

**The knowledge, attitudes, perceptions and perceived barriers of
chiropractors within the eThekweni municipality towards evidence-
based practice**

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Master's Degree in Technology: Chiropractic at the Durban University of Technology.

I, Divashni Naidoo, do declare that this dissertation is representative of my own work
in both conception and execution, except where specific assistance is sought and
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DEDICATION

This dissertation is dedicated to my parents, Pam and Calvin.
Thank you for giving me this opportunity to make you proud. I love you both immensely.

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To my dad – Thank you for your constant love and support. I cannot begin to express my gratitude to you for all that you've done for me.

To my mum – My best friend and greatest supporter. Thank you for teaching me dedication and perseverance. Thank you for your prayers and for being the best role model that a daughter could ask for.

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ABSTRACT

Background

In the chiropractic profession, it has been an established goal to utilise evidence-based practice (EBP) in clinical practice in order to empower chiropractors to develop effective treatment protocols. However, the extent to which chiropractors are utilising EBP, and the factors associated with its implementation in practice is unknown. The lack of research in this regard suggests that further studies need to be undertaken within the chiropractic profession in South Africa in order to fully understand the relationship of factors which contribute to the adoption and application of EBP by chiropractors in clinical practice. Therefore, the aim of this study was to investigate the knowledge of, attitudes towards, perceptions of and perceived barriers towards EBP by chiropractors within the eThekweni municipality.

Method

A pre-validated cross sectional descriptive survey was administered to chiropractors practicing within the eThekweni municipality (n = 101) by hand delivery. The questionnaire was validated by means of a focus group and pilot testing. Participants gave informed consent prior to participation. Data were analysed using SPSS Statistics 24.0 and Statgraphics Centurion 15.1 (2006) to determine the descriptive and inferential statistics while the open-ended questions were analysed qualitatively using manifest coding.

Results

A response rate of 51% (n=51) was obtained. The majority of respondents were male (51%), mean age of 37.8 years, practicing for less than 19 years, working in full time practice (76.5%) between 40 and 49 hours per week (45.1%). The majority of the respondents had a positive attitude and perception towards EBP with respondents showing a willingness to improve skills (72.6%) and utilisation (52.9%) of EBP. Respondent 15 explained that “it is very important to have the skills in order to utilise EBP. Once you have the skills, utilising EBP becomes easy”. Responses highlighted that respondents are engaging with scientific literature when necessary and possess the skills necessary to utilise EBP. The majority of respondents believe that they had a strong academic foundation in their knowledge and skills related to accessing and interpreting information, yet 47.1% reported not having received formal training in search strategies to access literature. However, most felt confident about their knowledge and skills to utilise EBP. Insufficient time (66.7%), lack of generalisability of the literature findings to their patient population (49.0%) and the inability to apply research findings to individual patients with unique characteristics (45.1%) were the three top barriers identified. Respondent 12 described: “most articles are vague or time consuming and searching for

relevant, up to date and reliable articles is a difficult process that can take a lot of time” as a possible barrier to utilising EBP.

Conclusion

The respondents in this study had a favourable attitude towards, and perception of, EBP and its usefulness to chiropractic practice. However, like other healthcare professionals they felt that they had insufficient time to utilise EBP. This study also highlighted the importance of academic institutions providing the necessary skills required to utilise EBP. It is recommended that workshops focusing on EBP principles and training are arranged to assist practitioners in integrating EBP into practice.

Key words

Chiropractic, evidence-based practice, knowledge, skills, attitudes, perceptions, utilisation

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LIST OF ABBREVIATIONS

%	percentage
<	refers to a figure “less than” the figure reported
AHPCSA	Allied Health Professions Council of South Africa
ANZCO	Australian and New Zealand Classification of Occupations
CAM	Complementary and Alternative Medicine
CASA	Chiropractic Association of South Africa
CINAHL	The Cumulative Index to Nursing and Allied Health Literature
CPD	Continuing Professional Development
CPE	Continuing Professional Education
DUT	Durban University of Technology
EBM	Evidence-based medicine
EBP	Evidence-based practice
ECCE	European Council on Chiropractic Education
IREC	Institutional Research Ethics Committee
MEDLINE	Medical Literature Analysis and Retrieval System Online
N	Population size
n	Sample size
PhD	Doctor of Philosophy
p-value	probability value
SA	South Africa
SD	Standard Deviation
SPSS	Statistical Package for the Social Sciences
UJ	University of Johannesburg
WFC	World Federation of Chiropractic

DEFINITIONS

Attitude

Expression of feelings, thoughts and tendencies (Bergh and Theron, 1999). In the context of this study it refers to the respondent's feelings, thoughts and the predisposition to act toward evidence-based practice.

Barrier

A problem, rule or situation that prevents somebody from doing something, or that makes something impossible (Oxford Dictionaries, 2011). In the context of this study it refers to a situation that prevents chiropractors from utilising evidence-based practice.

Chiropractic

A health profession concerned with the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system, and the effects of these disorders on the function of the nervous system and general health. There is an emphasis on manual treatments including spinal adjustment and other joint and soft-tissue manipulation (World Federation of Chiropractic, 2012).

Chiropractor

A chiropractor is a health professional specialising in the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system and the effect of these disorders on the function of the nervous system and general health (World Federation of Chiropractic, 2012).

Content Validity

A questionnaire has content validity when the content of the questionnaire is considered effective and well-rounded enough to be able to assess a particular concept (Mouton, 2011).

This is achieved by having the individuals in the focus group representative of the specific areas of expertise related to the research to be conducted as well as participant representation (Dyer, 1997).

Content Reliability

Content reliability refers to the extent of a survey to elicit the same type of information each time they are used under the same conditions (Guion, 1998).

Evidence-based Medicine (EBM)

Evidence-based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients (Sackett et al., 1996).

Evidence-based Practice (EBP)

Evidence-based practice (EBP) incorporates the integration of individual clinical expertise and current external clinical evidence from systematic research (Sackett et al., 1996).

Face Validity

The degree to which the procedure, namely validation of the questionnaire, appears effective in terms of the purpose of the study (Mouton, 2011)

Knowledge

Facts, information and skills acquired through experience or education; the theoretical or practical understanding of a subject (Oxford Dictionaries, 2011).

Perception

Perception is the process by which information about the world, as received by the senses, is analysed and made meaningful (Oxford Dictionaries, 2011). In the context of this study it refers to the way in which evidence based practice is regarded, understood or interpreted due to past experiences.

Psychosocial

Psychosocial refers to both psychological and social aspects and more specifically, the interrelation of social factors and individual thought and behaviour (Oxford Dictionaries, 2011). In the context of this study it refers to one of the environmental factors contributing to human behaviour.

Research

Research is the systematic investigation into and study of materials and sources in order to establish facts or verify information (Oxford Dictionaries, 2011). In the context of this study it

refers to available information already generated through research which may be utilised by a practitioner to inform practice.

Skill

The ability to do something well; expertise (Oxford Dictionaries, 2011). In the context of this study it refers to the abilities and expertise that a respondent may possess or be competent to complete a task successfully.

Utilisation

The act of using something, especially for a practical (Oxford Dictionaries, 2011). In the context of this study it refers to the practical use of literature to inform clinical decision making.

CHAPTER ONE

INTRODUCTION

1.1 Background

Evidence-based medicine (EBM) was first introduced by medical physicians around the early 1990s in an effort to bridge the gap between clinical practice and literature (Rosenberg and Donald, 1995). Sackett, Rosenberg, William, Gray, Haynes and Richardson (1996) defined EBM as the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. At the time of its conception, “EBM” was directed at traditional medicine but rapidly expanded to include related complementary and alternative medical (CAM) professions as an interdisciplinary movement known as evidence-based practice (EBP) (Hjørland, 2011).

EBP involves the complex integration of clinical experience, current literature and individual patient contribution to ensure that a chiropractor can make clinical decisions which are effective and will promote healthcare delivery and patient care (Hall, 2011). This model ensures that practitioners utilise the best, most current and reliable literature (Hadley et al., 2007), preventing habitual practice methods (Hall, 2011) and avoiding opinion-based medicine (Iles and Davidson, 2006).

Perceptions are formed by the incorporation of past experiences, knowledge, and understanding (Bernstein, Clark-Stewart, Ray and Wickens, 1997) which are interpreted to be most useful to an individual (Neisser, 1976). In order to fully understand the perception of chiropractors towards EBP, one must be mindful of the factors that may contribute to a positive or negative perception (Bergh and Theron, 1999). Thus, the extent to which a clinician engages in EBP is greatly dependent on their perception and attitude towards EBP (d’Hotman de Villiers, 2014).

While it is vital to place emphasis on EBP, it is imperative that practitioners possess the skills required for basic literature searches, critical appraisal of literature and therefore the utilisation of literature in clinical decision making (Smith, 2004). While these skills can be obtained by means of courses, workshops and continued professional activities, they are often taught as part of healthcare professionals’ undergraduate training (Hall, 2011). This acts as an enabler for EBP to become a central theme in practice (Watson and Buchanan, 2005).

any reasons have been suggested for the possible lack of uptake of EBP by healthcare practitioners and it is important to explore these perceived barriers for greater understanding (Hall, 2011). These barriers include time constraints (McColl, Smith, White and Field, 1998; Young and Ward, 2001; Carrion, Woods and Norman, 2004), a lack of understanding of research terminology (McColl et al., 1998; Young and Ward, 2001; Young, Ashby, Boaz and Grayson, 2002), limited access to articles (Dahm, Poolman, Bhandari, Fesperman, Baum, Kosiak and Preminger, 2009) and the perceived limited impact of research on clinical practice (Caldwell, Coleman, Copp, Bell and Ghazi, 2007). There have been limited studies that have explored the barriers faced by chiropractors and it has been suggested that further studies should aim to determine the challenges chiropractors face when implementing EBP (d'Hotman de Villiers, 2014).

1.2 Study rationale

In the past 20 years, the chiropractic profession has been encouraged to incorporate scientific literature into clinical practice in order to empower chiropractors to develop effective treatment protocols based on the best, most current literature available (Haneline, 2006). On a global scale, literature exists outlining the attitudes of chiropractors towards EBP (Hall, 2011). In South Africa, chiropractors have been surveyed in terms of their perceptions towards research and its perceived role within the profession (Gordon, 2012). However, this study has not been published and provides limited insight into the knowledge, attitudes and perceptions of chiropractors to EBP. While chiropractors on a global scale have a generally positive attitude towards EBP, the South African literature demonstrates a lack of research in this regard. This suggests that further studies need to be undertaken within the chiropractic profession in South Africa in order to fully understand the relationships which contribute to the adoption of EBP, or the lack of it by chiropractors in clinical practice.

It has been said that the future of the profession lies in its ability to become more evidence-based (Chapman-Smith, 2000; Wyatt and Post-White, 2005; Meeker and Haldeman, 2002). The present study aimed to determine how chiropractors in the eThekweni municipality perceive and engage with EBP. It is envisaged that the findings of this study would inform the chiropractic curricula of the South African chiropractic teaching institutions. It would also allow the professional associations to organise workshops should there be a need to upskill practitioners.

1.3 Aim and objectives of the study

1.3.1 Aim of the study

The aim of this study was to investigate the knowledge of, attitudes towards, perceptions of and perceived barriers towards EBP by chiropractors within the eThekweni municipality.

1.3.2 Objectives of the study

The study objectives were:

- 1) To determine the attitudes and perceptions towards EBP by chiropractors.
- 2) To identify the level of knowledge and skills of EBP by chiropractors.
- 3) To determine the perceived barriers to EBP by chiropractors.
- 4) To determine relationships between knowledge of, attitudes towards, perceptions of and barriers to EBP by chiropractors.

1.4 Delimitations of the study

This study was limited to chiropractors practicing in the eThekweni municipality, KwaZulu-Natal and may therefore not be representative of all chiropractors in South Africa.

1.5 Flow of the dissertation

Chapter One

Chapter one provides the background to the research problem and includes the aim and objectives of the study.

Chapter Two

Chapter two presents a review of the literature relevant to EBP and chiropractic.

Chapter Three

Chapter three outlines the methodology utilised in this study. It describes the study design, sample population, research procedures and the tool used to collect the data.

Chapter Four

Chapter four presents the results of the statistical analyses of the data.

Chapter Five

Chapter five contextualises the results in relation to the existing literature.

Chapter Six

Chapter six concludes the study, highlighting the important findings and providing recommendations for future research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Evidence-based practice (EBP) has become a widely accepted term across healthcare professions and has become recognised as the gold standard for clinical practice (Prasun, 2013). In order to fully understand an individual's perception of EBP, one must consider the various factors that contribute to the development of a perception (Bergh and Theron, 1999). This chapter provides a theoretical framework for the perceptual process and an overview of the literature as it pertains to the knowledge of, attitudes towards, perceptions of and perceived barriers of chiropractors towards EBP. Various search engines such as Google Scholar, Summon, Wiley Online Library, EbscoHost and BioMed Central were used to retrieve articles related to the study. The following search terms were included but were not limited to words/phrases such as: "evidence-based practice", "evidence-based medicine", "chiropractic", "knowledge, attitudes, perceptions, barriers". Where possible, the most recent literature has been cited. However, due to the abundance of literature in the early 2000s, some of these references have been included.

2.2 The perceptual process

Perception is the process by which information about the world, as received by the senses, is analysed and made meaningful (Oxford Dictionaries, 2011). Historically, Neisser (1976) proposed that people are constantly receiving sensory stimuli from their environment and are interpreting this information in a way that is most useful to them. Later, a perception was defined as a widely recognised concept that is not only influenced by a reaction to events, people or things, but it was also influenced by conditions within the individual (Milton, 1981). Thus, it can be seen that perception is an active cycle of cognitive activities based on experiences (Wittmann, 2009).

According to Bergh and Theron (1999), perception is influenced by a combination of factors as seen in figure 2.1.

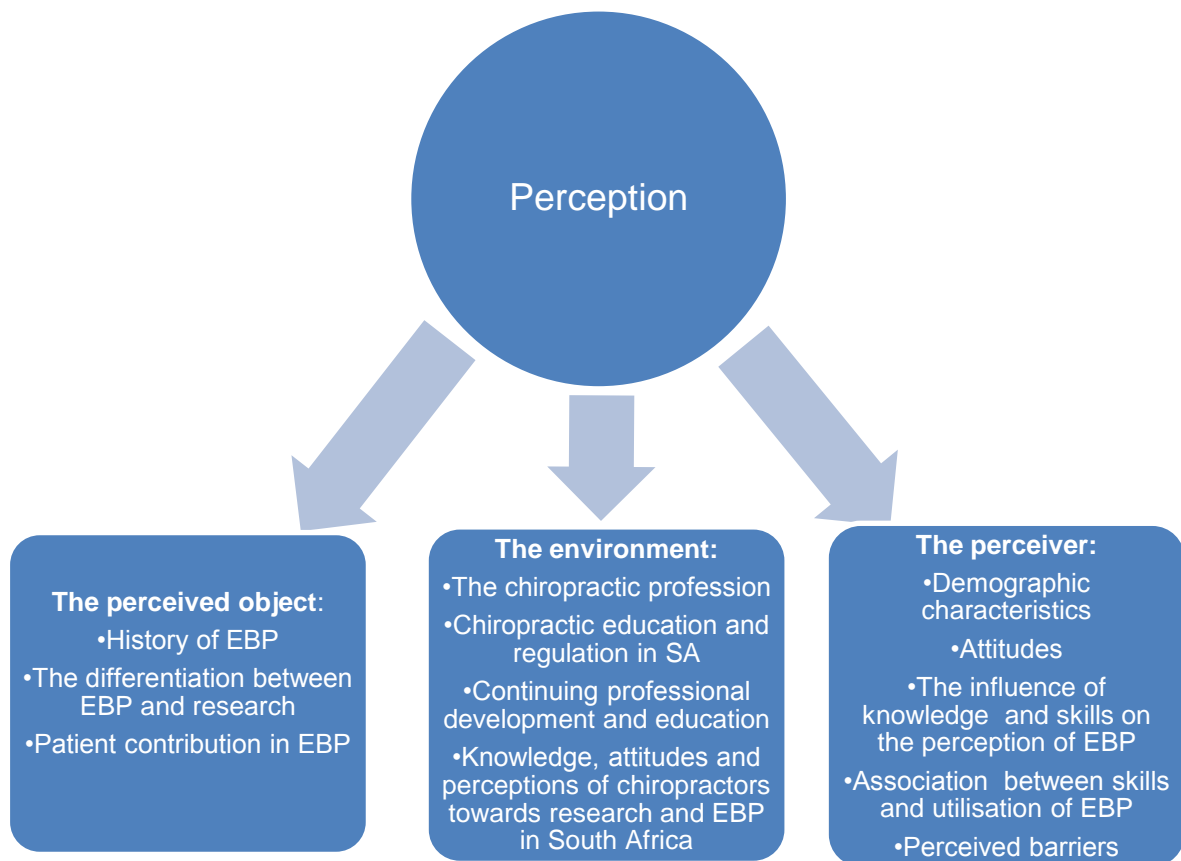


Figure 2.1 Factors influencing perception (proposed by Bergh and Theron (1999). These factors have been adapted to this study as outlined below.

- Perceived object: EBP.
- Environment: the chiropractic profession.
- Perceiver: chiropractors.

Perceptions are experienced by a perceiver and Bergh and Theron (1999) suggest that perceptions are subjective and belong to the thinking subject rather than to the object of thought. Subjective factors include attitudes, motives, interests, prejudices, preferences, past experiences and expectations. Individuals are more inclined to see what they expect to see which demonstrates that an expectation can easily affect an individual's perception. The perception of an individual can be influenced by the attributes of objects. Factors such as motion, sounds and size of an object influence the way an individual perceives them.

Environmental factors relate to an individual's development on all levels as a result of all non-genetic factors that have had an influence on an individual during his/her lifetime. Human behaviour should be interpreted with particular consideration to the environment within which an individual exists (Bergh and Theron, 1999). These environmental factors can include:

- a) physical,
- b) cognitive,
- c) emotional and
- d) psychosocial development.

The complex phenomenon of perception explains possible variations in individuals' everyday experiences as well as the endless possibilities for inaccurate perceptions in all areas of life (Bergh and Theron, 1999). Convergence of the factors that influence perception refute the idea that sensory input results in perceived experience. Instead, it has been suggested that there are personal attributes and external factors which subjectively construct accurate or inaccurate perceptions as well as biased or unbiased attitudes (Bergh and Theron, 1999). In order to understand the perception of chiropractors towards EBP, the factors influencing perception will be discussed relative to this framework.

2.2.1 The perceived object – Evidence-based practice

Evidence-based medicine (EBM) was first introduced in the early 1990s and was originally used to describe an approach to teaching the practice of medicine in order to improve clinical decision-making of physicians about individual patients (Evidence-based Medicine Working Group, 1992). This revolutionary article aggressively presented EBM as a fundamentally new approach bringing it to the attention of the wider medical community (Montori and Guyatt, 2008). Soon after this publication, subsequent articles provided tools for physicians to improve their skills in question formulation, sourcing of literature, critical appraisal and application of evidence to clinical practice in order to facilitate the progression of EBM (Guyatt and Rennie, 1993; Guyatt, Rennie, Meade and Cook, 2008).

EBM was presented as a newfound paradigm in the teaching and practice of medicine by deemphasising unsystematic clinical observations and emphasising the need for acquisition of new skills such as efficient literature searching, critical appraisal and evaluation of literature and thereafter, appropriate application of literature to clinical practice (Montori and Guyatt, 2008). While these factors were the initial areas of focus for EBM, it was suggested that evidence alone was insufficient to inform clinical decision making which in turn gave rise to the second fundamental principle of EBM (McGinn, Guyatt, Wyer, Naylor, Stiell and Richardson, 2000). In 2000, The Evidence-based Medicine Working Group maintained that while evidence was of paramount importance, patient values and preferences are implicit in every clinical decision (Guyatt, Haynes, Jaeschke, Cook, Green and Naylor, 2000). The second principle of EBM implies that a practitioner should place great emphasis on patient

values and preferences while still positioning the best available, current research at the top of the hierarchy in clinical decision-making (Montori and Guyatt, 2008).

In the years following the introduction of EBM, there was a significant growth in its popularity and it soon became a cornerstone of high-quality medical care (Committee on Quality of Health Care in America, 2001). General practitioners were forerunners to engage in the model but the evolution of EBM was rapid and soon expanded to include related healthcare professions as an interdisciplinary movement known as EBP (Montori and Guyatt, 2008).

EBP is concerned with the translation of knowledge and complements the fundamental principles of problem-based learning and authentic learning (Rycroft-Malone, 2004). EBP allows a clinician to utilise best evidence together with the clinician's clinical expertise to inform patient management (Anderson, 2006). This enables a clinician to make clinical decisions based on the best, most current and relevant information that is available (Hadley, Wall and Khan, 2007), to prevent habitual practice methods (Hall, 2011) and to help practitioners avoid opinion-based medicine (Ghosh, 2004). EBP is believed to help clinicians in selecting appropriate and effective techniques for better outcomes in the treatment of various conditions (Iles and Davidson, 2006).

EBP has been described by Straus, Richardson, Rosenberg and Haynes (2000) as the "integration of best research evidence with clinical expertise and patient values and circumstances". EBP provides practitioners with an efficient way of keeping abreast of current healthcare literature. Practitioners who have adopted EBP believe that best evidence can and should be utilised as an integral part of their clinical decision-making (Mills, Montori and Guyatt, 2004).

Shaneyfelt, Mayo-Smith and Rothwangl (1999) explained that while an evidence-based approach may enhance the scientific rigour of the development of treatment guidelines, recommendations for treatment in the form of evidence may not always meet the highest scientific standard. It has been suggested that all evidence should be considered and clinical decision-making should not be based purely on the results of one research study (Manchikanti, Staats, Singh, Schultz, Vilims, Jasper and Racz, 2003). For that reason, it has been proposed that once clinical research has been thoroughly scrutinised and a consensus has been reached, the clinical research findings, integrated with individual clinical expertise and the patient's values and preferences it would present a more reliable solution to the evidence-based approach (Lee and Hunsley, 2015).

Over the last two decades, there has been a growing emphasis on EBP and this has consequently resulted in significant improvements in the adoption of EBP by many healthcare

professionals (Lugtenberg, Zegers-van Schaick, Westert and Burgers, 2009; Leach and Gillham, 2011). The evidence suggests that there are numerous clinical benefits associated with the utilisation of EBP by practitioners (Black, Balneaves, Garossino, Puyat and Qian, 2015). Such benefits include improved quality of healthcare delivery (Leach, 2004), enhanced professional credibility (McKenna, Ashton and Keeney, 2004), improved interdisciplinary relationships (Stomski, Grimmer-Somers and Petkov, 2008), standardised care (Romyn, Allen, Boschma, Duncan, Edgecombe, Jensen and Warnock, 2003) and less reliance on unreliable sources of information that would otherwise influence clinical decision making (Stomski, Mackintosh and Stanley, 2010). These benefits suggest that practitioners have an ethical obligation to adopt EBP principles in order to afford every patient with healthcare of the highest quality. However, much remains to be undertaken to improve healthcare professionals' use of EBP principles (Lugtenberg et al., 2009; Leach and Gillham, 2011).

EBP is widely promoted as a tool to promote continuing professional education by means of inquiry and to help practitioners steer clear of opinion-based medicine. The promotion of EBP has also helped students at all levels of tertiary education to critically assess the most current, best evidence for the diagnosis and treatment of patients (Ghosh, 2004). As previously described, the implementation of EBP involves a process which results in the incorporation of EBP principles into clinical practice. The EBP process is a systematic approach that should be adopted in order to facilitate best practice (Newhouse, Dearholt, Poe, Pugh and White, 2005). The process often begins with an initial motivator or reason for a practitioners' interest in EBP which may result in a genuine desire to utilise evidence in practice. In the next phase, practitioners will identify gaps in their knowledge and will begin to formulate research questions. Such questions require knowledge and skills in order to conduct relevant searches and reach conclusive ideas which leads to the next phase. Practitioners will be required to develop the skills necessary to conduct an efficient literature search, filter through the abundance of literature currently available and critically appraise the evidence sourced. The final phase of the evidence-based process involves the appropriate application and integration of the literature to the presenting patient's case and subsequently, evaluation of the application of evidence (Hicks, 2001; Fineout-Overholt, Melnyk and Schultz, 2005).

The principles of EBP have been widely studied and utilised in Europe, Canada and the United States of America (Nelson, Lawrence, Triano, Bronfort, Perle, Metz, Hegetschweiler and LaBrot, 2005; Triano, 2005; Villaneuva-Russel, 2005; French, Walker and Perle, 2010; Mirtz, Hebert and Wyatt, 2010; Reggars, 2011; Leboeuf-Yde, Lanlo and Walker, 2013). This is in contrast to South Africa where not much is known about EBP utilisation by practitioners in private practice despite the abundance of relevant literature which is easily accessible. In recent years, the development of EBP has accelerated the need for new literature (Titler,

2008), as research is increasingly being accepted as the strongest justification of any health care modality (Sackett et al., 1996).

However, research investigating the utilisation as well as attitudes and beliefs of chiropractors to EBP are limited to just two studies, one of which was conducted in the United Kingdom (Hall, 2011) (n = 7) and the other in Australia (Walker, Stomski, Hebert and French, 2014) (n = 584). This suggests that further studies need to be undertaken within the chiropractic profession in order to fully understand the relationship of factors which contribute to the adoption and application of EBP by chiropractors in clinical practice.

2.2.1.1 The differentiation between evidence-based practice and research

Since the introduction of EBP, the difference between “EBP” and “research” has become indistinguishable. Therefore, a clear distinction needs to be made to differentiate between these terms (Bolton, 2014). Scientific research can be defined as performing a methodical study in order to prove a hypothesis or answer a specific question. Finding a definitive answer is the central goal of any experimental process. The purpose of conducting research is to generate new knowledge or to validate existing knowledge based on a theory. Scientific research is organised and involves planning, performing literature reviews of past research and evaluating what questions need to be answered. On the other hand, research is about investigation, exploration, and discovery, it also requires an understanding of the philosophy of science (Shuttleworth, 2008).

Unlike research, EBP is not about developing new knowledge or validating existing knowledge. EBP requires formulating searchable questions, searching for and appraising research and acting according to relevant findings (O’ Donnell, 2004). Therefore, it involves integrating individual clinical expertise with best available external clinical evidence and applying it to clinical decision-making. The purpose of EBP is to utilise the best evidence available to make patient care decisions by means of incorporating clinical expertise and patient preferences and values (Conner, 2014).

2.2.1.2 Patient contribution to evidence-based practice

In the past 20 years, there has been an increase in scientific inquiry within the chiropractic profession. EBP aims to shift the emphasis of clinical decision-making from intuition, unsystematic clinical experience and pathophysiologic rationale to direct patient management using scientific, clinically relevant research (Guyatt, Cairns, Churchill, Cook, Haynes, Hirsh and Sackett, 1992). Haneline and Meeker (2011) stated that patients are seeking alternatives to conventional medicine and consequently, chiropractic care is becoming accepted for

various conditions. This shift has led to chiropractors being confronted with various clinical cases that they were not previously treating on a regular basis. This warranted an approach of effective treatment of the patient by means of utilising past clinical decisions which were proven to be effective, evidence in the form of research findings as a result of a rigorous review of the literature, combined with the patient's specific presenting symptoms, values and preferences. With this combination of factors, a clinician can effectively utilise EBP to provide treatment for a vast majority of patients (Haneline, 2006).

The integration of a patient's values and preferences into the clinical management of the patient is supported by the National Health Act which states that "a user has the right to participate in any decision affecting his or her personal health and treatment" (National Health Act, 2003). One of the greatest benefits of this integration is that when patients, the public and service users are actively involved in the research process which ultimately leads to a decision on care, the requirements of all parties are considered resulting in evidence that can be utilised and accepted in health policies and practice (Kelson, Akl, Bastian, Cluzeau, Curtis, Guyatt and Schünemann, 2012).

While EBP stresses the examination of evidence from clinical research, it should be acknowledged that other factors, unique to every patient, exist which also influence the outcome of the treatment (Guyatt et al., 1992). It has been postulated that patient-specific factors such as comorbid conditions, quality of life, time constraints and financial status often play a large part in the treatment that a practitioner can offer and possible guidance can be sourced via current, reliable literature, which can then be applied to a specific case (Gresham, 2016). Individual patient contribution plays a vital role in the decision-making process and some authors have stated that it is as important as clinical expertise and the utilisation of current research (van der Weijden, Légaré, Boivin, Burgers, van Veenendaal, Stiggelbout and Elwyn, 2010). In the same way, it has been suggested that evidence to inform clinical decision-making should be derived from different sources to gain a broad insight of possible treatment protocols and that clinical expertise and patient preference should hold equal importance alongside quantitative and qualitative research (Gerrish and Clayton, 2004). In order for maximal patient recovery to take place, a research-based treatment regime is crucial in order to inform the complex clinical presentations of patients which vary between patients due to a combination of disease and co-existing lifestyle behaviours (Trovato, 2012).

In a similar way, Hall (2011) emphasised patient contribution in EBP as the thoughtful identification and compassionate use of individual patients' predicaments, rights and preferences. This shows that with the utilisation of clinical experience, current research and individual patient contribution, a chiropractor or any other healthcare practitioner can make

clinical decisions which are effective and will promote effective healthcare delivery and patient care. A fundamental assumption of EBP is that practitioners who provide treatment that is based on the best available evidence will provide their patients with superior healthcare when compared to practitioners who rely solely on their personal clinical experiences or understanding of basic biomechanics. However, there has been no convincing evidence to date that has proven this assumption to be true (Haynes, 2002).

Similarly, Jacobson, Edwards, Granier and Butler (1997) stated that practitioners relying solely on research to make clinical decisions could result in a potential lack of applicability of literature. This eliminates the role of a practitioner's opinion in order to tailor a relevant treatment protocol which takes the patient's preferences and overall health status into consideration. Thus, it is apparent that an integration of all aspects of EBP is crucial in order to ensure its success.

2.2.2 The environment - Chiropractic

2.2.2.1 The chiropractic profession

Chiropractic dates back to 1896 when it was founded by D.D. Palmer, a magnetic healer (Haldeman, 2005). The first chiropractic patient was Mr. Harvey Lillard, a janitor who became deaf after a fall which he claimed injured his back (Keating, 2005). Palmer performed a manual thrust to Lillard's spinal column, changing his alignment, resulting in Lillard claiming that his hearing had been regained (Keating, 2005). Palmer explained this phenomenon as 'Innate Intelligence' which he described as a vital force that was transmitted to the body's cells and organs through the nervous system. He claimed that this channel had been blocked due to misaligned vertebrae placing pressure on nerves. These misaligned vertebrae became known as vertebral subluxations (Keating, Charlton, Grod, Perle, Sikorski and Winterstein, 2005). This theory and its vitalistic underpinnings laid the foundation for the chiropractic profession (Clum, 2007).

