the Tables 7, 8 and 9.

Table 7: How often do you search for evidence?

	More than once a week	Every one - two weeks	Every three - four weeks	Less than once a month	Never
How often do you search for evidence?	n=8 (29.6%)	n=8 (29.6%)	n=5 (18.5%)	n=6 (22.2%)	n=0

Table 8: Do you keep up to date with your professional literature?

	Yes - read every week	Yes - occasionally	Yes - for specific info	No
Do you keep up to date with your professional literature?	n=2 (7.4%)	n=10 (37%)	n=14 (51.9%)	n=1 (3.7%)

Table 9: Type of material that students read to find information about evidence for their practice

	Journals: review articles	Journals: original research reports	Textbooks	Internet resources	Hospital guidelines	Hospital intranet	Cochrane library	Nice guidelines	Clinical guidelines	EBM journal	Other
Type of material that students read to find information about evidence for their practice	n=23 (85.2%)	n=11 (40.7%)	n=24 (88.9%)	n=24 (88.9%)	n=7 (25.9%)	n=2 (7.4%)	n=5 (18.5%)	n=0	n=15 (55.6%)	n=15 (55.6%)	n=7 (25.9%)



Table 10 represents the computer usage of the respondents. The results show that approximately 67% had written a paper using Microsoft word more than three times, and a large group had sent or received emails (92.6%). With regards to email discussions, 51.9% had participated in an email discussion more than three times and with regards to using other features such as Windows Messenger, 59.3% have never chatted using Windows Messenger. Furthermore, 7.4% have used a computer instruction programme more than three times and only 1 person (3.7%) had taken an online class more than three times. When it came to using the use of internet though 96.3% used the web to search for information, 88.9% indicated the use of the internet via a browser and 85.2% utilised databases.



Table 10: Demonstration of computer usage

	Written a paper using Microsoft Word	Sent or received an email	Participated in an email discussion group	Chatted using Windows Messenger	Used a computer-assisted instruction programme	Taken a class online	Explore the internet	Used the web to search for information	Used resources such as Medline or Ebscohost (databases)
Never	n=3 (11.1%)	n=1 (3.7%)	n=5 (18.5%)	n=16 (59.3%)	n=13 (48.1%)	n=18 (66.7%)	n=1 (3.7%)		n=1(3.7%)
1-2 weeks	n=5 (18.5%)	n=1 (3.7%)	n=8 (29.6%)	n=7 (25.9%)	n=12 (44.4%)	n=6 (22.2%)	n= 2 (7.4%)	n=1(3.7%)	n=2 (7.4%)
3-4 weeks	n=18 (66.7%)	n=25 (92.6%)	n=14 (51.9%)	n=4 (14.8%)	n=2 (7.4%)	n=2 (7.4%)	n= 24 (88.9%)	n=26 (96.3%)	n=23 (85.2%)
Not indicated	n=1 (3.7%)					n=1 (3.7%)			n=1 (3.7%)

Descriptive statistics were used to analyse frequencies for the Likert scale which evaluated the student's confidence in assessing a paper. There were six items on the scale. The results showed that 48.1% (n=13) felt they were *slightly confident* in assessing the study design and in assessing generalizability or research papers, 44.4% (n=12) stated they also *slightly confident* in evaluating statistical tests and principles and assessing the general worth of the article, 40.7% (n=11) indicated they were *slightly confident* in evaluating bias and 37% (n= 10) were *confident* in assessing the adequacy of the sample size. 3.7% (n=1) stated they have no confidence in evaluating bias or statistical tests and principles. This is seen in Figure 7.

The questionnaire further evaluated the student's beliefs of EBP also using a Likert scale. Again descriptive statistics was employed to run the frequencies. There were ten items. According to the responses, 33.3% (n=9) both *slightly disagreed* and *disagreed* that the original article is confusing, 59.3% (n=16) *strongly agreed* that EBP is essential in their practice, 37% (n=10) *agreed* and 22.2% (n=6) *strongly agreed* that they feel they need more training in EBP. This indicates that 16/27 (59%) of the respondents were in agreement that need some sort of training in EBP. With regard to confidence in assessing research evidence; 59.3% (n=16) *slightly agree* that they were confident in in this aspect, 44.4% (n=12) *slightly agree*, 33.3% (n=9) *agree* and 3.7% (n=1) *strongly agree* that systematic reviews are key to informing EBP, 51.9% (n=14) *disagreed* that evidence-based medicine has little impact on an individuals practice, 48.1% (n=13) only *slightly agreed* that they received good training in EBP, 44.4% (n=12) *slightly disagree* that clinical judgement is more important than EBP, 37% (n=10) *slightly disagree* that patient choices should override EBP and 44.4% (n=12) *slightly disagree* that EBP is a passing fashion. This is shown in Figure 8.

Figure 7: Students confidence assessing a paper

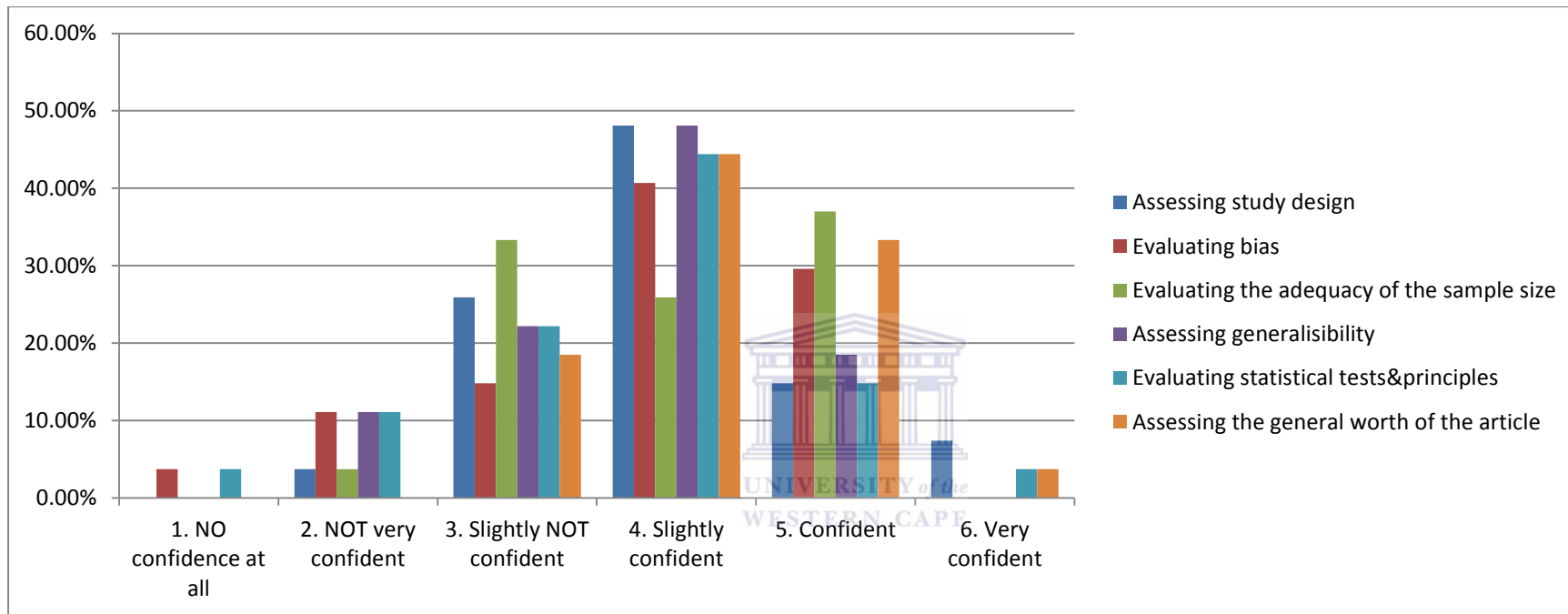
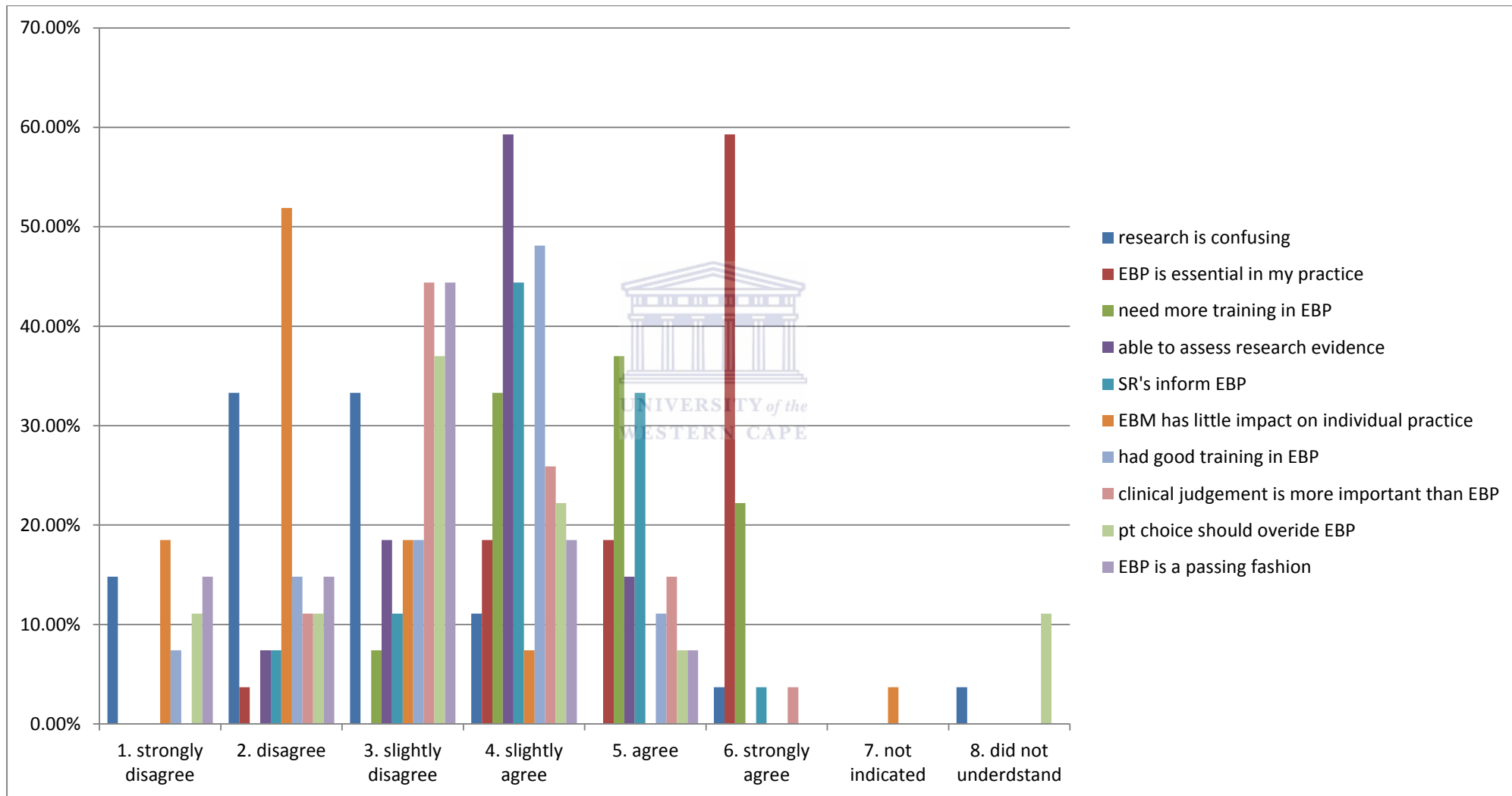


Figure 8: Student beliefs of EBP



There were two open-ended questions. The first aimed to assess the student's rationale behind their choice of treatment and asked what knowledge their treatment choices were based on. The following themes emerged; text books/peer reviewed journals/internet (20/27), class notes/lectures (19/27), clinicians (7/27), prior experience (7/27) and patient information (3/27). A large percentage of students, 19/27 (70.4%), indicated that they use class notes and information from lecturers to base their treatment choices on. The second question asked the student to briefly explain what they understood by the term EBP. In unpacking the understanding of the term two themes emerged:

1. "Techniques that they have practiced and was effective" (12/27)
2. " Making use of evidence such as articles to inform your treatment" (16/27)

In addition, another theme or idea that emerged was that EBP is when research is used only when you are unsure about how to treat a condition.

3.3.2 Summary: Phase 2

This phase addressed students understanding and beliefs of EBP as well as their use of computers and literature. All the students are exposed to epidemiology and statistics as well as research methods and a research project in their 3rd and 4th years respectively. All the students who participated in the study indicated they had access to internet and the majority had access to their own personal computers. Less than half the students searched for literature 1 to 2 times per week and stated they occasionally kept up with literature. Half the population (50%) indicated they read literature for specific information. With regard to their confidence in assessing a paper they seemed to only be slightly confident in most aspects of assessment of a paper. When they were asked what they based their treatment choices on nineteen out of the twenty seven responses (70.4%) answered "class notes/lectures". In terms of their understanding of EBP twelve out of the twenty seven (44.4%) was "Techniques that they have practiced and was effective" sixteen out the twenty seven (59.2%) was "Making use of evidence such as articles to inform your treatment". This showed that they understood that EBP was to inform their practice but did not necessarily implement it.

