The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal

by

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I, Tasmiya Tayob, hereby declare that the contents of this dissertation are entirely my own in both conception and execution, unless acknowledged otherwise by a form of reference (including citations of published and unpublished sources).

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DEDICATION

In The Name of Allah, Most Gracious, Most Merciful

“Truly my Lord is with me, He will guide me through” (Qur’aan 26:62)

Only with the blessings of The Almighty was this possible. Through His mercy, I dedicate this dissertation to my parents, Dr Zaid and Hajira Tayob.

“I killed a spider
Not a murderous brown recluse
Nor even a black widow
And if the truth were told this
Was only a small
Sort of papery spider
Who should have run
When I picked up the book
But she didn’t
And she scared me
And I smashed her

I don’t think
I’m allowed

To kill something
Because I am

Frightened”

- Nikki Giovanni

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ABSTRACT

Background

Evidence-based practice (EBP) integrates the best available research evidence in conjunction with clinical expertise with the consideration of patient values. A well-trained clinician should pose clinically relevant questions and access the clinically relevant literature to find, appraise, and use the best valuable evidence in routine clinical care. Patients who receive evidence-based therapy have better outcomes in comparison to patients who do not. Globally, EBP is accepted as a basis of healthcare professional education, which was initially used in medicine, but now extends to allied health professions. In order to achieve the best patient outcomes, healthcare professions should effectively incorporate adequate knowledge, skills and attitudes towards EBP into education programmes. The implementation of EBP is regarded as a key competence for the improvement of healthcare quality. Numerous professions have implemented EBP, such as nursing, physiotherapy, occupational therapy, social care, pharmacy, physical therapy, dietetics, podiatry, radiography, orthotics, speech and hearing therapy, psychology and chiropractic. Evidence-based practice has had an increasing impact on chiropractic education and its implementation in chiropractic care. The importance of EBP is essential as its implementation is a requirement at the Durban University of Technology (DUT) Chiropractic Day Clinic (CDC). Students are required to use EBP when managing and treating patients during their clinical practicum and, thus, it is essential that students are knowledgeable in EBP and know how to use it adequately.

Aim of the study

The aim of this study was determine the perceptions and experiences of registered Chiropractic Master's students on the implementation of evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal, South Africa.

Methodology

This study utilised a qualitative, exploratory and descriptive design. Purposive sampling was used, interviewing 14 Chiropractic Master's students who have been clinically active for more than four months at a chiropractic teaching clinic in KwaZulu-Natal. Their perceptions and experiences with regard to the implementation of EBP were obtained

through semi-structured interviews, which consisted of three key questions, encouraged by relevant probes. The data collected were stored electronically and then transcribed verbatim. Thereafter, the transcripts were coded and analysed by the researcher in order to identify themes along with relevant subthemes. The coded data were then interpreted by the researcher using the previously identified themes and sub-themes.

Results

There were four main themes identified in this study, namely perceptions and necessity regarding the roles of EBP; undergraduate education and its role in the implementation of EBP; the importance of clinical experience in the implementation of EBP; and the implementation of EBP. Overall, students had a positive perception with regard to EBP with some students reporting limitations to its practice, along with positive perceptions. The students believed that the chiropractic training at the DUT CDC provided a solid foundation but a lack of training in multiple aspects was found. These aspects are discussed comprehensively, including the insufficient training in theoretical and clinical aspects, as well as for pre-clinical preparation. In addition, limitations and barriers were identified, as well as measures of improvement in order to enhance the implementation of EBP were suggested.

Conclusion

In South Africa, this study is the first to explore the perceptions and experiences of Chiropractic Master's students on the practice of EBP at a teaching clinic in KwaZulu-Natal. The perceptions and experiences were based on various aspects, such as knowledge, application, skills, proficiency, confidence, support structures, training and challenges. Although Chiropractic Master's students had positive perceptions regarding the implementation of EBP and found the chiropractic training at the DUT to have provided a solid foundation, there were suggested methods of improvement for the chiropractic curriculum to enhance the implementation of EBP. A lack of undergraduate training regarding EBP was one of the key factors that students found to have hindered a more efficient practice of an evidence-based approach. Therefore, it is recommended that the findings of this study be of aid to the Durban University of Technology Chiropractic Department to enhance the quality of the chiropractic curriculum by re-evaluating the context in which the concept of an evidence-based approach was set out in order to

encourage EBP by students and consider a different, more coherent method of implementation.

Keywords: Evidence-based practice, education, perceptions, experiences, clinical experience.

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GLOSSARY OF TERMS

Allied Health Professionals

Allied health professionals are health professionals who are not part of the medical, dental or nursing professions. They are university qualified practitioners with specialised expertise in preventing, diagnosing and treating a range of conditions and illnesses. Allied health practitioners often work within a multidisciplinary health team to provide specialised support for different patient needs (Allied Health Professions Australia 2022).