The first school of chiropractic was started by D.D. Palmer and its teachings focused on identification and correction of the vertebral subluxation. The vertebral subluxation was described by Palmer (1910) as the cause of all "disease" and its correction resulted in complete restoration of health. New chiropractic schools were opened where naturopathy and other forms of alternate therapy were taught as part of chiropractic training (Keating, 2004). In contrast to teachings of D.D. Palmer's teachings, the rival school considered a vertebral subluxation as one of the many causes of disease and therefore, treatment regimens included manipulations as well as various treatment modalities (Palmer, 1910; Chapman-Smith, 2000). This deviation from "pure" chiropractic led D.D. Palmer to label these chiropractors as "mixers"

and those that adopted the more classical approach to chiropractic were labelled as “straights”.

These differing schools of thought led to a divide within the profession as there was no unity around a common set of principles between mixers and straights (Chapman-Smith and Cleveland, 2005). This invited external criticism as the chiropractic profession lacked a professional identity (Villanueva-Russell, 2011) while medicine at the time was advancing into an era of scientific investigation, which challenged the vitalistic foundation of the chiropractic profession (Phillips, 2005). This led to greater tension in the “straights versus mixers” battle as the mixers supported scientific advances while the straights held on the vitalistic principles (Villanueva-Russell, 2011). In later years, mixers were found to be more supportive of the integration of chiropractic into mainstream medicine whereas the straights viewed chiropractic as separate from medicine and were intent on it being its own profession (Carey, Clum and Dixon, 2005). The impact of this was that chiropractic teaching institutions aligned themselves with either a straight or mixer philosophical orientation and thereby taught their students accordingly (Simpson, 2012). Today this division remains regardless of efforts to unify the profession.

Despite the internal conflict at the start of the century, the chiropractic profession was one of the fastest growing in the world following medicine and dentistry (Chapman-Smith, 2000). This considerable growth is evident now that chiropractic is practiced in over 100 countries (WFC, 2012), is the most popular CAM healthcare discipline (Meeker and Haldeman, 2002) and is recognised by the World Health Organisation (WHO) (WHO, 2016). Chiropractic is defined as a health profession concerned with the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system, and the effects of these disorders on general health. Treatment includes manual therapy such as spinal adjustment with emphasis on joint and soft-tissue manipulation (World Federation of Chiropractic, 2012).

2.2.2.2 Chiropractic education and regulation in South Africa

In 2005, the WHO published the first guidelines on training and safety of chiropractic (WHO, 2005). This set the minimum requirements for education of chiropractic students internationally. In South Africa, chiropractic education started in 1989 when the Minister of National Education approved the implementation of the chiropractic programme at Technikon Natal (later named the Durban Institute of Technology and now the Durban University of Technology, DUT) in association with the Allied Health Professions Council of South Africa (AHPCSA) (DUT, 2015). The AHPCSA is the statutory body in South Africa (SA) tasked with regulating the chiropractic profession. It defines the scope of chiropractic practice and requires

that all chiropractors must register with the AHPCSA to be able to practice in SA (AHPCSA, 2014).

The DUT and the University of Johannesburg (UJ) are the only two tertiary institutions in South Africa to provide chiropractic education. Both are accredited by the European Council on Chiropractic Education (ECCE), which is an international autonomous organisation that accredits undergraduate chiropractic education and training to assure quality chiropractic undergraduate education and training against a set of educational standards. The ECCE is responsible for the establishment of standards of excellence as well as the education and training that potential future chiropractors should undergo in order to qualify as safe and competent healthcare practitioners. The DUT Chiropractic department is a dynamic programme that provides the chiropractic student with a thorough grounding in traditional medical subjects with special emphasis on diagnostic skills and evidence-based methods, to ensure that chiropractors can contribute meaningfully to the healthcare environment by affording patients with holistic evidence-based patient care (DUT, 2015).

South African chiropractic programmes award graduates with a Master's degree in chiropractic training which is the minimum requirement to register as a chiropractor with the AHPCSA (AHPCSA, 2016) and this includes a research component focusing on research methods and techniques with incorporation of EBP principles. This means that undergraduate students are directly involved in conducting research focussing on research methodology and EBP principles as part of their minimum qualification requirement (ECCE, 2016). Previous studies have proposed that prior research exposure has a positive influence on one's perception of research (Newell and Cunliffe, 2003) and can be associated with a higher degree of research utilisation (Rodgers, 2000). In contrast to this, it has been reported that some students find the requirement to complete a master's degree to qualify as a chiropractor as challenging (Rieder, 2010). This may result in a negative perception of research (Bergh and Theron, 1999).

2.2.2.3 Continuing professional development and continuing professional education

The key purpose of continuing professional education (CPE) is to maintain and improve clinical performance (Speck and Knipe, 2005). CPE is now mandatory in most countries (Bolton, 2002) including South Africa when it became a legal requirement for chiropractors in 2014 (AHPCSA, 2014). Chiropractors are required to develop and maintain their clinical competencies and skills throughout their professional lives to ensure a high standard of care for patients and this is widely recognised amongst all health care professions. The current emphasis of EBP means that CPE and continuing professional development (CPD) has become of increased importance to all healthcare professionals (Forsetlund Bjørndal,

Rashidian, Jamtvedt, O'Brien, Wolf and Oxman, 2009). While there is widespread recognition of the importance of CPE and CPD, there continues to be discussions surrounding the best way to implement these programs so that they translate into a change in practicing habits (Bolton, 2002). It has been shown that chiropractors who met or exceeded the CPD quota were active in CPD activities and were committed to lifelong learning (d'Hotman de Villiers, 2014). Studies on chiropractic populations have shown that chiropractors favoured attending conferences and reading journals (Schwarz and Hondras, 2007; Gordon, 2012; d'Hotman de Villiers, 2014; Walker et al., 2014).

2.2.2.4 Knowledge, attitudes and perceptions of chiropractors towards research and evidence-based practice in South Africa

In South Africa, chiropractors have been surveyed in terms of their perception towards research and its perceived role within the profession (Gordon, 2012) (n = 174). The results of this study showed that the general perception of research was overall positive. The strongest positive response of this study corroborated an idea that was previously described by Hall (2011), which was that research adds credibility to the profession. Gordon (2012) demonstrated that most respondents regularly made use of websites and textbooks to research special areas of interest (98%). Despite this, respondents stated that research was unlikely to be used to change their current treatment protocols in practice as their utilisation of evidence to inform practice seemed low however, the study did not further investigate this relationship. This was in contrast to the positive correlation that as perceptions increased, so did research utilisation. While this is the case, that study was not published and provides limited insight into the knowledge, attitudes and perceptions of chiropractors to EBP, specifically in the eThekweni municipality.

In a later study by d'Hotman de Villiers (2014) (n = 140), the researcher investigated the perception, knowledge and utilisation of research and their roles in the chiropractic profession as determined by chiropractors attending the World Federation of Chiropractic Biennial Conference 2013 in Durban, South Africa. The results of this study showed that respondents had an overall favourable perception of research (51.4%). Additionally, 97.5% of respondents perceived that research was essential to the progression of the chiropractic profession as supported by Haldeman (2005). The respondents in the former study had an adequate knowledge of research terminology (59.2%) and showed high utilisation of research articles (88.9%), particularly in areas of special interest and for further investigation of specific patient conditions. While that was the case, it must be noted that this study was conducted in a population of chiropractors attending the World Federation of Chiropractic Biennial Conference 2013 with the majority of respondents consistently exceeding their continuing

education hours by attending conferences, seminars and congresses. This suggests that the respondents saw the value of research and how it could improve practice however, the study did not focus on EBP but rather the knowledge, attitudes and perceptions of research.

Similar findings were shown in general practitioners in Gauteng, South Africa (n = 221) when asked about EBP (De Wet, 2015). The findings of this study showed that neither awareness of EBP principles, positive attitudes or perceptions of EBP, perceived usefulness of EBP, nor prior training in EBP principles had a positive effect on the utilisation of EBP when implementing treatment protocols for patients. The respondents were positive about the current promotion of EBP (66%), with 68% believing that research findings were useful in day-to-day practice and 94% stating that EBP ultimately improved patient care. However, while respondents regarded EBP as a useful tool in practice, few made use of databases when considering treatment plans for patients with only 44% of respondents reported visiting EBM databases and the majority making use of these databases as the exception rather than the rule. The respondents' largest barrier to EBP was a lack of time (De Wet, 2015).

2.2.3 The perceiver - The chiropractor

2.2.3.1 Demographic characteristics

2.2.3.1.1 Gender

The chiropractic profession has always been a male dominated profession (Sigrell, 2002) however, the number of female chiropractors is progressively increasing (Newell and Cunliffe, 2003). This was consistent with the Australian and New Zealand Classification of Occupations (ANZCO) census which reported 75% of male chiropractors in 1996 compared to 65% of male chiropractors 10 years later (ANZCO, 2006). Similarly, a chiropractic survey conducted in the United Kingdom in 1976 showed that 8% of respondents were female, whereas in a study conducted in 2003, 46% of respondents were female (Wilson, 2003). Gender differences have been found with regard to females favouring CAM professions and expressed a greater interest in CAM over males (National Center for Complementary and Integrative Health, 2004).

In South Africa, results of studies conducted on chiropractic students revealed that the majority of respondents were female suggesting that the professions' profile is shifting (Rieder, 2010) and a higher number of female chiropractors should be expected (De Gouveia, 2009). On the contrary, many studies conducted in chiropractors showed that there were more male than female respondents (Mathews, 2006; Bunge, 2007; Keyter, 2010) which is possibly due to a greater likelihood of females to limit or discontinue practice due to family growth and

commitments (Maharaj, 2009). Only minor differences have been shown between genders towards the perception of research (Newell and Cunliffe, 2003).

2.2.3.1.2 Age

In a study of South African chiropractors, Keyter (2010) showed that the majority of respondents were in the age group of 30-39 years which was consistent with the studies conducted by De Gouveia (2009) and Gordon (2012). Other studies of South African chiropractors had similar findings but with a slightly lower age group of 25-37 years (Fletcher, 2005; Mathews, 2006; Bunge, 2007). This age finding was much younger than chiropractors internationally (Coulter and Shekelle, 2005; Ailliet, Rubinstein and de Vet, 2010; French, Charity, Forsdike, Gunn, Polus, Walker, Chondros, and Britt, 2013). This may be due to the chiropractic profession being fairly young in South Africa as it has only been offered for the past 25 years (DUT, 2015) as opposed to chiropractic institutions in the United States which are as old as the chiropractic profession itself. Age has been shown to influence practitioners' attitudes towards EBP. Jette, Bacon, Batty and Carlson (2003) (n = 488) found that younger physical therapists were more likely to have a positive attitude towards EBP. This was supported by Walker et al. (2014) (n=584) who found that older chiropractors were less likely to have a positive attitude towards EBP. In contrast to this, d'Hotman de Villiers (2014) found that chiropractic respondents between the age of 20 and 29 years expressed a poor perception of research possibly because chiropractic students (n = 138) perceived chiropractic course work to be vague and frustrating (Rieder, 2010). It has been suggested that these negative perceptions towards research could result in the development of negative perceptions towards EBP (Banzai, Derby, Long and Hondras, 2011).

2.2.3.1.3 Years in practice

In South Africa, Keyter (2010) reported that the majority of respondents were in practice for five years or less. These results may have been skewed as chiropractors who have recently started practicing may have more time to complete research questionnaires compared to those who have been in practice for a long time with busy, established practices. On the contrary, studies conducted on an international scale showed that the majority of respondents were in practice for five to 15 years (Schwarz and Hondras, 2007; Humphreys, Peterson, Muehleemann and Haueter, 2010; Kvammen and LeBoeuf-Yde, 2014). Similarly, studies that recorded the mean number of years revealed 16.3 years in Australia (French et al., 2013) and 18 years in Belgium (Ailliet et al., 2010). Jette et al. (2003) found that physical therapists who had been in practice for a short period of time (five years or less) were more likely to have a positive attitude towards EBP. It has been postulated that those practitioners that have graduated in the past 20 years may have a better knowledge and understanding of research

methodology and EBP principles due to the recent rise of EBP which may in turn lead to a positive perception towards research (d'Hotman de Villiers, 2014). In contrast, Walker et al. (2014) showed that Australian chiropractors who had been in practice for a longer period of time were more likely to have a positive attitude towards EBP.

2.2.3.1.4 Hours worked per week

Numerous studies from across the world have shown that the majority of chiropractors worked between 31 and 40 hours per week (Imbos, Langworthy, Wilson and Regelink, 2004; Coulter and Shekelle, 2005; Waalen and Mior, 2005; Schwarz and Hondras, 2007; Ailliet et al., 2010; Humphreys et al., 2010; Eaton, Bonello, Brown and Graham, 2012; Kvammen and LeBoeuf-Yde, 2014). However, less hours were worked in a day in areas such as Victoria, Australia where chiropractors were in practice between 27 and 30 hours per week. In South Africa, the chiropractic profession operates largely in the private sector, with most chiropractors working in full time or part time private practice (De Gouveia, 2009; Keyter, 2010; WFC, 2012). However, some chiropractors may elect to go into part time practice due to other commitments such as lecturing, research or family growth (Hughes and Wingard, 2006; Smith and Eckert, 2006; Tatalias, 2006; Wilson, Dowson and Mangin, 2007; Gittel, Seider and Wimbush, 2010). It is important to note that working in full time practice may result in a lack of time for EBP as most studies have identified this to be a top barrier (Brown, Wickline, Ecoff and Glaser, 2009; Knops, Vermeulen, Legemate and Ubbink, 2009; Walker et al., 2014; Alcantara and Leach, 2015; Khammarnia, Haj Mohammadi, Amani, Rezaeian and Setoodehzadeh, 2015).

2.2.3.2 Attitudes

The definition of attitude presented by Milton (1981) is the combination of an individual's feelings and thoughts that result in the predisposition of an individual to act towards an aspect of his or her environment in a particular way. Similarly, Fishbein and Ajzen (1975) defined an attitude as the general feeling or evaluation a person has towards self, other people, events or objects. However, while Coon and Mitterer (2007) agree with the above definitions, these authors placed more emphasis on the previous or learned experience of an individual that may mould an attitude. It has been suggested that a formed attitude is a combination of belief and emotion based on preceding experiences that inclines a person to respond to other people, objects or institutions in a positive or negative way (Coon and Mitterer, 2007).

It has been explained that an individual's perception, once formed, will have a resultant effect of their attitudes and behaviour thereafter (Bennett and Murphy, 1997). The most widely held definitions of an attitude include the idea that an attitude is a predisposition to behave in a particular way (Proctor, 2001) and research that explores attitudes hypothesise there is a

strong relationship between attitudes and behaviour (Bennett and Murphy, 1997). Therefore, studies that aim to measure attitudes require the researcher to fully understand an attitude as part of a psychological process which in turn influences an individual's behaviour (Milton, 1981). It has been shown that poor research training or lack of research training will negatively affect attitudes towards research (Aslam, Qayyum, Mahmud, Qasim and Haque, 2004), and hence negatively affect behaviour or in the case of EBP, low utilisation of literature in practice (Bohner and Dickel, 2011). Haldeman (2005) emphasised that the survival of the chiropractic profession will be greatly determined by its commitment to research and consequently, EBP. In the same way, it has been suggested that a positive attitude towards research and continuous involvement in the research process, have been positively correlated with implementation of research findings in practice (Varcoe and Hilton, 1995).

The study conducted by Hall (2011) (n= 7) in the United Kingdom investigated the attitudes of chiropractors towards EBP. Hall believed that the development of research was important in order to add credibility to the chiropractic profession. The study had a qualitative study design which included seven practicing chiropractors. The author acknowledged the sample size to be small and identified that a larger study would be required in future to establish if the results of that study can be affected to the entire population of chiropractors in the United Kingdom. The results of that study demonstrated a positive attitude towards research although participants viewed EBP as more of an academic interest as opposed to an important factor of everyday clinical practice. This highlights a discrepancy between positive attitudes towards research and actual utilisation of research in practice. Furthermore, the study showed that the interviewed chiropractors felt that they lacked the skills required to critically appraise literature and attributed their lack of utilisation of EBP to this (Hall, 2011). There have been limited studies that have ventured into the attitudes of chiropractors towards EBP (Hall, 2011) and this appears to remain true, due to the lack of ongoing research in this field, especially in a South African context.

Walker et al. (2014) (n = 584) surveyed Australian chiropractors measuring their attitudes and beliefs about EBP and their use of research literature and clinical practice guidelines. They used a questionnaire that had been previously utilised by Jette et al. (2003) which was initially developed to survey physical therapists. The questionnaire was modified to suit the intended population. This study received a 13% response rate and subsequently, the authors stated that caution should be exercised in determining whether the views of the study sample would be representative of the entire Australian chiropractic population. While this was the case, the study demonstrated a generally positive attitude towards EBP with respondents showing a keen interest in personal improvement of EBP skills due the positive perception that EBP would show usefulness in practice. It is possible that only those that were interested in the

topic selected to partake in the study, thus biasing the outcome. Notwithstanding, the favourable inclination towards EBP did not translate to increased utilisation of evidence to inform clinical decision-making (Walker et al., 2014).

The results seen with chiropractors is consistent with other healthcare professions as physical therapists surveyed by Jette et al. (2003) had generally positive attitudes towards EBP. Results from this study showed that respondents perceive the use of evidence in practice to be necessary, that literature is helpful in clinical decision-making and that evidence improves the quality of patient care. The questionnaire from this study has been used in the current study. Burns and Grove (2005) believe that greater emphasis should be placed on EBP in the hope of the health care sciences becoming evidence-based professions.

2.2.3.3 The influence of knowledge and skills on the perception of evidence-based practice

It has been shown that chiropractic institutions offer a program comprising both basic and clinical sciences (WHO, 2005). The principles and practice taught at colleges prepare the student adequately to enter into private practice in order to treat patients (Coulter and Shekelle, 1997). However, the need for ongoing research is essential in order to afford patients the opportunity to reach optimal recovery and an improved quality of life based on clinical evidence (Haneline, 2006). The profession must also be willing to incorporate EBP throughout its college programmes (Newell and Cunliffe, 2003). Leaders in medical education are now developing syllabi that train future medical professionals to apply the latest and most appropriate evidence together with the patient's personal values to reach a clinic decision. This is a major advancement as undergraduate students were previously trained to merely recollect facts (Ghosh, 2004). The chiropractic profession has made significant progress throughout the years and continuation of emphasis on both research and EBP remains the responsibility of future chiropractic graduates (Gordon, 2012). Their engagement and utilisation is strongly influenced by their attitudes towards EBP, as a means of progressing chiropractic (Newell and Cunliffe, 2003).

There is an abundance of information on healthcare and a clinician would need to acquire certain skills and knowledge in order to determine the best available research for the treatment of the patient using the relevant evidence (Pravikoff, Tanner and Pierce, 2005). It has been suggested that evidence-based skills are introduced at an early stage to ensure that experience is gained in basic literature searches and critical appraisal of literature and hence, utilisation of evidence in clinical decision-making (Smith, 2004). According to Watson and Buchanan (2005), in order for EBP to become a central theme in practice, it needs to be integrated significantly into undergraduate and postgraduate programmes. The skills required

for practitioners to be evidence-based should be identified, broken down into components and incorporated in increments throughout the undergraduate curriculum so that it may be developed further. Practitioners are encouraged to utilise evidence to determine the effectiveness of different treatments and thereafter, selecting techniques most suited to the presenting patient which have been proven to be effective. Therefore, it is essential for practitioners to fully understand the process of EBP as well as acquire the skills required to source reliable literature in order to practice EBM (Iles and Davidson, 2006).

Studies conducted in a South African context have found that chiropractic students and graduates alike are unconvinced that tertiary institutions provide adequate preparation, skills and knowledge in order to conduct, evaluate and utilise literature in practice (Bunge, 2007; Black, 2008; Rieder, 2010). Bunge (2007) (n = 47) surveyed chiropractic graduates from the UJ about postgraduate student confidence in their knowledge and skills acquired during the chiropractic course and found that 56% reported low or no confidence in conducting research, even after having completed their Master's degree. The participants of this study suggested that improvements can be made to ensure higher understanding of the research process by means of additional research tutors, greater exposure to preceding literature and practical research courses within the curriculum which may translate to higher utilisation of EBP.

In a similar study conducted on DUT chiropractic graduates (n = 62), Black (2008) reported that only 17.7% of participants found research methods and techniques as a subject to be useful and only 48.4% of participants saw value in the research process and completion of a dissertation. Respondents further explained the lack of practicality of these factors in their profession (Black, 2008). It is possible that respondents are unable to translate the skills they have learnt in the research process to the evidence-based process. In the same way, Rieder (2010) found that chiropractic students at DUT demonstrated a negative attitude toward research as a subject and its ability to adequately prepare students to conduct a research project. These findings may be skewed by the survey including first and second year students who had limited experience in research. On the contrary, students displayed a more positive attitude about research being a mandatory part of the chiropractic qualification (Rieder, 2010).

The results of the aforementioned studies revealed that graduates and students at chiropractic institutions in South Africa felt that research as a subject did not provide the necessary skills and knowledge required in order to complete a Master's dissertation which can be related to a negative attitude towards research and hence, have a negative effect on their ability to conduct research. As a result of perceived lack of preparation in research methods from their respective chiropractic institutions, it is likely that a negative attitude towards research may be carried forward into their professional chiropractic careers and negatively influence their

utilisation of EBP (Gordon, 2012). Many tertiary institutions have identified limited external education and research funding as significant causes of hindered chiropractic institutional development. Initiatives have been enforced since and are currently focusing on developing and prioritising research within the chiropractic profession, emphasising the need for research skills and knowledge in an effort to increase the implementation of EBP (Adams and Gatterman, 1997).

It should be noted that there is a discrepancy between teaching of EBP principles and the application thereof. Many tertiary institutions have chosen the route of integrating EBM teachings into academic curricula in an effort to bridge the gap between the teaching and practicing of EBM by incorporating EBM into clinical cases as opposed to teaching EBM as an independent concept (Korenstein, Dunn and McGinn, 2008). However, Yew and Reid (2008) found that these efforts may not have been successful. Their study aimed to determine the long-term behaviour of students after completing a three year critical appraisal/EBM integrated curriculum and participants included medical school graduates who had been in practice for three to five years. The results of this study showed respondents did not regularly utilise the EBM skills acquired at university. Instead, most of the respondents justified that they attended continuing education meetings, relied on the clinical judgement of their colleagues, and occasionally read journals in order to keep abreast of the wealth of new evidence.

The implications of a lack of understanding of research terminology are dire. False understanding could lead to improper conclusions and ultimately bad practice (Hagino, 2003). Therefore, it is suggested that a good understanding of research terminology as well as a proper understanding of scientific paper appraisal is essential for EBP to be implemented. However, it has been suggested that evidence-based skills may be taught but not necessarily practiced in the future (McGinn, Wyer, Newman, Keitz, Leipzig and Guyatt, 2004). In order for chiropractors and other healthcare professionals to stay current with the abundance of published research, routine sourcing of this research is essential (Hall, 2011). The skills required to formulate a researchable question, appraising of literature and utilisation of literature are increasingly taught at workshops aimed at multi-professional audiences which are aimed at enabling professionals to access evidence easily (O' Donnell, 2004). The central theme of the above findings is that practitioner's perception of EBP needs to be changed, their knowledge of research terminology needs to improve and subsequently, evidence-based practices need to progress (d'Hotman de Villiers, 2014).

2.2.3.4 Association between skills and utilisation of evidence-based practice

The advancement of EBM hinges greatly on regular execution of the procedures outlined for its implementation. While a practitioner's clinical expertise is vital in the application of clinical

evidence to a patient's clinical presentation, it is up to the practitioner to ultimately determine the best use of the information, specific to the presenting case (Haneline, 2006). In a study conducted on nurses (Fink, Thompson and Bonnes, 2005), the authors postulated that the lack of utilisation of EBP could be attributed to the poor preparation offered to healthcare professionals within their tertiary education programs. Furthermore, they stated that this reality places a significant burden on healthcare and emphasised the gap that needs to be filled between the knowledge and skills required to access EBP, and the utilisation thereof. It has been stated that while case studies have an important role to play in EBP, practitioners need to be aware of the hierarchy of clinical papers that exist if they wish to change their treatment or more importantly, utilise literature to inform EBP (Pollentier and Langworthy, 2007).

Many studies (McColl et al., 1998; Siegfried, Swingler, Seedat, Muller, Churchill and Stein, 2003; Suter, Vanderheyden, Trojan, Verhoef and Armitage, 2007) demonstrate a relationship between acquisition of skills and utilisation of literature which is consistent amongst healthcare professions. In a study conducted by Suter et al. (2007) (n = 483), perceptions of research, frequency of use of research findings in practice, and the level of research skills of chiropractors and massage therapists in Canada were investigated. Predictors of application of research findings in clinical practice were also explored. The results of this study revealed that neither chiropractors nor massage therapists consistently applied research in practice and the authors linked this to a possible lack of research education and research skills. Similarly, a study was conducted on South African psychiatrists and general practitioners by Siegfried et al. (2003) on EBP and mental health care. Practitioners surveyed displayed a low overall understanding of research terminology, however, respondents showed a high willingness to understand EBP. This gives rise to the idea that a better understanding of research terminology may translate to a higher utilisation of EBP in practice.

These results were reiterated by McColl et al. (1998) (n = 302) who focused on the perceptions and attitudes of general practitioners in England to EBM. Practitioners were welcoming to the idea of EBP but stated that their level of skills and knowledge in accessing literature, extracting pertinent information from literature and reviewing publications were poor, resulting in a lack of EBM in practice. The study went on further to determine perceived barriers to EBP and the major perceived barrier expressed by respondents to practicing EBM was insufficient personal time. Respondents further explained that the best way to move away from opinion-based practice and towards EBP was the use of clinical practice guidelines or by synthesis of protocols developed by colleagues yet studies show that these are also underutilised (Suter et al., 2007; De Wet, 2015).

2.2.3.5 Perceived barriers to evidence-based practice

While Haneline (2006) agrees that it is difficult to stay abreast of the latest trends in healthcare, he also emphasised the importance of EBP, the clinical experiences of practitioners, and the patient's core values and expectations. While this is the case, it is important to address possible barriers to the uptake of EBP.

The year 1993 saw the release of the World Wide Web. At the time, this brand new technology had introduced a ground breaking format for the global dissemination of information. The internet made it possible for practitioners to easily access literature and to apply EBP. Since then, a wide range of medical databases have been made available which are dedicated solely to providing doctors with relevant clinical research evidence. This innovative technology, whilst helpful and convenient, introduces a possible barrier to EBP. Practitioners who were trained prior to the launch of the internet may be less informed about databases that are currently available or may even lack the skills and proficiency required to find, critically appraise and implement up-to-date research in clinical decision-making and hence, in EBP (De Wet, 2015).

Numerous reasons have been suggested for the lack of use of EBP by healthcare practitioners (Hall, 2011). These barriers include a lack of understanding of research terminology (McColl et al., 1998; Young and Ward, 2001; Young et al., 2002), time constraints (McColl et al. 1998; Young and Ward, 2001; Carrion et al., 2004), limited access to articles (Dahm et al., 2009) and the perceived limited impact of research on clinical practice (Caldwell et al., 2007). Apart from these barriers, there is also a lack of knowledge of actual research-related issues which included the inability to conduct a literature search, lack of skills to critically appraise literature and the inability to apply evidence to a clinical setting (Fernandez and Delaney, 2004). Some chiropractors have acknowledged that research was important to the profession but stated that it appeared to be detached and irrelevant to their own practice life (Hall, 2011).

Chiropractors may dismiss the ideas of EBP based on flaws in the model and these criticisms may have led to a lack of treatment which is evidence-based (Cohen, Stavri and Hersh, 2004). The common criticisms can be categorised in three ways: limitations universal to the practice of medicine, limitations unique to EBP and the misperceptions of EBP (Straus et al., 2000). The application of a generalised theory to an individual patient needs a large amount of clinical judgement which may present as a problem due to the possible lack of studies relevant to that specific patient's condition (Fairhurst and Huby, 1998; Mayer and Piterman, 1999; Oswald and Bateman, 2000; Cohen et al., 2004).

Proponents of EBP have stated that the goal of EBP is to save medical practice from bad practice habits such as wide variations of treatment for common clinical cases in practice, the

use of unproven interventions, and failure to apply consistent practice guidelines. Opposing points of view refute the significance of these issues, and disagree that EBP can provide solutions to them. Furthermore, opponents are dismissive of EBP on the basis that there are inherent philosophical and practical weaknesses (Cohen et al., 2004).

Kawchuk, Bruno, Busse, Bussières, Erwin, Passmore and Srbely (2013) presented an overview of barriers believed to impede the implementation of EBP by chiropractic professionals. These included:

- 1) Limited research capacity due to lack of research conducted by members of the chiropractic profession;
- 2) Negative attitudes of practitioners towards research;
- 3) The need to fully implement broad-based EBP content in chiropractic training programmes;
- 4) Limited interaction with colleagues due to a large percentage of chiropractors practicing in solo practices;
- 5) Limited exposure to clinical guidelines;
- 6) Lack of co-ordination between practitioners and researchers to disseminate and implement guidelines and
- 7) Ongoing debates about contrasting approaches of practice and confusion about the identity of the chiropractic profession.

Other studies investigating a population of nurses (Brown et al., 2009) and chiropractors (Walker et al., 2014) identified further barriers as:

- 1) a lack of time and
- 2) the lack of generalisability of literature to a broader population.

As demonstrated in the above studies as well as in a study conducted by O'Donnell (2004) (n = 289), a common finding is the lack of time of health care professionals to read literature and apply EBP, as well as the declination of practitioners to appraise the research evidence themselves. Furthermore, O'Donnell (2004) explained that innovative ways of presenting current evidence to practitioners should be established in order to provide an accessible format which allows practitioners to easily understand research findings and subsequently, apply them to treatment protocols. Barriers to EBP differ between professions as the challenges experienced by different healthcare practitioners such as general practitioners and

nurses would differ to that of chiropractors (McKenna et al., 2004). Limited studies have explored the barriers experienced by chiropractors and it has been suggested that further studies should aim to identify these challenges in implementing EBP (d'Hotman de Villiers, 2014).

2.3 Conclusion

The development of a scientific, research-based treatment protocol is vital to the future of chiropractors and the acceptance thereof (Wyatt and Post-White, 2005). There is a growing need for chiropractors to maintain their clinical competencies through continuing professional education and development (Bolton, 2002). Even though the attitudes of chiropractors towards EBP is favourable (Hall, 2011), there is a notable discrepancy between positive attitudes and utilisation. With the utilisation of clinical experience and current research, a chiropractor can make clinical decisions which are effective and will promote effective healthcare delivery and patient care (Hall, 2011). The literature has shown that chiropractors from the developed world have a generally positive attitude towards EBP. However, in a South African context, emphasis has been largely on research. Literature reveals that EBP is the most important concept that integrates clinical expertise and research evidence in making decisions for patient care. This concept has been researched in most healthcare disciplines. However, there is no research that has been conducted to explore the knowledge of, attitudes towards, perceptions of and perceived barriers to EBP by chiropractors.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides the research design for this descriptive study and the methods employed for collection and analysis of data. In addition, the study design, study population, sampling procedure and characteristics, research procedure, questionnaire background and design are outlined. Furthermore, an outline of the statistical analyses and ethical considerations are discussed.