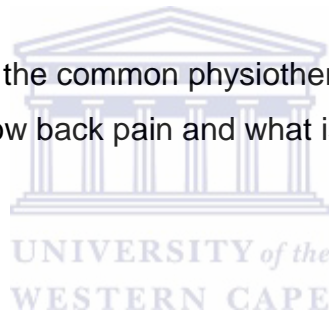
CHAPTER 4

SYSTEMATIC REVIEW

4.1 Introduction

The aim of the systematic review was to determine the most common physiotherapy interventions used for patients with low back pain. An example of one of the databases used is presented in the flow chart (Figure 9). Low back pain was determined as one of the common conditions managed during phase one of the study. A specific, targeted review question was formulated identifying the population, intervention and outcomes that the review would evaluate. The population included patients with low back pain and the intervention focused physiotherapy treatment techniques. The outcomes included aspects such as pain, function, disability and return to work.

The review question was: What is the common physiotherapy interventions used for the management of patients with low back pain and what is the impact of these interventions?



4.2 Methodology

4.2.1 Inclusion criteria

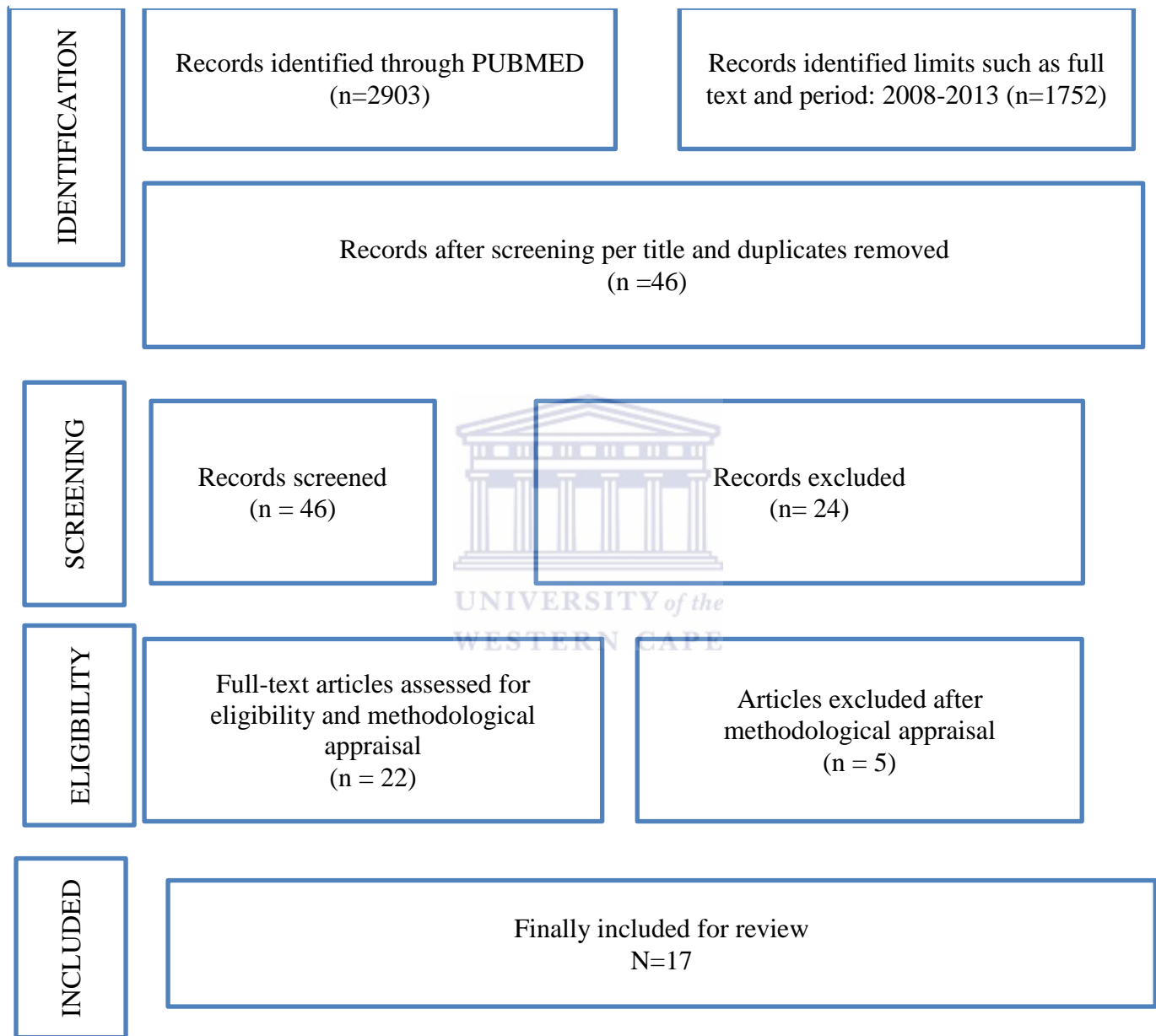
The search parameters included full-text systematic reviews published in English between 2008 and 2013. Search terms were chosen after a preliminary review of relevant literature yielded commonly used words and phrases, which were finalised after consultation with an experienced researcher and clinical educator.

4.2.2 Search method and study selection

The search was conducted in three parts. Initially publications were retrieved from selected electronic databases (Academic Search Premier, CINAHL and MEDLINE). The next search made use of Google and Google Scholar in order to identify relevant articles that existed outside of the previously identified databases. The last stage included scrutiny of the reference lists of the collected articles in order to identify additional studies that fit the inclusion criteria. When the titles of the articles were not

sufficiently descriptive to make a decision, the abstracts were consulted. An example of search results for one database is presented in the flow chart in figure 9.

Figure 9: Flow chart of screening of articles included



4.2.3 Methodological appraisal

The total number of articles included for methodological appraisal was twenty two. Following the methodological appraisal five articles were excluded based on poor methodological quality. The articles with methodological scores with 5/10 and below were excluded from the review and are illustrated in Table 11. All articles were reviewed using the CASP tool for systematic reviews (Appendix G). CASP scores of the included articles varied from 6/10 – 10/10 with an average score of 8/10. A total of seventeen articles were left for data extraction.

4.3 Data extraction

Following the methodological assessment of twenty two articles seventeen were included for data extraction. The data extraction tool used in the study was an intervention review tool for both RCT's and non-RCT's from the Cochrane Collaboration. The form states that it can be used as a guide for developing one's own data extraction form. The researcher then modified the tool to suit the type of systematic review. Some of the general information extracted included the title and the author of the article, the eligibility and methods (extracted information such as types of participants and outcome measures and aim of the study), the results (extracted information such as if a meta-analysis was performed and how the results were presented) and the applicability (information extracted was if the study addresses the review question). The data extracted from the included articles are presented in the data extraction table (Table 12).

Table 11: Methodological Appraisal

No	Author(s)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	%	Outcome
1	Ammendolia et al (2008)	1	1	1	1	1	0	0	1	1	0	70	Included
2	Bronfort et al (2008)	1	1	1	1	1	0	1	1	1	1	90	Included
3	Brox et al (2008)	1	1	0	1	1	1	1	1	1	0	80	Included
4	Clarke et al (2011)	1	1	1	1	1	0	1	0	1	0	70	Included
5	Dupeyron et al (2011)	1	1	1	0	0	0	0	0	0	1	40	Excluded
6	Gatchel et al (2008)	0	0										Excluded
7	Gay and Brault (2008)	1	1	1	0	1	0	1	1	1	0	70	Included
8	Goertz et al (2012)	1	1	1	0	1	0	1	0	1	0	60	Included
9	Hettinga et al (2008)	1	1	1	1	1	1	0	1	0	1	80	Included
10	Imamura et al (2008)	1	1	1	1	1	0	0	1	1	1	80	Included
11	Kuczynski et al (2012)	1	1	0	1	1	1	1	1	1	0	80	Included

12	May and Johnson (2008)	1	1	1	1	1	1	1	1	1	1	100	Included
13	Mayer et al (2008)	1	1	1	0	1	0	0	0	1	0	50	Excluded
14	Poitras and Brosseau (2008)	1	1	1	1	1	1	1	1	1	0	90	Included
15	Posadzki et al (2011)	1	1	1	1	0	0	0	0	1	0	50	Excluded
16	Richards et al (2013)	1	1	1	1	1	1	1	1	1	0	90	Included
17	Seco et al (2011)	1	1	1	1	0	1	0	1	1	0	70	Included
18	Slater et al (2012)	1	1	1	1	1	1	1	1	1	1	100	Included
19	Standaert et al (2008)	1	1	1	1	0	0	0	1	1	0	60	Included
20	van Middelkoop et al (2010)	1	1	1	1	1	1	1	1	1	1	100	Included
21	van Middelkoop et al (2011)	1	1	0	1	0	0	1	1	1	0	60	Included
22	Yuan et al (2008)	1	1	1	0	0	1	0	0	0	0	40	Excluded

4.4 Results

4.4.1 Description of studies and evidence hierarchy

According to the level of evidence of the National Health and Medical Research Council, the highest level of evidence is the level I evidence which is a systematic review of randomised controlled trials. All of the studies included in this review were aimed at the highest level of evidence as they were all systematic reviews of randomised controlled trials. The studies by Poitras & Brosseau (2008), van Middelkoop et al. (2010), Clarke, Ryan & Martin (2011), van Middelkoop et al. (2011) and Richards et al. (2013) included a meta-analysis whereas the rest of the studies that were reviewed did not do a meta-analysis but did a narrative summary.

4.4.2 Description of interventions

In describing the interventions highlighted, a range of interventions used by physiotherapists were identified to manage low back pain. The review highlighted that various interventions were used by physiotherapists to manage low back pain. The interventions mentioned included manual therapy (including mobilisation, spinal manipulation and massage) (6/17), exercise therapy (including lumbar stabilising exercises) (3/17), electrophysical therapy (this includes electrotherapy, ultrasound therapy, shockwave, traction therapy) (3/17), needle acupuncture (1/17), pain neuro physiology education (1/17), physiotherapy functional restoration (1/17), back school, brief education and fear avoidance training (1/17). One of the included studies looked at multiple physiotherapy and rehabilitation treatments (1/17). An attempt was made to determine the average duration of treatment sessions but this proved difficult to determine as the duration of interventions varied and some of the studies did not report on it. Variations on how interventions were classified or reported on included information such as either short term or long term interventions. In some cases it was referred to as one or three week follow ups to measure the impact of the intervention. Some studies lacked direct or specific information on the interventions provided and this made it difficult to compare in the review.


4.4.3 Description of randomized controlled trials (RCTs) included in the review

The systematic reviews included in this current systematic review had a range of RCTs included in each review and the numbers tended to range from two RCTs per review to eighty three RCTs reported in a review. The systematic review with the least number of RCTs included in their review was the review by Clarke et al. (2011) which focused on pain neurological education as an intervention. This was followed by the review by Poitras and Brossaeu (2008) which had six RCT's and focused on the effects of various electrotherapy modalities but could only report on the use of Transcutaneous Electrical Nerve Stimulation (TENS) for low back pain as there was insufficient evidence for other electrotherapy modalities. van Middelkoop et al. (2011) focused on various physical and rehabilitation interventions with a great focus on exercise therapy. This review had a total of 83 RCT's with the majority belonging to exercise therapy (37 RCT's). The systematic review by Goertz, Pohlman, Vining, Brantingham, and Long (2012) focused on the use of spinal manipulation as an intervention to manage low back pain, they were able to identify 38 RCTs which focused on this intervention modality. The next review that had a large number of RCTs included in their review was the another one by van Middelkoop (2010) which focused on the intervention exercise therapy for managing chronic low back pain. As the number of RCTs included per review varied, the same was found for the number of participants in RCT's. The number of participants ranged from as little as 122 participants per RCT to as high as 8816 participants per RCT. When averaging out the number of patients used across the reviews and the number of RCTs, it could be speculated that to conduct a trial a minimum of 146 participants would provide an accurate reflection thus being able to classify approximately 70 per group. However, this is not a norm but a guide as all RCTs are dependent on the research question and the recruitment strategy.

Table 12: Systematic reviews of interventions for Low Back Pain


No.	Author	Intervention	Condition treated and classification	Overall result	Hierarchy of evidence	Outcomes
1	Ammendolia et al (2008)	Needle acupuncture A form of acupuncture that involves penetrating skin at anatomical points of the body.	Chronic Low Back Pain	The review showed inconclusive evidence for the effectiveness of acupuncture.	Level I (without meta-analysis) Includes 19 RCT's.	Pain (NPS, McGill pain questionnaire) was decreased when compared to no treatment in the short term and when compared to sham therapy Function (Oswestry questionnaire) was increased when compared to no treatment in the short term
2	Bronfort et al (2008)	Spinal manipulation therapy (SMT) application of high velocity, low amplitude, manual thrust to spinal joint slightly above passive ROM Spinal mobilization (MOB) application of manual force to the spinal joints within passive ROM, does not involve thrust	Chronic Low Back Pain (> 12 weeks) Mixed duration with >50% Chronic Low Back Pain	The evidence is not very convincing for whether SMT is better than sham SMT for pain in the short term. Evidence is also not convincing for whether MOB has a similar effect to exercise on pain in both the short and long term. Results do show that high dose SMT seems to be better than low dose SMT. The literature provides moderate to strong evidence regarding the efficacy of SMT for mixed (but predominantly chronic) LBP.	Level I (without meta-analysis). Includes 21 RCT's.	In the short term high dose SMT is better than low dose SMT, SMT is superior to acupuncture to decrease pain and improve disability and MOB is better than an exercise programme. In the long term SMT/MOB is better than physiotherapy and home exercise programme for decrease in pain and improvement in disability. In both the short and long term SMT combined with strength exercises is similar to NSAID's for pain and MOB has the same effect on both pain and disability as an exercise programme.
3	Brox et al (2008)	1.Back schools, 2.Brief education	Non-specific chronic low back pain	Recommendations for back schools are limited to the occupational setting if multidisciplinary interventions	Level I (without meta-analysis). Includes 23 (8=back	There is favour of back schools both pain reduction and disability improvement in the long term.