Barrier

A barrier refers to a problem, rule or situation that prevents somebody from doing something, or that makes something impossible (Oxford Learner's Dictionaries 2022a). In the context of this study, this term is used to identify a problem, rule or situation that prevented participants from implementing evidence-based practice.

Challenge

A challenge refers to a new or difficult task that tests somebody's ability and skill (Oxford Learner's Dictionaries 2022b). In the context of this study, this term is used to identify a new or difficult task that tested participants' ability and skill with regard to the implementation of EBP.

Chiropractic

A chiropractor is 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 2001).

Clinical Practicum

A clinical practicum is a term used to describe the initial career experience that consolidates practical experience and theoretical knowledge for new graduates to become proficient (Beck and Doig 2002). In the context of this study, clinical practicum refers to the time at the Durban University of Technology Chiropractic Day Clinic where

students spend consulting patients as part of the Master's of Health Science in Chiropractic curriculum.

Clinician

A clinician is defined as a health professional engaged in the care of patients, as distinguished from one working in other areas of practice (Farlex Partner Medical Dictionary 2012). In the context of this study, a clinician is referred to as a qualified chiropractor with a minimum of three years of experience, who is present at the Durban University of Technology Chiropractic Day Clinic, to supervise students during their consultations with patients.

Complementary and Alternative Medicine

This term refers to a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine (NCCAM 2002).

Continuing Education Units

This term refers to the value that is attached to a learning activity for the purpose of continuing professional development (AHPCSA 2022).

Continuing Professional Development

This term refers to an act that involves not only educational activities to enhance medical competence in medical knowledge and skills, but also in management, team building, professionalism, interpersonal communication, technology, teaching, and accountability (Filipe *et al.* 2014).

Critical Appraisal

Critical appraisal is the process of carefully and systematically examining research evidence to judge its trustworthiness, its value and relevance in a particular context (Mhaskar *et al.* 2009).

Evidence-Based Medicine

Evidence-based medicine is a term used to describe the careful and meticulous use of up-to-date evidence in the decision-making process regarding patient care (Hong and Chen 2019).

Evidence-Based Practice

Evidence-based practice is a term used where individual clinical expertise is integrated with the best available clinical evidence obtained from systematic research (Sackett *et al.* 1996).

Experience

An experience refers to the knowledge and skill that one has gained through doing something for a period of time (Oxford Learner's Dictionaries 2022c). In the context of this study, this term is used to identify the knowledge and skill that participants gained during their clinical practicum with regard to the implementation of EBP.

Health care professional

A health care professional refers to someone who maintains health in humans through the application of the principles and procedures of evidence-based medicine and caring. They study, diagnose, treat and prevent human illness, injury and other physical and mental impairments in accordance with the needs of the populations they serve. They advise on or apply preventive and curative measures, and promote health with the ultimate goal of meeting the health needs and expectations of individuals and populations and improving population health outcomes. In addition, they conduct research and improve or develop concepts, theories and operational methods to advance evidence-based health care. Their duties may include the supervision of other health workers (World Health Organization 2013).

Hindrance

A hindrance refers to a person or thing that makes it more difficult for somebody to do something or for something to happen (Oxford Learner's Dictionaries 2022d). In the context of this research, this term is used to refer to a person or thing that made it difficult for participants to implement evidence-based practice.

Journal Club

A journal club is a term used to describe an educational meeting in which a group of individuals discuss published articles, to keep themselves informed with new knowledge, promoting in them the awareness of current research findings, teaching them to critique and appraise research, and encourage them to utilize research in evidence-based practice of the speciality (Bhattacharya 2017).

KwaZulu-Natal

KwaZulu-Natal is one of the nine provinces in South Africa. With regard to the context of this research, the Durban University of Technology Chiropractic Day Clinic is the only chiropractic teaching clinic existent in this province.

Master's Student

A master's degree refers to a further university degree that is studied after a first degree (Oxford Learner's Dictionaries 2022e). Hence, that makes a master's student one that is studying a further university degree after a first degree. In the context of this study, Chiropractic Master's students were the target population to be interviewed.

Perception

A perception is a term used to describe an idea, belief or an image one has as a result of how one sees or understands something (Oxford Learner's Dictionaries 2022f). In the context of this study, this term is used to describe ideas, beliefs or images participants understood or saw with regard to evidence-based practice.

Pilot Study

A pilot study is a term used in research which refers to the first step of the research protocol and is often a smaller-sized study which assists in planning and modification of the main study (In 2017).