3.2 Study design

Creswell (2013) described methodological design as a framework for conducting a study that includes methods, methodology, sampling and tools involved in conducting quantitative or qualitative research so that conclusions may be drawn. This study utilised a cross sectional descriptive survey design in the quantitative paradigm administered to chiropractors practicing within the eThekweni municipality. Furthermore, open-ended questions were included to provide a qualitative aspect to the responses in order to gain further depth of understanding of the topics being considered.

Quantitative research was defined by Burns and Grove (2010) as a “formal, objective, systematic process to describe and test relationships”. Furthermore, Creswell (2013) stated that quantitative research results in quantifiable data that can be analysed and represented using numbers and statistics. A descriptive study design allows a researcher to gather information from a sample of a population to provide an accurate portrayal of characteristics such as behaviour, opinions, beliefs and knowledge towards a specific area of interest (Burns and Grove, 2010). Questionnaire studies aim to collect opinions from participants who have reasonable knowledge about a particular topic (de Vos, Strydom, Fouche and Delport, 2005). Surveys can be used for descriptive, explanatory or exploratory research and are useful in studies that aim to determine attitudes and perceptions of a sample population towards a topic (De Vaus, 2014). Therefore, this design was chosen to meet the objectives of this study.

A structured quantitative questionnaire was utilised in order to gather demographic characteristics, level of knowledge and skills, attitudes, utilisation, perceptions, and perceived barriers towards evidence-based practice (EBP) by chiropractors in the eThekweni

municipality. A structured survey allows minimal misinterpretation of results due to bias being kept to a minimum (Rattray and Jones, 2007). This design was most appropriate as similar studies have utilised a cross sectional descriptive survey design in the quantitative paradigm to determine health care professionals' perceptions, knowledge, utilisation and barriers regarding EBP (McColl et al., 1998; Jette et al., 2003; Walker et al., 2014).

However, it must be noted that when conducting questionnaire based research the researcher relies on respondents to be honest in their answers. Therefore, participants may respond in a manner which they may view as pleasing to the researcher, which may not necessarily be a reflection of their true feelings. This may result in inaccurate responses and skewed results (Dyer, 1997). Similarly, a potential participant may be more inclined to respond to the topic being researched if it is of interest to them which could result in the sample not accurately reflecting the population being investigated (Denscombe, 2014).

This study design was approved by the Durban University of Technology Institutional Research and Ethics Committee (IREC) (REC 94/15) (Appendix A).

3.3 Study population

Brynard and Hanekom (2005) explain that in the context of research methodology, a population refers to subjects, objects, cases, events or activities specified for the purpose of sampling. Sampling is a process that is always strategic and sometimes mathematical, which involves the utilisation of the most practical procedures in order to gather a sample that best represents the greater population (O'Leary, 2004). In this study, all practicing chiropractors in the eThekweni municipality with a practice telephone number with the dialling code (031) who met the inclusion and exclusion criteria were invited to participate in the study.

A list of potential participants was compiled using a list provided by the Allied Health Professions Council of South Africa (AHPCSA) which was checked against a list of chiropractors practicing in South Africa from the Chiropractic Association of South Africa (CASA). Participants were selected using non-probability purposive sampling. According to Kumar and Phrommathed (2005), purposive sampling is useful when a researcher aims to describe a phenomenon, create a historical reality or to build on an idea of which only a little is known.

At the time of the study, the total number of registered chiropractors within the eThekweni municipality as per correlation of information provided by the AHPCSA and CASA was 135:

- 28 had moved out of the eThekweni municipality, could not be contacted or were no longer practicing.
- Six were excluded as they participated in the focus group, pilot study and due to involvement with the Chiropractic department at DUT.

This calculation rendered the total number of eligible chiropractors to be 101. A response rate of 70% (n = 71) was selected. This response rate was selected based on the expertise of the statistician as it allows for generalisations to be made about the population (Singh pers. comm, 2016).

3.4 Characteristics of the population

In order to participate in the study the potential participants had to meet the following criteria:

3.4.1 Inclusion criteria

1. Participants must have been registered with the AHPCSA as a chiropractor.
2. Participants must have been in practice for a minimum of six months since qualifying.
3. Participants must have currently been in practice within the eThekweni municipality (dialling code 031).
4. Participants were required to provide written informed consent to participate in the study.

3.4.2 Exclusion criteria

1. Chiropractic students, assistants, DUT chiropractic academic or administrative staff.
2. Any chiropractor who may have partaken in the expert group or during pilot testing.
3. Any chiropractor who had been in practice for less than 6 months.

3.5 Questionnaire background and design

3.5.1 Questionnaire development

In order to find a suitable instrument the researcher conducted an internet search using the following search terms: evidence-based practice, knowledge, attitudes, perceptions, and barriers. Similar research from local and international sources were identified and reviewed to determine which data collection tool best suited the aims and objectives of this study (McColl et al., 1998; Jette, 2003; Hadley et al., 2007; Suter et al., 2007; Keyter, 2010; Hall, 2011; Gordon, 2012).

A study instrument utilised by Jette et al. (2003) was identified as being the most suitable to the aims and objectives of this study. The questionnaires were designed to explore participants' understanding of the term EBP and terms related to EBP; knowledge of and skills for; personal attitudes toward, use of, and perceived barriers to EBP; personal use and understanding of clinical practice guidelines; availability of resources to access information and personal skills in using those resources.

Prior to distribution, Jette et al. (2003) presented the questionnaire to a sample of physical therapists rendering it reliable. While the questionnaire has been tested for consistency (content validity) and reliability (content reliability), it has not been previously utilised in a South African population.

After permission was obtained from Dr Jette to utilise and adapt the questionnaire (Appendix B), questions regarding demographic and practice data were modified by the researcher to ensure that they were relevant to a South African chiropractic population (Appendix C).

A total of four open-ended questions were included in the questionnaire as the Jette et al. (2003) questionnaire did not allow participants to openly express their opinions in this manner. These questions were aimed to gain further insight into the topic by allowing respondents to provide their views, thus making the data collected descriptively rich, informative, and qualitatively meaningful. This approach uses the strengths from both paradigms therefore giving the researchers an expanded understanding of research problems (Creswell, 2013).

3.5.2 Research assistants

Two research assistants (Appendix D; Appendix E) were trained in the method of data collection and were utilised to assist in data collection. The first research assistant was a fellow Master's student who was also conducting surveys and assisted in manual distribution and collection of the questionnaires while the second research assistant was the DUT clinic student administrator who was responsible for managing electronic responses from participants.

3.5.3 Study questionnaire validity and reliability

An expert group was set up and pilot testing was conducted in order to validate the measurement tool.

3.5.3.1 Expert group testing

Following DUT Institutional Research Ethics Committee (IREC) approval, the modified questionnaire was validated through an expert group. The expert group consisted of the researcher, two research supervisors, fellow researcher, two chiropractic Master's students and two practicing chiropractors to determine face and content validity. Face validity is the degree to which the procedure, namely validation of the questionnaire, appears effective in terms of the purpose of the study (Mouton, 2011). Content validity refers to when the content of the questionnaire is considered effective and well-rounded enough to be able to assess a particular concept (Mouton, 2011). Each person was required to read and complete a letter of information and consent (Appendix F), an attendance register (Appendix G) and a confidentiality statement and code of conduct (Appendix H) prior to the commencement of the expert group.

The participants were given an overview of the study and the aims and objectives were explained. The questionnaires were then distributed to the participants who were given time to scrutinise the questionnaire and make notes where necessary. Thereafter, the researcher then read each question aloud and participants were given an opportunity to give their feedback. All amendments made at the expert group were made after unanimous agreement and were affected to the main questionnaire (Krueger and Casey, 2014). As per the DUT IREC protocol, a list of all amendments to the document were submitted (Appendix I) and a post-expert group questionnaire was formulated (Appendix J).

3.5.3.2 Pilot study testing

Thereafter, pilot testing was conducted. Pilot testing involved a small scale trial in which four participants who qualified to partake in the main study by means of meeting the inclusion and exclusion criteria, completed the questionnaire. Each person was required to read and complete a letter of information and consent (Appendix K) and the post-expert group questionnaire. The purpose of a pilot test is to ensure that everyone in the pilot test interprets the questions in the same way, to test the appropriateness of the questions and their comprehension and to ensure that there was no ambiguity, grammatical or measurement irregularities (Thabane, Ma, Chu, Cheng, Ismaila, Rios and Goldsmith, 2010). Any chiropractor who participated in the pilot testing was excluded from the main study. As per the DUT IREC protocol, a list of all amendments to the questionnaire (Appendix L) together with the final questionnaire (Appendix M) were submitted to the DUT IREC for final ethics approval.

3.5.4 Measurement tool

The final questionnaire consisted of 19 questions covering the following areas:

Table 3.1 Questions covered in the final questionnaire

Question Number	Outcomes	Structure of question
Q 1-8	The participants' demographic and practice data	Tick appropriate response / short written response
Q 9	The participants' method undertaken in clinical problem solving	Open-ended
Q 10	The participants' understanding of the term EBP	Open-ended
Q 11	The participants' perceived barriers to using evidence in practice	Open Ended
Q 12	The participants' continuing education activity	"exceed the requirements/met the requirements/less than required/none" responses
Q 13	The participants' personal attitudes toward, use of, perceived benefits and limitations of EBP	5-point Likert scale with "strongly disagree" and "strongly agree" as anchors
Q 14	The participants' level of attention to and utilisation of literature	Number of times per week with "none or 1" as minimum and "16+" as maximum as anchors
Q 15.1 - 15.3	The participants' personal use and understanding of clinical practice guidelines	"yes/no/do not know" responses
Q 15.4 - 15.6	The participants' availability of resources to access information and personal skills in using those resources	"yes/no/do not know" responses
Q 16	The participants' educational background, knowledge and skills related to accessing and interpreting information	5-point Likert scale with "strongly disagree" and "strongly agree" as anchors
Q 17	The participants' understanding of terms related to EBP	3-point Likert scale with "understand completely" and "do not understand" as anchors
Q 18	The participants' perceived barriers to using evidence in practice	List of 9 possible perceived barriers and participants were asked to rank their 3 greatest barriers
Q 19	The effect of knowledge and skills of EBP principles on utilisation of EBP	Open-ended

3.6 Data collection

After IREC approval was granted and the study tool had undergone expert group and pilot testing, the formal procedure of data collection commenced. The eThekweni municipality was divided geographically and allocated by convenience to either the researcher or research assistant who delivered the questionnaires via hand to the participants. Participants were contacted telephonically prior to being approached by the researcher and/or the research assistant. Participants were given the letter of information and consent (Appendix N) and the research questionnaire to complete at their own convenience and were requested to provide their e-mail addresses to the researcher or the research assistant. Participants were given an

electronic reminder if after two weeks the researcher or research assistants had not received a completed questionnaire. A second reminder was then sent a week later.

Two separate ballot boxes per researcher and research assistants were utilised when collecting the hand delivered documents, in order to ensure that the letter of information and consent be placed in one box and the questionnaires in another, thus ensuring confidentiality. The documents were given to the participants with the instructions that they should not place any information (name, surname) on the questionnaire. This was to ensure that the questionnaire information remained anonymous (Mouton, 2011). The questionnaires were collected according to the participant's preference, either personally by the researcher or the research assistant or scanned and sent via e-mail – these were decided upon when the questionnaire was delivered to the participants. The questionnaires that were electronically returned were sent to the second research assistant who printed the letter of information and consent and the questionnaire and placed them in separate ballot boxes. The researcher and the research assistants ticked the respondents name off a participant list once questionnaires were returned in order to track respondents. The tracking lists of the researcher and research assistants were compared and updated at the end of each week in order to consolidate an updated list to track non-respondents.

Once data collection was complete, the researcher took possession of all data collection boxes. The data collection boxes were opened; the questionnaires were numbered and coded onto an Excel spreadsheet as outlined by a statistician, in preparation for data analysis. All questionnaires were kept in a locked cabinet during this process. All questionnaires and all materials related to this research will be handed to the Chiropractic department at DUT for storage for five years and thereafter will be shredded on completion of this study.

3.7 Statistical analyses

3.7.1 Quantitative

All sections of the questionnaire were coded into an Excel spreadsheet. Data that were incomplete in the questionnaires were noted as 'missing' or 'unknown' for the purposes of statistical analysis. They were then described, organised and analysed using descriptive and inferential statistics. Data were analysed using the Statistical Package for the Social Sciences (SPSS) Statistics 24.0 and Statgraphics Centurion 15.1 (2006).

Descriptive statistics were used to summarise the quantitative data as means, standard deviations and percentages. Inferential statistics were made possible by cross tabulations.

The methods of inferential statistics are the estimation of parameters and testing of statistical hypotheses (Willemse, 2009). A significant result of " $p < 0.05$ " was considered in this study. Chi-square tests were used for nominal data and ordinal data and the Fisher's exact test was used when Chi-square conditions were violated (Singh pers. comm, 2015).

3.7.2 Qualitative

Although qualitative research can be used for testing hypotheses and theories, in this study, a qualitative approach was used to describe the relationship between knowledge, attitudes and perceptions of EBP as experienced by chiropractors. Thus, this approach was not engaged to test or generate a theory. All open-ended questions in this study were designed to provide respondents an opportunity to freely express their opinions about EBP. These were analysed using a qualitative thematic analysis. Concepts from verbatim responses were extracted and coded using manifest coding, (Saldaña, 2015). All coded concepts were grouped into categories and thereafter into themes using vertical and horizontal approach, according to Strauss and Corbin methodology as cited by Mshunqane, Stewart and Rothberg (2012).

3.8 Ethical considerations

- Permission to conduct the research was obtained from DUT IREC.
- The ethical principle of autonomy was taken into consideration by means of informed consent obtained from all participants prior to participating in the study.
- Justice was addressed as the study included a fair selection of research participants and no exclusions were made with regards to gender or race.
- The results of the study will contribute to the greater body of knowledge of chiropractic in South Africa, therefore complying with the ethical principle of beneficence.
- All data were coded: each questionnaire was numbered with no personal information of the participant appearing on the questionnaire. All completed questionnaires and informed consent forms collected by the researcher were placed in sealed boxes (one box for the signed informed consent and the other for the completed questionnaire). This ensured anonymity. The boxes were opened once data collection was completed and only done so by the researcher. All information was kept confidential, locked in a steel cupboard, and was shared only with the research supervisors and research assistants. All data will be kept in storage for a period of five years. Thereafter, it will be shredded.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the statistical analyses of the data obtained from the questionnaires used in this study. The response rate is first presented followed by the demographic and practice characteristics, research exposure, and CPD activity of the participants. Thereafter, the results are presented under each of the study objectives. In the instance of missing responses, it has been indicated as such.

4.2 Response rate

All eligible chiropractors in the eThekweni municipality were invited to partake in the study (N = 101) of which 51 chiropractors (n = 51) completed the questionnaire, resulting in a 51% response rate.

4.3 Respondent characteristics

4.3.1. Demographic characteristics

4.3.1.1 Gender

The sample consisted of 51% male (n = 26) and 49% female (n = 25) respondents.

4.3.1.2 Age

The mean age of respondents was 37.8 years of age ($SD \pm 7.90$) with a range from 26 to 69 years of age. Figure 4.1 shows that the majority of the respondents were younger than 50 years of age ($n = 48$).

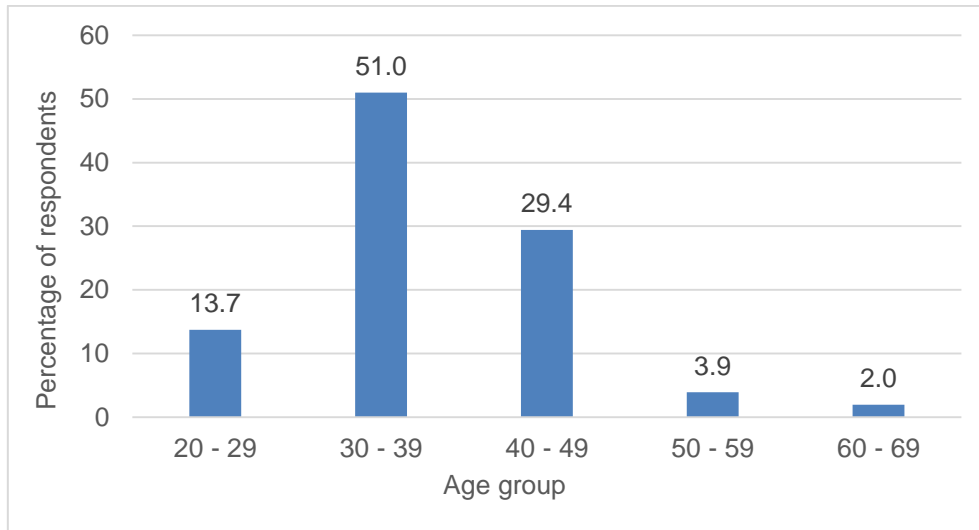


Figure 4.1 Age of respondents

4.3.2 Practice characteristics

4.3.2.1 Years in practice

The duration respondents have been in practice ranged from 1 to 46 years, with a mean number of 11.5 ($SD \pm 7.91$) years. Figure 4.2 shows that the majority of respondents have been in practice for less than 20 years ($n = 45$).

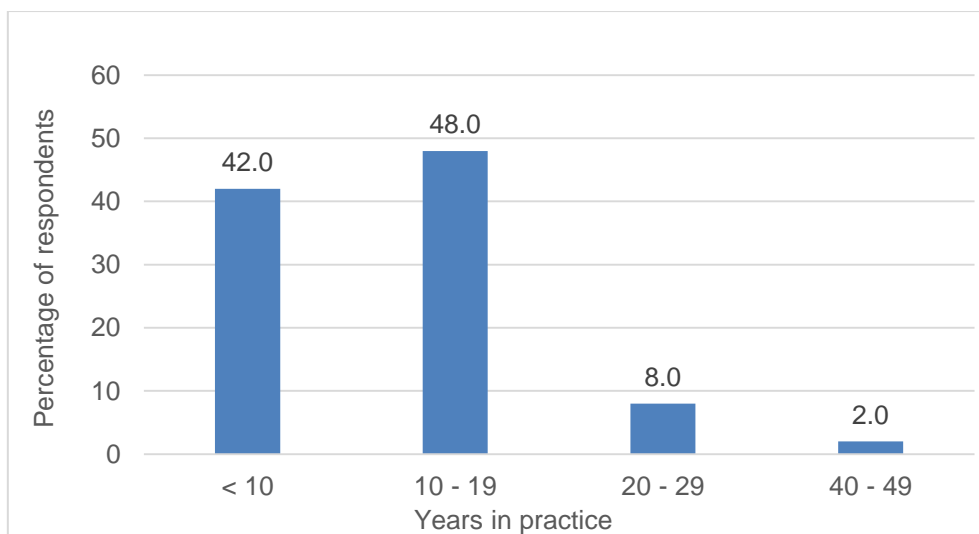


Figure 4.2 Years in practice

4.3.2.2 Hours practiced per week

The mean number of hours practiced per week by respondents was 37.06 (SD±11.78) with a range of 8 to 70 hours worked per week. Figure 4.3 shows that 45% of respondents practiced between 40 and 49 hours per week (n = 23) which indicates that the majority of respondents were in full-time practice.

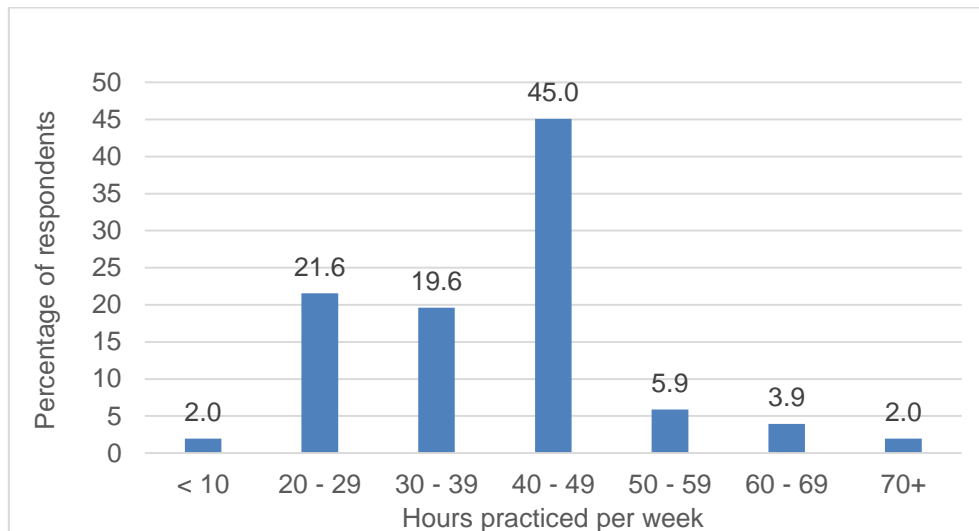


Figure 4.3 Hours practiced per week

4.3.2.3 Respondents' role in chiropractic

Participants were asked to best describe their role in the chiropractic profession by selecting one or more of the pre-defined categories. Figure 4.4 shows that the majority of respondents were in full time practice (n = 39).

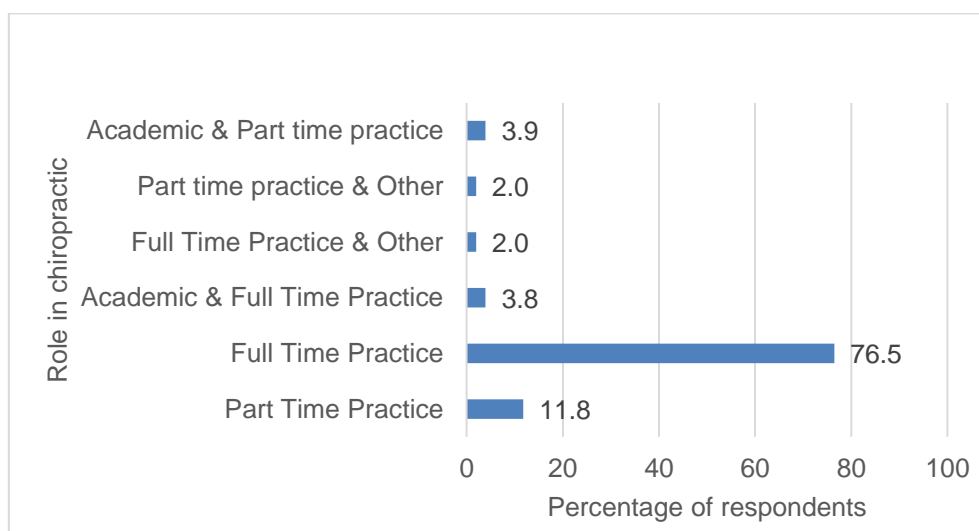


Figure 4.4 Respondents' role in chiropractic

4.3.3 Research exposure and continuing professional development activity

4.3.3.1 Highest academic qualification

Figure 4.5 shows the responses to highest academic qualification obtained, almost all (94.1%, n = 48) of the respondents reported that they had obtained a Master's degree with the remaining three indicating either a Doctor of Philosophy (PhD) degree, specialisation or 'other' - where the respondent did not specify.

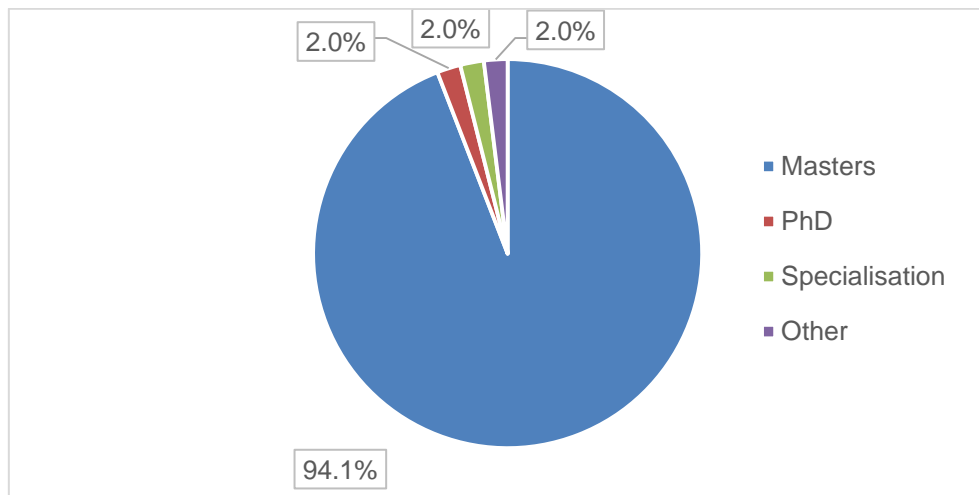


Figure 4.5 The respondents' highest academic qualification

4.3.3.2 Postgraduate training

The majority of the respondents (n = 43) reported not having attended formal postgraduate training such as a degree course, seminar or workshop in epidemiology, research methods or statistics, as demonstrated in Figure 4.6.

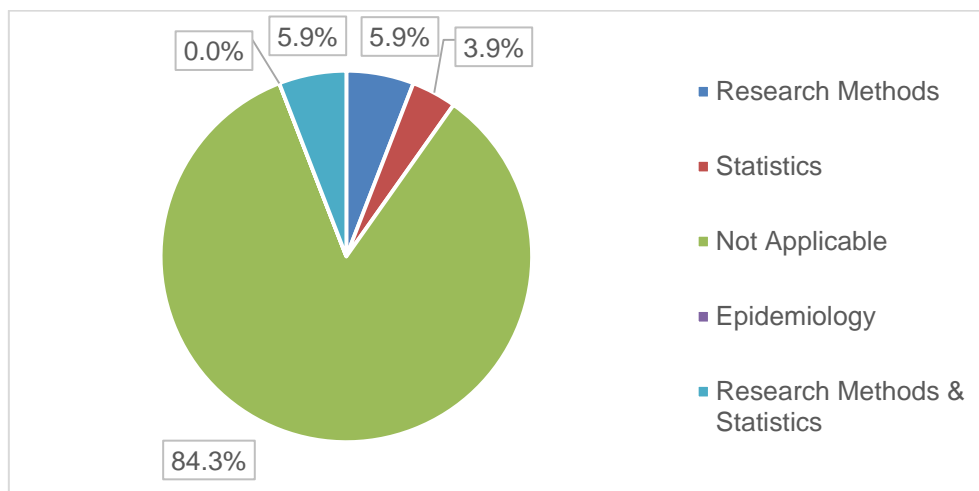


Figure 4.6 Postgraduate training relative to research

4.3.3.3 Personal involvement in research conducted

Due to the structure of the chiropractic programme in South Africa, all respondents were involved in conducting research (100%, n = 51), in order to obtain their Masters qualification and this was reflected in section 4.3.3.1. However, some respondents' involvement in research (n = 10) was not limited to the minimum requirement of a Masters qualification. Table 4.1 shows a description of respondents' involvement in research.

Table 4.1 Personal involvement in research

Involvement in research	n (%)
Postgraduate (Masters / PhD)	41 (80.4)
Supervisor	5 (9.8)
Postgraduate & Supervisor	4 (7.8)
Other	1 (2.0)
Total	51 (100.0)

4.3.3.4 Continuing professional development activity

When asked about their CPD activities, the majority of respondents indicated that they had either met or exceeded the requirements of CPD credits during the past year (71.4%, n = 35) as seen in Figure 4.7. There was missing data from two respondents.

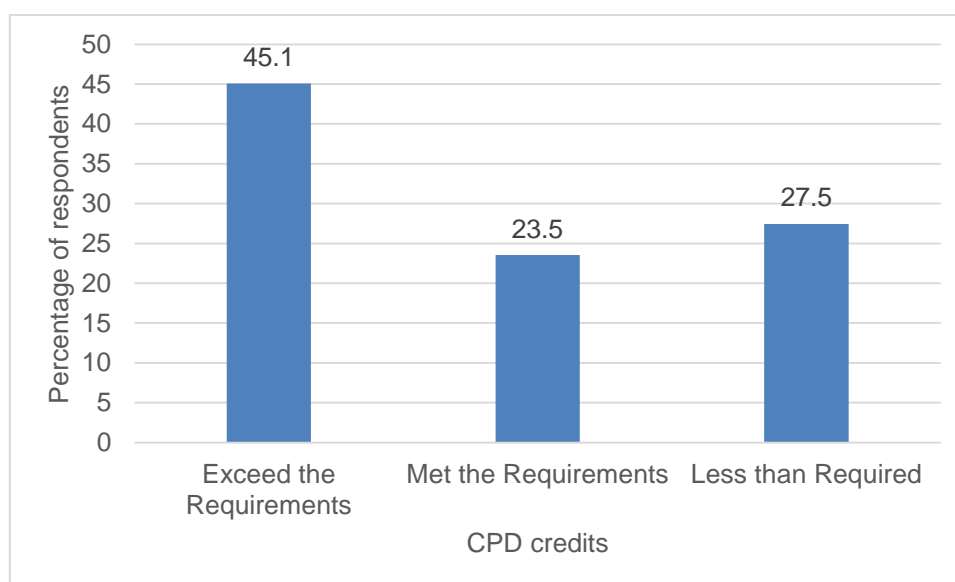


Figure 4.7 Continuing professional development activity

4.4 Objective 1: To determine the attitudes and perceptions towards evidence-based practice by chiropractors (Q 13)

Respondents were asked to indicate their level of agreement with statements relating to their attitudes and perceptions towards EBP. The statements presented to respondents will be outlined below.

4.4.1 Statements associated with positive attitudes and perceptions towards the usefulness of evidence-based practice

Almost all of the respondents had a favourable perception of EBP when asked the statements presented in Figure 4.8, with no respondents indicating that they felt that EBP was not necessary to the practice of chiropractic.