		3.Fear-avoidance training		<p>are included.</p> <p>Incorporating fear-avoidance training in a rehabilitation programme as an alternative to spinal fusion should be considered.</p> <p>There was limited and conflicting evidence for the effectiveness of brief education given as a back book or Internet discussion.</p> <p>It was concluded that these interventions cannot be recommended.</p>	<p>schools, 7=brief education, 5=brief education/back school/internet education and 6=fear-avoidance training) RCT's.</p>	<p>Strong evidence to support brief education is not better than usual care in the clinical setting for pain. But, consistent recommendations are given for brief education in the clinical setting for short-term reduction of disability. Limited evidence that brief education is not more effective than back schools and as effective as massage and acupuncture to decrease pain and improve disability.</p> <p>Fear avoidance training had limited evidence that is better than usual on pain and disability and moderate evidence that when incorporated in a rehabilitation programme consisting of cognitive intervention and exercise it is no different to spinal fusion for both pain and disability.</p>
4	Gay and Brault (2008)	Traction therapy refers to any method of separating the lumbar vertebrae with the primary force directed along the inferior-superior axis of the spine in an attempt to treat CLBP	Chronic Low Back Pain	Literature provides more evidence against the use of traction than for it. Further studies needed to determine whether these different types of traction are actually beneficial for CLBP.	<p>Level I (without meta-analysis).</p> <p>Includes 9 RCT's.</p>	Pain was not decreased or disability improved when sustained traction was compared to hot pack/ultrasound/active exercises, or interferential. When traction was compared to TENS there was a decrease I pain in favour of the TENS group.
5	Hettinga et al (2008)	Manual Therapy: 1.Manipulation, 2.Massage 3.Mobilisation	Non-specific low back pain for 6 weeks duration	RCT's that fulfilled study criteria on methodological quality/sample size and statistical rigour suggested mobilisation in combination with manipulation is useful and effective additional to general practitioner for pain and function, manipulation in isolation is less effective, no statement was made for massage.	<p>Level I (without meta-analysis).</p> <p>Includes 10 RCT's.</p>	Manipulation in combination with mobilisation is more effective than GP care for pain relief and function improvement in non-specific low back pain. Manipulation used in isolation is as effective as sham manipulation or an education programme for pain reduction.

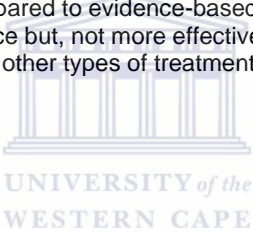
6	Imamura et al (2008)	Massage soft tissue manipulation using hands or mechanical device	Chronic Low Back Pain	<p>The review showed strong evidence that massage was a good treatment for CLBP. Moderate evidence shows that symptoms decrease in both the long and short term. Massage effects are when combined with exercise and education and delivered by a licenced professional.</p> 	<p>Level I (without meta-analysis). Includes 9 RCT's (5 were later excluded).</p>	<p>Pain (VAS, McGill Pain Questionnaire) Pain improved when massage was compared sham massage and laser. Short and long term: Moderate evidence that pain improved with massage (acupressure) when compared to conventional physiotherapy, pain also decreased when massage was used with exercise and education. Long term: Pain also improved when massage was compared to exercise, pain was decreased by massage when compared to self-care education and other interventions but the effects were not maintained in the long term (for self-care). Function (RDQ, Modified Roland Morris disability index) improved when massage was compared to exercise and massage is also better than acupuncture to improve function. Short term: Function improved when massage was compared sham massage and laser. Long term: Function was increased by massage when compared to self-care and other interventions education but the effects were not maintained in the long term (for self-care). Long and short term: Function was also improved when massage was used with exercise and education in both the long and short term. Disability (RMDQ, ODI) moderate evidence that this outcome improved with massage (acupressure) when compared to conventional physiotherapy</p>
7	May and Johnson (2008)	Stabilization exercises	<p>Specific low back pain</p> <p>Non-specific low back pain</p>	<p>Little evidence supported the use of stabilisation exercises for acute low back pain.</p> <p>Some evidence supported the use of stabilisation exercises</p>	<p>Level I (without meta-analysis). Includes 18 RCT's.</p>	<p>Pain, RMDQ, Oswestry, McGill pain questionnaire In chronic pain there were high-quality trials that showed significant differences for pain and function favouring stabilisation exercises. In the medium term, there were</p>

				<p>in chronic back pain.</p> <p>Overall, it must be concluded that there was conflicting evidence about the effectiveness of stabilisation exercises for acute back pain; they do not appear to be effective.</p>		<p>significant differences in pain and function favouring stabilisation exercises in two high-quality trials, and non-significant differences in three and two trials, respectively, one of which was high quality. In the long term, there were significant differences in pain and function scores in four and five trials, respectively, in favour of stabilisation exercises; most of these were high-quality trials.</p>
8	Poitras and Brosseau (2008)	Electrotherapeutic modalities (includes; TENS, electrical muscle stimulation (EMS), I/F, U/S, Thermotherapy: heat therapy and cold therapy)	<p>Mixed sub-acute low back pain</p> <p>Non-specific mechanical Chronic Low Back Pain (>12 weeks)</p>	<p>Few studies were found to support the use of ET modalities in CLBP, even though they are frequent choice of treatment. The only ET modality that delivered some evidence was TENS. TENS seems to reduce pain immediately; however, its use is not well-known in CLBP. It was also found that high frequency TENS has a more effective impact on pain reduction than low frequency TENS. No studies were found in support of the modalities.</p>	<p>Level I (with meta-analysis).</p> <p>Includes 6 RCT's ONLY for TENS.</p>	<p>Both high and low frequency showed a decrease in pain. But no effect on disability. Immediately after the use of TENS there was a decrease seen in pain but no effect on disability. TENS appears to have an immediate impact on pain intensity, with results favouring high-frequency. High frequency tens clinically important improvements without statistical significance in physical function.</p>
9	Standaert et al (2008)	Lumbar stabilization exercises (LSE's)	Chronic Low Back Pain	<p>Spinal stabilization exercises are not more effective than manual therapy or minimal care; strong evidence was provided that spinal stabilization exercises not more effective than a general exercise programme.</p>	<p>Level I (without meta-analysis).</p> <p>Includes 3 RCT's.</p>	<p>Disability (RMDQ, Patient Specific Functional Scale, Oswestry Disability Index) improved by both stabilization exercise and physical therapy. In the short-term stabilization exercise and Manual Therapy improved disability when compared to general exercise. Pain (VAS, McGill Pain Questionnaire, SF-36) improved by both stabilization exercise and physical therapy. In the short-term stabilization exercise and MT was better for this outcome than general</p>

						exercise. Functional disability (ODI) improved by both stabilization exercise and physical therapy.
10	van Middelkoop et al (2010)	Exercise therapy	Chronic Low Back Pain	Exercise therapy is not effective for acute LBP, but it is effective for CLBP. Research shows poor adherence to exercise, therefore, therapists should employ strategies to ensure home exercises get done and consider patients preferences when deciding which exercises to choose.	Level I (with meta-analysis). Includes 11 RCT's.	Pain and Disability Decreased pain and improved disability was seen when exercise was compared to no treatment, back schools, and psychotherapy (6/12 follow-up) in favour of exercise. However, these results were not significant. When compared to usual care there was significant decreased pain and improved disability at the intermediate follow-up. Statistically significant difference in pain relief at 3 months follow-up of an aerobic exercise training programme compared with a lumbar flexion exercise programme of 3 months.
11	Clarke et al (2011)	Pain neurophysiology education (PNE) a form of education for patients with CLBP	Chronic low back pain	The evidence is insufficient to recommend its use above other educational approaches. This approach is new and should be further researched. It should also be noted that PNE is intended to be delivered as part of a wider intervention rather than in isolation.	Level I (with meta-analysis). Includes 2 RCT's.	Pain (VAS) The short-term effect of PNE combined with a pain management programme was better than the corresponding control group (pain management and education based on the Back Book). For the medium term the difference between-groups was in favour of the PNE group and found to be statistically and clinically significant. In the long term the PNE plus pain management group showed a large advantage over control, which meets the criterion for clinical significance. Physical function (RMDQ and PSFS) The short term showed the PNE group improved physical-function from baseline, while the control group showed a worsening of physical-function. In the comparison of PNE plus pain management

						against pain management and a Back Book based education as control, difference was in favour of PNE. The difference between-groups was neither statistically or clinically significant. In the medium term the difference between-groups was neither statistically or clinically significant. Long term results showed between groups difference was in favour of the PNE group. The difference between-groups was neither statistically or clinically significant.
12	Seco et al (2011)	1.Ultrasound therapy 2.Shockwave therapy	Acute LBP Chronic LBP	Results from this review do not support the use of U/S and Shockwave therapy for treatment of patients with LBP and leg pain. 	Level I (without meta-analysis). Includes 4 RCT's.	Pain (VAS) in patients with LBP with leg pain due to lumbar disc herniation traction, U/S, laser had the same results on pain and disability (ACUTE LBP), pain was improved in the manipulation group when compared Disability (Roland Disability Questionnaire, Modified Oswestry Disability Index) in patients with LBP with leg pain due to lumbar disc herniation traction, U/S, laser had the same results on pain and disability (ACUTE LBP)
13	van Middelkoop et al (2011)	Physical and Rehab interventions (exercise therapy, back school, TENS, low level laser therapy, education, massage, behavioural treatment, traction, multidisciplinary treatment, lumbar supports, heat/cold therapy)	Chronic NS LBP	The researchers concluded that there was insufficient data to draw firm conclusions of the clinical effect of back schools, low level laser therapy, patient education, massage, traction, superficial heat/cold, and lumbar supports. There was also the lack of or conflicting evidence. It was also concluded that only multidisciplinary treatment, behavioural treatment, and exercise therapy should be provided as conservative	Level I (with meta-analysis) Includes 83 RCT's. [Ex the (37), back schools (5), TENS (6), LLLT (3), massage (3), behavioural treatment (21), patient education (1), traction (1), multidisciplinary treatment (6)]	Pain (VAS, McGill pain questionnaire) and Back specific disability (Roland Morris, Oswestry Disability Index): No significant treatment effects of exercise therapy compared to no treatment/waiting list controls were found on pain intensity and disability. Exercise therapy compared to usual care showed pain intensity and disability was significantly reduced by exercise therapy at short-term follow-up. There was no difference in effectiveness of TENS and sham TENS and there were also no differences between TENS and active treatments. Behavioural therapy were more effective in reducing pain intensity than

				treatments in daily practice in the treatment of chronic LBP		waiting list controls. Multidisciplinary treatment was found to be more effective in reducing pain intensity compared to no treatment/waiting list controls and active treatments (such as exercise and physiotherapy).
14	Goertz et al (2012)	High velocity, low amplitude spinal manipulation	Non-specific low back pain	The data was generally insufficient to make strong recommendations but spinal manipulation (SM) appears to be one of several effective treatment options for both acute and chronic LBP. The review found that high velocity, low amplitude SM for LBP conveys a small but consistent treatment effect.	Level I (without meta-analysis). Includes 38 RCT's.	Pain (VAS and NPRS) Pain was decreased in favour of spinal manipulation. However, there were smaller differences for sub-acute and chronic LBP; larger differences for acute LBP. Disability (RMDQ and OLBPDI) Disability was reduced in favour of spinal manipulation. However, changes were higher in studies that focused on acute LBP when compared to chronic LBP.
15	Kuczynski et al (2012)	Physical therapy spinal manipulations	LBP	Physical therapy spinal manipulation appears to be a safe intervention that improves clinical outcomes for a variety of patients with LBP. Based on current literature, physical therapists should continue to use this intervention as one of many options to treat LBP.	Level I (without meta-analysis). Includes 6 RCT's	Pain (VAS, NPRS): pain was decreased for all included studies; Disability (percentage of ODQ, RMDQ, ODQ): Disability was improved for all included studies
16	Slater et al (2012)	Manual Therapy high velocity thrust manipulation or low velocity mobilization directed at the vertebrae articulation	Unclear	Sub-group specific manual therapy may decrease pain and improve activity in people with LBP when compared to other treatments.	Level I (without meta-analysis). Includes 7 RCT's.	Pain (NPRS, VAS) significant treatment effect in the short term favouring manipulation over mobilization, significant treatment effect on pain and activity in the short to medium term in favour of specific manipulation Activity (ODQ) significant treatment effect in the medium term favouring manipulation over mobilization, significant treatment effect on pain and activity in the short to medium term in favour of specific manipulation

17	Richards et al (2013)	<p>Physiotherapy Functional Restoration (PFR) includes physical, psychological, social dimensions of pain</p>	Post-acute back pain (> 6 weeks)	<p>Moderate to high quality evidence of small effects favouring PFR when compared with advice for intermediate and long term follow-up. Low to moderate quality of advice suggested that PFR is not different to any other type of physiotherapy intervention. The results of the review overall suggest PFR in people with sub-acute LBP is more effective when improving pain and function when compared to evidence-based advice but, not more effective than other types of treatment.</p> 	<p>Level I (with meta-analysis). Includes 16 RCT's.</p>	<p>Pain (VAS, NPS) There was low evidence when compared to placebo, for short term pain and function compared to Dutch occupational physician guideline advice for sub-acute sick-listed workers, high evidence for PFR for intermediate to long term pain and function, no difference when compared to advice (ST), no difference for LT pain when compared to cognitive behavioural therapy, no difference versus exercise therapy in the medium term, no difference versus other therapy in the medium and long term, no difference versus usual care and waiting list in the long term, Function (RMDQ, PSFS, ODI) There was low evidence when compared to placebo, low evidence for short term pain and function compared to Dutch occupational physician guideline advice for sub-acute sick-listed workers, high evidence for PFR for intermediate to long term pain and function, no difference when compared to advice (LT), no difference versus exercise therapy in the medium term, no difference versus other therapy in the medium and long term, no difference versus usual care or waiting list in the long term,</p>
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4.4.4 Description of outcome measures

The main outcome measures that this review focused on included pain, function and disability. Although there were reviews that included the above mentioned outcomes, others such as fear avoidance behaviour and return to work were also included. Table 13 links the outcome measure to the common treatment modalities used.