ABBREVIATIONS AND ACRONYMS

ACP	American College of Physicians
AHPCSA	Allied Health Professions Council of South Africa
BHSc	Bachelor of Health Sciences
CAM	Complementary and alternative medicine
CASA	Chiropractic Association of South Africa
CDC	Chiropractic Day Clinic
CEU	Continuing education units
COVID	Corona Virus Disease
CPD	Continuing professional development
DUT	Durban University of Technology
EBCC	Evidence-based chiropractic care
EBM	Evidence-based medicine
EBP	Evidence-based practice
ECCE	The European Council on Chiropractic Education
GP	General practitioner
JAMA	Journal of the American Medical Association
MHSc	Master of Health Sciences
RCT	Randomised controlled trial
SARS-CoV-2	Severe Acute Respiratory Syndrome Corona Virus 2
TENS	Transcutaneous electrical nerve stimulation
USA	United States of America
WFC	World Federation of Chiropractic
WHO	World Health Organisation

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Evidence-based practice (EBP) integrates the best available research evidence in conjunction with clinical expertise with the consideration of patient values (Sackett *et al.* 2001). A well-trained clinician should pose clinically relevant questions and access the clinically relevant literature to find, appraise and use the best valuable evidence in routine clinical care. The literature shows that patients who receive evidence-based therapy have better outcomes in comparison to patients who do not (Bronfort *et al.* 2010; Haas *et al.* 2012).

The initial utilisation of EBP with incorporation into clinical practice started in medicine but now extends to allied health and social care professions (McEvoy *et al.* 2010). Professions such as nursing, physiotherapy, occupational therapy, social care (Caldwell *et al.* 2007), pharmacy, medicine, physial therapy (Weng *et al.* 2013), dietetics, podiatry, radiography, orthotics, speech and hearing therapy, psychology (Upton and Upton 2006) and chiropractic (LeFebvre *et al.* 2012) are among those who have adopted EBP.

Evidence-based practice is important in that it requires a health care professional to ask, acquire, appraise, apply, analyse and adjust in order to make professional decisions regarding patient treatment (McEvoy *et al.* 2010). Suitable training in knowledge, attitudes and skills are the foundation for the implementation for EBP and its implementation in the curriculum is not a matter of choice for universities but rather a necessity (McEvoy *et al.* 2010).

In order to achieve the best patient outcomes, healthcare professions should effectively incorporate aquequate knowledge, skills and attitudes towards EBP into education programmes (Lehane *et al.* 2019). The implementation of EBP is regarded as key competence for the improvement of healthcare quality (Weng *et al.* 2013). Although widely accepted in professions such as nursing, physiotherapy, medicine, dentistry, physical therapy, occupational therapy and chiropractic (Bussières *et al.* 2016), studies show that EBP can be difficult to implement in many professions (Palfreyman *et al.* 2003; Thomas *et al.* 2017; Koekemoer 2018).

In a systematic review conducted by Hitch and Nicola-Richmond (2016) targeting allied health students, as well as those studying physiotherapy, occupational therapy, social work, speech therapy, nursing, psychology and paramedicine regarding EBP internationally, found that there was a general sense that all allied health students begin from a very low basis of prior knowledge and pre-existing skills of EBP.

In the United States of America (USA), the first chiropractic institution started in 1897 (Homola 2006) and, in South Africa, the first intake of students into the chiropractic programme was in 1989 (Lamprecht and Padayachy 2019). Chiropractic is taught in at least 40 different institutions in 16 different countries within six continents, out of which only two institutions are in Africa (Salehi *et al.* 2015). This makes chiropractic relatively new in South Africa (Lamprecht and Padayachy 2019) and, hence, extensive research has not been done in comparison to other countries.

Evidence-based practice has had an increasing impact on chiropractic education and its implementation in chiropractic care. The importance of EBP is essential as its implementation is a requirement at the Durban University of Technology (DUT) Chiropractic Day Clinic (CDC). Students are required to use EBP when managing and treating patients during their clinical practicum and, thus, it is essential that students are knowledgeable in EBP and know how to use it adequately.

Naidoo (2018) suggested that EBP should be inculcated into the undergraduate programme in order to ensure post-graduation compliance and certain measures be put in place to equip chiropractors with sufficient knowledge and skills required to effectively implement EBP, as well as address student issues regarding the implementation of EBP at a tertiary level, to instil positive attitudes towards its implementation at an early stage.

1.2 STUDY RATIONALE

Chiropractors are required to implement EBP as much as possible to provide efficient treatment protocols. Globally (Haas *et al.* 2012) and within South Africa (Naidoo 2018), the knowledge and skills and the attitudes and perceptions of chiropractors have been studied. However, there is a paucity in the literature with respect to the experiences of registered Chiropractic Master's students on the

implementation of EBP in South Africa. Studies have also been done on perceptions, utilisation, and barriers of general practitioners and chiropractors (Koekemoer 2018), as well as on the knowledge, utilisation and perceptions of chiropractors who attended the World Federation of Chiropractic biennial conference in 2013 (de Villiers 2015) towards EBP, yet the paucity in the literature on the experiences of Chiropractic Master's students on its implementation remains.

The DUT Chiropractic Master's students are required to implement EBP as part of their management plans at the CDC and it is essential that students have adequate skills to implement EBP correctly. As a student, the first year doing their clinical practicum can be daunting, given the novelty of being in a clinical environment and learning the procedures thereof, which entail adequate patient assessment and management, a vast amount of paperwork and EBP implementation. A study delving into their experiences as novice practitioners will identify positive aspects, as well as inconsistencies in the undergraduate curriculum or within their own capabilities. Evidence-based practice has been deemed important by medical students and physicians and the same sentiment is shared by complementary and alternative medicine therapies which include chiropractic, naturopathy and acupuncture (Alcantara and Leach 2015).