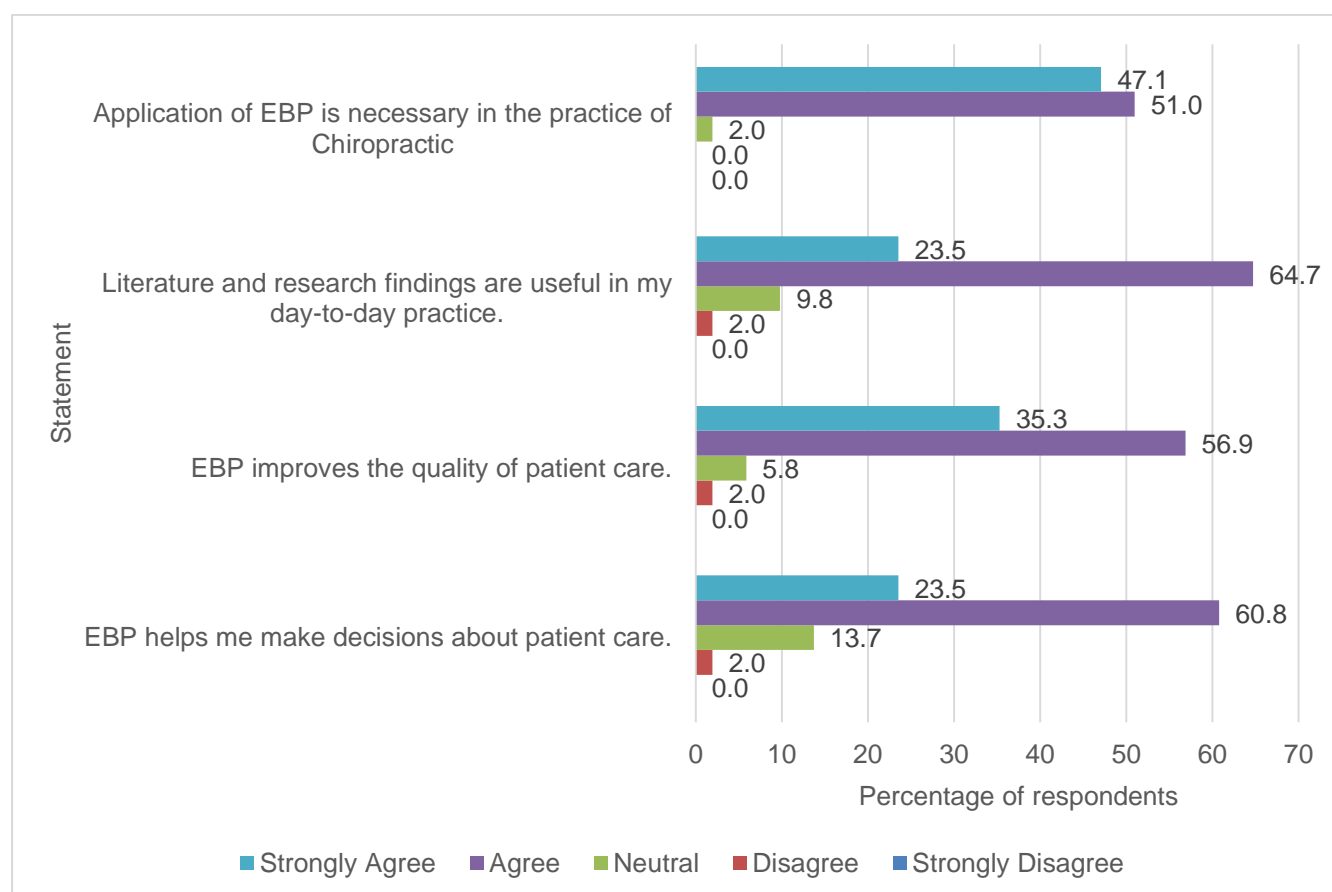


Figure 4.8 Responses to questions indicating a positive attitude and perception towards the usefulness of evidence-based practice

4.4.2 Statements associated with positive attitudes and perceptions towards improving skills and utilisation of evidence-based practice

When asked statements related to the willingness to improve skills and utilisation of EBP, most of the respondents had a positive perception as seen in Figure 4.9. Interestingly, almost a third of respondents were neutral when asked if they needed to increase their use of evidence in daily practice, with the majority indicating that they agreed or strongly agreed with this statement.

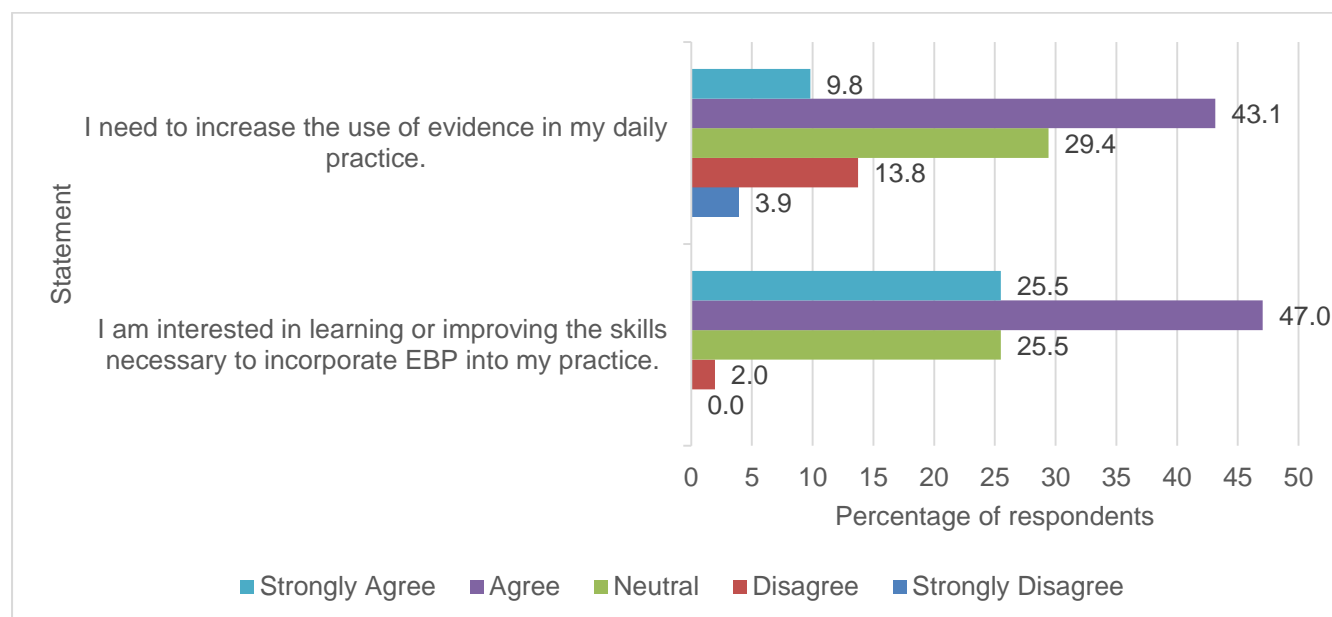


Figure 4.9 Responses to questions indicating a positive attitude and perception towards improving skills and utilisation of evidence-based practice

4.4.3 Statements associated with negative attitudes and perceptions towards evidence-based practice

Respondents mostly disagreed with the negative perception questions as seen in Figure 4.10 indicating a favourable perception towards EBP.

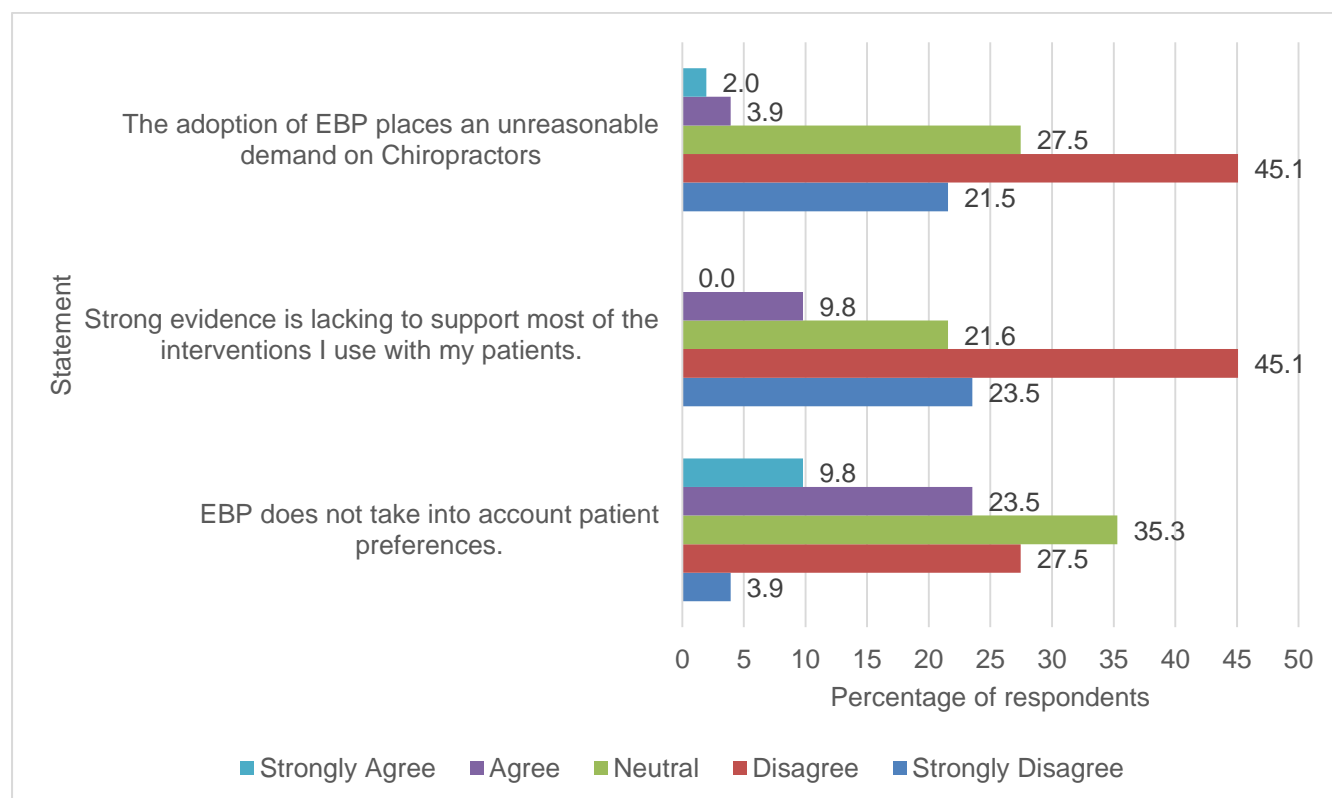


Figure 4.10 Responses to questions indicating a negative perception and attitude towards evidence-based practice

4.5 Objective 2: To identify the level of knowledge and skills of EBP by chiropractors (Q 14, 15, 16, 17)

4.5.1 Level of attention to, and utilisation of, literature

Respondents were asked to indicate the number of times per week that they would read scientific literature, use scientific research findings in their decision making processes and use databases to search for literature. These statements were used to measure respondents' level of attention to and utilisation of literature.

Table 4.2 Level of attention to, and utilisation of, literature

	None or 1 % (n)	2 – 5 % (n)	6 – 10 % (n)	11 – 15 % (n)	16 + % (n)
Read scientific literature related to clinical practice.	45.1 (23)	41.2 (21)	9.7 (5)	2.0 (1)	2.0 (1)
Use scientific research findings in the process of clinical decision-making.	29.4 (15)	33.3 (17)	19.6 (10)	9.9 (5)	7.8 (4)
Use MEDLINE or other databases to search for practice-relevant literature/research.	51.0 (26)	37.3 (19)	7.7 (4)	2.0 (1)	2.0 (1)

From the responses it can be seen that the majority of the respondents indicated that they read scientific literature related to clinical practice (86.3%, n = 44) and used databases to search for practice-relevant literature (88.3%, n = 45) less than five times per week. When asked about their use of scientific research findings to guide clinical decision making, 62.7% (n = 32) of the respondents reported doing so less than five times per week. This information highlights that respondents are engaging with scientific literature when necessary.

4.5.2 Personal use and understanding of clinical practice guidelines

The majority of respondents (80.4%, n = 41) used clinical practice guidelines in their practice, with 29.4% (n = 15) of respondents indicating that they were unaware of the availability of clinical practice guidelines related to their practice (Figure 4.11).

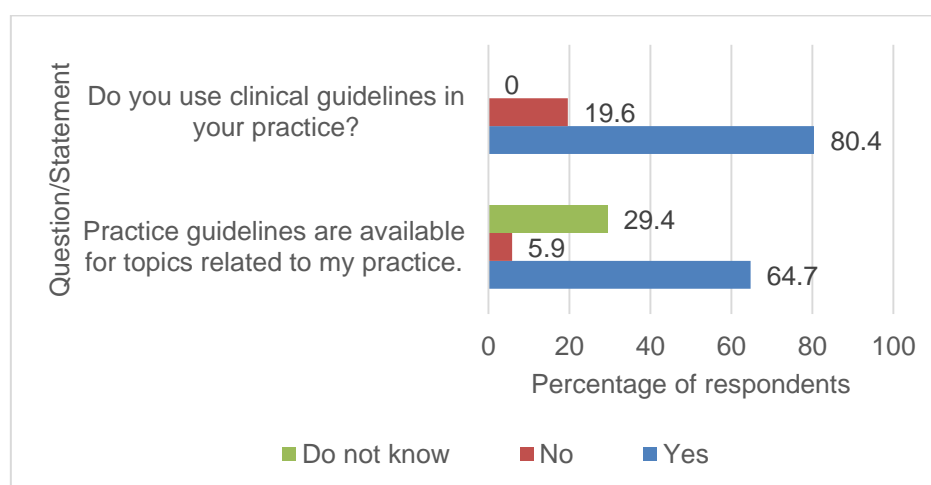


Figure 4.11 Personal use and understanding of clinical practice guidelines

4.5.3 Availability of resources to access information and personal skills in using those resources

When respondents were asked about their ability to access databases and the internet, more than 80% had access at their facility, home or other locations and most reported to be proficient in accessing relevant databases and the internet. This was consistent with the finding that more than two-thirds of the respondents did not have access to current research through professional journals in their paper form which indicates that respondents are more likely to access literature in electronic format.

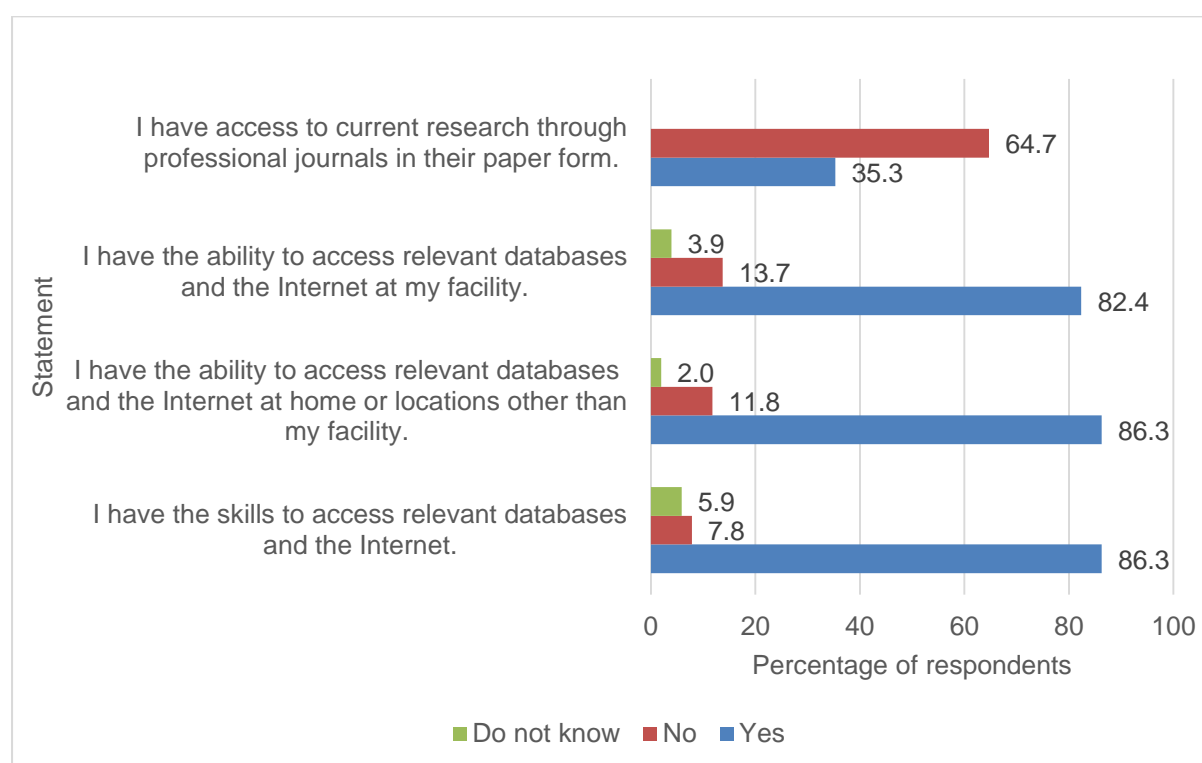


Figure 4.12 Availability of resources to access information and personal skills in using those resources

4.5.4 Educational background, knowledge and skills related to accessing and interpreting information

Figure 4.13 shows that the majority of respondents believe that they had a strong foundation in their knowledge and skills related to accessing and interpreting information and were confident in their abilities, yet almost half of the respondents reported not having received formal training in search strategies to access literature.

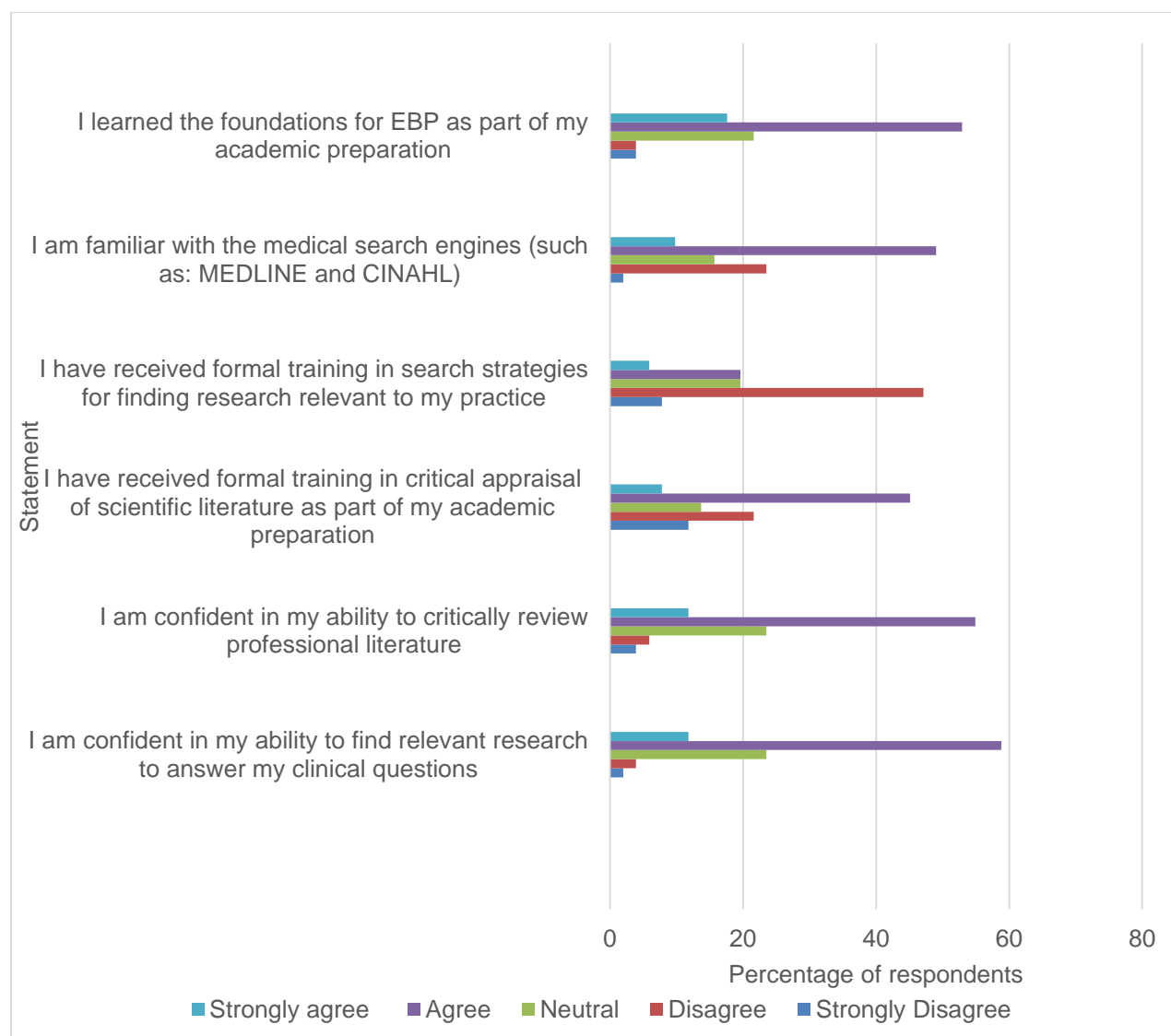


Figure 4.13 Educational background, knowledge and skills related to accessing and interpreting information

4.5.5 Participants understanding of the term 'evidence-based practice'

Participants were asked to explain in their own words, their understanding of the term 'evidence-based practice'. Responses were coded and allocated into one of three themes namely 'research', 'experience' and 'security'.

- Under the theme 'research', the codes reflected that EBP is relying on current and proven research to manage their patients. Respondent six described EBP as *'using the latest, highest quality research to help guide clinical decision-making'*.
- The theme 'experience' was described by respondents as *'the accumulative use of learned knowledge, self-knowledge and past experience...'* (Respondent seven), *'treatment that has been scientifically proven to work for a diagnosis based on a full medical and relevant testing'* (Respondent 29) and *'taking knowledge obtained from research and together with my expertise, treat my patient effectively'* (Respondent 30).
- The theme 'security' was reflected in the codes as reliable, valid, producing an unbiased outcome which was outlined by respondent seven and 11 as *'arriving at a deducible conclusion that a particular treatment will produce a certain measurable outcome'*, *'proven by research conduction and verification processes'* and *'following an honest approach of treating patients within our scope of knowledge'* (Respondent four).

4.5.6 Understanding of terms related to evidence-based practice

Participants were asked to rate their understanding of terms related to EBP using “understand completely” and “do not understand” as anchors. Figure 4.14 shows that of the 50 participants that responded to this question, there was a high level of understanding of terms such as absolute risk, heterogeneity, publication bias, relative risk and systematic review. However, respondents demonstrated partial to no understanding of terms such as confidence interval, meta-analysis and odds ratio. On average, the majority of respondents had a high level of understanding of terms with one-third of respondents having little confidence in their ability to understand terms related to EBP.

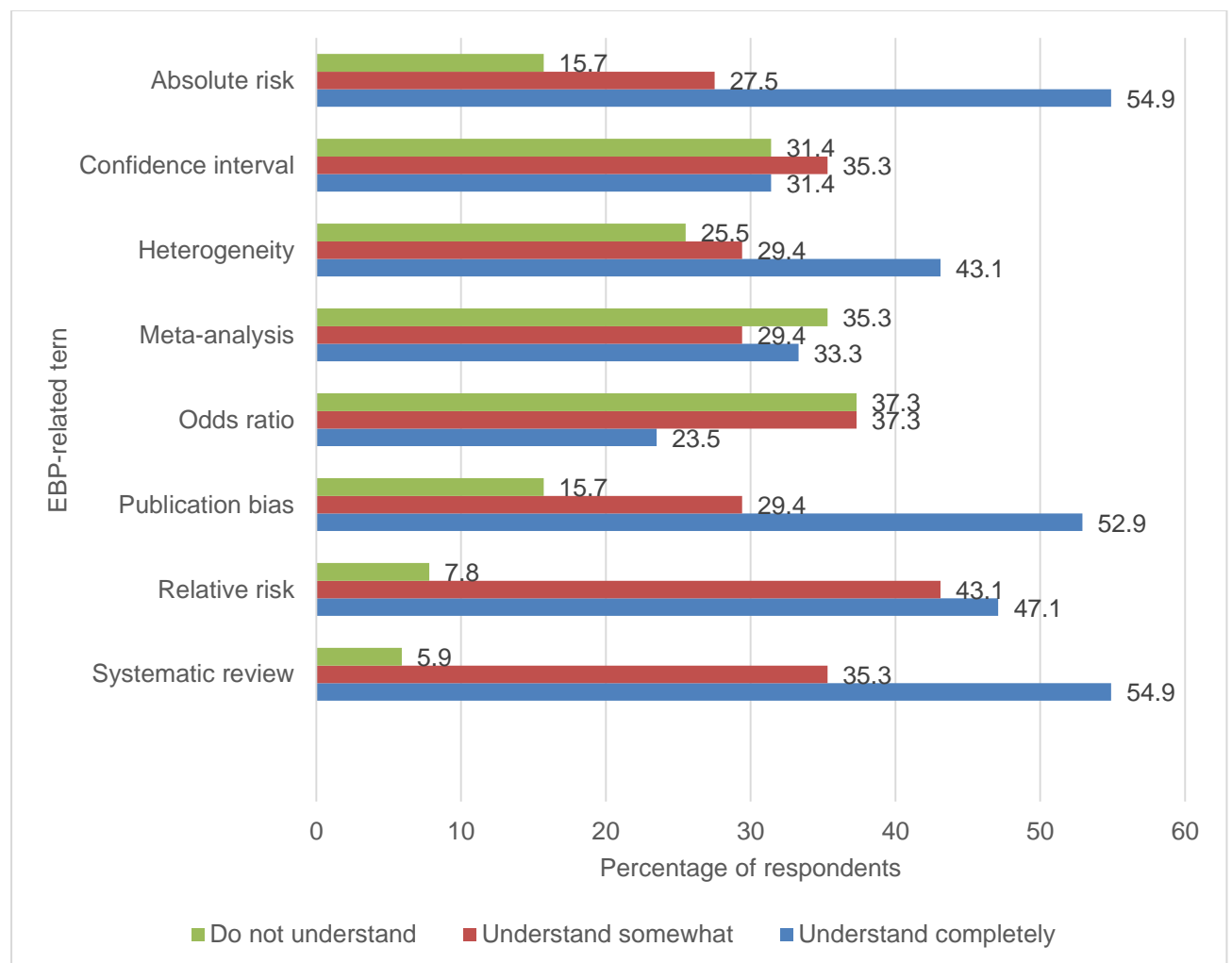


Figure 4.14 Understanding of terms related to evidence-based practice

4.5.7 Participants method used in clinical problem solving

Participants were asked “When faced with a challenging case in your practice, explain the process that you would follow and what resources you would use to clinically solve your problem”. A total of 50 participants answered this question, some providing one response, while others provided up to five responses. A total of 130 responses were received which were allocated into seven codes. From there, two main themes evolved namely ‘research’ and ‘clinical’.

- Under the theme ‘research’ the respondents said that they would conduct research regarding the specific patient case using the internet, articles or books or consult with colleagues. Examples of responses were *‘I would research the symptoms and case via internet case studies and books in my possession’*... *‘I would contact fellow chiropractors and physiotherapists to discuss the case’* (Respondent one).
- Under the theme ‘clinical’ the respondents said that they would go through the full clinical encounter of completing a comprehensive case history, physical examination and clinical chiropractic assessment, conduct a trial of chiropractic treatment, send for further investigations and referral. A respondent described the process followed as *‘Good clinical history, thorough examination, blood tests and x-ray referral if needed, attempt a short course of treatment based on diagnosis and refer if necessary’* (Respondent five).

4.6 Objective 3: To determine the perceived barriers to evidence-based practice by chiropractors (Q 18)

Respondents were given a list of possible perceived barriers and asked to rank their three greatest barriers to their use of EBP in clinical practice. Insufficient time was indicated most commonly amongst respondents as the greatest perceived barrier to their use of EBP in clinical practice (66.7%, n = 34) (Table 4.3). The second most commonly indicated perceived barrier was the lack of generalisability of the literature findings to their patient population (49.0%, n = 25). And finally, the third highest perceived barrier was the inability to apply research findings to individual patients with unique characteristics (45.1%, n = 23), as seen in Table 4.3.

Table 4.3 Greatest perceived barriers to the use of evidence-based practice in clinical practice

Barrier	Respondents that have indicated as a barrier % (n)
Insufficient time	66.7 (34)
Lack of generalizability of the literature findings to my patient population	49.0 (25)
Inability to apply research findings to individual patients with unique characteristics	45.1 (23)
Lack of information resources	23.5 (12)
Lack of understanding of statistical analysis	23.5 (12)
Lack of collective support among my colleagues in my facility	21.6 (11)
Lack of research skills	17.6 (9)
Lack of interest	15.7 (8)
Poor ability to critically appraise the literature	13.7 (7)

In an open-ended question, respondents were asked “Have you experienced any difficulties using EBP?” and there was a wide range of responses. These responses were coded and allocated into one of four themes namely ‘research’, ‘clinical’, ‘experience’ and ‘time and accessibility’.

- The theme ‘research’ consisted of the lack of availability of data in the South African context when compared to global data as outlined in this response: *‘I utilise international websites as I have found it hard to gain satisfactory information via South African databases in all fields of physical therapy’* (Respondent one).
- The theme ‘clinical’ consisted of the codes: ‘specific diagnosis’, ‘patients response to treatment’ and ‘atypical presentations’. An example of these responses are expressed in the following excerpts, respectively: *‘A definite diagnosis is not always possible’* (Respondent 29). *‘The difficulty is not applying EBP from a practitioner’s side but with patient compliance and participation’* (Respondent seven) and *‘There are always the odd exception to the rule’* (Respondent four).
- The theme ‘experience’ was expressed by respondents as *‘Often you will use your own experience and intuition on a patient that may not have a scientific explanation but you know from experience that it works’* (Respondent 28).
- The theme ‘time’ and accessibility’ can be seen in the following responses: *“Most articles are vague or time consuming and searching for relevant, up-to-date and*

reliable articles is a difficult process that can take a lot of time' (Respondent 12) and *"Research is scarce on treatment options available to chiropractors and when there is research available, it is often of poor quality"* (Respondent 39).

4.7 Objective 4: To determine relationships between knowledge of, attitudes towards, perceptions of and barriers to evidence-based practice

4.7.1 The relationship between selected demographic and practice-related variables and knowledge and skills of evidence-based practice

4.7.1.1 Gender, age and years in practice compared to selected questions about the respondents knowledge and skill of evidence-based practice

Gender, age and years in practice did not significantly influence the respondents' answers to the statements in Table 4.4.

Table 4.4 The p-values* for the relationship between selected demographic variables and knowledge and skills of evidence-based practice**

	Gender	Age	Years in practice
I learned the foundations for EBP as part of my academic preparation	0.105	0.987	0.989
I am familiar with the medical search engines (such as: MEDLINE and CINAHL)	0.527	0.636	0.614
I have received formal training in search strategies for finding research relevant to my practice	0.416	0.715	0.336
I have received formal training in critical appraisal of scientific literature as part of my academic preparation	0.338	0.360	0.652
I am confident in my ability to critically review scientific literature	0.204	0.162	0.532
I am confident in my ability to find relevant research to answer my clinical questions	0.290	0.275	0.423

*Fisher's exact test

**p < 0.05

4.7.1.2 Clinical practice guideline use compared to whether the respondents reported receiving formal training in critical appraisal of scientific literature as part of their academic preparation

Responses to “Do you use clinical guidelines in your practice” and “I have received formal training in critical appraisal of scientific literature as part of my academic preparation” were compared and no statistically significant result was found ($p = 0.563$; Fisher’s exact test).

4.7.1.3 Access and availability of information compared to educational background, knowledge and skills

Respondents who indicated that they had the skills to access relevant databases and the internet were more likely to agree with the statement “I am confident in my ability to find relevant research to answer my clinical questions” ($p = 0.016$; Fisher’s exact test). This suggests that a clinician’s confidence in finding relevant research to answer clinical questions was increased in those who possessed the skills to access relevant databases and the internet.

4.7.2 The effect of knowledge and skills on the perception of evidence-based practice

Nine statements regarding the perception of EBP by respondents were compared to statements regarding the knowledge and skills of EBP principles by respondents. Table 4.5 shows the p-values generated for these relationships. The cross tabulations for this data can be found in Appendix O.