4.4.4.1 Pain

Pain was commonly measured using the numerical pain rating scale, McGill Pain Questionnaire and the visual analogue scale. Spinal manipulation and mobilisation was found to have a positive effect on pain in all the identified studies. Bronfort, Hass, Evans, Kawchuck & Dagenais (2008), Hettinga et al. (2008), Goertz et al. (2012), Kuczynski et al. (2012) and Slater et al. (2012) all showed that pain was decreased when compared to other modalities in their reviews. When comparing back schools, brief education and fear avoidance training, the only convincing result for the pain outcome was back schools. According to Brox et al. (2008) and van Middelkoop et al. (2011) pain is reduced for back schools especially when compared to usual care. Pain was not improved when traction therapy was compared to other modalities (Gay and Brault, 2008 & van Middelkoop et al., 2011); pain was only improved in patients who received acupuncture when it was compared to no treatment (Ammendolia et al., 2008). In terms of electrotherapeutic modalities it was only studies that included transcutaneous electrical nerve stimulation (TENS) that had positive effects on pain, otherwise pain was not improved in many other studies (Poitras & Brosseau, 2008; Seco, Kovacs & Urrutia, 2011 & van Middelkoop et al., 2011). Massage therapy (Imamura, Furlan, Dryden and Irvin, 2008), lumbar stabilization exercises (May and Johnson, 2008 & Standaert et al., 2008), education (Clarke, Ryan and Martin, 2011 & van Middelkoop et al., 2011) and physiotherapy functional restoration (Richards et al., 2013 & van Middelkoop et al., 2011) all have positive effects on the pain outcome.

4.4.4.2 Function

Function was commonly assessed by using the modified Oswestry Disability Index, Roland Morris Disability Questionnaire and Patient specific functional scale across the reviews. It was found that function seemed to improve when mobilisation and spinal manipulation was combined in the management of patients with low back pain (Hettinga et al. 2008) and spinal manipulation was favoured when specific manual therapy is compared to other manual therapy (Slater et al., 2012). In addition, the review by May and Johnson (2008) studies showed that in both the medium and long term there were positive effects on function when lumbar stabilization exercises were included as a management intervention for low back pain. However, in patients with recurrent back pain there were no benefits for function when lumbar stabilization exercises were compared to conventional physiotherapy (Standaert et al., 2008). Massage was found to improve function in the short term when compared to laser therapy or sham massage (Imamura et al., 2008) and when used in conjunction with exercise and education (van Middelkoop et al., 2011). Physiotherapy functional restoration (Richards et al., 2013) and pain neurophysiology education (Clarke et al., 2011) were both better for improving function. Function was not improved for back schools, brief education and fear avoidance training, electrotherapeutic modalities and exercise therapy. It is thus evident that physiotherapy interventions such as mobilisation and stabilisations exercises definitely impact positively on the function of patients with low back pain.

4.4.4.3 Disability


In some studies disability was also assessed using the Oswestry Disability Index and the Roland Morris Disability Questionnaire. Disability seemed to be reduced when spinal manipulation and mobilisation was used especially in the acute setting compared the chronic. Disability seems to decrease when back schools are compared to usual care (van Middelkoop et al., 2011). Disability also improved for lumbar stabilization exercises (Standaert et al., 2008). Exercise therapy improved disability outcomes when compared to usual care (van Middelkoop., 2010). When patient education was focused on the neurosystem as opposed to anatomy disability was reduced (van Middelkoop et al., 2011). Disability was not affected by treatments such as traction therapy (Gay and Brault, 2008), brief education and fear avoidance

training (Brox et al., 2008), electrotherapeutic modalities (Poitras & Brosseau, 2008; Seco et al., 2011 & van Middelkoop et al., 2011).



Table 13: Outcome measures

	Mobilization (MOB) Spinal manipulation therapy (SMT) (Bronfort¹, Hettinga², Kuczynski³, Goertz⁴ and Slater⁵)	Back school Brief education Fear avoidance training (Brox¹, van Middelkoop²)	Traction therapy (Gay & Brault¹, van Middelkoop²)	Lumbar stabilization exercises (May & Johnson¹, Standaert²)	Massage (Imamura¹, van Middelkoop²)
Pain	<p>1. High dose SMT better than low dose SMT to improve pain. SMT is superior to acupuncture in the short term to reduce pain. MOB is superior to exercise programme in terms of reducing pain. In the long term SMT/MOB is more effective than physiotherapy or home exercise programme to reduce pain. SMT combined with strengthening exercise is similar to NSAID's in both the long and short term to reduce pain.</p> <p>2. Manipulation/Mobilization is more effective for pain.</p> <p>3. Pain was decreased with the use spinal manipulation.</p> <p>4. Pain was decreased with spinal manipulation in acute (big effect), sub-acute and chronic (smaller effects) pain.</p> <p>5. Specific manual therapy versus other manual therapy</p>	<p>1. Back school There is favour for back schools in the long term for positive effects on pain.</p> <p>Brief education There is strong evidence that brief education is inferior to usual care in the clinical setting for pain. There is limited/conflicting evidence that brief education is not more effective than back school and as effective as massage and acupuncture to decrease pain.</p> <p>Fear avoidance training There is limited evidence that fear avoidance training is more effective than usual care for pain. There is moderate evidence that fear avoidance training in a rehabilitation programme that consists of cognitive intervention and exercise is not different from spinal fusion for pain.</p> <p>2. For back school pain is decreased in versus usual care.</p>	<p>1. Sustained traction. There is no difference in the outcome measure VAS when traction is compared to hot pack/ ultrasound/ active exercises or physiotherapy combined with traction.</p> <p>Intermittent traction: PAIN was improved by the TENS when it was compared to intermittent traction.</p> <p>2. No significant differences seen with regard to pain post treatment or at 3 month follow up in the specific study used.</p>	<p>1. In chronic pain there were high quality trials that showed significant effects for pain in favour of stabilization exercise. In the medium and long term there were positive effects on pain in favour of stabilization exercises.</p> <p>2. In patients with recurrent pain there were no benefits in terms of pain when compared to conventional physiotherapy.</p>	<p>1. Pain is reduced when massage is compared to laser or sham massage. In short and long term pain massage is better than conventional physiotherapy to decrease pain. In the long term pain is decreased when compared exercise.</p> <p>2. Non-significant effects are seen for the decrease of pain with massage.</p>

	showed positive effects on pain in the short term in favour of spinal manipulation over MOB. When specific manual therapy is compared to trunk muscle training there is decreased pain in both the long and short term.				
Function	<p>2. Function is improved when manipulation is combined with mobilisation in non-specific LBP</p> <p>5. Specific manual therapy versus other manual therapy showed positive effects on activity/function in the short term in favour of spinal manipulation over MOB.</p>		<p>1.Sustained traction: RMDQ, no difference high and low dose sustained traction.</p> <p>Intermittent traction: ODI no differences compared to interferential.</p>  <p>UNIVERSITY of the WESTERN CAPE</p>	<p>1. In the medium and long term there were positive effects on function in favour of stabilization exercises.</p> <p>2. In patients with recurrent pain there were no benefits in terms of function when compared to conventional physiotherapy.</p>	<p>1. Function is improved in the short term for massage when compared to laser or sham massage. In the short and long term function is improved when massage is used with exercise and education.</p>
Disability	<p>1. SMT is superior to acupuncture in the short term to improve disability. MOB is superior to exercise programme in terms of improving disability. In the long term SMT/MOB is more effective than physiotherapy or home exercise programme to reduce disability. MOB has the same effect as exercise on disability.</p> <p>3. Disability was decreased with the use of spinal manipulation.</p> <p>4. Disability was decreased</p>	<p>1.Back schools There is favour for back schools in the long term for positive effects on disability.</p> <p>Brief education There is limited/conflicting evidence that brief education is not more effective than back school and as effective as massage and acupuncture to decrease pain.</p> <p>Fear avoidance training There is limited evidence that fear avoidance training is more effective than usual care for disability. There is moderate evidence that fear avoidance training in a rehabilitation programme that consists of</p>	<p>2.No significant differences seen with regard to disability post treatment or at 3 month follow up in the specific study used.</p>	<p>2. Disability improved for stabilization exercise and physiotherapy in the short term. Disability also had better effect for stabilization exercise and manual therapy compared to general exercise.</p>	

	with the use of spinal manipulation (higher in the acute group).	cognitive intervention and exercise is not different from spinal fusion for disability. 2. For back school Disability is decreased versus usual care.			
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	Needle acupuncture (Ammendolia¹)	Electrotherapeutic modalities (including Shockwave therapy) (Poitras & Brosseau¹, Seco², van Middelkoop³)	Exercise therapy (van Middelkoop 2010¹, van Middelkoop 2011²)	Education (including Pain neurophysiology education) (Clarke¹, van Middelkoop²)	Physiotherapy functional restoration (PFR) (Richards¹, van Middelkoop²)
Pain	Pain was decreased when acupuncture was compared to no treatment and sham treatment in the short term.	1.Immediately after TENS there was a decrease in pain. 2.Ultrasound and shockwave had the same effect on pain as traction, ultrasound and laser when compared. 3.Poor quality trials and no significance shown for the decrease of pain using TENS.	1 & 2.Decreased pain in the exercise therapy group when compared to usual care. UNIVERSITY of the WESTERN CAPE	1.Pain neurophysiology education is better in the short, medium and long term for decreasing pain. Significant effects in the medium and long term. 2.Non-significant effects when patient education compared to active non-education.	1.When PFR was compared to guidelines pain was improved (small to medium effect) in the short term in favour of PFR. 2.Bahavioural therapy was reduced when compared to waiting list.
Function	Function was improved when acupuncture was compared to no treatment in the short term. There was also moderate evidence that spinal manipulation is more effective than acupuncture in the short term.			1.Pain neurophysiology education is better in the short, medium and long term for improving function. Significant effects in the short and long term.	1.When PFR was compared to guidelines function was improved (small to medium effect) in the short term in favour of PFR.
Disability		1.TENS had no effect on disability.	1 & 2.Decreased disability in the exercise therapy	2.Non-significant effects when patient education compared to	

		<p>2. Ultrasound and shockwave had the same effect on disability as traction, ultrasound and laser when compared.</p> <p>3. Poor quality trials and no significance shown for the decrease of disability using TENS.</p>	<p>group when compared to usual care.</p>	<p>active non-education. When patient education that focused on anatomy was compared to patient education that was focused on the neurosystem disability was decreased.</p>	
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4.5 Summary: Systematic review

The aim of the systematic review was to determine the current practice with regard to treatment for low back pain. A systematic review of reviews was undertaken. The review had a clearly stated question and search methods and methodology have been described previously.

The results of the review show that all studies considered were level I evidence according to the National Health and Medical Research Council Hierarchy of Evidence. Only five of the included studies included a meta-analysis. The outcomes considered in this review were pain, function and disability. The number of RCT's included in each study also varied and the number of participants ranged from 122 to 8816. The intervention types varied between the seventeen studies. Manual therapy (which includes massage, spinal manipulation and mobilisation), electrophysical therapy (electrotherapy, shockwave therapy and traction), needle acupuncture, education, back schools, fear avoidance training and physiotherapy functional restoration were some of the interventions reviewed. Spinal manipulation and mobilisation (Bronfort et al., 2008, Hettinga et al., 2008, Slater et al., 2012, Goertz et al., 2012 and Kuczynski et al., 2012) was the only intervention that appeared more than twice in the review. It was also one of the few interventions that showed a positive impact on all the outcomes (pain, functional outcome and disability) highlighted by the researcher for the systematic review. When spinal manipulation was combined with mobilisation, used on their own or in conjunction with another modality the outcomes (pain, function and disability) were improved. The use of lumbar stabilization exercises May & Johnson (2008) and Standaert, Weinstein & Rumpeltes (2008) and education Clarke, Ryan & Martin (2011) and van Middelkoop et al. (2011) also had a positive effect on the outcomes. Pain neurophysiology education Clarke et al. (2011) specifically showed an improvement on pain, function and disability. The second review highlighted that when patient education is focused on the neurosystem as opposed to anatomy disability was improved (van Middelkoop et al., 2011). Exercise (van Middelkoop et al., 2010) and back schools (Brox et al., 2008) compared to usual care was shown to reduce pain and disability in favour of both these modalities. Both modalities also only had two reviews as support for them.