An increasing number of chiropractors practicing evidence-based chiropractic should increase the scientific credibility of the chiropractic profession among other medical professionals (Keyter 2010). Despite having conclusive findings from studies done on chiropractors and the implementation of EBP, there is a lack of literature with regard to student perceptions and experiences regarding the implementation of EBP, and whether challenges stem from a teaching level, is still inconclusive. This study will benefit future students of chiropractic as it will enable universities to identify gaps in the chiropractic curriculum in order to allow for a more prevalent and efficient implementation of EBP in their clinical practicum and future clinical practice

1.3 RESEARCH PROBLEM

Evidence-based practice is fundamental across all areas of healthcare and its implementation is introduced to new clinicians during their period of study (Hitch and Nicola-Richmond 2016). However, new clinicians face a range of challenges

regarding the implementation of EBP, not least of which integrating the evidence to local contexts and the individual needs of patients (Harvey and Kitson 2015). Students are taught how to locate and critique the best available evidence to make a conscientious, explicit and judicious decision to deliver the best possible care for their patients (Sackett *et al.* 1996).

In South Africa, studies have been conducted on qualified chiropractors and general practitioners regarding EBP (Koekemoer 2018) but there is a paucity in the literature regarding Chiropractic Master's student's experiences on the implementation of EBP during the first year of their clinical practicum. Thus, this study aimed to address this gap in the literature.

1.4 RESEARCH AIM

The aim of this study was to determine the experiences of registered Chiropractic Master's students on the implementation of evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal, South Africa.

1.5 RESEARCH QUESTIONS

The study focused on the following questions:

1) What are the perceptions of Chiropractic Master's students towards evidence-based practice?

2) What are the experiences of Chiropractic Master's students on the implementation of evidence-based practice?

3) What are the perceived barriers and challenges of Chiropractic Master's students on the implementation of evidence-based practice?

1.5 SCOPE OF THE STUDY

The experiences of registered Chiropractic Master's students on the implementation of evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal is explored and described in this dissertation. Registered Chiropractic Master's students were invited to participate in the study. After obtaining informed consent, the data were collected using a semi-structured

interview guide. Interviews were recorded on Microsoft Teams and transcribed verbatim. The data obtained from the study were analysed using the Tesch method for thematic analysis.

1.7 STRUCTURE OF THE DISSERTATION

Chapter 1 – Introduction

Chapter one describes the background and rationale of the study and provides insight to the research problem, aims, questions and scope of the study.

Chapter 2 – Literature review

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

Chapter 3 – Methodology

Chapter three outlines the methodology used in this study. It describes the study design, research location and population, participant recruitment and tools used to collect the data.

Chapter 4 – Results

Chapter four presents the results of the analysed data relevant to qualitative research

Chapter 5 – Discussion

Chapter five discusses the results of the study in comparison to previous literature.

Chapter 6 – Conclusion, recommendations and limitations

Chapter six provides insight to the overall conclusions, recommendations and limitations to this study.

1.8 SUMMARY OF CHAPTER ONE

This chapter has provided a background to the study with insight into the rationale of the study, research problem, research aim, research questions, scope of the study and the structure of the dissertation with an outline of each chapter.

The next chapter elicits the available literature pertaining to this study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter explores the literature pertaining to EBP and its importance in multiple medical disciplinaries. The potential contributing factors that influence its implementation is recognised and the gap in the literature pertaining to chiropractic students is highlighted. Search engines such as EBSCO host, PubMed, Science Direct and DUT Open Scholar were used.

2.2 DESCRIPTION OF EVIDENCE-BASED PRACTICE

Evidence-based practice has been defined by Sackett *et al.* (2001) as "the integration of the best available research evidence in conjunction with clinical expertise and consideration of patient values". They contend that a well-trained clinician should be able to pose clinically relevant questions and access clinically relevant literature to find, appraise and use the best available evidence in routine clinical care.

Around the world, EBP has become a concern for healthcare professionals and researchers. Evidence-based practice is considered to be a pertinent element for the improvement in the quality of healthcare services to achieve excellence in patient care (AbuRuz *et al.* 2017). The World Health Organization (WHO) placed emphasis on the fact that health and social services should be based on the most suitable research evidence (AbuRuz *et al.* 2017). It was shown that 28% of improvement in patient outcomes was due to clinical practices that were based on EBP, rather than traditional practices (Melnyk *et al.* 2012). The implementation of EBP encourages the efficient use of resources, improves patient care and satisfaction, decreases the costs and length of hospital stays and eliminates unnecessary practices (Melnyk *et al.* 2014).