Table 4.5 The p-values* for the effect of knowledge and skills on the perception of evidence-based practice by respondents** (shaded cells represent significant relationships)

	Application of EBP is necessary in the practice of chiropractic	Literature and research findings are useful in my day-to-day practice	I need to increase the use of evidence in my daily practice	The adoption of EBP places an unreasonable demand on chiropractors	I am interested in learning or improving the skills necessary to incorporate EBP into my practice	EBP improves the quality of patient care	Strong evidence is lacking to support most of the interventions I use with my patients	EBP helps me make decisions about patient care	EBP does not take into account patient preferences
I learned the foundations for EBP as part of my academic preparation	0.050	0.245	0.075	0.104	0.088	0.361	0.848	0.043	0.737
I am familiar with the medical search engines (such as: MEDLINE and CINAHL)	0.417	0.249	0.102	0.418	0.736	0.192	0.481	0.023	0.062
I have received formal training in search strategies for finding research relevant to my practice	0.189	0.023	0.459	0.061	0.172	0.193	0.206	0.072	0.264
I have received formal training in critical appraisal of scientific literature as part of my academic preparation	0.015	0.021	0.779	<0.001	0.174	0.016	0.107	0.005	0.637
I am confident in my ability to critically review scientific literature	0.155	0.266	0.095	0.021	0.571	0.561	0.653	0.298	0.139
I am confident in my ability to find relevant research to answer my clinical questions	0.199	0.794	0.024	0.129	0.997	0.784	0.674	0.294	0.235

*Fisher's exact test

**p < 0.05

Interpretation of the significant relationships identified in table 4.5:

- Respondents who agreed or strongly agreed that the application of EBP is necessary in the practice of medicine were more likely to have received formal training in critical appraisal of scientific literature as part of their academic preparation.
- Those who agreed that literature and research findings are useful in their day-to-day practice were less likely to have received formal training in search strategies for finding research relevant to their practice and more likely to have received formal training in critical appraisal of scientific literature as part of their academic preparation.

- Respondents that agreed to the statement “I need to increase the use of evidence in my daily practice” were more likely to be confident in their ability to find relevant research to answer their clinical questions.
- Respondents that disagreed that the adoption of EBP places an unreasonable demand on chiropractors were more likely to have received formal training in critical appraisal of scientific literature as part of their academic preparation and were confident in their ability to critically review scientific literature.
- Those who agreed that EBP improves the quality of patient care were more likely to have received formal training in critical appraisal of scientific literature as part of their academic preparation.
- Respondents who agreed that EBP helps them make decisions about healthcare were more likely to have agreed with the statements: “I learned the foundations for EBP as part of my academic preparation”, “I am familiar with the medical search engines (such as: MEDLINE and CINAHL)” and “I have received formal training in critical appraisal of scientific literature as part of my academic preparation”.

It can be seen that irrespective of having an adequate or lacking educational background, knowledge and skills in EBP, participants still had a positive perception of EBP. Regardless of educational background, knowledge and skills of EBP, respondents perceived the application of EBP to be necessary in the practice of chiropractic and helpful in clinical decision-making.

4.7.3 The effect of knowledge and skills of evidence-based practice principles on utilisation of evidence-based practice

Participants were asked “In your opinion, how does the knowledge of EBP principles and skills to source research, influence your ability to utilise EBP?”. Their written responses were allocated into one of eight codes. From there, four main themes evolved namely ‘research’, ‘clinical’, ‘confidence’ and ‘time and accessibility’.

- The theme ‘research’ consisted of the codes: ‘external values’ and ‘critical selection’. Examples of these responses were expressed in the following excerpts, respectively: *‘lack of EBP knowledge will result in a lack of ability to utilise it’* (Respondent 31) and *‘allows me to be critically selective in terms of what I incorporate in my practice’* (Respondent 16).
- The theme ‘clinical’ consisted of the codes ‘clinical integration’, ‘symptom complexity’ and ‘patient individuality’ and were expressed by respondents as: *‘I use EBP in my practice based on the amalgamation and interpretation of research’* (Respondent five), *‘I utilise EBP when difficult cases present themselves’* (Respondent one).

- The theme ‘confidence’ was outlined by respondents as *‘It’s essential’* (Respondent ten) *‘It influences my use of EBP positively’* (Respondent 41).
- The theme ‘time and accessibility’ was described by respondents in the following statements: *‘It is a deterrent to using it as it is time consuming to sift through relevant literature’* (Respondent 28) and *‘Difficulty in finding occupation and country specific guidelines would likely reduce my likelihood in following EBP for that particular case’* (Respondent 35).

4.7.4 The effect of perceptions towards evidence-based practice on perceived barriers

There were no statistically significant relationships found between the responses to the questions regarding perceptions towards EBP and perceived barriers with the exception of the statements presented in Table 4.6.

Table 4.6 Significant relationships between perceptions of EBP and perceived barriers**

Perception statement	Perceived barrier	P-value*
Application of EBP is necessary in the practice of chiropractic	Lack of research skills	0.032
EBP improves the quality of patient care	Lack of interest	0.029
EBP helps me make decisions about patient care	Lack of understanding of statistical analysis	0.042

*Fisher’s exact test

**p < 0.05

- Respondents who strongly agreed that the application of EBP is necessary in the practice of chiropractic were more likely to have indicated “lack of research skills” as a barrier.
- Those who agreed that EBP improves the quality of patient care were more likely to have indicated “lack of interest” as a barrier.
- Respondents who agreed that EBP helps them make decisions about patient care were more likely to have indicated “lack of understanding of statistical analysis” as a barrier.

In summary, when analysing the associations with statistically significant findings, it can be seen above that even when respondents perceived a lack of understanding of statistical analysis, interest or research skills as barriers, they still demonstrated favourable perceptions towards EBP.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter presents a discussion of the results of this study relevant to existing literature.

5.2 Response rate

Survey type research has been associated with difficulties in obtaining responses (Baruch and Holtom, 2008). Prior to commencement of the study a response rate of 70% was set for generalisability (Singh pers. comm, 2016), however a response rate of 51% (n=51) was achieved. The response rate obtained is comparable to other studies using chiropractic respondents (Schwarz and Hondras, 2007; Suter et al., 2007; Keyter, 2010; Gordon, 2012). According to Lindström (2007), a response rate in the range of 40-100% can be generalisable to the entire population, particularly if the sample is highly representative of the general population to which the data is applied.

5.3 Respondent characteristics

It has been reported that the Chiropractic profession is male dominated (Sigrell 2002), with more recent studies showing increased numbers of females seeking chiropractic as a profession (Newell and Cunliffe, 2003; Rieder, 2010). This study had approximately equal numbers of male and female respondents limiting the influence that gender could have had on the results. In terms of age there were very few older respondents, with the majority being between 30 and 49 years of age, the working populace. The first chiropractic training institution in South Africa was established in 1989, with the first graduates in 1995 (Chiropractic Association of South Africa, 2016), highlighting that Chiropractic in South Africa is a relatively young profession. This was supported by the majority of respondents having been in practice for less than 19 years.

In the past 20 years, research has been a cornerstone of the profession as it has been said that the future of the chiropractic profession will be greatly determined by its commitment to research (Haldeman, 2005) and consequently, EBP. This shift has led to the adoption of the EBP paradigm by chiropractic training institutions with greater incorporation of its principles, thus chiropractic students in South Africa are getting greater exposure to research and EBP principles, as part of their minimum qualification requirement (ECCE, 2016).

Chiropractic training in South Africa requires that all graduates complete a Master's degree in order to qualify and register with the professional board (AHPCSA, 2016). Yet through a 'grandfather clause', the chiropractors who were practicing in the country at the time when the chiropractic legislation was approved were allowed to register with the board. Their qualifications would have been at the Bachelors level (Doctor of Chiropractic degree), thus the majority of chiropractors in SA have graduated at South African institutions obtaining a Master's degree as seen in this study. One participant had obtained a PhD and according to Haldeman (2005) more chiropractors are obtaining post-graduate qualifications like PhDs or specialisations, emphasising the shift to a more science-based profession.

Most respondents were in full time chiropractic practice (on average working a 37.06 hour week) leaving little time for further academic activities like part-time lecturing, post-graduate research supervision or improvement of their own qualifications. Only 15.7% of the respondents had received additional research training through an additional degree, seminar or workshop in research methods, statistics and/or epidemiology, with the majority only having had the research training as part of their chiropractic qualification. It has been proposed that prior research exposure has a positive influence on one's perception of research (Rieder, 2010) and that it is associated with a higher degree of research utilisation (Rodgers, 2000). In contrast it has been reported that some students find the requirement to complete a Master's degree to qualify as a chiropractor in South Africa as challenging and demanding (Rieder, 2010) and this may result in a negative perception of research (Bergh and Theron, 1999) yet in this study there was an overwhelming positive perception of EBP in spite of all respondents having completed a Master's degree in chiropractic.

Since 2014, continued education has been a legal requirement in South Africa for all chiropractors in order for them to maintain their registration with the professional board (AHPCSA, 2016). More than two thirds of the respondents (71.4%) had met or exceeded their CPD requirements. This shows that respondents are interested in keeping abreast of the latest professional trends and are committed to the continued learning process. Similar findings were reported in other chiropractic populations internationally (Schwarz and Hondras, 2007; Suter et al., 2007; Walker et al., 2014) and locally (Gordon, 2012).

5.4 Objective 1: To determine the attitudes and perceptions towards evidence-based practice by chiropractors

5.4.1 Attitudes and perceptions

The majority of respondents had a positive perception towards statements regarding EBP, the usefulness of literature and the effect on the quality of patient care. These findings were

consistent with similar studies in other healthcare professions (Flores, Lee, Bauchner and Kastner, 2000; Retsas, 2000; Freeman and Sweeney, 2001). Results from McColl et al. (1998) and Jette et al. (2003) suggested a generally positive attitude towards EBP by general practitioners and physical therapists surveyed in these studies. Respondents in the current study felt that the use of evidence in practice was necessary, helpful and informed clinical decision-making ultimately leading to a superior quality of patient care. A study conducted in Australia showed that as many as 87% of nurses believed that the use of evidence greatly influenced medical practice in a positive way (Retsas, 2000).

The majority of respondents perceived EBP to be helpful in decision-making and displayed a willingness to learn or improve their skills necessary to incorporate EBP into practice and the need to increase the use of evidence into practice. However, almost a third of respondents were neutral in this regard which was explained by respondent five as *“I rely on review of research by teachers and authors in the field and I am able to use EBP in my practice based on their amalgamation and interpretation of that research. This allows me to use EBP quite effectively, regardless of my limited research review skills”*. The lack of enthusiasm in this regard was in contrast to findings from similar studies which found that most of the physical therapists surveyed were interested in improving their skills and were in agreement that there could be greater incorporation of evidence into practice (Jette et al., 2003). It is possible that the respondents in the current study felt like they were already utilising EBP and did not find it necessary to further increase the use of evidence in practice.

The majority of respondents did not perceive the adoption of EBP to place an unreasonable demand on chiropractors and disagreed that there is a lack of strong evidence to support interventions used in practice. However, the majority of respondents were neutral regarding the incorporation of patient preferences in EBP. It must be noted that the incorporation of patient preferences in EBP has been echoed over the years and emphasised as an important part of clinical decision making in determining appropriate treatment protocols (Sackett et al., 1996; Guyatt et al., 2000; Haynes, Devereaux and Guyatt, 2002).

5.4.2 The effect of knowledge and skills on perception of evidence-based practice

Trends suggest that irrespective of having an adequate educational background, knowledge and skills necessary for EBP, respondents perceived the application of EBP to be necessary in the practice of chiropractic. Respondent 41 explained that *“with more knowledge of EBP and skills to source research, the better the patient management”* and, on the contrary, respondent 11 stated that knowledge and skills to source research did not affect ones utilisation of EBP. The majority had a favourable perception of the usefulness of EBP irrespective of whether or not they received prior formal training in search strategies for finding

research relevant to their practice. Respondent nine stated that *“knowledge and skills probably greatly influences the ability to utilise EBP but this could be overcome by associations providing practitioners who do not have the necessary skills with available guidelines”*. It is apparent that some respondents feel that it is not crucial to possess the knowledge and skills necessary for EBP in order to utilise it. This may be due to respondents feeling like this is the responsibility of a researcher instead of the clinician as the outcome of a study is all that is of interest to them.

Findings show that the majority of respondents who indicated that they need to increase the use of evidence in daily practice were confident in their ability to find relevant research to answer clinical questions. Respondent 31 stated that *“although I recognise the benefits of EBP principles, I do not have the skills and therefore, do not use it”* which was supported by respondent 45 who explained that *“I would do far more if I felt equipped to find resources online”*. The majority of respondents who reported to have received formal training in critical appraisal of scientific literature as part of their academic preparation were more likely to perceive EBP to improve the quality of patient care.

Results show that respondents who concurred that EBP helps them make decisions about patient care were more likely to have stated that they learned the foundations for EBP as part of their academic preparation, had received formal training in critical appraisal of scientific literature as part of their academic preparation and were familiar with medical search engines. Respondent 33 indicated that *“I utilise EBP significantly as a result of my knowledge and training”*. Therefore, it is evident that there is a need for short courses, workshops and other CPD activities which would assist to upskill clinicians.

5.5 Objective 2: To identify the level of knowledge and skills of evidence-based practice by chiropractors

5.5.1 Level of attention to, and utilisation of, literature

A common finding in studies investigating EBP by physical therapists (Turner and Whitfield, 1997; Jette et al., 2003; Iles and Davidson, 2006) and general practitioners (De Wet, 2015) was that respondents sourced literature fewer than two times per month indicating an extremely low level of attention to and under-utilisation of literature in practice. However, in this study, the majority of respondents sourced literature less than five times per week indicating that respondents are engaging with scientific literature when necessary. This is consistent with studies assessing utilisation of literature by chiropractors internationally (Schwarz and Hondras, 2007; Suter et al., 2007; Alcantara and Leach, 2015). In a South African context, Gordon (2012) found that even though chiropractors indicated high research

utilisation, there was still poor implementation in practice. Similarly, d'Hotman de Villiers (2014) found the lowest utilisation of research amongst respondents with a Master's degree which can be explained by respondents reported frustration towards the chiropractic Master's programme (Rieder, 2010).

It is possible that experienced clinicians who treat similar cases on a daily basis may not need to refer to the literature for every patient. These clinicians are more likely to source literature when difficult cases present themselves which may be less frequent than for an inexperienced practitioner. Another possible explanation for a clinicians' lack of attention to literature may be a lack of time. This was described by respondent 12 who stated: "*most articles are vague or time consuming and searching for relevant, up to date and reliable articles is a difficult process that can take a lot of time*" as a possible barrier to utilising EBP. This statement also describes a frustration that clinicians may be faced with if they do not possess the skills and knowledge necessary for EBP which may make the utilisation of EBP difficult. With regard to access of literature, it has been found that practitioners with online access to databases were likely to perform database searches more frequently and were more likely to read more articles, more often (Walker et al., 2014; de Wet, 2015). This emphasises that online access may result in a higher level of attention to and greater utilisation of literature in practice. Similarly, a lack of skills required to access databases has also been shown to influence the utilisation of databases. This was supported in studies with nurses (Majid, Foo, Luyt, Zhang, Theng, Chang and Mokhtar, 2011) and physiotherapists (Iles and Davidson, 2006).

5.5.2 Personal use and understanding of clinical practice guidelines

The majority of respondents in this study indicated that they were aware of practice guidelines available for topics related to their practice and made use of such guidelines. The primary goal of a clinical practice guideline is to review, condense and present the best available evidence to improve quality of care (Chou, Qaseem, Snow, Casey, Cross, Shekelle and Owens, 2007). However, a sample of general practitioners and nurses have expressed doubt that clinical practice guidelines have the ability to apply to specific patients in their specific settings (Retsas, 2000; Cranney, Warren, Barton, Gardner and Walley, 2001) which may affect the utilisation of these guidelines in practice.

Respondents in this study stated that "*research does not account for the many variables associated with normal clinical practice*" (Respondent 13) and "*research conducted does not fit into what is expected practically*" (Respondent 43) expressing similar concerns about the applicability of research findings to practice. Notwithstanding, results of this study show that participants who had received formal training in critical appraisal of scientific literature as part

of their academic preparation were more likely to use clinical practice guidelines. This emphasises the importance of possessing the knowledge and skills necessary for EBP.

5.5.3 Availability of resources to access information and personal skills in using those resources

An important factor to consider with regard to the availability of resources to access information is efficiency and convenience. Convenience is the ability to complete a task with minimal difficulty and efficiency requires quick and simple retrieval of relevant information paired with the skills required to do so (Jette et al., 2003). Respondent 15 explained that *“it is very important to have the skills in order to utilise EBP. Once you have the skills, utilising EBP becomes easy”*. Prior to the introduction of the World Wide Web in 1993, the incidence of computer searches were low with the majority of clinicians utilising journals in their paper form (Bohannon, 1999) and there has certainly been a shift over the years. In 1990, Bohannon reported that only 7% of physical therapists mentioned computer searches as a source of literature. In 1998, McColl et al. reported that 17% of general practitioners had internet access at their practice and 29% had access at home. These figures have drastically increased over the years as society takes on a rapid rate of technological advancement as can be seen in this study where more than 80% of respondents reported having internet access at their practice or at home.

In the present day, there is increased availability of journals electronically and now, more journals are available offering open access which allows for greater convenience (Jette et al., 2003). This also explains the low report of respondents in this study accessing articles in their paper form. Respondents who reported having the skills to access relevant databases and the internet were more confident in their ability to find relevant research to answer clinical questions thus reinforcing that greater access and availability of information resulted in greater confidence in sourcing literature for clinical problem solving.

5.5.4 Educational background, knowledge and skills related to accessing and interpreting information

Despite almost half of the respondents reporting that they had not received formal training in search strategies to access literature (47.1%), the majority believe that they had a strong academic foundation in EBP principles and were confident in their ability to access and interpret information. In a study surveying Australian chiropractors, many respondents reported that although they had either minimal or no formal training in conducting clinical research and evaluating systematic reviews and meta-analyses, most considered their skills in these areas to be “above-average” (Alcantara and Leach, 2015). Similarly, in a study of

physical therapists, more than two-thirds of respondents were confident in their research skills despite reporting to have had either minimal or no formal training in conducting clinical research and evaluating systematic reviews and meta-analyses (Jette et al., 2003). This shows that respondents' positive academic experience of research skills was perceived to be sufficient in allowing them to be confident in their ability to access and interpret information. While it is unknown whether perceived skills in research can be translated to perceived skills related to EBP, a study of chiropractors in the UK (Hall, 2011) showed that respondents' positive academic experience of EBP led to greater confidence in accessing and interpreting information. In the current study, respondent six stated that due to the knowledge and skills acquired in conducting their Master's degree dissertation, they have been "positively influenced" to utilise EBP and they now consider themselves as a "supporter of EBP".

Rodgers (2000) explained that a research background, and hence, the skills and knowledge of research and EBP, have been associated with a higher degree of research utilisation. In a sample of physiotherapists, Jette et al. (2003) found that respondents with an undergraduate qualification were less likely to claim to have the skills and knowledge of EBP principles when compared to those with a Master's degree or PhD. This may be due to the prior exposure to research methodology, skills and critical appraisal which may result in greater confidence of EBP utilisation when compared to those with undergraduate qualifications (Jette et al., 2003). However, studies conducted on South African chiropractic graduates and students have revealed that research as a subject did not adequately equip them to complete a Master's dissertation, which may result in a negative attitude towards research, and hence, negatively impact their utilisation of evidence in an EBP approach in their professional chiropractic careers (Bunge, 2007; Black, 2008; Rieder, 2010). This challenges the idea of the current study as all respondents had a Master's degree and displayed a positive attitude towards, and perception of, EBP.

In 1998, a study of general practitioners (McColl et al., 1998) showed that only 16% reported to have had formal training in search strategies. However, the internet and web browser was introduced in 1993, a few years prior to these studies being conducted which meant that the new information technology era was still fairly novel and practitioners being less informed than they would be in the present day. Since these studies were conducted, greater emphasis has been placed on critical appraisal skills, skills required to implement EBP and skills required to access databases which are also relevant to the chiropractic profession.

In the current study, the majority of respondents believed that there is a positive correlation between possessing the knowledge and skills related to EBP principles and the utilisation of EBP in practice. A quarter of the respondents in this study elaborated that without the

necessary knowledge and skills of EBP principles, a clinician is unlikely to apply EBP principles in practice.

Jette et al. (2003) reported that younger respondents (20 -29 years of age) were more likely to have displayed confidence in their research skills than older respondents (50+ years of age) due to a higher exposure to computers and the internet. However, in the current study, no statistical significance was found between demographic information such as gender, age and years in practice and questions investigating respondents educational background, knowledge and skills of EBP which may be due to the homogenous sample of this study.

5.5.5 Participants understanding of the term ‘evidence-based practice’

Since the introduction of EBP, the difference between “EBP” and “research” has become indistinct and there has been much confusion amongst healthcare professionals regarding the differences and similarities between these two terms. However, it is imperative that a clear distinction exists in order to eliminate any confusion (Bolton, 2014) as well as to inform practitioners exactly what is meant by the term EBP. Unlike research, EBP is not about developing new knowledge or validating existing knowledge. EBP requires formulating searchable questions, searching for and appraising research and acting according to relevant findings (O’ Donnell, 2004). Therefore, it involves integrating individual clinical expertise with the best available external clinical evidence and applying it to clinical decision-making.

The purpose of EBP is to utilise the best evidence available to make patient care decisions by means of incorporating clinical expertise and patient preferences and values (Conner, 2014). This is theorised to lead to proven and effective treatment methods. In this study, respondents most often identified EBP as management of patients based on current and proven research, combined with one’s own clinical expertise developed from previous skills and techniques found to be effective in the past, in order to deliver chiropractic treatment that is reliable, valid and reproducible thereby offering security to both the patient and practitioner. This is in line with common definitions of EBP which further highlights that respondents were knowledgeable about EBP.

When respondents were asked to outline the process used in clinical problem solving, two main themes were identified namely ‘research’ and ‘clinical’. Many respondents stated that they would conduct research regarding the specific patient case using the internet, articles or books if they were faced with a challenging case in practice, this constituted the theme ‘research’. This was reinforced by Elstein and Schwarz (2002) who stated that difficult clinical and diagnostic problems were solved by a process of generating hypotheses and thereafter conducting literature searches in order to determine the best possible solution. The second

theme was 'clinical' and findings showed that respondents were concerned with the clinical experience of the patient which included the initial assessment, chiropractic examinations, special investigations and referrals. These two themes were of particular importance to respondents in this study.

Respondents were required to analyse the process they would follow in order to come to a justifiable solution when solving a clinical problem. It can be seen from the responses that practitioners follow a systematic method of sourcing the best, most current and relevant information available and integrating this with their own clinical expertise and their patients' presentation, preferences and values. Therefore, the responses to these questions showed that practitioners were not only knowledgeable about EBP but were actively engaging and using an EBP paradigm.

5.5.6 Understanding of terms related to evidence-based practice

In order for a clinician to understand and appraise literature, there must be a comprehensive knowledge of research terminology (Hagino, 2003). McColl et al. (1998) found that most respondents have an adequate knowledge of technical terms related to EBP and this finding was consistent in this study. Two-thirds of respondents reported confidence in their understanding of terms. However, the terms odds ratio, meta-analysis and confidence interval were understood by the least number of respondents which was consistent with other studies (McColl et al., 1998; Jette et al., 2003; Marshall, Renfrew and Godfrey, 2006). A lack of understanding of these terms relates to a lack of understanding of statistics and the analysis thereof in the context of research studies. However, a sample of surgeons fared better in this regard with approximately 90% showing understanding of a majority of terms put to them (Knops et al., 2009). This was believed to be the case as the study sample was from the Academic Medical Centre in Amsterdam where the Department of Surgery strongly encourages EBP at regular, rigorous courses focusing on critically appraised topics and improvement of EBP skills and principles (Ubbink and Legemate, 2004).

5.6 Objective 3: To determine the perceived barriers to evidence-based practice by chiropractors

The literature suggests possible reasons for the lack of uptake of EBP across healthcare disciplines (Caldwell et al., 2007). Studies investigating barriers to EBP in general practitioners (Cranney et al., 2001; Ely et al., 2002), nurses (Retsas, 2000; Carrion et al., 2004; Kajermo, ., Uden, Gardulf, Eriksson, Orton, Arnetz and Nordström, 2008; Brown et al., 2009; Khammarnia et al., 2015), surgeons (Knops et al., 2009), urologists (Dahm et al., 2009), physiotherapists (Jette et al., 2003) and international chiropractic populations (Walker et al.,

2014; Alcantara and Leach, 2015) found that the most common barrier to EBP was insufficient time, which was reinforced in this study. This was expressed by respondent 12 as “*a difficult process that can take a lot of time*”. Yet despite this barrier, respondents still demonstrated favourable perceptions towards EBP.

However, it is worth noting that when participants in this study were asked to state their perceived barriers to EBP in clinical practice in the form of an open-ended question, more than half indicated that they had not experienced any difficulties using EBP. This may be due to respondents’ unwillingness to state their answer qualitatively which respondents may have perceived to be time-consuming or that they felt they had nothing new to add.

The remaining respondents mentioned other possible difficulties experienced as a barrier to utilising EBP which evolved into four themes. The theme of time and accessibility was echoed in the open-ended questions as well as a lack of availability of data in a South African context, clinical difficulties such as reaching a definitive diagnosis and patient compliance and the tendency of practitioners to utilise their own clinical expertise based on positive past experience.

When analysing associations between perceptions and perceived barriers it was found that even when respondents perceived a lack of understanding of statistical analysis, interest or research skills, they still demonstrated favourable perceptions towards EBP. This is in contrast to a finding by Aslam et al. (2004) who surveyed medical doctors and found that a perceived lack of research training and research skills resulted in negative attitudes and perceptions towards research and hence, their utilisation of literature in practice.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The aim of this study was to determine the knowledge of, attitudes towards, perceptions of and perceived barriers towards EBP by chiropractors within the eThekweni municipality. The demographic characteristics of the respondents showed that there was an approximately equal number of males and females, with the mean age being 37.8 years of age. The majority of respondents have been in practice for less than 20 years, practiced between 40 and 49 hours per week and were in full time practice. Gender, age and years in practice did not influence respondents' educational background, knowledge and skills of EBP. The majority of respondents obtained their Masters as their highest academic qualification and 84.3% had not received postgraduate training in courses related to EBP. While all respondents had completed a postgraduate research study, 19.6% of respondents had additional experience as a supervisor or other which was not specified. The majority of respondents indicated that they had exceeded the requirements of CPD credits for the past year.

In terms of attitudes and perceptions towards EBP, respondents had an overall favourable perception when asked about the usefulness of literature, its effect on the quality of patient care, its helpfulness in clinical decision making, interest in learning or improving the skills necessary to incorporate EBP into practice and the need to increase the use of evidence in practice. The majority of respondents did not perceive the adoption of EBP to place an unreasonable demand on practitioners and believed that strong evidence was available to support interventions commonly used in practice.

With regards to knowledge and skills of EBP, results indicated that respondents are engaging with scientific literature when necessary. The majority of respondents indicated awareness and utilisation of clinical practice guidelines in their practice. Respondents reported not having access to professional journals in their paper form but had access through electronic sources. While the majority of practitioners had never received formal training in search strategies to access literature, the majority believe they were confident in their ability to access and interpret information due to their academic foundation. When asked about their understanding of the term EBP, three themes were identified namely 'research', 'experience' and 'security'. Two-thirds of respondents reported confidence in their understanding of terms with the exception of some terms. The two themes identified from open-ended questions in the respondents'

method of clinical problem solving was conducting research regarding the specific patient case and the clinical experience of the patient which included the initial assessment, chiropractic examinations, special investigations and referrals. The majority of respondents in this study believed that a positive correlation existed between a practitioner possessing the knowledge and skills related to EBP principles and the utilisation of EBP in practice.

In terms of respondents' greatest perceived barriers to the use of EBP in clinical practice, the most common barrier experienced was insufficient time. Results demonstrate that even when respondents perceived a lack of understanding, interest or research skills as a barrier, they still demonstrated favourable perceptions towards EBP.

Trends suggest that regardless of their educational background, knowledge and skills in EBP, respondents had a positive perception and attitude towards EBP, the usefulness of EBP and improving their skills and utilisation of EBP.

Thus, the study concluded that chiropractors within the eThekweni municipality had a positive attitude and perception towards EBP, an adequate level of knowledge and skills of EBP and the main perceived barrier to EBP was a lack of time.

The information gathered from this study is of specific interest to the chiropractic profession as it allows for a greater understanding of the knowledge, attitudes, perception of chiropractors in the eThekweni municipality towards evidence-based practice and importantly, highlighting the perceived barriers preventing chiropractors from implementing EBP in practice. This is of particular importance as the future of chiropractic lies in its ability to become more evidence-based (Chapman-Smith, 2000; Meeker and Haldeman, 2002; Wyatt and Post-White, 2005). Furthermore, the results of this study may assist other researchers when investigating the use of EBP in various professions, as it will enable them to assess if their results are similar or different to those found in this study. In addition, the results can assist professional organisations and programmes who may be integrating EBP into the curriculum or in workshops.

6.2 Recommendations

6.2.1 Recommendations for the chiropractic profession

- CPD courses focusing on EBP principles, search strategies for finding relevant literature and critical appraisal of scientific literature should be implemented in order to equip chiropractors with the necessary knowledge and skills required to effectively implement EBP.
- Meetings held by regional chiropractic associations of South Africa should include a journal club promoting practitioners' engagement with current literature.

- Educational institutions should determine ways that they can inculcate EBP principles into the undergraduate programme to facilitate post-graduation compliance together with ensuring that their graduates are proficient in database searching, common research terminology and critical analysis of literature.

6.2.2 Recommendations for future research

- Educational institutions should determine students' issues with EBP and address these issues at tertiary level in order to instil positive attitudes and perceptions at an early stage.
- Future research should focus on chiropractic in a South African context to build on the body of current and relevant literature in order to assist practitioners in utilising EBP more effectively.

6.2.3 Recommendations regarding the questionnaire used in this study

- Question 3: a space should be left open for respondents to elaborate if 'Specialisation' or 'Other' was selected.
- Question 8.2: should exclude undergraduate and a space should be left open for respondents to elaborate if 'Other' was selected.

6.3 Limitations of this study

- Questionnaire studies are dependent on the participants' responses (Mouton, 2011). Therefore, there is a reliance that the respondents were open and honest when answering the questions and that their responses were an accurate reflection of their views and experiences at the time of questionnaire completion.
- The response rate in this study limited the generalisability of the results. A larger population may have ensured that the study sample and total population were homogenous allowing for greater generalisability of the data.
- Question 18: it appears that the respondents were unsure about how to answer this question since the question was answered poorly. Future studies should rather ask the participants to select their top three barriers rather than asking them to rank them.