Massage (Imamura et al., 2008) and physiotherapy functional restoration (Richards et al., 2013) both had positive effects on pain and function, but only when compared to no treatment and a guide (physiotherapy functional restoration). Electrotherapy (interferential current, electrical muscle stimulation, ultrasound, thermotherapy and shockwave therapy) Poitras & Brosseau (2008) and Seco, Kovacs & Urrutia (2011) as an intervention did not have an effect on any of the outcomes. TENS Poitras & Brosseau (2008) was the only modality in this group that had a positive effect on pain. The decrease in pain was however limited to the short term and mostly seen immediately after treatment. The study also showed that high-frequency TENS had a better effect on pain compared to low-frequency TENS. Traction Gay & Brault (2008) and van Middelkoop et al. (2011) showed no positive effect on any of the chosen outcomes. Finally, acupuncture Ammendolia, Furlan, Imamura, Irwin, and van Tulder (2008) only had one review to support its use and only had an effect on pain and function when it was compared to no treatment.

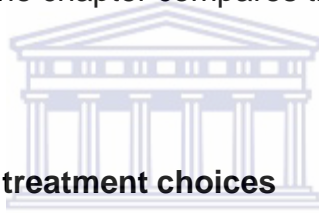
The results show that manual therapy (spinal manipulation and mobilisation) as an intervention had positive effects on all the outcomes selected for this review. The number of RCT's included in the five studies that supported the intervention varied between six and thirty eight. All five studies were level I evidence but did not include a meta-analysis.

CHAPTER 5

DISCUSSION

5.1 Introduction

This study aimed to determine whether undergraduate physiotherapy students implement evidence-based practice in the management of musculoskeletal disorders and sports injuries. The following objectives were met in order to meet this aim; the most common treatment techniques used by students in the management of conditions was found, a survey completed by the students determined their knowledge and beliefs of EBP, a systematic review was employed to determine an evidence-based strategy to treat the most common condition and methodological triangulation was employed to map the links between current practice, student beliefs and evidence-based information. The chapter compares the findings of the study to other research.

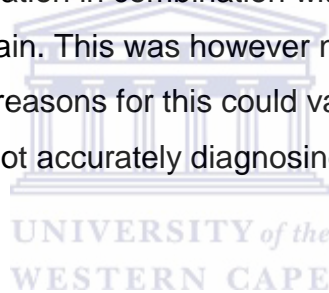


5.2 Musculoskeletal injuries and treatment choices

The findings from the first phase of the study showed that 785 patient folders were assessed in the period from 2009-2011. The three top regions that were treated by students at the clinic were the neck, back and shoulder. According to Jordan et al., (2010) patients with musculoskeletal problems often present to primary care with a regional symptom, such as back, knee or shoulder pain. Bot and Bouter (2006) reported that the top three self-reported musculoskeletal pain is neck pain, shoulder pain and low back pain. This is in line with the findings of the current study which highlighted back, neck and shoulder pain as popular complaints. The neck and low back consisted of pain in the identified area as well as referred pain. Injury to the shoulder included injury to the muscle ligament or joint. Overall, the common treatments used by the students were heat, stretches, education, strengthening exercises, joint mobilisation and ice. Looking closely at the treatment choices for the most common areas; soft tissue mobilisation and heat were the two top choices for cervical, lumbar and shoulder pain. For the shoulder area electrotherapy and stretching, education and mobilisation, strength exercises and ice were common treatments. The research on common treatments for both neck and shoulder pain

seem to be scarce and/or slightly out-dated. Green, Buchbinder and Hetrick (2008) found that exercise and electrotherapy modalities were common choices in the shoulder. This was in line with what was found in the current study with regard to shoulder treatments.

In the management of the cervical spine, stretches, mobilisation, education, electrotherapy and strength exercises were the common choices that followed soft tissue treatment and heat. The fact that neck pain was quite predominant could indicate poor sitting postures by staff and students alike attending the clinic on campus. The students are taught Maitland's joint mobilisation as part of their undergraduate course for both lumbar spine and the peripheral joints, thus, it is unclear why soft tissue mobilisation and heat were the first choices for all the top three conditions. According to Aker, Gross, Goldsmith and Peloso (1996) manual treatment such as Maitland mobilisation in combination with other treatments can provide short term relief for neck pain. This was however not the common choice of treatment by the students and the reasons for this could vary from offering a treatment that is easy to possibly not accurately diagnosing the condition of the patient.



Finally, for the lumbar spine the treatments following soft tissue mobilisation and heat were stretches, mobilisation of the spine and joints, education, strength and electrotherapy. Literature does not seem to support the current findings of the use of soft tissue therapy (which includes massage) and heat. Following a review of clinical guidelines by Dagenais, Tricco and Haldeman (2010) out of the six guidelines none endorsed heat for the management of low back pain, and more especially chronic low back pain.

There seem to be inconsistencies with what was found in the literature versus what was found in the study. The inconsistencies could be due to a lack of confidence on the students' part when treating patients in real life situations. During the retrospective study the researcher noticed that students lacked detailed information regarding the diagnosis or treatment of the patients seen. Clinically this is relevant as it is important that students are doing the best for the patients with regard to patient treatment choices. According to Dagenais et al. (2010) it would be ideal if those involved in the

management of low back pain are guided by best available scientific evidence to minimize the use of ineffective procedures. This can be assumed for the management of all conditions.

5.3 Evidence-based practice amongst students

The second phase of the study focused on the physiotherapy student's beliefs, understanding and use of evidence-based practice. Twenty seven out of the invited thirty six undergraduate students participated in the study and completed the questionnaire. Results showed that all students were exposed to some form of training in terms of working with statistics and epidemiology and conducting their own research projects during their undergraduate curriculum training. In addition, the majority of the population indicated that they had access to computers as well as medical literature at university. This was the same for Rowe, Frantz and Bozalek (2012) who also found that all students had access to the internet on campus. It is possible that although students have access to medical literature on campus this may not be the case in some hospital institutions where they do their clinical education. This could impact on the ability of students to search for literature in the clinical placement environment and thus, apply it to practice. In addition, Olsen et al. (2013) stated that some undergraduate students found it difficult to determine if research evidence was valid and applicable, this was also indicated in the results of this study as students felt only slightly confident in assessing research articles. If students do not have the competence to do this evaluation then the practical implementation of evidence-based practice becomes but a dream. Although highlighting their challenge with assessing articles the students indicated that they did not seem to think research was confusing and believed EBP was essential to their practice. Results also highlighted that the students feel they need more training in EBP. Students struggling to attempt EBP could be due to the provided teaching in EBP not being sufficiently context specific, the teaching of EBP for the students had mainly occurred in an academic setting, and they had received little if any practical guidance in clinical settings on how to apply research evidence to real patient management (Olsen et al., 2013).

It would seem then that though the students think EBP is important they may lack the skills to implement it. Guyatt, Meade, Jaeschke, Cook and Haynes (2000) stated that to achieve EBP there is a need to train clinicians who can independently find, appraise, and apply best evidence. They further state that they believe the skills needed to provide an evidence-based solution to a clinical predicament include defining the problem; constructing and conducting an efficient search to locate the best evidence; critically appraising the evidence; and considering that evidence, and its implications, in the context of patients' circumstances and values. "EBM should always be patient centred" (Manske & Lehecka, 2012, p.470). This was different to what was found in this study where students were in slight disagreement that the patient's preferences should override EBP which makes us think that students might be aware of the concept of EBP but not in what context it should be used or how to use it. Schlosser (2006) also agrees the process of EBP requires knowledge and skills in searching the literature efficiently for the best and most current evidence relevant to the question at hand as well as knowledge and skills in the critical appraisal of evidence. These basic skills of using research; searching, appraising, and applying research evidence to individual patients should be taught early and applied as an essential part of learning in all years of the curriculum (Glasziou, Burls & Gilbert, 2008). Glasziou et al (2008) indicates that the medical curriculum should reflect the importance of changing information for today's practitioner thus these skills should be taught and assessed with the same rigour as the skills taught for the physical examination. This would be applicable in the context of physiotherapy education as well. The skills needed to find potentially relevant studies quickly and reliably, to separate the good from the bad, and to apply sound research findings to patient care have today become as essential as skills with a stethoscope (Glasziou et al. 2008). In physiotherapy education and practice perhaps we should invest time on giving the students the skills on how to search for literature and then how to differentiate between what is good and relevant. Support and assistance must be given to students to enable and develop them so that they are able to review literature in order to recognise the best available evidence Emanuel, Day & Diegnan (2011). It thus becomes evident that physiotherapy educators should ensure that students have access to resources in the clinical setting. However we need to take cognisance of the fact that students indicate that time is a barrier to implementing evidence-based practice and this is similar to a study where nurses suggested that lack of time is a

major barrier when trying to access and review any of the evidence (Bertulis, 2008). Nicholas, Williams, Smith and Longbottom (2005) also indicated that poor access to facilities and information, lack of experience and little confidence in using computers may also prevent health professionals from successfully using evidence-based practice. Manspeaker et al. (2011) also indicated barriers such as time, relevance of the searched literature to the specific target population and available resources. Nicholas et al., (2005) however says that although information can be accessed via the internet, which is available to practitioners in many clinical areas, the quality of the resources that nurse's access remains contentious.

5.4 Evidence for the management of low back pain and student interventions

5.4.1 Evidence for the intervention

Looking at the number of studies found per intervention implies that it could in some cases be too small to be convincing. However, there were interventions that were supported by a large number of RCT's and these were mainly in the area of spinal manipulation and mobilisation. This intervention showed a definite improvement on outcomes such as pain, function and disability. One of the reviews in support of the intervention (Goertz et al. 2012) had 38 RCT's in their study. This number of RCT's was the most across all the reviews that were included in the study. Pain neurophysiology education Clarke et al. (2011) also showed improvement on all outcomes included but only had one review to support its use as an intervention. This thus starts to highlight the need for large numbers of RCTs to support the interventions that we advocate as good interventions to manage conditions. This review was based on a condition that is commonly managed by physiotherapists and in some areas there was still limited evidence to support the treatment modalities. This then raises concern with regard to conditions that are not as a common and whether enough literature will be found to support the management of them. Evidence for interventions thus becomes a challenge for the physiotherapy profession as a whole.

5.4.2 Outcome measures linked to the intervention

Spinal manipulation and mobilisation Bronfort et al. (2008), Hettinga et al. (2008), Slater et al. (2012), Goertz et al. (2012) and Kuczynski et al. (2012), lumbar stabilization exercises May & Johnson (2008) and Standaert et al. (2008), education which included pain neurophysiology education Clarke et al. (2011) had a positive effect on all the outcomes considered. The intervention spinal manipulation and mobilisation was supported by five reviews and showed an impact on all the outcomes highlighted by the researcher for the systematic review. Lumbar stabilization also showed positive effects on all outcomes highlighted. There were however only two studies to support the use of lumbar stabilization and education in this review. Pain neurophysiology education specifically was shown to improve pain, function and disability. The review by van Middelkoop et al. (2011) highlighted that when patient education focused on the neurosystem as opposed to anatomy disability was improved. Pain physiology education is a valuable therapeutic modality (Meeus, Nijs, Van Oosterwijck, Van Alsenoy & Truijen, 2010). Exercise van Middelkoop et al. (2010) and back schools Brox et al. (2008) compared to usual care reduced pain and disability in favour of both modalities. Both modalities also only had two reviews as support for them. Massage Imamura et al. (2008) and physiotherapy functional restoration Richards et al. (2013) both had positive effects on pain and function, but only when compared to no treatment and a guide (physiotherapy functional restoration). Only one clinical practice guideline in the review by Dagenais et al. (2010) recommended massage for acute low back pain. TENS Poitras & Brosseau (2008) and van Middelkoop et al. (2011) was the only electrotherapeutic modality that had a positive effect on pain. Traction (Gay and Brault, 2008) and van Middelkoop et al. (2011) did not have an effect on any of the chosen outcomes. Finally, acupuncture Ammendolia et al. (2008) only had one review to support its use and only had an effect on pain and function when it was compared to no treatment. There was no recommendation for the use of acupuncture, transcutaneous electrical nerve stimulation, traction, or ultrasound in the management of acute or chronic low back pain (Dagenais et al., 2010).

From the assessment of the main outcome measures and results for this review it would seem that manual therapy (which includes spinal manual therapy and manipulation) is the best choice for pain, functional improvement and disability.

However, according to an overview of clinical guidelines, Koes et al. (2010), spinal manipulation and mobilisation is only recommended by some and for use in the acute phase for a short period. The review was not focused on a particular sub-group or category of low back pain and thus results could not be accurate in terms of matching an intervention to a particular sub-group or category. Other findings from clinical practice guidelines that were presented for the management of acute LBP focused mostly on patient education, with short-term use of acetaminophen, NSAIDs, or manual therapy for symptomatic relief (Dagenais et al., 2010). The authors stated that there were no recommendations for transcutaneous electrical nerve stimulation, traction, or ultrasound in patients with acute low back pain (Dagenais et al., 2010). Similarly, this review also did not find much support for the use of electrotherapeutic modalities. In chronic pain management was described with the use of opioid analgesics, back exercises, behavioural therapy, or acupuncture for additional symptomatic relief with chronic LBP (Dagenais et al., 2010). Further recommendations suggest the assessment of patients with LBP should be centred on the history, physical and neurological examination, and ordering diagnostic testing only when possibly serious spinal pathology or specific causes of LBP are assumed (Dagenais et al., 2010). The findings of the review are valuable in that it should inform practitioners of which modalities are best suited for low back pain.