Evidence-based practice increases practitioner accountability and decreases the reliance of the practioner on less credible sources and, thereby, reducing the risk of clinical error (Leach and Gillham 2011). The uptake of EBP benefits the patient in

that improvements in clinical outcomes and quality of care reduces the patient mortality rate and minimises the use of unnecessary treatment interventions which could save time, resources and/or the costs involved with treatment (Leach and Gillham 2011).

2.2.1 History of Evidence-Based Practice

According to Sur and Dahm (2011), in 1990, the residency coordinator of McMasters University Internal Medicine, Dr Gordon Guyatt introduced a new concept he referred to as “Scientific Medicine”. This term related to a novel method of teaching medicine at the bedside which was built on a foundation laid by his mentor Dr David Sackett, who used critical appraisal techniques applicable to the bedside to formulate this ideology. However, fellow staff members were appalled by the idea that current clinical decisions had a limited scientific background, although proposed concepts were probably deemed true. Guyatt then suggested a new term, describing the core curriculum of the residency programme “Evidence-Based Medicine” (EBM) which subsequently appeared in the 1991 American College of Physicians (ACP) Journal Club editorial (Guyatt 1991).

The foundation for this new strategy was accomplished through years of work by many others despite the introduction of the term in 1991. Due to an increasing awareness of the weaknesses of standard clinical practices and their impact on the cost and quality of patient care in the USA, increased effort was made to bring more certainty to clinical decision making. Previously, clinical practice was viewed as “the art of medicine where expert opinion, experience and authoritarian judgment were the basis of clinical decision making”. Scientific methodology and statistical analysis were rare. Political mistrust and historical precedence posed barriers to incorporating their tools into medicine but several events globally during the 1960s paved the way for EBM.

Suzanne and Robert Fletcher, trained at Harvard Medical School, Standford Medical Centre and John Hopkin University, were pioneers of this initiative in the early 1960s and recognised a deficit in medicine (Daly 2005). They ascertained that biomedical science often had no bearing on the application of clinical medicine. They then enrolled into the clinical scholar’s programme which was funded by the Carnegie Foundation in 1969 for training in public health and clinical care. Graduates of this

programme tackled political affairs of public health and medicine. Thereafter, they taught epidemiology at McGill University medical school and eventually had the opportunity of publishing a textbook describing the scientific basis of clinical care in 1982. This book was called “Clinical Epidemiology: The Essentials”.

During this period, a mathematician turned physician, Alvan Feinstein, was trying to settle the uncertainty attributed to bedside medical practice. He suggested that the uncertainty in clinical decisions could be minimised by implementing a new form of medicine which incorporated principles of basic science. He then requested to be a part of an epidemiological study at a rheumatic fever hospital in New York, where he wanted to take care of the children and collect data (Daly 2015). During the study, he established a discrepancy in the distinguishing of benign and pathological tumours and that clinical diagnosis was based on clinical authority rather than scientific criteria (Feinstein and Massa 1959). He achieved favourable outcomes due to his successful classification of the disease and this led to the closing of the hospital due to the lack of sufficient patients. In a set of three “Annals of Internal Medicine” articles, he proposed the term “clinical epidemiology” which detailed the new discipline of medical teaching (Feinstein 1968a; Feinstein 1968b; Feinstein 1959. His teachings combined statistical methods of epidemiology with clinical reasoning as he viewed the public health institution unable to provide clinicians with guidelines to improve clinical care.

In 1967, clinical epidemiology became a formal course of study at McMaster University’s new school under the care of their first Dean, John Evans, and pathology chairman, Fraser Mustard. A department of Clinical Epidemiology and Biostatistics was also introduced, headed by Dr David Sakett who was trained by the Harvard School of Public Health but viewed epidemiology as “the application, by a physician who provides direct patient care, of epidemiological and biometric methods to the study of diagnostic and therapeutic process in order to effect an improvement in health” (Sackett *et al.* 1996). Going forth, there were other chairpersons supportive towards this new philosophy.

In 1981, Dr David Sackett and his peers wrote a series of articles in the Canadian Medical Association Journal (CMAJ) addressing a new method for physicians reading the literature and called this new technique “critical appraisal”. They saw the

need to teach physicians methods of understanding the literature as well as implementing the literature at the bedside.

Gordon Guyatt and his colleagues refined the evidence-based medical teachings at the McMasters University throughout the 1990s and then collaborated with the USA academicians to form an international evidence-based medicine working group (Group 1992). Due to the work of this group, the practice of medicine drastically changed at the bedside in relation to the exposure of critical appraisal techniques and they recognised that the CMAJ articles were limited to the focus of the quality of evidence rather than the application of evidence. This created a need for a "user's" guide as opposed to a "reader's" manual initiating the issuing of the Journal of the American Medical Association (JAMA) User's Guide.

The efforts to eschew bias in clinical research through the promotion of the randomised controlled trial (RCT) is attributed to Archie Cochrane, who performed his first trial on fellow prisoners of war during his imprisonment in World War II. He compared the effect of yeast extract on deficiency diseases. The hallmark of the Cochrane Collaboration is that RCTs should provide benefit to subjects (Cochrane and Blythe 1989). Cochrane spent many years trying to determine the effect of tuberculosis versus dust in causing progressive pulmonary fibrosis in Cardiff, South Wales, called the Rhondda Fach study. One of the most valuable lessons learnt from this study was the value of epidemiological studies and the threat of bias to a study (Cochrane and Jarman 1952).