REFERENCES

- Adams, A. H. and Gatterman, M. 1997. The state of the art of research on chiropractic education. *The Journal of Manipulative and Physiological Therapeutics*, 20(3): 179-84.
- Ailliet, L., Rubinstein, S. M. and de Vet, H. C. W. 2010. Characteristics of chiropractors and their patients in Belgium. *Journal of Manipulative and Physiological Therapeutics*, 33(8): 618-625.
- Alcantara, J. and Leach, M. J. 2015. Chiropractic attitudes and utilization of evidence-based practice: the use of the EBASE questionnaire. *Explore: The Journal of Science and Healing*, 11(5): 367-376.
- Allied Health Professions Council of South Africa. 2014 (online). Available: <http://ahpcsa.co.za/> (Accessed 12 December 2014).
- Allied Health Professions Council of South Africa. 2016 (online). Available: <http://ahpcsa.co.za/>. (Accessed 27 December 2016).
- Anderson, N. B. 2006. Evidence-based practice in psychology. *American Psychologist*, 61(4): 271-285.
- Aslam, F., Qayyum, M., Mahmud, H., Qasim, R. and Haque, I. 2004. Attitudes and practices of postgraduate medical trainees towards research: a snapshot from Faisalabad. *Journal of Pakistan Medical Association*, 54(10): 534-536.
- Australian and New Zealand Classification of Occupations (ANZCO) 2006. *Chiropractors: Profile using data from census 2006*. (online). Available: www.health.vic.gov.au/__data/assets/pdf.../chiropracticprofile.pdf (Accessed 12 October 2015).
- Banzai, R., Derby, D. C., Long, C. R. and Hondras, M. A. 2011. International web survey of chiropractic students about evidence-based practice: a pilot study. *Chiropractic & Manual Therapies*, 19(1): 6-14.
- Baruch, Y. and Holtom, B. C. 2008. Survey response rate levels and trends in organizational research. *Human Relations*, 61(8): 1139-1160.
- Bennett, P. and Murphy, S. 1997. *Psychology and Health Promotion*. Buckingham: Open University Press.

- Bergh, Z. C. and Theron, A. L. 1999. *Psychology in the work context*. South Africa: International Thomson Publications.
- Bernstein, D.A., Clark-Stewart, A. Ray, E.J. and Wickens, C.D. 1997. *Psychology*. 4th ed. Boston, MA Houghton Mifflin Company.
- Black, A. T., Balneaves, L. G., Garossino, C., Puyat, J. H. and Qian, H. 2015. Promoting evidence-based practice through a research training program for point-of-care clinicians. *The Journal of Nursing Administration*, 45(1): 14-20.
- Black, E. 2008. A retrospective survey of the career paths and demographics of Durban University of Technology (DUT) chiropractic graduates. MTech: Chiropractic. Durban University of Technology.
- Bohannon, R. W. 1999. Core journals of physiotherapy. *Physiotherapy*, 85(6): 317-321.
- Bohner, G. and Dickel, N. 2011. Attitudes and attitude change. *Annual Review of Psychology*, 62: 391-417.
- Bolton, J. 2014. Evidence-based case reports. *The Journal of the Canadian Chiropractic Association*, 58(1), 6-7.
- Bolton, J. E. 2002. Chiropractors' attitudes to, and perceptions of, the impact of continuing professional education on clinical practice. *Medical Education*, 36(4): 317-324.
- Brown, C. E., Wickline, M. A., Ecoff, L. and Glaser, D. 2009. Nursing practice, knowledge, attitudes and perceived barriers to evidence-based practice at an academic medical center. *Journal of Advanced Nursing*, 65(2): 371-381.
- Brynard, P. A. and Hanekom. 2005. *Introduction to research in Public Administration and related academic disciplines*. Pretoria: Van Schaik.
- Bunge, J. 2007. A survey to determine post graduate student confidence in their knowledge and skills acquired during the chiropractic course at University of Johannesburg. MTech: Chiropractic. University of Johannesburg.
- Burns, N. and Grove, S. K. 2005. *The practice of nursing research: conduct, critique and utilization*. St Louis: Elsevier Saunders.
- Burns, N. and Grove, S. K. 2010. *Understanding nursing research: Building an evidence-based practice*. St Louis: Elsevier Health Sciences.

Caldwell, K., Coleman, K., Copp, G., Bell, L. and Ghazi, F. 2007. Preparing for professional practice: how well does professional training equip health and social care practitioners to engage in evidence- based practice? *Nurse Education Today*, 27(6): 518-528.

Carey, P. F. Clum, G. and Dixon, P. 2005. (online) *Final report of the identity consult task force*. Available: <http://www.wfc.org>. (Accessed 12 December 2016).

Carrion, M., Woods, P. and Norman, I. 2004. Barriers to research utilisation among forensic mental health nurses. *The International Journal of Nursing Studies*, 41(6): 613-619.

Chapman-Smith, D. 2000. *The Chiropractic Profession*. Des Moines, IA: NCMIC Group, inc.

Chapman-Smith, D. A., and Cleveland, C.S. 2005. *International status, standards, and education of the chiropractic profession*. In: Haldeman, S. (ed). *Principles and practice of chiropractic*. 3rd ed. New York: McGraw-Hill.

Chiropractic Association of South Africa. 2016. (online). Available : <http://www.chiropractic.co.za/>. (Accessed 16 February 2017).

Chou, R., Qaseem, A., Snow, V., Casey, D., Cross, J. T., Shekelle, P. and Owens, D. K. 2007. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Annals of Internal Medicine*, 147(7): 478-491.

Clum, G. 2007. Philosophy of chiropractic: its origin and its future. *Journal of Chiropractic Humanities*, 14(1): 41-45.

Cohen, A. M., Stavri, P. Z. and Hersh, W. R. 2004. A categorization and analysis of the criticisms of evidence-based medicine. *International Journal of Medical Informatics*, 73(1): 35-43.

Committee on Quality of Health Care in America. 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington DC: National Academic Press.

Conner, B. T. 2014. Differentiating research, evidence-based practice, and quality improvement. *American Nurse Today* (online). 9(6). Available: <https://www.americannursetoday.com/differentiating-research-evidence-based-practice-and-quality-improvement/> (Accessed 10 December 2016)

Coon, D. and Mitterer, J. 2007. *Introduction to Psychology*. Belmont: Wadsworth

Coulter, I. D. and Shekelle, P. G. 2005. Chiropractic in North America: a descriptive analysis. *Journal of Manipulative and Physiological Therapeutics*, 28(2): 83-89.

- Coulter, I. D. and Shekelle, P. G. 1997. Chiropractic in the United States: training, practice, and research. *Montana*, 364(45): 45-46.
- Cranney, M., Warren, E., Barton, S., Gardner, K. and Walley, T. 2001. Why do GPs not implement evidence-based guidelines? A descriptive study. *Family Practice*, 18(4): 359-363.
- Creswell, J. W. 2013. *Research design: Qualitative, quantitative, and mixed methods approaches*. California: Sage publications.
- d'Hotman de Villiers, J. 2014. The perception, knowledge and utilisation of research and its role in the chiropractic profession as determined by chiropractors attending the World Federation of Chiropractic Biennial Conference 2013. MTech: Chiropractic. Durban University of Technology.
- Dahm, P., Poolman, R., Bhandari, M., Fesperman, S., Baum, J., Kosiak, B. and Preminger, G. 2009. Perceptions and competence in evidence based medicine: a survey of American urological association membership. *Journal of Urology*, 181(2): 767-777.
- De Gouveia, N. 2009. The knowledge, perception and utilisation of vitamin and mineral supplements, natural medicines and pharmacological agents as adjuncts to Chiropractic practice in South Africa. MTech: Chiropractic. Durban University of Technology.
- De Vaus, D. 2014. *Surveys in social research*. New York: Routledge.
- De Vos, A. S., Strydom, H., Fouche, C. B. and Delport, C. S. L. 2005. *Research at grassroots: for the social sciences and human services professions*. 3rd ed. Pretoria: Van Schaik.
- De Wet, W. 2015. Knowledge, attitude and perception of private practitioners based in Gauteng, South Africa, regarding evidence-based practice. PhD: Family Medicine and Primary Care. University of Stellenbosch.
- Denscombe, M. 2014. *The good research guide: for small-scale social research projects*. UK: McGraw-Hill Education.
- Durban University of Technology: Chiropractic and Somatology. 2015. (online). Available: http://www.dut.ac.za/faculty/health_sciences/chiropractic_and_somatology/ (Accessed 15 December 2015).
- Dyer, C. 1997. *Beginning research in psychology: A practical guide to research methods and statistics*. Oxford: Blackwell Publishers Ltd.

- Eaton, S., Bonello, R., Brown, B. T. and Graham, P. L. 2012. Chiropractic practice in NSW: A description of demographic and practitioner characteristics. *Chiropractic Journal of Australia*, 42(3): 114-121.
- Elstein, A. S. and Schwarz, A. 2002. Clinical problem solving and diagnostic decision making: selective review of the cognitive literature. *British Medical Journal*, 324(7575): 729-732.
- Ely, J. W., Osheroff, J. A., Ebell, M. H., Chambliss, M. L., Vinson, D. C., Stevermer, J. J. and Pifer, E. A. 2002. Obstacles to answering doctors' questions about patient care with evidence: qualitative study. *British Medical Journal*, 324(7339): 710-713.
- European Council on Chiropractic Education (ECCE). 2016. (online). Available: <http://www.cce-europe.com/> (Accessed 15 November 2016).
- Evidence-Based Medicine Working Group. 1992. Evidence-based medicine. A new approach to teaching the practice of medicine. *Journal of the American Medical Association*, 268(17): 2420-2425.
- Fairhurst, K. and Huby, G. 1998. From trial data to practical knowledge: qualitative study of how general practitioners have accessed and used evidence about statin drugs in their management of hypercholesterolaemia. *British Medical Journal*, 317(7166): 1130-1134.
- Fernandez, C. E. and Delaney, P. M. 2004. Applying evidence-based health care to musculoskeletal patients as an educational strategy for chiropractic interns (a one-group pretest-posttest study). *Journal of Manipulative and Physiological Therapeutics*, 27(4), 253-261.
- Fineout-Overholt, E., Melnyk, B. M. and Schultz, A. 2005. Transforming health care from the inside out: advancing evidence-based practice in the 21st century. *Journal of Professional Nursing*, 21(6): 335-344.
- Fink, R., Thompson, C. J. and Bonnes, D. 2005. Overcoming barriers and promoting the use of research in practice. *Journal of Nursing Administration*, 35(3): 121-129.
- Fishbein, M. and Ajzen, I. 1975. *Belief, attitude, intention, and behaviour: An introduction to theory and research*. Massachusetts: Addison-Wesley.
- Fletcher, J. 2005. A survey of treatment regimens of chiropractic in South Africa. MTech: Chiropractic. Durban University of Technology.

- Flores, G., Lee, M., Bauchner, H. and Kastner, B. 2000. Pediatricians' attitudes, beliefs, and practices regarding clinical practice guidelines: a national survey. *Pediatrics*, 105(3): 496-501.
- Forsetlund, L., Bjørndal, A., Rashidian, A., Jamtvedt, G., O'Brien, M. A., Wolf, F. M. and Oxman, A. D. 2009. Continuing education meetings and workshops: effects on professional practice and health care outcomes. *The Cochrane Library*, 11(2): 1-99.
- Freeman, A. C. and Sweeney, K. 2001. Why general practitioners do not implement evidence: qualitative study. *British Medical Journal*, 323(7321): 1100-1102.
- French, S. D., Charity, M. J., Forsdike, K., Gunn, J. M., Polus, B. I., Walker, B. F., Chondros, P. and Britt, H.C., 2013. Chiropractic observation and analysis study (COAST): providing an understanding of current chiropractic practice. *Medical Journal of Australia*, 199(10): 687-691.
- French, S. D., Walker, B.F. and Perle, S.M. 2010. Chiropractic care for children: too much, too little or not enough?. *Chiropractic and Osteopathy*, 18(1): 1-17.
- Gerrish, K. and Clayton, J. 2004. Promoting evidence-based practice: an organizational approach. *Journal of Nursing Management*, 12:114-123
- Ghosh, A. K. 2004. On the challenges of using evidence-based information: the role of clinical uncertainty. *Journal of Laboratory and Clinical Medicine*, 144(2): 60-64.
- Gittel, J. H., Seider, R. and Wimbush, J. 2010. A relational model of how high-performance work systems work. *Organization Science*, 21: 490-506.
- Gordon, J. 2012. A study to explore the perceptions that South African chiropractors have regarding the perceived role and impact of research within the profession. MTech: Chiropractic. Durban University of Technology.
- Gresham, B. B. 2016. *Concepts of evidence based practice for the physical therapist assistant*. Philadelphia: FA Davis.
- Guion R M. 1998. *Assessment, measurement, and prediction for personnel decisions*. New Jersey: Lawrence Erlbaum Associates.
- Guyatt, G. H. and Rennie, D. 1993. Users' guides to the medical literature. *The Journal of the American Medical Association*, 270(17): 2096-2097.
- Guyatt, G. H., Haynes, R. B., Jaeschke, R. Z., Cook, D. J., Green, L., Naylor, C. D. and Evidence-Based Medicine Working Group. 2000. Users' guides to the medical literature:

XXV. Evidence-based medicine: principles for applying the users' guides to patient care. *The Journal of the American Medical Association*, 284(10): 1290-1296.

Guyatt, G. H., Rennie, D., Meade, M. and Cook, D. 2008. *Evidence users' guides to the medical literature. A manual for evidence-based clinical practice*. 2nd ed. Chicago, IL: McGraw Hill Co.

Guyatt, G., Cairns, J., Churchill, D., Cook, D., Haynes, B., Hirsh, J. and Sackett, D. 1992. Evidence-based medicine: a new approach to teaching the practice of medicine. *The Journal of the American Medical Association*, 268(17): 2420-2425.

Hadley, J. A., Wall, D. and Khan, K. S. 2007. Learning needs analysis to guide teaching evidence-based medicine: knowledge and beliefs amongst trainees from various specialities. *BMC Medical Education*, 7(1): 11-16.

Hagino, C. 2003. *How to appraise research: a guide for chiropractic students and practitioners*. New York: Churchill Livingstone.

Haldeman, S. 2005. *Principles and practice of chiropractic*. 3rd ed. New York: McGraw-Hill.

Hall, G. 2011. Attitudes of chiropractors to evidence-based practice and how this compares to other healthcare professionals: A qualitative study. *Clinical Chiropractic*, 14(3): 106-111.

Haneline, M. T. 2006. *Evidence-based chiropractic practice*. Sudbury, MA: Jones & Bartlett Publishers Inc.

Haneline, M. T. and Meeker, W. C. 2011. *Introduction to public health for chiropractors*. Sudbury, MA: Jones and Bartlett Publishers.

Haynes, R. B. 2002. What kind of evidence is it that evidence-based medicine advocates want health care providers and consumers to pay attention to? *BMC Health Services Research*, 2(1): 1-7.

Haynes, R. B., Devereaux, P. J. and Guyatt, G. H. 2002. Physicians' and patients' choices in evidence based practice: Evidence does not make decisions, people do. *British Medical Journal*, 324(7350): 1350-1351.

Hicks, N. 2001. Evidence-based health care: what it is and what it is not. *European Journal of Chiropractic*, 46(3): 69-70.

Hjørland, B. 2011. Evidence-based practice: An analysis based on the philosophy of science. *Journal of the Association for Information Science and Technology*, 62(7): 1301-1310.

Hughes, S. C. and Wingard, D. L. 2006. Children's visits to providers of complementary and alternative medicine in San Diego. *Ambulatory Pediatrics*, 6(5): 293-296.

Humphreys, B. K., Peterson, C. K., Muehlemann, D. and Haueter, P. 2010. Are swiss chiropractors different than other chiropractors? Results of the job analysis survey 2009. *Journal of Manipulative and Physiological Therapeutics*, 33(7): 519-535.

Iles, R. and Davidson, M. 2006. Evidence based practice: a survey of physiotherapists' current practice. *Physiotherapy Research International*, 11(2): 93-103.

Imbos, N., Langworthy, J., Wilson, F. and Regelink, G. 2004. Practice characteristics of chiropractors in the Netherlands. *Clinical Chiropractic*, 8(1): 7-12.

Jacobson, L. D., Edwards, A. G. K., Granier, S. K. and Butler, C. C. 1997. Evidence based medicine and general practice. *British Journal of General Practice*, 47(420): 449-452.

Jette, D. U., Bacon, K., Batty, C. and Carlson, M. 2003. Evidence-based practice: beliefs, attitudes, knowledge, and behaviors of physical therapists. *Physical Therapy*, 83(9): 786-805.

Kajermo, K. N., Unden, M., Gardulf, A., Eriksson, L. E., Orton, M. L., Arnetz, B. B. and Nordström, G. 2008. Predictors of nurses' perceptions of barriers to research utilization. *Journal of Nursing Management*, 16(3): 305-314.

Kawchuk, G., Bruno, P., Busse, J. W., Bussi res, A., Erwin, M., Passmore, S. and Srbely, J. 2013. Knowledge transfer within the Canadian chiropractic community. Part 1: understanding evidence-practice gaps. *The Journal of the Canadian Chiropractic Association*, 57(2): 111-115.

Keating Jr., J. C. 2004. *Scopes of purpose, scopes of practice: distinguishing among evidence-based practice, traditional straight chiropractic and super-straight ideologies*. PowerPoint presentation. Canadian Memorial Chiropractic College.

Keating, J. C. 2005. *Philosophy of chiropractic*. In: Haldeman, S. (ed). Principles and practice of chiropractic. 3rd ed. New York: McGraw-Hill.

Keating, J. C., Charlton, K. H., Grod, J. P., Perle, S. M., Sikorski, D. and Winterstein, J. F. 2005. Subluxation: dogma or science? *Chiropractic & Osteopathy*, 13(1): 17-18.

Kelson, M., Akl, E. A., Bastian, H., Cluzeau, F., Curtis, J. R., Guyatt, G. and Sch nemann, H. J. 2012. Integrating values and consumer involvement in guidelines with the patient at the center: *Proceedings of the American Thoracic Society*, 9(5): 262-268.

Keyter, K. 2010. The perceptions of South African chiropractors regarding their professional identity. MTech: Chiropractic. Durban University of Technology.

Khammarnia, M., Haj Mohammadi, M., Amani, Z., Rezaeian, S. and Setoodehzadeh, F. 2015. Barriers to implementation of evidence based practice in Zahedan teaching hospitals, Iran, 2014. *Nursing Research and Practice*, 2015(1): 1-5.

Knops, A. M., Vermeulen, H., Legemate, D. A. and Ubbink, D. T. 2009. Attitudes, awareness, and barriers regarding evidence-based surgery among surgeons and surgical nurses. *World Journal of Surgery*, 33(7): 1348-1355.

Korenstein, D., Dunn, A. and McGinn, T. 2008. Mixing it up: integrating evidence-based medicine and patient care. *Journal of Hospital Medicine*, 3(1): 741-742.

Krueger, R. A. and Casey, M. A. 2014. *Focus groups: A practical guide for applied research*. 5th ed. India: Sage.

Kumar, S. and Phrommathed, P. 2005. *Research methodology*. US: Springer.

Kvammen, O. C. and Leboeuf-Yde, C. 2014. The chiropractic profession in Norway 2011. *Chiropractic & Manual Therapies*, 22(1), 44-45.

Leach, M. J. and Gillham, D. 2011. Are complementary medicine practitioners implementing evidence based practice? *Complementary Therapies in Medicine*, 19(3): 128-136.

Leach, R.A. 2004. *The chiropractic theories: a textbook of scientific research*. 4th ed. Philadelphia, PA: Lippincott, Williams and Wilkins.

Leboeuf-Yde, C., Lanlo, O. and Walker, B. F. 2013. How to proceed when evidence-based practice is required but very little evidence available? *Chiropractic and Manual Therapies*, 21(1): 24-29.

Lee, C. M. and Hunsley, J. 2015. Evidence-based practice: separating science from pseudoscience. *The Canadian Journal of Psychiatry*, 60(12): 534-540.

Lindström, M. 2007. Social capital, anticipated ethnic discrimination and self reported psychological health: a population-based study. *Social Science and Medicine*, 66(1): 1-13.

Lugtenberg, M., Zegers-van Schaick, J. M., Westert, G. P. and Burgers, J. S. 2009. Why don't physicians adhere to guideline recommendations in practice? An analysis of barriers among Dutch general practitioners. *Implementation Science*, 4(1): 54-63.

- Maharaj, P. 2009. The knowledge and perceptions of provincial and national Health Portfolio Committee members of South Africa regarding the chiropractic profession. MTech: Chiropractic. Durban University of Technology.
- Majid, S., Foo, S., Luyt, B., Zhang, X., Theng, Y. L., Chang, Y. K. and Mokhtar, I. A. 2011. Adopting evidence-based practice in clinical decision making: nurses' perceptions, knowledge, and barriers. *Journal of the Medical Library Association*, 99(3): 229-236.
- Manchikanti, L., Staats, P. S., Singh, V., Schultz, D. M., Vilims, B. D., Jasper, J. F. and Racz, G. B. 2003. Evidence-based practice guidelines for interventional techniques in the management of chronic spinal pain. *Pain Physician*, 6(1): 3-50.
- Marshall, J., Renfrew, M. and Godfrey, M. 2006. Using evidence in practice: what do health professionals really do? A study of care and support for breastfeeding women in primary care. *Journal of Clinical Nursing*, 18(9): 181-190.
- Mathews, M., 2006. The prevalence and factors associated with occupational overuse syndrome in the hands and wrists of chiropractors in South Africa. MTech: Chiropractic. Durban University of Technology.
- Mayer, J. and Piterman, L. 1999. The attitudes of Australian GPs to evidence-based medicine: a focus group study. *Family Practice*, 16(6): 627-632.
- McColl, A., Smith, H., White, P., and Field, J. 1998. General practitioners' perception of the route to evidence based medicine: a questionnaire survey. *British Medical Journal*, 316(7128): 361-365.
- McGinn, T. G., Guyatt, G. H., Wyer, P. C., Naylor, C. D., Stiell, I. G., Richardson, W. S. and Evidence-Based Medicine Working Group. 2000. Users' guides to the medical literature: XXII: how to use articles about clinical decision rules. *Journal of the American Medical Association*, 284(1): 79-84.
- McGinn, T., Wyer, P. C., Newman, T. B., Keitz, S., Leipzig, R. and Guyatt, G. 2004. Evidence-Based Medicine Teaching Tips Work Group. *Tips for learners of evidence-based medicine*, 171(11): 1369-1373.
- McKenna, H. P., Ashton, S., and Keeney, S. 2004. Barriers to evidence-based practice in primary care. *Journal of Advanced Nursing*, 45(2): 178-189.
- Meeker, W. C. and Haldeman, S. 2002. Chiropractic: a profession at the crossroads of mainstream and alternative medicine. *Annals of Internal Medicine*, 136(3): 216-227.

- Mills, E. J., Montori, V. M. and Guyatt, G. H. 2004. Evidence-based clinical practice. *Brief Treatment and Crisis Intervention*, 4(2), 187-194.
- Milton, C. R. 1981. *Human behaviour in organization*. Englewood Cliffs: Prentice-Hall.
- Mirtz, T. A., Hebert, J. J. and Wyatt, L. H. 2010. Attitudes of non-practicing chiropractors: a pilot survey concerning factors related to attrition. *Chiropractic and Osteopathy*, 18(1): 29-37.
- Montori, V. M. and Guyatt, G. H. 2008. Progress in evidence-based medicine. *The Journal of the American Medical Association*, 300(15): 1814-1816.
- Mouton, J. 2011. *How to succeed in your master's and doctoral studies: A South African guide and resource book*. Pretoria: Van Schaik Publishers.
- Mshunqane, N., Stewart, A. V. and Rothberg, A. D. 2012. Type 2 diabetes management: patient knowledge and health care team perceptions, South Africa: original research. *African Journal of Primary Health Care and Family Medicine*, 4(1): 1-7.
- National Center for Complementary and Integrative Health. 2004. (online). Available: <https://nccih.nih.gov/>. (Accessed 3 May 2016).
- National Health Act. 2003. (RSA). (online). Available: http://www.chr.up.ac.za/undp/domestic/docs/legislation_55.pdf. (Accessed 28 September 2016).
- Neisser, U. 1976. *Cognition and reality: Principles and implications of cognitive psychology*. New York: WH Freeman.
- Nelson, C. F., Lawrence, D. J., Triano, J. J., Bronfort, G., Perle, S. M., Metz, R.D., Hegetschweiler, K. and LaBrot, T. 2005. Chiropractic as spine care: a model for the profession. *Chiropractic and Osteopathy*, 13(1): 9-10.
- Newell, D. and Cunliffe, C. 2003. Attitude towards research in undergraduate chiropractic students. *Clinical Chiropractic* (online), 6(3): 109-119. Available: www.sciencedirect.com (Accessed 4 September 2016).
- Newhouse, R., Dearholt, S., Poe, S., Pugh, L. C. and White, K. M. 2005. Evidence-based practice: A practical approach to implementation. *Journal of Nursing Administration*, 35(1): 35-40.
- O'Donnell, C. A. 2004. Attitudes and knowledge of primary care professionals towards evidence-based practice: a postal survey. *Journal of Evaluation in Clinical Practice*, 10(2): 197-205.

- O'Leary, Z. 2004. *The essential guide to doing research*. London: Sage.
- Oswald, N. and Bateman, H. 2000. Treating individuals according to evidence: why do primary care practitioners do what they do? *Journal of Evaluation in Clinical Practice*, 6(2), 139-148.
- Oxford Dictionaries. 2011. (online). Available: <http://oxforddictionaries.com>. (Accessed 27 September 2016)
- Palmer, D. D. 1910. *Text-book of the science, art and philosophy of chiropractic for students and practitioners*. Portland: Portland Printing House.
- Phillips, R. 2005. *The evolution of vitalism and materialism and its impact on philosophy in chiropractic*. New York: McGraw Hill Companies.
- Pollentier, A. and Langworthy, J. M. 2007. The scope of chiropractic practice: a survey of chiropractors in the UK. *Clinical Chiropractic*, 10(3): 147-155.
- Prasun, M. A. 2013. Evidence-based practice. *Heart & Lung: The Journal of Acute and Critical Care*, 42(2): 84-85.
- Pravikoff, D. S., Tanner, A. B. and Pierce, S. T. 2005. Readiness of US nurses for evidence-based practice: Many don't understand or value research and have had little or no training to help them find evidence on which to base their practice. *The American Journal of Nursing*, 105(9): 40-51.
- Proctor, M. 2001. *Measuring attitudes*. In Gilbert, N. *Researching Social Life*. 2nd ed. London: Sage.
- Rattray, J. and Jones, M. C. 2007. Essential elements of questionnaire design and development. *Journal of Clinical Nursing*, 16(2): 234-243.
- Reggars, J. W. 2011. Chiropractic at the crossroads or are we just going around in circles?. *Chiropractic & Manual Therapies*, 19(1): 11-19.
- Retsas, A. 2000. Barriers to using research evidence in nursing practice. *Journal of Advanced Nursing*, 31(3): 599-606.
- Rieder, R. 2010. *The attitudes of chiropractic students towards research at Durban University of Technology*. MTech: Chiropractic. Durban University of Technology.
- Rodgers, S. E. 2000. A study of the utilization of research in practice and the influence of education. *Nurse Education Today*, 20(4): 279-287.

Romyn, D. M., Allen, M. N., Boschma, G., Duncan, S. M., Edgecombe, N., Jensen, L. A. and Warnock, F. 2003. The notion of evidence in evidence-based practice by the Nursing Philosophy Working Group. *Journal of Professional Nursing*, 19(4): 184-188.

Rosenberg, W. and Donald, A. 1995. *Evidence based medicine: an approach to clinical problem solving*. (online). Available:
http://vz.truni.sk/old/Prednasky/EBM_Guidelines/Papers/EBM_%20Rosenberg.pdf.
(Accessed 15 June 2015).

Rycroft-Malone, J. 2004. The PARIHS framework—A framework for guiding the implementation of evidence-based practice. *Journal of Nursing Care Quality*, 19(4): 297-304.

Sackett, D. L., Rosenberg, W. M., William, M. C., Gray, J. A., Haynes, R. B. and Richardson, W. S. 1996. Evidence based medicine: what it is and what it isn't. *British Medical Journal*, 312(7023): 71-72.

Saldaña, J. 2015. *The Coding Manual for Qualitative Researchers*. 2nd edition. Washington DC: Sage publishers.

Schwarz, I. and Hondras, M.A. 2007. A survey of chiropractors practicing in Germany: Practice characteristics, professional reading habits, and attitudes and perceptions towards research. *Chiropractic and Osteopathy*, 15(1): 1-8.

Shaneyfelt, T. M., Mayo-Smith, M.F. and Rothwangl, J. 1999. Are guidelines following guidelines? The methodological quality of clinical practice guidelines in the peer reviewed medical literature. *The Journal of the American Medical Association*, 281(20): 1900-1905.

Shuttleworth, M. 2008. *Definition of Research* (online). Available:
<http://explorable.com/definition-of-research> (Accessed 31 October 2016).

Siegfried, N., Swingler, G., Seedat, S., Muller, M., Churchill, R., Stein, D. J. 2003. What do South African psychiatrists and GPs think, feel and know about evidence-based mental health care? *The South African Medical Journal*, 93(2): 114-117.

Sigrell, H. 2002. Expectations of chiropractic treatment: What are the expectations of new patients consulting a chiropractor, and do chiropractors and patients have similar expectations? *Journal of Manipulative and Physiological Therapeutics*, 25(5): 300-305.

Simpson, J. K. 2012. The five eras of chiropractic & the future of chiropractic as seen through the eyes of a participant observer. *Chiropractic & Manual Therapies*, 20(1), 1-8.

- Smith, C. and Eckert, K. 2006. Prevalence of complementary and alternative medicine and use among children in South Australia. *Journal of Paediatrics and Child Health*, 42(9): 538-543.
- Smith, D. 2004. *Social work and evidence-based practice*. London and Philadelphia: Jessica Kingsley Publishers.
- Speck, M. and Knipe, C. 2005. *Why can't we get it right? Designing high-quality professional development for standards-based schools*. 2nd ed. Thousand Oaks: Corwin Press.
- Stomski, N. J., Mackintosh, S. and Stanley, M. 2010. Patient self-report measures of chronic pain consultation measures: a systematic review. *The Clinical Journal of Pain*, 26(3): 235-243.
- Stomski, N., Grimmer-Somers, K. and Petkov, J. 2008. A survey of the uptake and implementation of research evidence by South Australian acupuncturists in clinical practice: attitudes and associated predictive factors. *Complementary Therapies in Medicine*, 16(4): 199-205.
- Straus, S. E., Richardson, W. S., Rosenberg, W. and Haynes, R. B. 2000. *Evidence-based medicine: how to practice and teach EBM*. London: Churchill Livingstone.
- Suter, E., Vanderheyden, L. C., Trojan, L. S., Verhoef, M. J. and Armitage, G. D. 2007. How important is research-based practice to chiropractors and massage therapists? *Journal of Manipulative and Physiological Therapeutics*, 30(2): 109-115.
- Tatalias, J.A. 2006. A prospective, epidemiological pilot study to investigate the level of knowledge of homoeopathy and its contextualization in health shops in the Gauteng area. MTech: Homeopathy. Durban University of Technology.
- Thabane, L., Ma, J., Chu, R., Cheng, J., Ismaila, A., Rios, L. P. and Goldsmith, C. H. 2010. A tutorial on pilot studies: the what, why and how. *BMC Medical Research Methodology*, 10(1): 1-9.
- Titler, M. G. 2008. *The evidence for evidence-based practice implementation*. Rockville: Agency for Healthcare Research and Quality.
- Triano, J. J. 2005. Evidence-based care, certainty, and the doctor's duty of care. *The Journal of Manipulative and Physiological Therapeutics*, 28(4): 215-216.
- Trovato, G. M. 2012. Behavior, nutrition and lifestyle in a comprehensive health and disease paradigm: skills and knowledge for a predictive, preventive and personalized medicine. *EPMA Journal*, 3(1): 8-22.