Although the links between some of the outcome measures and interventions were not well researched, there was definite evidence emerging that a well-rounded approach to managing low back pain would yield a positive result. Manual therapy had an effect on all chosen outcomes for low back pain in this review. Therefore, including spinal mobilisation and manipulation, stabilisation exercise and education would be considered a good combination to manage low back pain. Based on the evidence above there does not seem to be a match between the student choices and what was found in the current review of literature. The students most chosen treatment technique was soft tissue mobilisation (which included massage) and heat. For patients with low back pain (especially chronic low back pain) there are no recommendations for bed rest or heat/ cold therapy (Dagenais et al., 2010). It would seem there is very little connection between the student's choices and the result of the systematic review with regard to treatment choices for low back pain. This highlights the challenge of implementing EBP and the question that arises is: At which

stage of the EBP cycle is the student struggling? This could be due to students either not understanding how to assess the patient and the patients responsiveness to intervention or the student could be struggling with the integration of classwork theory into the clinical setting. According to Gorgon, Basco and Manuel (2013) there is a need to determine how students can be educated successfully and creatively on translating what is learned in the classroom into sound clinical decisions.

5.5 Is evidence-based practice integral to students practice?

In attempting to answer the question whether students are implementing evidence-based practice in the clinical education component of their studies, the answer is that although students seem to know what EBP is, they did not seem to implement it in the treatment choices made when they treated patients at the physiotherapy clinic. When their treatment choices were compared to the reviewed literature it highlighted that there was very little similarity. This result then highlights the lack of the use of current best evidence. Understanding why this is happening remains a challenge. Earlier the question was raised regarding whether it was at the stage of assessing the patient and determining the right questions to ask that students were struggling. We might also have considered whether the students had the skills and resources to find the evidence. The findings in the current study indicate that the students had the necessary training although they do highlight some shortcomings. The challenge again lies in the implementation of the theory into practice.

Literature highlights that when students are on clinical placement learning the new routines of each placement took time, and they found it more convenient to use clinical instructors and other persons as their information sources, as opposed to finding research evidence on their own (Olsen et al., 2013). Students also ranked gaining clinical experience over implementing EBP and thought EBP to be a non-clinical activity, which was similar to attitudes of the clinical instructors in the study (Olsen et al., 2013). This could possibly be linked to the fact that the students had a lack of role-models in implementing EBP (Olsen et al., 2013). If this could be improved and students actively engaged with clinicians in implementing EBP, they would be more likely to practice this way.

Hanson, Allegrante, Sleet and Finch (2012) highlight there is also the gap between research and its application to in everyday practice that exists. They state that if research does not connect with the practical realities of implementation and adoption, and does not build the consensus needed to ensure effective implementation there will be very little improvement in health. Similarly, Rycroft-Malone et al. (2004) also agree that actually delivering high-quality health-care to individuals based on the best available evidence could be a challenge. This literature shows the possibility that the students in this study perhaps did not have role models to guide the process of using EBP, applied treatments based on the clinicians experience or that there is in fact difficulty in translating research into practice. Thus it does not seem as if accessing and acquiring the evidence is a challenge but implementing the process of EBP may be found to be challenging if it is not seen to be the norm in the clinical setting.

5.6 Data triangulation of this study

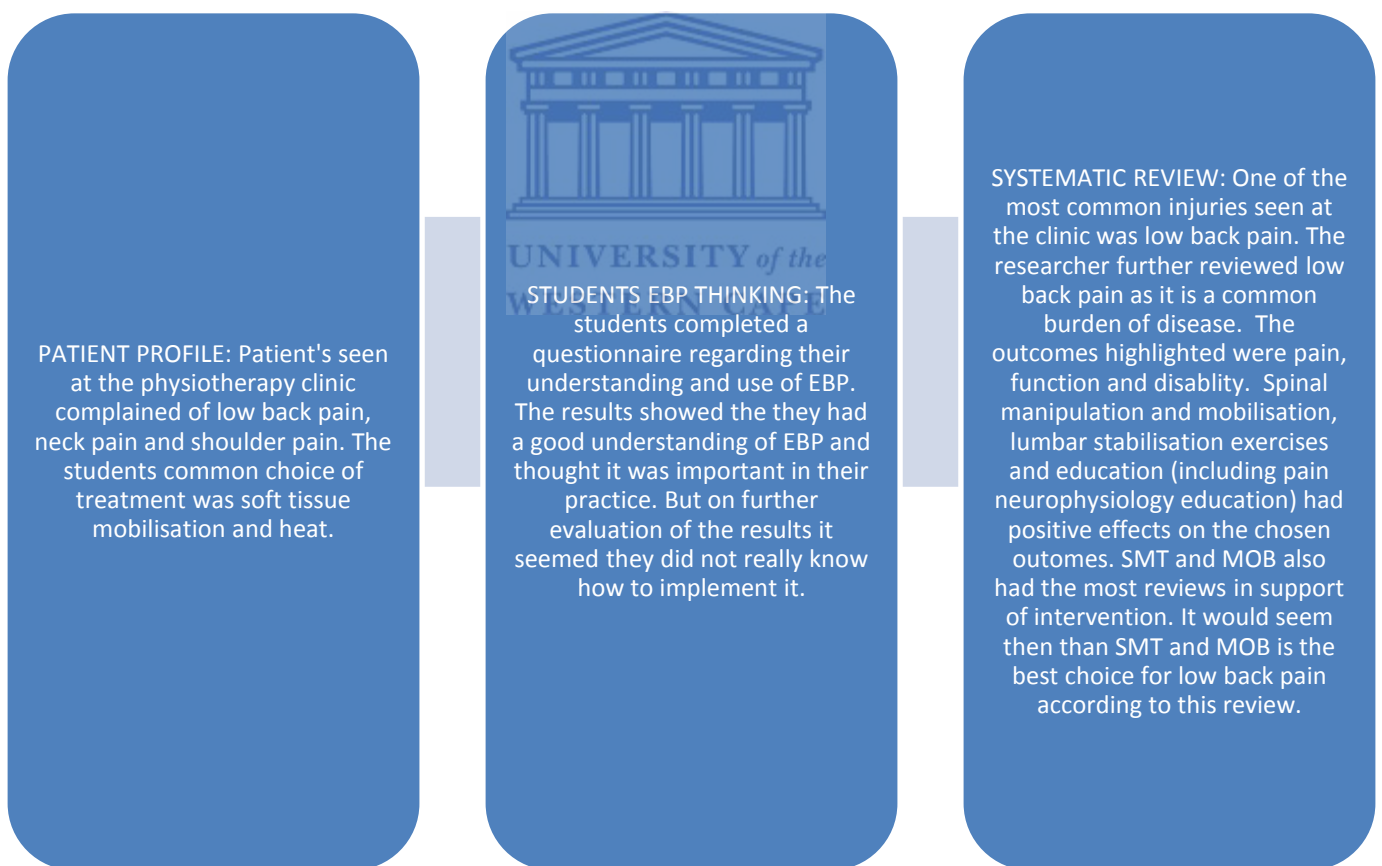
Between methods triangulation involves mixing of different methods (Figure 10). During this study the patient profile records the condition and treatment were the main variables. During the evidence-based practice thinking phase the knowledge, skills and behaviour related to evidence-based practice was identified. The systematic review focused on one condition and highlighted the interventions and outcomes linked to that condition. Thus an assessment of the management techniques used for low back pain was the main focus for the data triangulation process in this study. The study identified the lower lumbar area to be an area of concern for the patients seen at the Physiotherapy clinic. It was found that the undergraduate physiotherapy students used soft tissue mobilisation and heat mostly to manage the lower lumbar area. This was found to be in conflict with the systematic review which highlighted that spinal mobilisation; stabilisation exercises and education were the main modalities that impacted on the outcomes of pain, function and disability.

In attempting to understand the students' knowledge and beliefs regarding EBP they were asked to complete a questionnaire. When the students were asked what their understanding of EBP was it was evident that the majority had a good idea "Making use of evidence such as articles to inform your treatment". However, in unpacking the rationale behind their choice of treatment the majority of the responses were split

between journals/internet and class notes/lectures. This showed that the majority of the students felt that although EBP is essential to their practice, they still struggled with the understanding of its implementation. This was then further explored by conducting a systematic review to determine the best available evidence for one of the most common conditions reported from the patient profile (low back pain).

When the current literature was examined the treatment choices for low back pain did not correlate with the students choices of treatment for the same condition. This further highlighted the need for physiotherapy educators to ensure that the implementation of EBP in the clinical setting as part of clinical training becomes a reality.

Figure 10: Methodological triangulation



CHAPTER 6

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter summarises the findings of the study with regard to its implications, strengths and limitations.

6.2 Conclusion

The aim of this study was to determine if undergraduate physiotherapy students implement evidence-based practice in the management of musculoskeletal disorders and sports injuries. In order to address the aim the following objectives were achieved: the most common treatment techniques used by students in the management of the conditions treated at the UWC clinic were determined through data extraction of patient records, the knowledge and beliefs about EBP among the undergraduate physiotherapy students were determined through a survey, a systematic review was employed to determine an evidence-based intervention strategy for low back pain and finally, the links between current practice, student beliefs and evidence-based information were mapped. First a retrospective document analysis which consisted of data extraction of patient files at a Physiotherapy clinic was completed. This assisted the researcher in determining what the common conditions and treatments used by students were. The second objective was to determine what the undergraduate student's knowledge and beliefs were related to evidence-based practice. The third objective was to determine what current literature highlights as best practice interventions for one of the common conditions from the first phase of the study. The final phase consisted of methodological triangulation.

The first phase highlighted that the neck, shoulder and low back were common areas of injury seen at the Physiotherapy clinic. Furthermore, student's first choice of treatment for the problems encountered with the above-mentioned areas was soft tissue mobilisation (which included massage) and heat. The results of the questionnaire completed to determine the understanding and beliefs of EBP highlighted the most students knew what EBP was but very few knew exactly what it

entailed and how to implement it. A systematic review was undertaken to review current literature to determine the most common treatments for low back pain. The results show that there is very little link from the students choices for treatment of one of the common conditions highlighted and the current literature.

It is therefore possible that though students understand the term EBP they do not show that they know how to use or implement the concept. However, even though there is a poor link between current literature and what is actually happening it must be said that the students are new to clinical practice. Students are also beginners in clinical practice, whereas their supervisors and clinicians are developed in their area of clinical expertise (Olsen et al., 2013). Thus more emphasis should be placed on the role models in the clinical settings in order to guide the students.

6.3 Strengths of the study

In attempting to understand the beliefs and understanding of the students regarding EBP an already established questionnaire was used. The systematic review studied latest literature and includes studies from 2013. In addition this study tried to use the best available evidence in all the phases of the study.

6.4 Limitations of the study

6.4.1 Phase 1: Retrospective patient profile

When undertaking the first phase of the study the researchers did not divide the low back pain found into different sub-categories, therefore it is not clear whether the treatments used on low back pain were for acute or chronic low back pain.

Unfortunately the students also documented treatments and assessments poorly.

6.4.2 Phase 2: Students knowledge, skills and beliefs of evidence-based practice

There were a limited number of participants that took part in the questionnaire survey as the study had to make do with a convenience sample.

6.4.3 Phase 3: Systematic review

A systematic review of reviews was undertaken and there were many different variables in terms of outcomes. Only English articles were searched for.

6.5 Recommendations and Implications for practice

6.5.1 Future recommendations

1. Determine and evaluate the implementation of EBP in various clinical settings besides the musculoskeletal setting.
2. Explore the teaching strategies used for the implementation of EBP into physiotherapy education.
3. Focus the methods in which EBP is being taught and evaluated in the physiotherapy curriculum.
4. Educate the role models who supervise the physiotherapy students in the clinical setting.
5. Embed EBP as part of our clinical education learning outcomes.



6.5.2 Implications for practice

Institutions may need to be more vigilant about firstly making provision for EBP in the curriculum as well as how it is implemented so that students can be comfortable with this practice. More randomised controlled trials and systematic reviews are necessary on physiotherapy interventions so that practice can be better informed. Finally, EBP is perhaps one way to promote a culture of life-long learning within the physiotherapy profession and so it is vital that healthcare students know this from the beginning. Ultimately, practitioners, both current and future should be ensuring that patients receive care based on the best possible evidence (Rycroft-Malone et al., 2004). This becomes the responsibility of training institutions and creates a need to clinical practice guidelines to be put in place. EBP is a very valued practice and therefore argues well for future policies and interventions that would amend key barriers to physical therapist preparation on being effective evidence consumers in “real world” practice (Gorgon et al., 2013).



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APPENDICES



APPENDIX A: ETHICAL CLEARANCE



OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

13 August 2012

To Whom It May Concern

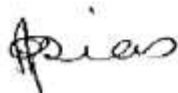
I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and ethics of the following research project by:
Mrs D Hess (Physiotherapy)

Research Project: Evidence-based intervention for musculoskeletal disorder and sports injuries.

Registration no: 12/3/12

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.



*Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape*

APPENDIX B: INFORMATION SHEET

Project Title: Do physiotherapy students employ evidence-based practice in the management of musculoskeletal disorders and sports injuries?

What is this study about?

This is a research project being conducted by Danelle Hess at the University of the Western Cape. We are inviting you to participate in this research project because you are either a patient who has been seen at the UWC Physiotherapy Clinic or you are a registered undergraduate physiotherapy student at the institute. The purpose of this research project is to determine if Evidence-based intervention in the management of musculoskeletal disorders and sports injuries by undergraduate physiotherapy students. The information will be used to improve the implementation of EBP into current physiotherapy curriculum and assist to create awareness of EBP in clinical practice.

What will I be asked to do if I agree to participate?