Tom Chalmers, who was one of the three men who formed the current Cochrane Collaboration expanded Cochrane's work. He asserted that RCTs are the foundation of a hierarchy of evidence that culminates with integrated data from multiple trials. He also stated that publication bias should be taken into account when summarising results, where studies with positive results are more likely to be published than those with negative results. The concept of meta-analysis then came about (Daly 2005).

Ian Chalmers, part of the formation of the Cochrane Collaboration, sought effective treatment from his experiences in Palestinian refugee camps in the 1960s. Based on his experience, he recognised the importance of searching for the truth, as well as the dangers of surrendering to medical dogma (Daly 2005). Ian Chalmers teamed

up with Murray Enkin, who was also part of the formation of the Cochrane Collaboration to create an enormous database of published, unpublished, planned and ongoing trials, as well as meta-analysis. The landmark book “Effective Care in Pregnancy and Childbirth” was published by The Oxford Database of Perinatal Trials (Chalmers *et al.* 1989).

The efforts of these three pioneers culminated in the 1993 Cochrane Collaboration. Following the work from the Oxford Database of Perinatal Trials, a numerous medical specialties committed to 10 principles: collaboration; avoiding duplication; minimising bias; using the most current literature; building on the enthusiasm of people; allowing for access to literature; promoting continuity; ensuring quality; and encouraging worldwide participation.

2.2.2 The Adoption of Evidence-Based Practice

Worldwide, EBP is a foundational element of healthcare professional education (Lehane *et al.* 2019). Evidence-based practice is implemented in healthcare professions such as medicine, nursing, physiotherapy, occupational therapy, social care, pharmacy, physical tharapy, dietetics, podiatry, radiography, orthotics, speech and hearing therapy, psychology and chiropractic (Upton and Upton, 2006; Caldwell *et al.* 2007; McEvoy *et al.* 2010; LeFebvre *et al.* 2012; Weng *et al.* 2013).

The uptake and the use of EBP core competencies in daily practices are slow, hindering the heathcare organisations from delivering the highest quality, evidence-based health care through a consistent and broad basis of EBP implementation (Saunders *et al.* 2019). In addition, the implementation of the best evidence into practice is challenging due to the complexity of the EBP implementation process consisting of various steps including individual development preparing one for EBP, translating and ensuring availability of the best evidence required at a particular time, as well as building organisational readiness, culture and support structures in relation to EBP (Melnyk *et al.* 2016; Saunders *et al.* 2016).

2.2.3 Chiropractic and Evidence-Based Practice

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” (World Federation of Chiropractic 2012). The basis of chiropractic treatment is the manipulation of joints

with an emphasis on joints of the spinal column. In addition to manipulation, a chiropractor acknowledges and integrates the biopsychosocial model with soft tissue and exercise therapy, nutritional advice, stress management, electrotherapy, massage, acupuncture and traction, among other modalities, to aid patient management and treatment (World Federation of Chiropractic 2012).

Over the last few years, EBP has had a progressive influence on the chiropractic profession (Delaney and Fernandez 1999). In the 1990s, clinical research had started offering support for the utilisation of manual therapy for multiple musculoskeletal conditions, especially low back pain (LeFebvre *et al.* 2012). Sequentially, manipulation was included as an effective treatment option in various national and international guidelines (Koes *et al.* 2010; Dagenais *et al.* 2010).

The implementation of EBP in the chiropractic profession was amplified in 2005 when education grants were awarded by the National Centre for Complementary and Alternative Medicine at the National Institutes of Health to the University of Western States (formerly Western States Chiropractic College) and three other chiropractic universities in the USA to strengthen their EBP curricula (LeFebvre *et al.* 2012). The implementation of EBP is imperative in that it helps to justify clinical decisions, facilitate interdisciplinary practice, allow for consistency of care, and improve credibility of the profession (Trinder 2000; Romyn *et al.* 2003; Leach 2006).

Similar to other healthcare professions, chiropractic is beginning to shift away from the early paradigm of theories and hypotheses explaining observed clinical improvements due to chiropractic care to embracing the concepts of scientific methodology and evidence (Gislason *et al.* 2019). In the past decade, there has been a progressive shift towards an EBP model within the chiropractic profession comprising of the development of practice-based guidelines, EBP educational programmes and evidence-informed practice statements by regulatory authorities, including national and international associations (Innes *et al.* 2016c; Schneider *et al.* 2016). There are recommendations that the Councils on Chiropractic Education, who are an organisation responsible for chiropractic accrediting bodies, should encourage incorporation of approved mainstream healthcare standards consisting of evidence-based approaches, accreditation standards and processes and chiropractic care (Innes *et al.* 2016; Innes *et al.* 2018; Innes *et al.* 2019a; Innes *et al.* 2019b).