- Turner, P. and Whitfield, T. W. 1997. Physiotherapists' use of evidence based practice: a cross-national study. *Physiotherapy Research International*, 2(1): 17-29.
- Ubbink, D. T. and Legemate, D. A. 2004. Evidence-based surgery. *British Journal of Surgery*, 91(9): 1091-1092.
- van der Weijden, T., Légaré, F., Boivin, A., Burgers, J. S., van Veenendaal, H., Stiggelbout, A. M. and Elwyn, G. 2010. How to integrate individual patient values and preferences in clinical practice guidelines? A research protocol. *Implementation Science*, 5(1): 10-18.
- Varcoe, C. and Hilton, A. 1995. Factors affecting acute-care nurses' use of research findings. *Canadian Journal of Nursing Research*, 27(4): 51-71.
- Villaneuva-Russell, Y. 2011. Caught in the crosshairs: identity and cultural authority within chiropractic. *Social Science and Medicine*, 72(11): 1826-1837.
- Villanueva-Russell, Y. 2005. Evidence-based medicine and its implications for the profession of chiropractic. *Social Science and Medicine*, 60(3): 545-561.
- Waalén, J. K. and Mior, S. A. 2005. Practice patterns of 692 Ontario chiropractors (2000-2001). *Journal of the Canadian Chiropractic Association*, 49(1): 21-31.
- Walker, B. F., Stomski, N. J., Hebert, J. J. and French, S. D. 2014. A survey of Australian chiropractors' attitudes and beliefs about evidence-based practice and their use of research literature and clinical practice guidelines. *Chiropractic and Manual Therapies*, 21(1): 1-9.
- Watson, R. and Buchanan, H. 2005. Making our practice evidence-based. *South African Journal of Occupational Therapy*, 35(3): 14-19.
- Willemse, I. 2009. *Statistical methods and calculation skills*. 3rd ed. Cape Town: Juta and Company Ltd.
- Wilson, F. J. H. 2003. A survey of chiropractors in the United Kingdom. *European Journal of Chiropractic*, 50(3): 185-198.
- Wilson, K., Dowson, C. and Mangin, D. 2007. Prevalence of complementary and alternative medicine use in Christchurch, New Zealand: children attending general practice versus paediatric outpatients. *New Zealand Medical Journal*, 120 (1251): 1-9.
- Wittmann, M. 2009. The inner experience of time. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 364(1525): 1955-1967.

World Federation of Chiropractic (WFC). 2012. *The current status of the chiropractic profession: Report to the World Health Organization from the World Federation of Chiropractic*. (online). Available: <http://www.wfc.org>. (Accessed 23 January 2016).

World Health Organization. 2016. (online). Available: <http://www.who.int/en/>. (Accessed 10 May 2016).

World Health Organization. 2005. *WHO guidelines on basic training and safety in chiropractic*. (online). Available: <http://www.who.int/medicines/areas/traditional/Chiro-Guidelines.pdf>. (Accessed 2 May 2016).

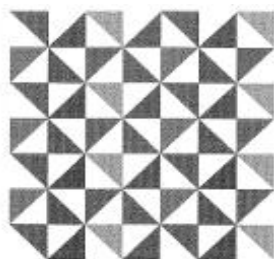
Wyatt, G. and Post-White, J. 2005. Future direction of complementary and alternative medicine (CAM) education and research. *Seminars in Oncology Nursing*, 21(3): 215-224.

Yew, K. S. and Reid, A. 2008. Teaching evidence-based medicine skills: an exploratory study of residency graduates' practice habits. *Family Medicine Journal*, 40(1): 24-31.

Young, J. M., and Ward, J. E. 2001. Evidence-based medicine in general practice: beliefs and barriers among Australian GPs. *Journal of Evaluation in Clinical Practice*, 7(2): 201-210.

Young, K., Ashby, D., Boaz, A. and Grayson, L. 2002. Social science and the evidence-based policy movement. *Social Policy and Society*, 1(3): 215-224.

Appendix A: Durban University of Technology Institutional Ethics Committee Approval letter



Institutional Research Ethics Committee
Faculty of Health Sciences
Room MS 49, Mansfield School Site
Gate 8, Ribson Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900

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http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

6 August 2015

IREC Reference Number: **REC 94/15**

Ms D Naidoo
139 Linnet Road
Woodhaven
Durban

Dear Ms Naidoo

The Knowledge, attitudes, perceptions and perceived barriers of chiropractors within the eThekweni municipality towards evidence-based practice

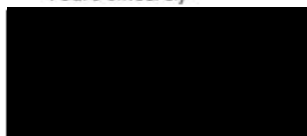
Please be advised that your research proposal was reviewed, and the following decision was made:

Provisional approval subject to minor changes to the satisfaction of the IREC Chair

1. P. 7 - Study design 2nd paragraph:
 - From a research ethics point of view, the reviewer queries whether it is fair to the (prospective) study participants to refer to a fellow Master's student as a research assistant only. In the research community, a 'Master's student' and a 'research assistant' refer to two different things. The reviewer sees no reason why the researcher should not inform the (prospective) study participants of the actual state of affairs, i.e. that a second Master's student is also involved.
 - Which dataset (or portions thereof) will be used in which Master's dissertation written by which student needs to be made explicit to the prospective participants in order for them to be adequately informed beforehand.
2. Appendix B - Information letter: 'no foreseeable risks...' is preferable to 'no risks...'

Please submit the amended proposal with a cover letter to the IREC administrator; this document must reach the IREC as soon as possible but not more than 6 months from 6 August 2015. Please note that research on the proposed project may not proceed until you receive Full Approval from the IREC.

Yours Sincerely



Professor J K Adam
Chairperson: IREC



Appendix B: Dr Jette : letter of permission to utilise questionnaire



From: Laura Wilson <lauraw@dut.ac.za>

Date: Mon, Nov 24, 2014 at 11:22 PM

Subject: Durban University of Technology: Evidence based practice: Beliefs, Attitudes, Knowledge, and Behaviours of Physical Therapists

To: "DJETTE@mghip.edu" <DJETTE@mghip.edu>

Cc: "c8lynkoekemoer@yahoo.com" <c8lynkoekemoer@yahoo.com>, divashninaidoo18 <divashninaidoo18@gmail.com>

Dear Dr Jette

Thank you for allowing your contact details to be shared. I wanted to ask if you would be willing to allow my two masters research students to utilise and modify the questionnaire that was used in your study titled: Evidence based practice: Beliefs, Attitudes, Knowledge, and Behaviours of Physical Therapists (Physical Therapy, Vol 83, no. 9, Sept 2003. The two students are registered for a Masters in Chiropractic, the one will be investigating the knowledge, attitudes, perceptions and beliefs of Chiropractors on the use of evidence based medicine and supplementing it with qualitative interviews and the other will use the quantitative data and compare it to general practitioners in Durban, Kwa-Zulu Natal, South Africa. If you allow them to utilise your questionnaire it will be very beneficial as they can then compare their results with yours.

Looking forward to hearing from you.

Regards

Laura

From: Jette, Diane U. [mailto:DJETTE@MGHIHP.EDU]

Sent: 26 November 2014 03:45 AM

To: Laura Wilson

Subject: RE: Durban University of Technology: Evidence based practice: Beliefs, Attitudes, Knowledge, and Behaviours of Physical Therapists

Dear Laura,

I am pleased that you will be using the survey in your study. Good luck with your project.

Diane

From: Laura Wilson <lauraw@dut.ac.za>

Date: Tue, Nov 25, 2014 at 10:35 PM

Subject: RE: Durban University of Technology: Evidence based practice: Beliefs, Attitudes, Knowledge, and Behaviours of Physical Therapists

To: "Jette, Diane U." <DJETTE@mghihp.edu>

Cc: Nombeko Mshunqane <nombekom@dut.ac.za>, "c8lynkoekemoer@yahoo.com" <c8lynkoekemoer@yahoo.com>, divashninaidoo18 <divashninaidoo18@gmail.com>

Dear Dr Jette,

Thank you. Will reference the origin of the questionnaire in line with normal referencing techniques.

Regards,

Laura

Appendix C: Pre-expert group questionnaire

Evidence-based practice Questionnaire

Thank you for assisting in this study. Please do not write your name or contact details or any other identification data on this questionnaire

Demographic information

Please place a mark "X" in the appropriate box to indicate your response

1. What is your sex?					Male	Female
2. What is your age? _____ years old						
3. At which level is your highest academic degree?	Degree	Honours	Bachelors/ Doctor of Chiropractic	Masters	PhD	Other
4. How many years have you been practicing? _____ years						
5. How many hours per week do you practice? _____ hours per week						
6. Which of the following best describes your role in your profession?	Academic	Part Time Practice	Full Time Practice	Research	Other	
7. Have you received any formal education or training (eg. Degree course, seminar, workshop) in any of the following?	No		Research Methods	Epidemio- logy	Statistics	
8. Have you personally been involved in conducting any kind of research?					Yes	No

1. When faced with a challenging case in your practice, explain the process that you would follow and what resources you would use to clinically solve the problem

2. In your own words, explain what you understand by the term evidence-based practice

3. What barriers have you experienced using evidence-based practice?

This section of the questionnaire inquires about personal attitudes toward, use of, and perceived benefits and limitations of EBP. Place a mark "X" in the appropriate box to indicate your response		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4.1	Application of EBP is necessary in the practice of chiropractic					
4.2	Literature and research findings are useful in my day-to-day practice					
4.3	I need to increase the use of evidence in my daily practice					
4.4	The adoption of EBP places an unreasonable demand on chiropractors					
4.5	I am interested in learning or improving the skills necessary to incorporate EBP into my practice.					
4.6	EBP improves the quality of patient care					
4.7	Strong evidence is lacking to support most of the interventions I use with my patients					
4.8	EBP helps me make decisions about patient care.					
4.9	EBP does not take into account patient preferences.					
For the following questions indicate the number of times/articles consulted per week		None or 1	2 – 5	6 – 10	11 –15	16 +
4.10	Read/review research/literature related to my clinical practice					
4.11	Use professional literature and research findings in the process of clinical decision making					
4.12	Use MEDLINE or other databases to search for practice-relevant literature/research					
The following section inquires about personal use and understanding of clinical practice guidelines. Practice guidelines provide a description of standard specifications for care of patients with specific diseases and are developed through a formal, consensus building process that incorporates the best scientific evidence of effectiveness and expert opinion available. Place a mark "X" in the appropriate box that indicates your response.)				Yes	No	Do not know
5.1	Practice guidelines are available for topics related to my practice					
5.2	Do you use clinical guidelines in your practice?					
The following section inquires about availability of resources to access information and personal skills in using those resources. Place a mark "X" in the appropriate box that indicates your response. In items referring to your "facility," consider the practice setting in which you do the majority of your clinical care				YES	NO	Do not know
6.1	I have access to current research through professional journals in their paper form.					
6.2	I have the ability to access the Internet at my facility.					
6.3	I have the ability to access relevant databases at my facility.					
6.4	I have the ability to access relevant databases and the Internet at home or locations other than my facility.					

Please answer the following questions:		Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
6.4	I learned the foundations for EBP as part of my academic preparation.					
6.5	I am familiar with the medical search engines (eg, MEDLINE, CINAHL).					
6.6	I have received formal training in search strategies for finding research relevant to my practice.					
6.7	I have received formal training in critical appraisal of search literature as part of my academic preparation.					
6.8	I am confident in my ability to critically review professional literature.					
6.9	I am confident in my ability to find relevant research to answer my clinical questions					
My understanding of the following terms is: Place a mark "X" in one box in the row for each term		Understand completely	Understand somewhat	Do not understand		
6.1	Relative risk					
6.2	Absolute risk					
6.3	Systematic review					
6.4	Odds ratio					
6.5	Meta-analysis					
6.6	Confidence interval					
6.7	Heterogeneity					
6.8	Publication bias					
7. Rank your 3 greatest barriers to the use of EBP in your clinical practice. For the following items, rank your top 3 choices by placing numbers in the appropriate boxes (1 = most important).					Ranking	
Insufficient time						
Lack of information resources						
Lack of research skills						
Poor ability to critically appraise the literature						
Inability to apply research findings to individual patients with unique characteristics						
Lack of generalizability of the literature findings to my patient population						
Lack of understanding of statistical analysis						
Lack of collective support among my colleagues in my facility						
Lack of interest						

8. In your opinion, how does the knowledge of evidence-based practice principles and the skills to source research, influence your ability to utilise evidence-based practice?

Thank you for your participation.

Appendix D: Permission from first research assistant

20 April 2015

To: Whom it may concern

Miss Caitlyn Koekemoer and Miss Divashni Naidoo, M.Tech Chiropractic students at the Durban University of Technology (DUT), will be conducting their research in 2015.

Caitlyn Koekemoer's study is titled:

A comparison of the perceptions, use and barriers to evidence-based practice by Chiropractors and General Practitioners in the greater Durban area.

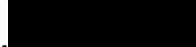
Divashni Naidoo's study is titled:

The knowledge, attitudes and perceptions of Chiropractors within the eThekweni municipality towards evidence-based practice.

The data generated from this study will be utilised in her study in order to do the comparison. As the research assistant, Miss Caitlyn Koekemoer will assume certain responsibilities which will be outlined below. The research assistant will be involved in the data collection of this study by means of delivery of questionnaires, collection of those questionnaires and tracking of respondents. The eThekweni municipality area will be divided geographically and allocated by convenience to either the researcher or research assistant. The research assistant will be in possession of 2 separate ballot boxes in order to ensure that the letter of information and consent be placed in one box and the questionnaires in another. The research assistant will tick the respondents names off a potential participant list once collected in order to track respondents and will be required to present this list to the researcher and Clinic Student Administrator at the end of each week in order to consolidate an updated list. At the end of the data collection process, the research assistant will have access to the results of the study.

This letter serves to confirm that I, Miss Caitlyn Koekemoer, am willing to assume these responsibilities. I can be contacted on 072 537 1842 or by e-mail at c8lynkoekemoer@yahoo.com

Yours sincerely,



Miss Caitlyn Koekemoer

Appendix E: Permission from second research assistant

25 March 2015

TO WHOM IT MAY CONCERN:

Miss Caitlyn Koekemoer and Miss Divashni Naidoo, M.Tech Chiropractic students at the Durban University of Technology (DUT), will be conducting their research in 2015.

Caitlyn Koekemoer's study is titled:

A comparison of the perceptions, use and barriers to evidence-based practice by Chiropractors and General Practitioners in the greater Durban area.

Divashni Naidoo's study is titled:

The knowledge, attitudes, perceptions and perceived barriers of chiropractors within the eThekweni municipality towards evidence-based practice.

Part of the protocol will require electronic mail (e-mail) replies from participants. In this instance, an administrative person from the DUT Chiropractic Day Clinic will be required to receive these e-mail replies on behalf of the researchers in order to ensure participant confidentiality.

This letter serves to confirm that I, Linda Twiggs, am willing to assume this responsibility – my position as Clinic Student Administrator in the DUT Chiropractic Day Clinic. I can be contacted on 031 373 2205 or via e-mail at lindat@dut.ac.za



L. Twiggs

Appendix F: Expert group: letter of information and consent



Dear expert group participant,

Thank you for your time and consideration to participate in this expert group meeting.

Study Title:

The knowledge, attitudes, perceptions and perceived barriers of chiropractors within the eThekweni municipality towards evidence-based practice

Aim:

The aim of this study is to identify the relationship between the knowledge, attitudes, perceptions and perceived barriers towards evidence-based practice by chiropractors within the eThekweni municipality

Objectives:

1. To determine the attitudes and perceptions towards evidence-based practice by chiropractors
2. To identify the level of knowledge and skills of evidence-based practice by chiropractors
3. To determine the perceived barriers to evidence-based practice by chiropractors
4. To identify the associations between knowledge, attitudes, perceptions and barriers to evidence-based practice

Purpose of the study:

Evidence-based practice (EBP) has become widely recognised amongst chiropractors as with other health care professionals. Internationally, studies show that health care practitioners support the use of EBP, but often have difficulty implementing it in practice. In the South African context, research into chiropractors' perceptions of research have been conducted, however the distinction between research and practicing EBP remains unclear. This information can be used by academic institutions and professional associations to determine if the practitioners have the necessary skills. If skills are seen to be lacking, then continuing professional development workshops can be arranged.

Please note the distinction between the terms "research" and "evidence-based practice". The difference in the context of this study will be discussed below:

Research:

The definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question. Finding a definitive answer is the central goal of any experimental process. The purpose of conducting research is to generate new knowledge or to validate existing knowledge based on a theory. Scientific research is organized and involves planning, performing literature reviews of past research and evaluating what questions need to be answered. While research is about investigation, exploration, and discovery, it also requires an understanding of the philosophy of science.

Evidence-based practice:

Evidence based practice is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. Unlike research, EBP is not about developing new knowledge or validating existing knowledge. It involves integrating individual clinical expertise with best available external clinical evidence and applying it to clinical decision making. The purpose of EBP is to utilise the best evidence available to make patient care decisions by means of incorporating clinical expertise and patient preferences and values.

Outline of the procedures:

As part of the research process, the questionnaire will be validated through an expert group. This expert group will consist of the researcher, the research supervisors, fellow researcher and other experts within the field of study, to determine face and content validity. Each person will be required to sign an attendance register and complete a confidentiality statement and code of conduct. Each question appearing on the questionnaire will be discussed amongst participants in great detail. Comments and suggestions will be recorded and later scribed. Any amendments made at the expert group must be unanimous and will be affected to the main questionnaire

Benefits:

Once the study has been completed, the results will be made available on the DUT Institutional repository. Using this information, you will have the opportunity to identify the areas that they can improve on or seek further training in certain aspects of evidence-based practice. You will be given the opportunity to inform the researcher if you would like to be sent the results of this study upon completion.

Reason/s why the Participant May Be Withdrawn from the Study:

You are free to withdraw from the expert group at any time. There will be no adverse consequences for the participant should you choose to withdraw

Remuneration:

No participants will receive any form of remuneration.

Costs of the study:

No costs will be expected to be covered by you with regards to the study.

Confidentiality:

Any information provided by you during the duration of the expert group will be treated in the utmost confidence. All information will be kept confidential, locked in a steel cupboard, and will only be shared with the research supervisors and fellow researcher. All data will be kept in storage for a period of five years. Thereafter, it will be shredded. All information contained in the research documents and any information discussed during the focus group meeting must be kept private and confidential. This is especially binding to any information that may identify any of the participants in the focus group.

Additional consent:

Should you agree, the data generated in this research study (I.e. entire questionnaire) will be made available to a fellow Masters Chiropractic student registered at the Durban University of Technology, who will be comparing the perceptions, use and barriers to evidence-based practice by chiropractors to those of General Practitioners in the eThekwin Municipality.

Study Title of fellow researcher:

A comparison of the perceptions, use and barriers to evidence-based practice by chiropractors and General Practitioners in the eThekwin Municipality

Risks/Discomforts/Research-related injury and costs:

There are no foreseeable risks/discomforts/research-related injuries or cost involved from participation in this expert.

Persons to Contact in the Event of Any Problems or Queries:

If you require any further information or there are any queries in this regard, please contact the researcher, Divashni Naidoo (Tel no. 083 415 8391), my supervisor, Dr Laura O'Connor (Tel no. 031 373 2923), or the Institutional Research Ethics administrator on 031 373 2900.

Yours sincerely,

.....
Divashni Naidoo
Researcher
B.Tech.: Chiropractic

.....
Dr. L. O'Connor
Research supervisor
M.Tech.: Chiropractic



CONSENT

Statement of Agreement to Participate in the expert group:

I hereby confirm that I have been informed by the researcher/s, Miss Divashni Naidoo and/or Mrs Caitlyn Koekemoer, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the expert group meeting.

I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	Date	Time	Signature / Right Thumbprint

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	Date	Signature

_____	_____	_____
Full Name of Witness (If applicable)	Date	Signature

_____	_____	_____
Full Name of Legal Guardian (If applicable)	Date	Signature



CONFIDENTIALITY STATEMENT AND CODE OF CONDUCT:
EXPERT GROUP

- All information contained in the research documents and any information discussed during the focus group meeting must be kept private and confidential. This is especially binding to any information that may identify any of the participants in the focus group.
- None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
- The information from this focus group will be made public in terms of a dissertation/thesis and/or journal publication, which will in no way identify any of the participants involved in this focus group.
- The returned questionnaires will be coded and kept anonymous in the research process.
- The focus group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will be stored securely under password protection.
- All data generated from this focus group (including the recording) will be kept for 5 years in a secure location at Durban University of Technology and thereafter will be destroyed.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Please print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's Name: _____ Signature: _____

Co-supervisor's Name: _____ Signature: _____

Appendix G: Expert group: attendance register



FOCUS GROUP ATTENDANCE REGISTER

<u>Name</u>	<u>Contact number</u>	<u>Sign</u>

Appendix H: Expert group: confidentiality statement and code of conduct



CONFIDENTIALITY STATEMENT AND CODE OF CONDUCT: **EXPERT GROUP**

- All information contained in the research documents and any information discussed during the focus group meeting must be kept private and confidential. This is especially binding to any information that may identify any of the participants in the focus group.
- None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
- The information from this focus group will be made public in terms of a dissertation/thesis and/or journal publication, which will in no way identify any of the participants involved in this focus group.
- The returned questionnaires will be coded and kept anonymous in the research process.
- The focus group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will stored securely under password protection.
- All data generated from this focus group (including the recording) will be kept for 15 years in a secure location at Durban University of Technology and thereafter will be destroyed.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Please print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's Name: _____ Signature: _____

Co-supervisor's Name: _____ Signature: _____

Appendix I: List of changes made at expert group



STUDENT NAME: Divashni Naidoo

IREC REFERENCE NUMBER: REC 94/15

EXPERT GROUP RECOMMENDED CHANGES	STUDENT/ SUPERVISOR RESPONSE	PAGE NO. WHERE CHANGE WAS MADE
Remove 'Demographic Information'	Removed	Page 1
Question 3: Addition of 'Specialisation' as an additional possible answer	'Specialisation' added	Page 1
Question 4: Re-phrase from 'How many years have you been practicing?'	Rephrased to 'How many years have you been in practice?'	Page 1
Question 6: add 'You may select more than one answer' after the question	'You may select more than one answer' was added after the question	Page 1
Question 7: Remove 'formal education or training' and replace with 'formal post graduate training'	Removed 'formal education or training' and replaced with 'formal post graduate training'	Page 1
Question 7: Remove 'No' and replace with 'Not Applicable'	Removed 'No' and replaced with 'Not Applicable'	Page 1
Question 8: Renumber 8 to 8.1	Renumbered to 8.1	Page 1
Question 8: Add question 8.2 'If you answered 'Yes' to 8.1: What was your involvement in the research conducted?'	Addition of question 8.2 'If you answered 'Yes' to 8.1: What was your involvement in the research conducted?'	Page 1
Add an additional question after question 8.2 regarding continuing education credits.	Question 9 added: 'How many hours of continuing education credits have you earned during the past year?' – Exceeded the Requirements/Met the Requirements/Less than Required/None	Page 1
Renumber question 9 onwards	All following questions were renumbered accordingly	Pages 1, 2 and 3
Question 9 renumbered to 10: Shorten the question for easier reading and understanding	Shortened to: 'For the following statements, state your level of agreement.'	Page 1
Question 9.1 renumbered to 10.1: Expand EBP as it is the first time the term is being used in the questionnaire.	EBP expanded to: evidence based practice (EBP)	Page 1
Question 9.1 renumbered to 10.1: Remove 'chiropractic/'	Removed 'chiropractic/'	Page 1

Question 9.4 renumbered to 10.4: Remove 'chiropractors/'	Removed 'chiropractors/'	Page 1
Question 10 renumbered to 11: Choose either times or articles.	Rephrased to: 'For these statements, indicate the number of times per week you would:'	Page 2
Question 10.1 renumbered to 11.1: Choose either read or review and literature or research	Rephrased to: 'Read scientific literature related to clinical practice.'	Page 2
Question 10.2 renumbered to 11.2: Remove 'professional literature and research' and replace with 'scientific research	Removed 'professional literature and research' and replaced with 'scientific research	Page 2
Question 11 renumbered to 12: Shorten the question for easier reading and understanding	Shortened to: ' Please answer the following regarding clinical practice guidelines and accessibility to resources	Page 2
Combine question 12 into question 11	Original questions from 12 were added to question 11 to form the new questions 12.3, 12.4, 12.5 and 12.6	Page 2
Question 12.2 and 12.3: Combine these into 1 question and allow 'Do Not Know' to be an answer	Question 12.4 was created: 'I have the ability to access relevant databases and the Internet at my facility. 'Do Not Know' was unblocked	Page 2
Addition of another question in question 12: 'I have the skills to access relevant databases and the Internet'	Question 12.6 was added: 'I have the skills to access relevant databases and the Internet'	Page 2
Question 13: Rephrase the question	Rephrased to: 'Please state your level of agreement with the following questions'	Page 2
Question 13.2: change 'e.g.' to 'such as'	Removed 'e.g.' and replaced with 'such as'	Page 2
Question 14: Shorten the question for easier reading and understanding	Rephrased to: 'Rate your understanding of the following terms:	Page 2
Question 14: Put the terms in alphabetical order to avoid favoritism	Terms were reshuffled to be in alphabetical order	Page 2
Question 15: Rephrase the question to allow better understanding of the requirements of the question	Rephrased to: 'From the below, in terms of your clinical practice, rank your top three barriers to EBP (1 = top barrier, 2 = 2 nd barrier, 3 = 3 rd barrier)	Page 3
Question 15: Arrange statements into alphabetical order to avoid favoritism	Statements were reshuffled to be in alphabetical order	Page 3
Question 15: Add an option 'other' and ask respondent to specify the other	'Other (Please specify)' was added to the list of statements	

Please underline all changes/additions to the research proposal in the amended document in order to facilitate review thereof.

SIGNATURE OF STUDENT

DATE

SIGNATURE OF SUPERVISOR

DATE

Appendix J: Post-expert group questionnaire

Evidence Based Practice Questionnaire

Thank you for participating in this study. Please do not write your name or contact details or any other identification data on this questionnaire

Please place a mark "X" in the appropriate box to indicate your response

What is your sex?	Female	Male
-------------------	--------	------

What is your age?	_____ years old
-------------------	-----------------

At which level is your highest academic qualification?	MBCHB/ MBBS	Masters	PhD	Specialisation	Other
--	-------------	---------	-----	----------------	-------

How many years have you been in practice?	_____ years
---	-------------

How many hours per week do you practice?	_____ hours per week
--	----------------------

Which of the following best describes your role in your profession? (You may select more than one answer.)	Academic	Part Time Practice	Full Time Practice	Research	Other
--	----------	--------------------	--------------------	----------	-------

Have you received any formal post graduate training (Such as degree course, seminar, workshop) in any of the following?	Epidemiology	Research Methods	Statistics	Not Applicable
---	--------------	------------------	------------	----------------

1. Have you personally been involved in conducting any kind of research?	Yes	No
--	-----	----

2. If you answered 'Yes' to 1.1: What was your involvement in the research conducted?	Undergraduate	Postgraduate (Masters/ PHD)	Supervisor	Other
---	---------------	-----------------------------	------------	-------

3. When faced with a challenging case in your practice, explain the process that you would follow and what resources you would use to clinically solve your problem.

4. In your own words, explain your understanding of the following term 'evidence based practice' (EBP).

5. Have you experienced any difficulties using EBP?

6. How many hours of continuing education credits have you earned during the past year?	Exceed the Requirements	Met the Requirements	Less than Required	None
---	-------------------------	----------------------	--------------------	------

3. For the following statements, state your level of agreement.		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1	Application of EBP is necessary in the practice of chiropractic.					
3.2	Literature and research findings are useful in my day-to-day practice.					
3.3	I need to increase the use of evidence in my daily practice.					
3.4	The adoption of EBP places an unreasonable demand on chiropractors.					
3.5	I am interested in learning or improving the skills necessary to incorporate EBP into my practice.					
3.6	EBP improves the quality of patient care.					
3.7	Strong evidence is lacking to support most of the interventions I use with my patients.					
3.8	EBP helps me make decisions about patient care.					
3.9	EBP does not take into account patient preferences.					
4. For the following statements, indicate the number of times per week you would:		None or 1	2 – 5	6 – 10	11 – 15	16 +
4.1	Read scientific literature related to clinical practice.					
4.2	Use scientific research findings in the process of clinical decision making.					
4.3	Use MEDLINE or other databases to search for practice-relevant literature/research.					
5. Please answer the following regarding clinical practice guidelines and accessibility resources:				Yes	No	Do Not Know
5.1	Practice guidelines are available for topics related to my practice					
5.2	Do you use clinical guidelines in your practice?					
5.3	I have access to current research through professional journals in their paper form.					
5.4	I have the ability to access relevant databases and the Internet at my facility.					
5.5	I have the ability to access relevant databases and the Internet at home or locations other than my facility.					
5.6	I have the skills to access relevant databases and the Internet.					
6. Please state your level of agreement with the following questions:		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6.1	I learned the foundations for EBP as part of my academic preparation.					
6.2	I am familiar with the medical search engines (such as: MEDLINE and CINAHL).					
6.3	I have received formal training in search strategies for finding research relevant to my practice.					

16.4	have received formal training in critical appraisal of scientific literature as part of my academic preparation.				
16.5	I am confident in my ability to critically review scientific literature.				
16.6	I am confident in my ability to find relevant research to answer my clinical questions				
7. Rate your understanding of the following terms:		Understand completely	Understand somewhat	Do not understand	
7.1	Absolute risk				
7.2	Confidence interval				
7.3	Heterogeneity				
7.4	Meta-analysis				
7.5	Odds ratio				
7.6	Publication bias				
7.7	Relative risk				
7.8	Systematic review				
8. From the list below, in terms of your clinical practice, rank your top three barriers to EBP (1 = top barrier, 2 = 2 nd barrier, 3 = 3 rd barrier).				Ranking	
Inability to apply research findings to individual patients with unique characteristics					
Insufficient time					
Lack of collective support among my colleagues in my facility					
Lack of generalizability of the literature findings to my patient population					
Lack of information resources					
Lack of interest					
Lack of research skills					
Lack of understanding of statistical analysis					
Poor ability to critically appraise the literature					
Other (Please specify)					

19. In your opinion, how does the knowledge of EBP principals and skills to source research, influence your ability to utilize EBP?

Thank you for your participation.

Appendix K: Pilot study: letter of information and consent



Dear Doctor,

Thank you for your time and consideration to participate in this pilot study.