You will be asked to either give consent to the researcher to retrieve information from your file if were treated at the Physiotherapy clinic during the period of January 2009 to December 2011 or if you are a current registered undergraduate physiotherapy student consent will be sought for you take part in a survey which will be administered by the researcher. The study will take place at the physiotherapy clinic which is situated on the university campus. For the students who will take part in the survey, the questions will mostly deal with the knowledge of EBP and how it is used by you.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, all data collected from patient files at the UWC clinic will be kept confidential in a locked file to which only the researcher has access. Confidentiality and the right to withdraw from the study at any time will be assured to the students taking part in the study. The surveys are anonymous and will not contain information that may personally identify you. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

In accordance with legal requirements and/or professional standards, we will disclose to the appropriate individuals and/or authorities information that comes to our attention concerning child abuse or neglect or potential harm to you or others.

What are the risks of this research?

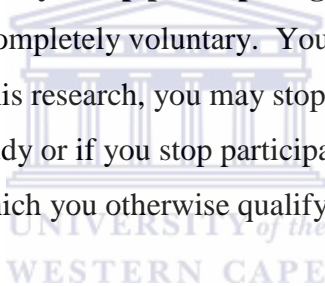
There are no known risks associated with participating in this research project.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about the knowledge of and needs related to EBP. We hope that, in the future, other people might benefit from this study through improved understanding of EBP.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.



What if I have questions?

This research is being conducted by Danelle Hess, Department of Physiotherapy at the University of the Western Cape. If you have any questions about the research study itself, please contact the supervisor, Prof J Frantz at: Department of Physiotherapy, UWC, Belleville, Cape Town.

Tel: 021 959 2452

Email: jfrantz@uwc.ac.za

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:
Head of Department: Prof A Rhoda

Dean of the Faculty of Community and Health Sciences: Prof J Frantz

University of the Western Cape

Private Bag X17

Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.



APPENDIX C: CONSENT FORM

Title of Research Project: Evidence-based interventions for Musculoskeletal disorders and Sports injuries

The study has been described to me in a language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature.....

Witness.....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: Danelle Hess

University of the Western Cape

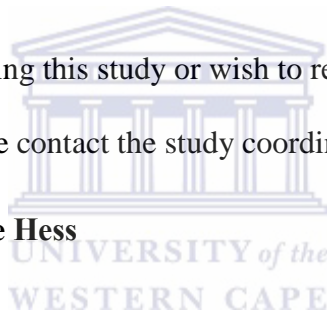
Private Bag X17, Belville 7535

Telephone: (021)959-2807

Cell: 0728409457

Fax: (021)959-1217

Email: dhess@uwc.ac.za



APPENDIX D: DATA EXTRACTION SHEET FOR PATIENT FOLDERS

Folder ID No: _____

Year: 2009 2010 2011

Gender: Male Female

Occupation: _____

Sport involved in: _____

Payment type: Medical aid Cash WCA SC

Hypothesis/Diagnosis/Patient condition: _____

- Area of pain:
- Headache
 - Neck/Cervical spine
 - Shoulder
 - Elbow
 - Wrist
 - Hand and Fingers
 - Thoracic spine/Mid back
 - Lower back/Lumbar spine
 - Hip
 - Knee
 - Ankle
 - Feet/Toes
 - Other



Symptoms the patient presents with: _____

Cause of injury: _____

Mechanism of injury: _____

- Nature of injury:
- Muscle
 - Ligament
 - Joint
 - Nerve
 - Tendon
 - Not indicated
 - Other



Date of assessment: _____

Date of last treatment: _____

Discharge date: _____

Management of patient:

Day 1: _____

Differences in symptoms from Day 1:

Number of treatments the patient received for this condition: _____

Treatment on the last day: _____



APPENDIX E: QUESTIONNAIRE

Critical Appraisal of health professions literature and evidence-based practice

PARTICIPANTS' KNOWLEDGE & NEEDS ASSESSMENT DETAILED TRAINING NEEDS ANALYSIS FORM



1. Rationale behind choice of treatment

What knowledge do you base your treatment choices on?

2. Health professions literature appraisal and Evidence-Based Practice (EBP)

Please tell us briefly what you understand by the term Evidence-Based Practice (EBP)

.....

.....


.....

.....

.....

.....

.....



3. Access to medical knowledge

- | | | |
|--|-----|--------------------------|
| 3.1. Do you have access to a medical/healthcare library? | Yes | <input type="checkbox"/> |
| | No | <input type="checkbox"/> |
| 3.2. Do you have access to literature via the Internet? | Yes | <input type="checkbox"/> |
| | No | <input type="checkbox"/> |
| 3.3. Have you searched the literature for any guidelines or other form of published evidence in the last six months? | Yes | <input type="checkbox"/> |
| | No | <input type="checkbox"/> |

4. Collection and dissemination of evidence

4.1. How often, on average do you search for evidence?

Please tick the appropriate box

- | | |
|-------------------------------|--------------------------|
| 4.1.1. More than once a week | <input type="checkbox"/> |
| 4.1.2. Every 1-2 weeks | <input type="checkbox"/> |
| 4.1.3. Every 3-4 weeks | <input type="checkbox"/> |
| 4.1.4. Less than once a month | <input type="checkbox"/> |
| 4.1.5. Never | <input type="checkbox"/> |

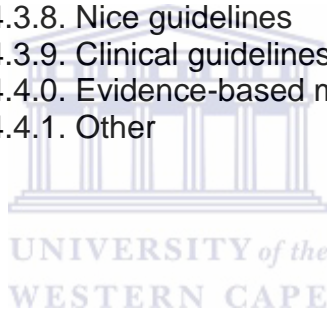
4.2. Do you keep up to date with your professional literature? *Please tick the appropriate box*

- 4.2.1. Yes – read every week regularly
- 4.2.2. Yes – read occasionally
- 4.2.3. Yes – only for specific information
- 4.2.4. No

4.3. What type of material do you read to find information about evidence for your practice?

Please tick all that apply

- 4.3.1. Journals: review articles
- 4.3.2. Journals: original research reports
- 4.3.3. Textbooks
- 4.3.4. Internet resources or similar
- 4.3.5. Hospital guidelines
- 4.3.6. Hospital Intranet guidelines
- 4.3.7. The Cochrane library
- 4.3.8. Nice guidelines
- 4.3.9. Clinical guidelines
- 4.4.0. Evidence-based medicine journal
- 4.4.1. Other



5. Computer use

How often have you personally...?

- 5.1 Written a paper (longer than five pages) using a word processing program (e.g. Microsoft Word) Never 1–2 times 3 or more times
- 5.2 Sent or received an electronic mail (e-mail) message Never 1–2 times 3 or more times
- 5.3 Participated in an email discussion group Never 1–2 times 3 or more times
- 5.4 Chatted using windows messenger? Never 1–2 times 3 or more times
- 5.5 Used a computer-assisted instruction (CAI) program, as a university student Never 1–2 times 3 or more times

- 5.6 Taken a class online Never 1–2 times 3 or more times
- 5.7 Explored the Internet using Netscape, Internet Explorer or other Never 1–2 times 3 or more times
- 5.8 Used the Web to search for information Never 1–2 times 3 or more times
- 5.9 Used any resources on the Internet (e.g. MEDLINE, EBSCOHOST) Never 1–2 times 3 or more times

5.10. Do you own a personal computer? Yes
No

5.11. If yes which of the following does it have?



please tick all that apply

- CD-ROM drive
Modem
Video card
Internet service provider (ISP) or online service

5.12. Do you have access to a computer room with Internet and network facilities? Yes
No

If yes
where?.....

6. How confident do you think you are at assessing each of these aspects of a published paper?

Please circle one for each that best represents your level of confidence. Please indicate if you do not understand the question. These are all on a 1-6 scale.

- 1 = no confidence at all 2 = not very confident 3 = slightly not confident**
4 = slightly confident 5 = confident 6 = very confident

								If you do not understand the question please tick below
Assessing study design	1	2	3	4	5	6		<input type="checkbox"/>
Evaluating bias	1	2	3	4	5	6		<input type="checkbox"/>
Evaluating the adequacy of sample size	1	2	3	4	5	6		<input type="checkbox"/>
Assessing generalisability	1	2	3	4	5	6		<input type="checkbox"/>
Evaluating statistical tests /principles	1	2	3	4	5	6		<input type="checkbox"/>
Assessing the general worth of an article	1	2	3	4	5	6		<input type="checkbox"/>



7. What are your beliefs about evidence-based practice (EBP)?

Instructions:

Below are ten statements about literature appraisal and evidence-based practice (EBP)

Please read each statement carefully and then circle the number, which reflects your views most closely. Please indicate if you do not understand the question.

These are all on a 1-6 scale.

1 meaning **strongly disagree**
4 means **slightly agree**
agree

2 means **disagree** **3** means **slightly disagree**
5 means **agree** **6** means **strongly**

If you do not understand the question please tick below

I think that original research is
Confusing 1 2 3 4 5 6

EBP is essential in my
practice 1 2 3 4 5 6

I feel I need more training in EBP
1 2 3 4 5 6

I am confident I can assess research
evidence 1 2 3 4 5 6

Systematic reviews are key to
informing EBP 1 2 3 4 5 6

EBM has little impact on an
individual's practice 1 2 3 4 5 6

I have received a lot of good training in
EBP 1 2 3 4 5 6

Clinical judgement is more important
than EBP 1 2 3 4 5 6

Patient choice should override
EBP 1 2 3 4 5 6

EBP is a passing fashion
1 2 3 4 5 6



Please feel free to add any further comments you wish in this box



Thank you for participating in this survey

UNIVERSITY *of the*
WESTERN CAPE

APPENDIX F: SYSTEMATIC REVIEW PROTOCOL

Systematic Review Protocol: Common physiotherapy interventions for the treatment of lower back pain: A review of systematic reviews

Background

Low back pain is a complex symptom with many diverse causes for its presentation (Jenkins, 2002). The disorder has much possible aetiology, occurring in different groups of population and with many definitions (Manchikanti, 2000). It is defined as pain and discomfort localised below the costal margin and above the inferior gluteal folds, with or without referred leg pain (Airaksinen et al., 2006). Low back pain can also be grouped into specific and non-specific low back pain the former caused by a specific pathophysiological mechanism such as infection, fracture and rheumatoid arthritis, the latter defined as symptoms without a clear or specific cause – this is back pain of unknown origin (Koes, van Tulder and Thomas, 2006 and Woolf, Erwin and March, 2012). According to Woolf, Erwin and March (2012) non-specific low back pain accounts for about 90% of patients seen and is classified according to duration and recurrence. Acute back pain is of less than 6 weeks duration, sub-acute back pain between 6 weeks and 3 months duration, chronic pain when it lasts for more than 3 months and frequent episodes are described as recurrent back pain (Woolf, Erwin and March, 2012).

Experimental studies suggest that low back pain may arise from various spinal structures, ligaments, facet joints, vertebral periosteum, paravertebral musculature and fascia, blood vessels, the annulus fibrosis and spinal nerve roots (Deyo and Weinstein, 2001 and Deyo, Rainville and Kent, 1992).

Low back pain is a significant health problem and has subsequently attracted a considerable amount of research (Wand and O'Connell, 2008). It is one of the leading causes of health problems in the developed world (Jenkins, 2002). It thus remains a condition with a fairly high incidence and prevalence (Koes et al., 2010). The prevalence of low back pain is reported to be as high as 84% and its best estimates suggest that the prevalence of chronic low back pain is about 23% with 11-12% of the population being disabled by it (Airaksinen et al., 2006). Prevalence estimates

however, differ depending on the definition of the low back pain used (Balagué, Mannion, Pellisé and Cedrasni (2012). According to Deyo and Weinstein (2001), Andersson (1999) and Deyo, Rainville and Kent (1992) 70-85% of all people have low back pain at some stage in their life. Of this population 14% have an episode that lasts more than 2 weeks (Deyo, Rainville and Kent, 1992). It affects men and women equally with onset most often between the ages of 30 and 50 years (Deyo and Weinstein, 2001).

Back pain has a marked effect on the patient as well as society because of its frequency and economic consequences (Woolf and Pfleger, 2003). Many patients do return to work within a week of diagnosis and the longer the patient is on sick leave the less likely they are to return to work (Woolfe and Pfleger, 2003). This has a huge impact on the economic status and day to day running of a company.

Nociceptive and mechanical factors both have a role in low back pain the former in acute pain conditions (Balagué, Mannion, Pellisé and Cedrasni, 2012). According to a systematic review done by Roffey, Wai, Bishop, Kwon and Dagenais (2010) there was no association between awkward occupational postures and low back pain however, in a meta-analysis (Shiri et al., 2009) obesity an overweight do increase the risk of low back pain.

There is a chance that 85% of these patients with isolated low back pain cannot be given an exact pathoanatomica diagnosis (Deyo and Weinstein, 2001). Even though low back pain may arise from different anatomical structures in the majority of patients the cause is not clearly indicated (Mody and Brooks, 2012). Thus, a diagnostic triage was proposed by Waddell (1987); back pain was categorized into three groups; specific spinal pathology, nerve root pain/radicular pain and non-specific low back pain (Airaksinen et al., 2006). The interest in this classification stems from the notion that this majority population would be treated more effectively if valid criteria could be established to assign these patients homogenous subgroups (Riddle, 1998).

The use of health care services as part of the management of chronic low back pain has increased considerably over the past two decades (Freburger et al., 2009). Managing low back pain consists of variety of intervention strategies which could include surgery, drug therapy and non-medical interventions (van Middelkoop et al., 2011). The physical and rehabilitative medicine interventions include exercise therapy, back schools, TENS, heat or cold therapy, low level laser therapy, patient education and massage interventions (van Middelkoop et al., 2011). According to Kent, Mjøsund and Petersen (2010) the aim of the management has become to target treatment to subgroups of people with low back pain as it is thought it might improve patient outcomes and increase health system efficiency. There is an acceptance that the management of low back pain should begin in primary care (Koes et al., 2010).