2.3 CHIROPRACTIC IN THE CONTEXT OF SOUTH AFRICA

Chiropractors in South Africa are considered primary healthcare providers and abide by regulations stipulated by the Allied Health Professions Council of South Africa (AHPCSA) (AHPCSA 2017). According to the AHPCSA ACT, ACT 63 OF 1982, AS AMENDED ('THE ACT'), Section 2 of the Act states that a practitioner may:

1. "Diagnose and treat or prevent, physical and mental disease, illness or deficiencies in humans.
2. Prescribe or dispense medicine.
3. Provide or prescribe treatment for such disease, illness or deficiencies in humans".

Chiropractic serves as a treatment for various conditions such as back pain, neck pain, headaches, fibromyalgia, sports injuries and infantile colic, to name a few (Salehi *et al.* 2015; Chiropractic Association of South Africa 2022). Chiropractic treatment consists of spinal manipulation and mobilisation and extends as far as soft tissue therapy (Salehi *et al.* 2015). In SA, diversified adjusting techniques were found to be the most common treatment protocol utilised, followed by advice on daily living (Johl *et al.* 2017).

In South Africa, the chiropractic profession experienced an uproar, starting in the early 1920s, due to long-standing conflict with medical orthodoxy preventing chiropractors from being fully legislated professionals (Myburgh and Mouton 2007). This only changed in 1982 and, subsequently, the first group of South African qualified chiropractors graduated in 1994 (Myburgh and Mouton 2007; Lamprecht and Padayachy 2019). This makes chiropractic a relatively young profession in South Africa (Lamprecht and Padayachy 2019).

2.4 CHIROPRACTIC EDUCATION IN SOUTH AFRICA

In Africa, there are only two chiropractic institutions, both of which are in South Africa. The two tertiary institutions are the Durban University of Technology (DUT), which has been offering chiropractic since 1989, and the University of Johannesburg (UJ), which has been offering the course since 1994. Both these institutions offer a full-time, five-year course-work Master's degree which includes a clinical practicum component at their respective clinics (Chiropractic Handbook, 2021).

The current chiropractic programme (**Table 2.1**) at the DUT is divided into two parts where a different qualification is recognised at each. After successful completion of the first four years of the chiropractic programme, a Bachelor's of Health Science (BHSc) degree is awarded. However, regardless of the vast number of skills and knowledge obtained, this degree does not allow one to practice as a chiropractor. In the following fifth year, students are required to register for a Master's of Health Science (MHSc) and only after successfully completing and satisfying the academic, clinical and research components do students then obtain a Chiropractic Degree. This is in accordance with Professional Board requirements, Act 63 of 1982, with specific reference to Regulations R629, Government Gazette No 11221 of March 1988 (Amendment of Allied Health Professions regulations, 2019).

In the first year of the chiropractic programme, students are taught subjects in basic medical sciences, pure sciences, basic chiropractic philosophy, as well as general education modules. In the second year of the programme, basic medical sciences and general education modules are continued with an introduction to a few medical pathology subjects. In the third year of the BHSc, there is a shift from basic science to more clinically orientated subjects. Chiropractic specific subjects are introduced as well and spinal manipulation techniques are taught. In addition, basic radiographic skills are taught. Complementary therapies to chiropractic are introduced and taught in the Myofascial and Adjunctive Therapies course which is essential for patient management and care (Chiropractic Handbook 2021). The fourth year and final year of the chiropractic programme is more clinically orientated with greater emphasis on clinical skills. Aside from the academic endeavours to prepare students for clinical practicum, there are other initiatives in place. There are weekly hospital visits, case appraisal and assessment of patients, the observer programme and mock patient assessments (Chiropractic Handbook 2021).

The commencement of the observer programme is at the beginning of the fourth year and extends until completion of the minimum requirement of observations have been achieved. This involves BHSc students observing chiropractic MHSc students throughout an entire consultation. At minimum, students are required to observe three new patients, ten spinal cases and three extremity cases (Chiropractic Handbook 2021). At the end of the fourth year, students are required to bring in three mock patients and perform a full case history, as well as physical and

orthopaedic regional examinations (Chiropractic Handbook 2021), These requirements allow the students to experience and observe the implementation of EBP in a clinical setting.

Proceeding completion of the BHSc, commencement of the MHSc begins in the fifth year of the chiropractic programme and is the first clinical year where students are required to complete clinical, academic and research components. The academic programme consists of lectures, practicals, tests, assignments and examinations whereas the clinical component consists of patient care at the DUT CDC, satellite and community clinics and sports events (Chiropractic Handbook 2021). The research component requires the production of a dissertation (Chiropractic Handbook 2021). Students are required to conduct research as part of their minimum qualification requirement (Allied Health Professions Council of South Africa 1982; ECCE 2016).