Study Title:

The knowledge, attitudes, perceptions and perceived barriers of chiropractors within the eThekweni municipality towards evidence-based practice

Name of Supervisor: Dr L. O' Connor (031 373 2923 / 084 848 0620)
M.Tech: Chiropractic

Name of Co-supervisor: Dr N. Mshunqane (031 373 2400 / 082 924 3773)
PhD: Physiotherapy

Name of Research Student: Divashni Naidoo (031 373 2205)
B. Tech: Chiropractic

Purpose of the study:

Evidence-based practice (EBP) has become widely recognised amongst chiropractors as with other health care professionals. Internationally, studies show that health care practitioners support the use of EBP, but often have difficulty implementing it in practice. In the South African context, research into chiropractors' perceptions of research have been conducted, however the distinction between research and practicing EBP remains unclear. This information can be used by academic institutions and professional associations to determine if the practitioners have the necessary skills. If skills are seen to be lacking, then continuing professional development workshops can be arranged.

Please note the distinction between the terms "research" and "evidence-based practice". The difference in the context of this study will be discussed below:

Research:

The definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question. Finding a definitive answer is the central goal of any experimental process. The purpose of conducting research is to generate new knowledge or to validate existing knowledge based on a theory. Scientific research is organized and involves planning, performing literature reviews of past research and evaluating what questions need to be answered. While research is about investigation, exploration, and discovery, it also requires an understanding of the philosophy of science.

Evidence-based practice:

Evidence based practice is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. Unlike research, EBP is not about developing new knowledge or validating existing knowledge. It involves integrating individual clinical expertise with best available external clinical evidence and applying it to clinical decision making. The purpose of EBP is to utilise the best evidence available to make patient care decisions by means of incorporating clinical expertise and patient preferences and values.

Outline of the procedures:

Following validation of the questionnaire, pilot testing will be conducted. Pilot testing involves a small scale trial in which participants who qualify to partake in the study by means of meeting the inclusion and exclusion criteria, complete the questionnaire. The purpose of a pilot test is to ensure that everyone in the pilot test interprets the questions in the same way, to test the appropriateness of the questions and their comprehension and to ensure that there is no ambiguity, grammatical or measurement irregularities, which will be a representation of the intended sample. Any chiropractor who may partake in the pilot testing will be excluded from the main study.

On agreeing to participate in this pilot study, you will be required to complete this letter of information, informed consent and questionnaire. The questionnaire will be hand delivered to you. Please complete the questionnaire at your own convenience and in full. Please provide the researcher with your email address so that a reminder email can be sent to you in two weeks. A second reminder will be sent to you a week later. The questionnaires will be collected according to your preference, either by personal collection or scanned and e-mailed to a neutral third party (lindat@dut.ac.za).

Benefits:

Once the study has been completed, the results will be made available on the DUT Institutional repository. Using this information, you will have the opportunity to identify the areas that they can improve on or seek further training in certain aspects of evidence-based practice. You will be given the opportunity to inform the researcher if you would like to be sent the results of this study upon completion.

Reason/s why the Participant May Be Withdrawn from the Study:

You are free to withdraw from the pilot study at any time. There will be no adverse consequences for the participant should you choose to withdraw

Remuneration:

No participants will receive any form of remuneration.

Costs of the study:

No costs will be expected to be covered by you with regards to the study.

Confidentiality:

Any information provided by you will be treated in the utmost confidence. All completed questionnaires and informed consent forms will be placed in sealed boxes (one box for the signed informed consent and the other for the completed questionnaire), this will ensure anonymity. The boxes will only be opened once data collection has been completed. All data will be coded: each questionnaire will be numbered with no personal information of the participant appearing on the questionnaire. All information will be kept confidential, locked in a steel cupboard, and will only be shared with the research supervisors and fellow researcher. All data will be kept in storage for a period of five years. Thereafter, it will be shredded.

Additional consent:

Should you agree, the data generated in this research study (I.e. entire questionnaire) will be made available to a fellow Masters Chiropractic student registered at the Durban University of Technology, who will be comparing the perceptions, use and barriers to evidence-based practice by chiropractors to those of General Practitioners in the eThekweni municipality.

Study Title of fellow researcher:

A comparison of the perceptions, use and barriers to evidence-based practice by chiropractors and General Practitioners in the eThekweni municipality

Name of Supervisor:

Dr L. O' Connor (031 373 2923 / 084 848 0620)

M.Tech: Chiropractic

Name of Co-supervisor: Dr K. Padayachy (031 373 2400 / 082 924 3773)
M.Tech: Chiropractic

Name of Research Student: Caitlyn Koekemoer (031 373 2205)
B. Tech: Chiropractic

Risks/Discomforts/Research-related injury and costs:

There are no foreseeable risks/discomforts/research-related injuries or cost involved from participation in this study.

Persons to Contact in the Event of Any Problems or Queries:

If you require any further information or there are any queries in this regard, please contact the researcher, Divashni Naidoo (Tel no. 083 415 8391), my supervisor, Dr Laura O'Connor (Tel no. 031 373 2923), or the Institutional Research Ethics administrator on 031 373 2900.

Yours sincerely,

.....
Divashni Naidoo
Researcher
B.Tech.: Chiropractic

.....
Dr. L. O'Connor
Research supervisor
M.Tech.: Chiropractic



CONSENT

Statement of Agreement to Participate in the Pilot Study:

I hereby confirm that I have been informed by the researcher/s, Miss Divashni Naidoo and/or Mrs Caitlyn Koekemoer, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

I agree that my completed questionnaire can be made available to Mrs Caitlyn Koekemoer in order for her to conduct her research project titled: "A comparison of the perceptions, use and barriers to evidence-based practice by chiropractors and General Practitioners in the eThekweni municipality"

_____	_____	_____	_____
Full Name of Participant	Date	Time	Signature / Right Thumbprint

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	Date	Signature

_____	_____	_____
Full Name of Witness (If applicable)	Date	Signature

_____	_____	_____
Full Name of Legal Guardian (If applicable)	Date	Signature

Appendix L: List of changes made at pilot study



STUDENT NAME: Divashni Naidoo

IREC REFERENCE NUMBER: REC 94/15

PILOT STUDY RECOMMENDED CHANGES	STUDENT/ SUPERVISOR RESPONSE	PAGE NO. WHERE CHANGE WAS MADE
Question 15: Was found to be confusing to answer with many pilot study participants either answering incorrectly or requiring to ask the researcher how to answer the question.	Rephrased to be the very similar as phrased in Dr Jette's study (Jette <i>et al.</i> 2003) as no difficulties with this question were noted in that study : 'From the list below, rank your 3 greatest barriers to the use of EBP in your clinical practice. Rank your top 3 choices by placing numbers in the appropriate boxes (1 = top barrier, 2 = 2 nd barrier, 3 = 3 rd barrier).	Page 3

Please underline all changes/additions to the research proposal in the amended document in order to facilitate review thereof.

SIGNATURE OF STUDENT

SIGNATURE OF SUPERVISOR

DATE

DATE

Appendix M: Final questionnaire

Evidence Based Practice Questionnaire

Thank you for participating in this study. Please do not write your name or contact details or any other identification data on this questionnaire

Please place a mark “X” in the appropriate box to indicate your response

1. What is your sex?	Female	Male			
2. What is your age? _____ years old					
3. At which level is your highest academic qualification?	Masters	PhD	Specialisation	Other	
4. How many years have you been in practice? _____ years					
5. How many hours per week do you practice? _____ hours per week					
6. Which of the following best describes your role in your profession? (You may select more than one answer.)	Academic	Part Time Practice	Full Time Practice	Research	Other
7. Have you received any formal post graduate training (Such as: degree course, seminar, workshop) in any of the following?	Epidemiology	Research Methods	Statistics	Not Applicable	
8.1 Have you personally been involved in conducting any kind of research?	Yes			No	
8.2 If you answered 'Yes' to 8.1: What was your involvement in the research conducted?	Undergraduate	Postgraduate (Masters/ PHD)	Supervisor	Other	

9. When faced with a challenging case in your practice, explain the process that you would follow and what resources you would use to clinically solve your problem.

10. In your own words, explain your understanding of the following term 'evidence based practice' (EBP).

11. Have you experienced any difficulties using EBP?

12. How many hours of continuing education credits have you earned during the past year?	Exceed the Requirements	Met the Requirements	Less than Required	None
--	-------------------------	----------------------	--------------------	------

13. For the following statements, state your level of agreement.		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13.1	Application of EBP is necessary in the practice of chiropractic.					
13.2	Literature and research findings are useful in my day-to-day practice.					
13.3	I need to increase the use of evidence in my daily practice.					
13.4	The adoption of EBP places an unreasonable demand on chiropractors.					
13.5	I am interested in learning or improving the skills necessary to incorporate EBP into my practice.					
13.6	EBP improves the quality of patient care.					
13.7	Strong evidence is lacking to support most of the interventions I use with my patients.					
13.8	EBP helps me make decisions about patient care.					
13.9	EBP does not take into account patient preferences.					
14. For the following statements, indicate the number of times per week you would:		None or 1	2 – 5	6 – 10	11 – 15	16 +
14.1	Read scientific literature related to clinical practice.					
14.2	Use scientific research findings in the process of clinical decision making.					
14.3	Use MEDLINE or other databases to search for practice-relevant literature/research.					
15. Please answer the following regarding clinical practice guidelines and accessibility to resources:				Yes	No	Do Not Know
15.1	Practice guidelines are available for topics related to my practice					
15.2	Do you use clinical guidelines in your practice?					
15.3	I have access to current research through professional journals in their paper form.					
15.4	I have the ability to access relevant databases and the Internet at my facility.					
15.5	I have the ability to access relevant databases and the Internet at home or locations other than my facility.					

5.6	I have the skills to access relevant databases and the Internet.						
16. Please state your level of agreement with the following questions:				Strongly Disagree	Disagree	Neutral	Agree
							Strongly Agree
16.1	I learned the foundations for EBP as part of my academic preparation.						
16.2	I am familiar with the medical search engines (such as: MEDLINE and CINAHL).						
16.3	I have received formal training in search strategies for finding research relevant to my practice.						
6.4	I have received formal training in critical appraisal of scientific literature as part of my academic preparation.						
16.5	I am confident in my ability to critically review scientific literature.						
16.6	I am confident in my ability to find relevant research to answer my clinical questions						
17. Rate your understanding of the following terms:				Understand completely	Understand somewhat	Do not understand	
17.1	Absolute risk						
17.2	Confidence interval						
17.3	Heterogeneity						
17.4	Meta-analysis						
17.5	Odds ratio						
17.6	Publication bias						
17.7	Relative risk						
17.8	Systematic review						
18. From the list below, rank your 3 greatest barriers to the use of EBP in your clinical practice. Rank your top 3 choices by placing numbers in the appropriate boxes (1 = top barrier, 2 = 2 nd barrier, 3 = 3 rd barrier).						Ranking	
Inability to apply research findings to individual patients with unique characteristics							
Insufficient time							
Lack of collective support among my colleagues in my facility							
Lack of generalizability of the literature findings to my patient population							
Lack of information resources							
Lack of interest							
Lack of research skills							
Lack of understanding of statistical analysis							
Poor ability to critically appraise the literature							
Other (Please specify)							

19. In your opinion, how does the knowledge of EBP principles and skills to source research, influence your ability to utilise EBP.

Thank you for your participation.

Appendix N: Letter of information and consent



Dear Doctor,

Thank you for your time and consideration to participate in this study.

Study Title:

The knowledge, attitudes, perceptions and perceived barriers of chiropractors within the eThekweni municipality towards evidence-based practice

Name of Supervisor: Dr L. O' Connor (031 373 2923 / 084 848 0620)
M.Tech: Chiropractic

Name of Co-supervisor: Dr N. Mshunqane (031 373 2400 / 082 924 3773)
PhD: Physiotherapy

Name of Research Student: Divashni Naidoo (031 373 2205)
B. Tech: Chiropractic

Purpose of the study:

Evidence-based practice (EBP) has become widely recognised amongst chiropractors as with other health care professionals. Internationally studies show that health care practitioners support the use of EBP, but often have difficulty implementing it in practice. In the South Africa context research into Chiropractors perceptions of research have been conducted, however the distinction between research and practicing EBP remains unclear. This information can be used by academic institutions and professional associations to determine if the practitioners have the necessary skills, if skills are seen to be lacking then continuing professional development workshops can be arranged.

Please note the distinction between the terms "research" and "evidence-based practice". The difference in the context of this study will be discussed below:

Research:

The definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question. Finding a definitive answer is the central goal of any experimental process. The purpose of conducting research is to generate new knowledge or to validate existing knowledge based on a theory. Scientific research is organized and involves planning, performing literature reviews of past research and evaluating what questions need to be answered. While research is about investigation, exploration, and discovery, it also requires an understanding of the philosophy of science.

Evidence-based practice:

Evidence based practice is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. Unlike research, EBP is not about developing new knowledge or validating existing knowledge. It involves integrating individual clinical expertise with best available external clinical evidence and applying it to clinical decision making. The purpose of EBP is to utilise the best evidence available to make patient care decisions by means of incorporating clinical expertise and patient preferences and values.

Outline of the procedures:

On agreeing to participate in this research you will be required to complete a questionnaire and sign this letter of information and consent. The questionnaire will be hand delivered to you, please complete it in full. You can complete the questionnaire at your own convenience. Please provide the researcher with your email address so that in two weeks a reminder email can be sent. A second reminder will be sent to you a week later. The questionnaires will be collected according to your preference, either collected, scanned and email the neutral third party or faxed to

Benefits:

Once the study has been completed, the results will be made available on the DUT Institutional repository. Using this information, you will have the opportunity to identify the areas that they can improve on or seek further training in certain aspects of evidence-based practice

Reason/s why the Participant May Be Withdrawn from the Study:

You are free to withdraw from the study at any time. There will be no adverse consequences for the participant should you choose to withdraw

Remuneration:

No participants will receive any form of remuneration.

Costs of the study:

No costs will be expected to be covered by you with regards to the study.

Confidentiality:

Any information provided by you will be treated in the utmost confidence. All completed questionnaires and informed consent forms will be placed in sealed boxes (one box for the signed informed consent and the other for the completed questionnaire), this will ensure anonymity. The boxes will only be opened once data collection has been completed. All data will be coded: each questionnaire will be numbered with no personal information of the participant appearing on the questionnaire. All information will be kept confidential, locked in a steel cupboard, and will only be shared with the research supervisors and fellow researcher. All data will be kept in storage for a period of five years. Thereafter, it will be shredded.

Additional consent:

Should you agree, the data gathered in this research project will be made available to a fellow Masters student registered at the Durban University of Technology, Chiropractic programme, who is comparing the perceptions, use and barriers to evidence-based practice by chiropractors to those of General Practitioners in the eThekweni municipality.

Study Title:

A comparison of the perceptions, use and barriers to evidence-based practice by chiropractors and General Practitioners in the eThekweni municipality

Name of Supervisor: Dr L. O' Connor (031 373 2923 / 084 848 0620)
M.Tech: Chiropractic

Name of Co-supervisor: Dr K. Padayachy (031 373 2400 / 082 924 3773)
M.Tech: Chiropractic

Name of Research Student: Caitlyn Koekemoer (031 373 2205)
B. Tech: Chiropractic

Risks/Discomforts/Research-related injury and costs:

There are no risks/discomforts/research-related injuries or cost involved from participation in this study.

Persons to Contact in the Event of Any Problems or Queries:

If you require any further information or there are any queries in this regard, please contact the researcher, Divashni Naidoo (Tel no. 083 415 8391), my supervisor, Dr Laura O'Connor (Tel no. 031 373 2923), or the Institutional Research Ethics administrator on 031 373 2900.

Yours sincerely,

.....
Divashni Naidoo
Researcher
B.Tech.: Chiropractic

.....
Dr. L. O'Connor
Research supervisor
M.Tech.: Chiropractic



CONSENT

Statement of Agreement to Participate in the Research Study:

I hereby confirm that I have been informed by the researcher/s, Miss Divashni Naidoo and/ Mrs Caitlyn Koekemoer, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

I agree my questionnaire can be made available to Mrs Koekemoer for her to conduct her research project titled: A comparison of the perceptions, use and barriers to evidence-based practice by chiropractors and General Practitioners in the eThekweni municipality

_____	_____	_____	_____
Full Name of Participant	Date	Time	Signature / Right Thumbprint

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	Date	Signature

_____	_____	_____
Full Name of Witness (If applicable)	Date	Signature

_____	_____	_____
Full Name of Legal Guardian (If applicable)	Date	Signature

Appendix O: Statistical analysis: Associations between knowledge of, attitudes towards, perceptions of and barriers to EBP by chiropractors

“Application of evidence based practice (EBP) is necessary in the practice of medicine” vs “I have received formal training in critical appraisal of scientific literature as part of my academic preparation”

		I have received formal training in critical appraisal of scientific literature as part of my academic preparation.					Total
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Application of evidence based practice (EBP) Neutral	Count	0	0	0	1	0	1
	% within I have recei	0.0%	0.0%	0.0%	4.3%	0.0%	2.0%
	Agree Count	2	9	6	9	0	26
	% within I have recei	33.3%	81.8%	85.7%	39.1%	0.0%	51.0%
	Strongly Ag Count	4	2	1	13	4	24
	% within I have recei	66.7%	18.2%	14.3%	56.5%	100.0%	47.1%
Total	Count	6	11	7	23	4	51
	% within I have recei	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	14.822 ^a	8	0.063	0.077		
Likelihood Ratio	17.274	8	0.027	0.014		
Fisher's Exact Test	16.182			0.015		
Linear-by-Linear Association	1.920 ^b	1	0.166	0.195	0.102	0.034
N of Valid Cases	51					

a. 11 cells (73.3%) have expected count less than 5. The minimum expected count is .08.

b. The standardized statistic is 1.386.

“Literature and research findings are useful in my day-to-day practice” vs “I have received formal training in search strategies for finding research relevant to my practice”

		I have received formal training in search strategies for finding research relevant to my practice.					Total
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Literature and research findings are useful in Disagree	Count	0	1	0	0	0	1
	% within I have receiv	0.0%	4.2%	0.0%	0.0%	0.0%	2.0%
	Neutral Count	0	2	0	3	0	5
	% within I have receiv	0.0%	8.3%	0.0%	30.0%	0.0%	9.8%
	Agree Count	2	19	7	5	0	33
	% within I have receiv	50.0%	79.2%	70.0%	50.0%	0.0%	64.7%
Strongly Ag	Count	2	2	3	2	3	12
	% within I have receiv	50.0%	8.3%	30.0%	20.0%	100.0%	23.5%
Total	Count	4	24	10	10	3	51
	% within I have receiv	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	21.466 ^a	12	0.044	0.080		
Likelihood Ratio	21.076	12	0.049	0.027		
Fisher's Exact Test	19.704			0.023		
Linear-by-Linear Association	.893 ^b	1	0.345	0.360	0.203	0.054
N of Valid Cases	51					

a. 16 cells (80.0%) have expected count less than 5. The minimum expected count is .06.

b. The standardized statistic is .945.

“Literature and research findings are useful in my day-to-day practice” vs “I have received formal training in critical appraisal of scientific literature as part of my academic preparation”

		I have received formal training in critical appraisal of scientific literature as part of my academic preparation.					Total
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Literature and research findings are useful in my day-to-day practice	Count	0	1	0	0	0	1
	% within I have received formal training	0.0%	9.1%	0.0%	0.0%	0.0%	2.0%
	Neutral	Count	0	2	0	2	5
	% within I have received formal training	0.0%	18.2%	0.0%	8.7%	25.0%	9.8%
	Agree	Count	3	8	6	16	33
	% within I have received formal training	50.0%	72.7%	85.7%	69.6%	0.0%	64.7%
Strongly Agree	Count	3	0	1	5	3	12
	% within I have received formal training	50.0%	0.0%	14.3%	21.7%	75.0%	23.5%
Total		Count	6	11	7	23	51
		% within I have received formal training	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	19.293 ^a	12	0.082	0.090		
Likelihood Ratio	22.634	12	0.031	0.016		
Fisher's Exact Test	19.502			0.021		
Linear-by-Linear Association	.596 ^b	1	0.440	0.471	0.250	0.054
N of Valid Cases	51					

a. 17 cells (85.0%) have expected count less than 5. The minimum expected count is .08.

b. The standardized statistic is .772.

“I need to increase the use of evidence in my daily practice” vs “I am confident in my ability to find relevant research to answer my clinical questions”

		I am confident in my ability to find relevant research to answer my clinical questions.					Total
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
I need to increase the use of evidence in my day-to-day practice	Count	0	0	0	0	2	2
	% within I am confident	0.0%	0.0%	0.0%	0.0%	33.3%	3.9%
	Disagree	Count	0	0	1	6	7
	% within I am confident	0.0%	0.0%	8.3%	20.0%	0.0%	13.7%
	Neutral	Count	0	0	4	8	15
	% within I am confident	0.0%	0.0%	33.3%	26.7%	50.0%	29.4%
Agree	Count	1	2	4	15	0	22
	% within I am confident	100.0%	100.0%	33.3%	50.0%	0.0%	43.1%
Strongly Agree	Count	0	0	3	1	1	5
	% within I am confident	0.0%	0.0%	25.0%	3.3%	16.7%	9.8%
Total		Count	1	2	12	30	51
		% within I am confident	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	29.358 ^a	16	0.022	0.060		
Likelihood Ratio	26.629	16	0.046	0.017		
Fisher's Exact Test	24.332			0.024		
Linear-by-Linear Association	5.220 ^b	1	0.022	0.022	0.011	0.005
N of Valid Cases	51					

a. 22 cells (88.0%) have expected count less than 5. The minimum expected count is .04.

b. The standardized statistic is -2.285.

“The adoption of EBP places an unreasonable demand on general practitioners” vs “I have received formal training in critical appraisal of scientific literature as part of my academic preparation”

Crosstab							
I have received formal training in critical appraisal of scientific literature as part of my academic preparation.							
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
The adoption of EBP places an unreasonable demand on general practitioners	Count	3	1	0	4	3	11
	% within I have received	50.0%	9.1%	0.0%	17.4%	75.0%	21.6%
	Disagree Count	1	4	2	16	0	23
	% within I have received	16.7%	36.4%	28.6%	69.6%	0.0%	45.1%
	Neutral Count	1	6	5	2	0	14
	% within I have received	16.7%	54.5%	71.4%	8.7%	0.0%	27.5%
	Agree Count	1	0	0	1	0	2
	% within I have received	16.7%	0.0%	0.0%	4.3%	0.0%	3.9%
	Strongly Agree Count	0	0	0	0	1	1
	% within I have received	0.0%	0.0%	0.0%	0.0%	25.0%	2.0%
Total	Count	6	11	7	23	4	51
	% within I have received	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	43.857 ^a	16	0.000	0.000		
Likelihood Ratio	37.801	16	0.002	0.000		
Fisher's Exact Test	33.645			0.000		
Linear-by-Linear Association	.741 ^b	1	0.389	0.401	0.216	0.036
N of Valid Cases	51					

a. 23 cells (92.0%) have expected count less than 5. The minimum expected count is .08.

b. The standardized statistic is -.861.

“EBP improves the quality of patient care” vs “I have received formal training in critical appraisal of scientific literature as part of my academic preparation”

Crosstab							
I have received formal training in critical appraisal of scientific literature as part of my academic preparation.							
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
EBP improves the quality of patient care.	Disagree Count	0	0	0	1	0	1
	% within I have received	0.0%	0.0%	0.0%	4.3%	0.0%	2.0%
	Neutral Count	1	1	0	1	0	3
	% within I have received	16.7%	9.1%	0.0%	4.3%	0.0%	5.9%
	Agree Count	1	9	6	13	0	29
	% within I have received	16.7%	81.8%	85.7%	56.5%	0.0%	56.9%
	Strongly Agree Count	4	1	1	8	4	18
	% within I have received	66.7%	9.1%	14.3%	34.8%	100.0%	35.3%
	Total Count	6	11	7	23	4	51
	% within I have received	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	18.980 ^a	12	0.089	0.100		
Likelihood Ratio	21.469	12	0.044	0.021		
Fisher's Exact Test	20.189			0.016		
Linear-by-Linear Association	.780 ^b	1	0.377	0.430	0.216	0.047
N of Valid Cases	51					

a. 17 cells (85.0%) have expected count less than 5. The minimum expected count is .08.

b. The standardized statistic is .883.

“EBP helps me make decisions about patient care” vs “I learned the foundations for EBP as part of my academic preparation”

		Crosstab						
		I learned the foundations for EBP as part of my academic preparation.						
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	
EBP helps me make decisions about patient	Disagree	Count	0	0	0	1	0	1
		% within I learned the	0.0%	0.0%	0.0%	3.7%	0.0%	2.0%
	Neutral	Count	0	1	3	3	0	7
		% within I learned the	0.0%	50.0%	27.3%	11.1%	0.0%	13.7%
	Agree	Count	2	1	8	17	3	31
		% within I learned the	100.0%	50.0%	72.7%	63.0%	33.3%	60.8%
	Strongly Ag	Count	0	0	0	6	6	12
		% within I learned the	0.0%	0.0%	0.0%	22.2%	66.7%	23.5%
	Total	Count	2	2	11	27	9	51
		% within I learned the	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	18.527 ^a	12	0.101	0.124		
Likelihood Ratio	20.585	12	0.057	0.027		
Fisher's Exact Test	19.146			0.043		
Linear-by-Linear Association	6.953 ^b	1	0.008	0.009	0.006	0.003
N of Valid Cases	51					

a. 16 cells (80.0%) have expected count less than 5. The minimum expected count is .04.
b. The standardized statistic is 2.637.

“EBP helps me make decisions about patient care” vs “I am familiar with the medical search engines (such as: MEDLINE and CINAHL).”

		Crosstab						
		I am familiar with the medical search engines (such as: MEDLINE and CINAHL).						
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	
EBP helps me make decisions about patient	Disagree	Count	0	0	1	0	0	1
		% within I am familiar	0.0%	0.0%	12.5%	0.0%	0.0%	2.0%
	Neutral	Count	0	4	2	1	0	7
		% within I am familiar	0.0%	33.3%	25.0%	4.0%	0.0%	13.7%
	Agree	Count	0	6	5	18	2	31
		% within I am familiar	0.0%	50.0%	62.5%	72.0%	40.0%	60.8%
	Strongly Ag	Count	1	2	0	6	3	12
		% within I am familiar	100.0%	16.7%	0.0%	24.0%	60.0%	23.5%
	Total	Count	1	12	8	25	5	51
		% within I am familiar	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	21.174 ^a	12	0.048	0.048		
Likelihood Ratio	20.461	12	0.059	0.028		
Fisher's Exact Test	20.639			0.023		
Linear-by-Linear Association	3.990 ^b	1	0.046	0.051	0.029	0.012
N of Valid Cases	51					

a. 17 cells (85.0%) have expected count less than 5. The minimum expected count is .02.
b. The standardized statistic is 1.997.

“EBP helps me make decisions about patient care” vs “I have received formal training in critical appraisal of scientific literature as part of my academic preparation”

Crosstab								
I have received formal training in critical appraisal of scientific literature as part of my academic preparation.								
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total	
EBP helps me make decisions about patient	Disagree	Count	0	0	0	1	0	1
		% within I have recei	0.0%	0.0%	0.0%	4.3%	0.0%	2.0%
	Neutral	Count	0	4	1	2	0	7
		% within I have recei	0.0%	36.4%	14.3%	8.7%	0.0%	13.7%
	Agree	Count	3	7	6	15	0	31
		% within I have recei	50.0%	63.6%	85.7%	65.2%	0.0%	60.8%
	Strongly Ag	Count	3	0	0	5	4	12
		% within I have recei	50.0%	0.0%	0.0%	21.7%	100.0%	23.5%
	Total	Count	6	11	7	23	4	51
		% within I have recei	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	26.468 ^a	12	0.009	0.008		
Likelihood Ratio	28.654	12	0.004	0.002		
Fisher's Exact Test	22.894			0.005		
Linear-by-Linear Association	1.284 ^b	1	0.257	0.265	0.150	0.037
N of Valid Cases	51					

a. 17 cells (85.0%) have expected count less than 5. The minimum expected count is .08.

b. The standardized statistic is 1.133.

Application of evidence based practice (EBP) is necessary in the practice of medicine” vs “Lack of research skills”

Crosstab						
		Lack of research skills				
		Top Barrier	2nd Barrier	3rd Barrier	Total	
Application of evidence based practice (EBP)	Neutral	Count	0	0	1	1
		% within Lack of rese	0.0%	0.0%	20.0%	11.1%
	Agree	Count	1	3	0	4
		% within Lack of rese	100.0%	100.0%	0.0%	44.4%
	Strongly Ag	Count	0	0	4	4
		% within Lack of rese	0.0%	0.0%	80.0%	44.4%
Total	Count	1	3	5	9	
	% within Lack of rese	100.0%	100.0%	100.0%	100.0%	

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.000 ^a	4	0.061	0.127		
Likelihood Ratio	12.365	4	0.015	0.032		
Fisher's Exact Test	8.938			0.032		
Linear-by-Linear Association	1.316 ^b	1	0.251	0.333	0.230	0.151
N of Valid Cases	9					

a. 9 cells (100.0%) have expected count less than 5. The minimum expected count is .11.

b. The standardized statistic is 1.147.

“EBP improves the quality of patient care” vs “Lack of interest”

Crosstab						
			Lack of interest			
			2nd Barrier	3rd Barrier	Total	
EBP improves the quality of patient care.	Disagree	Count	1	0	1	
		% within Lack of inter	25.0%	0.0%	12.5%	
	Neutral	Count	0	2	2	
		% within Lack of inter	0.0%	50.0%	25.0%	
	Agree	Count	3	0	3	
		% within Lack of inter	75.0%	0.0%	37.5%	
	Strongly Ag	Count	0	2	2	
		% within Lack of inter	0.0%	50.0%	25.0%	
Total	Count	4	4	8		
	% within Lack of inter	100.0%	100.0%	100.0%		

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	8.000 ^a	3	0.046	0.029		
Likelihood Ratio	11.090	3	0.011	0.029		
Fisher's Exact Test	6.737			0.029		
Linear-by-Linear Association	.467 ^b	1	0.495	0.771	0.386	0.229
N of Valid Cases	8					

a. 8 cells (100.0%) have expected count less than 5. The minimum expected count is .50.

b. The standardized statistic is .683.

“EBP helps me make decisions about patient care” vs “Lack of understanding of statistical analysis”

Crosstab						
		Lack of understanding of statistical analysis				
		Top Barrier	2nd Barrier	3rd Barrier	Total	
EBP helps me make decisions about patient	Neutral	Count	2	0	1	3
		% within Lack of unde	66.7%	0.0%	50.0%	25.0%
	Agree	Count	0	6	1	7
		% within Lack of unde	0.0%	85.7%	50.0%	58.3%
	Strongly Ag	Count	1	1	0	2
		% within Lack of unde	33.3%	14.3%	0.0%	16.7%
	Total	Count	3	7	2	12
		% within Lack of unde	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.864 ^a	4	0.097	0.092		
Likelihood Ratio	10.697	4	0.030	0.066		
Fisher's Exact Test	8.056			0.042		
Linear-by-Linear Association	.003 ^b	1	0.955	1.000	0.608	0.255
N of Valid Cases	12					

a. 9 cells (100.0%) have expected count less than 5. The minimum expected count is .33.

b. The standardized statistic is -.056.