Back pain and even more so chronic back pain can have a huge impact on people's lives; it decreases their quality of life and negatively affects their family and social relationships (Woolf, Erwin and March, 2012).

Research question

What are the common interventions used by physiotherapists to treat low back pain to decrease pain, improve quality of life and return to function?

Aim

To determine the most common physiotherapy interventions for patients with lower back pain

Objectives for this review

1. Highlight the types of interventions used to treat lower back pain
2. To highlight whether the interventions addressed Pain, Level of Disability and Functional Disability
3. Formulate an evidence base for clinicians of the best available evidence for treating lower back pain

Research question using PICO for systematic review:

P = Population or Participants **{Patients with lower back pain}**

I = Intervention **{All physiotherapy treatment interventions}**

O = Outcome {Pain, Level of Disability and Functional Disability}

Outcome measures

The sources used in this study should include the following outcome measures, visual analogue scale (VAS) and/or numeric pain scale for the measurement of pain, the Roland Morris Disability Questionnaire to determine the level of the patient's disability and the Quebec Back Pain Disability scale to measure functional disability.

Search methodology

Inclusion and Exclusion criteria

Exclusion criteria

Types of studies

Inclusion criteria

- English, full-text articles
- Literature published between 2008 – 2013
- Only systematic reviews will be taken into consideration
- All types of physiotherapy interventions will be considered as the review will be looking at what type of interventions literature suggests

Exclusion criteria

- Randomized controlled trials, descriptive studies, case studies, cohort and cross-sectional studies will be excluded from this review
- Studies were excluded if they primary research studies and not a systematic review.

Types of participants

Inclusion criteria

- All patients with lower back pain (chronic, acute and non-specific)

Exclusion criteria

- Patients who have sustained injury to the lower back through trauma and motor vehicle accident

- Systematic reviews that included patients that had sustained an injury to the lower back through trauma and motor vehicle accident were not included.

Types of interventions

Inclusion criteria

- Interventions for lower back pain

Exclusion criteria

- All surgical and medical interventions will be excluded
- In addition, any intervention that was not within the scope of a physiotherapist was excluded from the review.

Types of Outcome Measures

Inclusion criteria

- Visual analogue scale to measure pain
- Numeric pain scale to measure pain
- Quebec Back Pain Disability scale to measure functional disability
- Roland Morris Disability Questionnaire to determine the level of disability

Exclusion criteria

- All criteria that does not relate to pain, functional disability and level of disability

Search strategy

A systematic literature search will be performed using the following databases: Academic search complete, Biomed Central, CINAHL, Cochrane Library, Academic search premier, Google scholar, Healthsource: Nursing/Academic edition, Medicines complete, MEDLINE (EbscoHost), Science Direct, MEDLINE (PubMed), Rehabilitation and Sports Medicine source and SciVerse Hub. These databases will be accessed using the University of the Western Cape library website.

Search terms: back pain, low back pain, pain, interventions, physical activity, physiotherapy, physical therapy

Search method

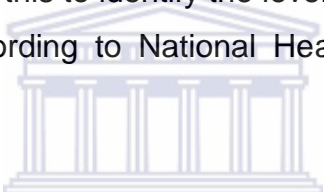
The reviewer will search each data base and relevant titles using the key words and relevant titles will be extracted. Once the titles are grouped the abstracts of the titles will be read and discussed with the supervisor. The abstracts will be screened against the pre-set inclusion and exclusion criteria. Any duplicates across the databases will be screened for and removed. The reviewer and research supervisor will discuss the titles and abstracts and then full text articles will be retrieved.

Methodological appraisal

Level of evidence

Studies that are suitable for the review will be evaluated by making use of the hierarchy of evidence according to the National Health and Medical Research Council. By doing this clinically reliable and strong evidence is ensured to be part of the review. The researcher will use this to identify the level of evidence of the reviews.

Table 1: Levels of evidence according to National Health and Medical Research Council (2000)



Level of evidence	Study design
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly-designed randomised controlled trial.
III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.

IV	Evidence obtained from case series (post-test or pre-test/post-test).
----	---

Appraisal

The appraisal tool: CASP

The quality of the studies will be assessed by use of the CASP appraisal tool.

This scoring tool is the Critical Appraisal Skills Programme (CASP). The CASP tool will be used to appraise the methodological quality of the retrieved articles and will give an indication of the internal and external validity.

Appraisal method

The first two questions of the CASP questionnaire are screening questions. If the answers are “yes” to both of the questions it is worth proceeding to the other questions. Following the first two questions a recording of a “yes”, “no” or “can’t tell” to most of the questions has to be completed. Prompts are given after each question to help answer the questionnaire. If 7-10 answers within the questionnaire are “yes” the articles will then be used in the review. The articles will be appraised by the reviewer and an additional reviewer (or the research supervisor). Each reviewer will appraise each article with the CASP tool (for systematic reviews) and compare the results and any differences will be discussed and a decision will be made as to whether the article will be included. When the article answers to more than three “no’s” when appraised with the tool that article will not be considered to be part of the review.

Data extraction and analysis

Data extraction

Data extraction will be done using a data extraction tool. The following data will be extracted; the participants, interventions of all the reviews, treatment and control group if the review was done with randomised controlled trials, outcome measures, results, as well as the conclusions of the review. The researcher and an assistant will perform the data extraction of each article independently. Should the researchers fail to obtain the necessary information from an article the thesis supervisor will be asked

to assist? After the data extraction the two researchers will compare their data. If there are discrepancies the thesis supervisor will be contacted.

Data analysis

Qualitative heterogeneous data

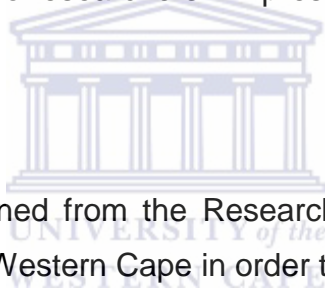
Since completely different interventions will be assessed the data might not be comparable and statistical pooling will not be appropriate, thus, the results of each study will be summarised in a narrative form.

Method of Analysis

The articles will be divided between the researcher and the researcher assistant with each article being reviewed. Each article will be reviewed independently to extract and analyse data followed by a comparison of their findings. If consensus about the data analysis is not reached, the two researchers will present their differences to the thesis supervisor.

Ethical considerations

A waiver of consent will be obtained from the Research, Leave and Study grants committee of the University of the Western Cape in order to publish the work.



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APPENDIX G: METHODOLOGICAL APPRAISAL TOOL (CASP)

Critical Appraisal Skills Programme (CASP) making sense of evidence **10 questions to help you make sense of** **Reviews**

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a systematic review:

- **Is the study valid?**
- **What are the results?**
- **Will the results help locally?**

The 10 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is “yes”, it is worth proceeding with the remaining questions.

You are asked to record a “yes”, “no” or “can’t tell” to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

The 10 questions are adapted from Oxman AD, Cook DJ, Guyatt GH, Users' guides to the medical literature. VI. How to use an overview. JAMA 1994; 272 (17): 1367-1371

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Screening Questions

1. Did the review ask a clearly-focused question?

Consider if the question is "focused" in terms of:

- The population studied
- The intervention given or exposure
- The outcomes considered

- | |
|-------------------------------------|
| <input type="checkbox"/> Yes |
| <input type="checkbox"/> Can't tell |
| <input type="checkbox"/> No |

2. Did the review include the right type of study?

Consider if the included studies:

- Address the review's question
- Have an appropriate study design

- | |
|-------------------------------------|
| <input type="checkbox"/> Yes |
| <input type="checkbox"/> Can't tell |
| <input type="checkbox"/> No |

Is it worth continuing?

Detailed Questions

3. Did the reviews try to identify all relevant studies?

Consider:

- Which bibliographic databases were used
- If there was a follow-up from reference lists
- If there was personal contact with experts
- If the reviewers searched for unpublished studies
- If the reviewers searched for non-English language studies

- | |
|-------------------------------------|
| <input type="checkbox"/> Yes |
| <input type="checkbox"/> Can't tell |
| <input type="checkbox"/> No |

4. Did the reviewers assess the quality of the included studies?

Consider:

- If a clear, pre-determined strategy was used to determine which studies were included. Look for:
 - a scoring system
 - more than one assessor

- | |
|-------------------------------------|
| <input type="checkbox"/> Yes |
| <input type="checkbox"/> Can't tell |
| <input type="checkbox"/> No |

5. If the results of the studies have been combined, was it reasonable to do so?

Consider whether:

- the results of each study are clearly displayed
- the results were similar from study to study (look for tests of heterogeneity)
- the reasons for any variations in results are discussed

- | |
|-------------------------------------|
| <input type="checkbox"/> Yes |
| <input type="checkbox"/> Can't tell |
| <input type="checkbox"/> No |

6. How are the results presented and what is the main result?

Consider:

- how the results are expressed (e.g. odds ratio, relative risk, etc.
- how large this size of result is and how meaningful it is
- how you would sum up the bottom-line result of the review in one sentence

<input type="checkbox"/> Yes
<input type="checkbox"/> Can't tell
<input type="checkbox"/> No

7. How precise are these results?

Consider:

- if a confidence interval were reported. Would your decision about whether or not to use this intervention be the same at the upper confidence limit as at the lower confidence limit?
- if a p-value is reported where confidence intervals are unavailable

<input type="checkbox"/> Yes
<input type="checkbox"/> Can't tell
<input type="checkbox"/> No

8. Can the results be applied to the local population?

Consider whether:

- the population sample covered by the review could be different from your population in ways that would produce different results
- your local setting differs much from that of the review
- you can provide the same intervention in your setting

<input type="checkbox"/> Yes
<input type="checkbox"/> Can't tell
<input type="checkbox"/> No

9. Were all important outcomes considered?

Consider outcomes from the point of view of the:

- individual
- policy makers and professionals
- family/carers
- wider community

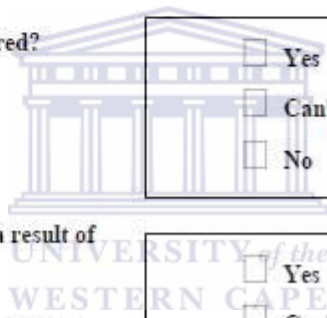
<input type="checkbox"/> Yes
<input type="checkbox"/> Can't tell
<input type="checkbox"/> No

10. Should policy or practice change as a result of the evidence contained in this review?

Consider:

- whether any benefit reported outweighs any harm and/or cost. If this information is not reported can it be filled in from elsewhere?

<input type="checkbox"/> Yes
<input type="checkbox"/> Can't tell
<input type="checkbox"/> No



APPENDIX H: DATA EXTRACTION SHEET



DATA EXTRACTION FORM (Revised by researcher) Intervention review – RCTs and non-RCTs

This form can be used as a guide for developing your own data extraction form. Sections can be expanded and added, and irrelevant sections can be removed. It is difficult to design a single form that meets the needs of all reviews, so it is important to consider carefully the information you need to collect, and design your form accordingly. Information included on this form should be comprehensive, and may be used in the text of your review, ‘Characteristics of included studies’ table, risk of bias assessment, and statistical analysis.

Notes on using a data extraction form:

- Be consistent in the order and style you use to describe the information for each report..
- Record any missing information as unclear or not described, to make it clear that the information was not found in the study report(s), not that you forgot to extract it.
- Include any instructions and decision rules on the data collection form, or in an accompanying document. It is important to practice using the form and give training to any other authors using the form.

Review title or ID

Study ID (<i>surname of first author and year first full report of study was published e.g. Smith 2001</i>)

Notes:

General Information

Date form completed (<i>dd/mm/yyyy</i>)	
Name/ID of person extracting data	

Report title <i>(title of paper/ abstract/ report that data are extracted from)</i>	
Reference details	
Report author contact details	
Publication type <i>(e.g. full report, abstract, letter)</i>	
Notes:	

Eligibility and Methods

Study Characteristic s	Review Inclusion Criteria <i>(Insert inclusion criteria for each characteristic as defined in the Protocol)</i>	Yes	No	Unclear	
Type of study					
Number of RCT's included in systematic review					
Types of Participants					
Classification of participants LBP (i.e. Chronic or Acute)					
Type of Intervention (e.g. Exercise, etc.)					

Quality assessment of the review/Methodological quality assessed					
Reviewers own quality assessment score on CASP					
Types of outcome measures List all					
Aim of study					
Overall result					
Inclusion criteria for review					
Exclusion criteria for review					



INCLUDE	EXCLUDE				
Reason for exclusion					
Notes:					

DO NOT PROCEED IF STUDY EXCLUDED FROM REVIEW



Results

	Description as stated in report/paper	<i>Yes No Unclear</i>
Meta-analysis done		
Results of meta-analysis		
Have the results been combined?		
How the results presented and what is the main result?		

How precise are the results?		
Unit of analysis (<i>by individuals, cluster/groups or body parts</i>)		
Statistical methods used and appropriateness of these methods (<i>e.g. adjustment for correlation</i>)		
Notes:		



Applicability

Have important populations been excluded from the study? (<i>consider disadvantaged populations, and possible differences in the intervention effect</i>)	Yes No Unclear	
Is the intervention likely to be aimed at disadvantaged groups? (<i>e.g. lower socioeconomic groups</i>)	Yes No Unclear	
Does the study directly address the review question? (<i>any issues of partial or indirect applicability</i>)	Yes No Unclear	
Notes:		

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Other information

	Description as stated in report/paper	
Key conclusions of study authors		
References to other relevant studies		
Correspondence required for further study information <i>(from whom, what and when)</i>		
Notes:		



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