According to the Chiropractic Handbook (2019), the chiropractic curriculum structure at the DUT was slightly different. In the first three years of the chiropractic programme, students were regarded to be studying towards the completion of a National Diploma in Chiropractic (N.Dip: Chiro). Upon completion of the following fourth year of the undergraduate programme, students were considered to have completed a Bachelor of Technology in Chiropractic (B. Tech: Chiro) even though an official qualification certificate was not awarded. Subsequently, registration as a postgraduate student was required in order to complete the Master's in Technology Degree in Chiropractic (M. Tech: Chiropractic). Although the structure of the subjects remained similar, the new curriculum started phasing in between 2020 and 2021.

Table 2.1: Summary of the curriculum structure at DUT (Chiropractic Handbook 2021)

BHSc		
First Year		
Subject	**Semester (S) or Year (Y)**	**LEVEL**
Gross Anatomy	Y	
Physiology	Y	
Physics	Y	
Biological sciences	S	
Cornerstone	S	
Philosophy and History of Medicine **OR** Contemporary Issues in SA	S	Undergraduate
Issues of Gender and Society within Health Care **OR** isiZulu for Health Care Professionals	S	
Histology	S	
Chemistry	S	
Chiropractic Principles and Practice	S	
Cultural diversity **OR** Information and Communication Technology Literacy and Skills	S	
SECOND YEAR		
Chiropractic Principles and Practice	S	
Gross Anatomy	S	
Physiology	Y	
Biochemistry	S	
Immunology, Parasitology and Communicable Diseases	S	Undergraduate
Diagnostic Imaging	S	
General Pathology	S	
Clinical Anatomy	S	
Sociology **OR** Leadership and supervisory development	S	
Introduction to sign language **OR** Values in the workplace	S	
THIRD YEAR		
Chiropractic Principles and Practice	Y	
Diagnostics	Y	
Systemic Pathology	Y	
Psychopathology	S	Undergraduate
HIV and communicable diseases **OR** The Entrepreneurial edge	S	
Reflections on Quantitative Thinking **OR** Equality and Diversity	S	
Clinical Chiropractic and Biomechanics	S	
Diagnostic Imaging	S	
Myofascial and Adjunctive Therapies	S	
FOURTH YEAR		
Diagnostics	Y	
Chiropractic Principles and Practice	Y	
Research Methods and Bioethics	S	
Clinical Chiropractic and Biomechanics	Y	
Myofascial and Adjunctive Therapies	S	
Clinical Nutrition	S	Undergraduate
Public and Community Health	S	
Clinical Pharmacology	S	
Diagnostic Imaging	S	
International perspectives and practices of health care systems **OR** Clinical Mentoring and Assessment	S	
MHSc		
FIRST YEAR		
Research Project and Dissertation	Y	
Chiropractic Practice Management and Jurisprudence	S	
Diagnostic Imaging	S	Postgraduate
Clinical Chiropractic Practicum	Y	
Chiropractic Case Management	S	
SECOND AND/OR THIRD YEAR		
Chiropractic Practice	S or Y	Postgraduate

2.5 CLINICAL REQUIREMENTS AT THE DUT CDC

Subsequent to registration of the MHSc degree, students commence their clinical practicum at the DUT CDC (Chiropractic Handbook 2021). Students are required to consult a total of 350 patients, out of which 35 should be new patients; a minimum amount of 180 follow-up consultations should be seen at the DUT CDC, and the remaining 170 patients can be consulted at community service or sports events (Chiropractic Clinic Manual 2021).

A clinician is defined as “an individual who uses a recognised scientific knowledge base and has the authority to direct the delivery of personal health services to patients (Donaldson *et al.* 1994)”. At the DUT CDC, qualified chiropractors who have been in practice for three years or more are appointed as clinicians. The DUT CDC has numerous medical record keeping protocols in place where students perform a case history, physical examination, orthopedic regional examination of the relevant area and decide on patient treatment and management. The clinicians are required to interact with the students discussing the relevant patient, sign all documentation and permit the students to treat and manage a patient (Chiropractic Clinic Manual 2021).

Initial consultations take a longer time than follow-up consults as students are required to fill in customary paperwork which consist of:

- An informed consent form.
- A patient consent form permitting the students to examine the patient during the SARS-CoV-2 pandemic.
- A Protection of Personal Information Act (POPIA) form.
- A detailed case history.
- A physical examination.
- An orthopedic regional examination.
- A SOAPE (Subjective, Objective, Assessment, Plan, Education) note.
- A visit sheet which allows for diagnostic and treatment coding.

Follow-up consultations require minimal paperwork such as:

- A SOAPE note.
- A visit sheet allowing for diagnostic and treatment coding.

A case summary and evidence-based chiropractic care (EBCC) reference are required to be hand-written and signed as affirmation from a clinical instructor within a month from the date of the initial consultation. However, if a patient visits the DUT CDC for a follow-up consultation within the duration of a month from the date of the initial consult, the EBCC reference is a requirement by the second visit of the patient. At the DUT CDC, an EBCC reference is used as a justification of the students chosen treatment for that particular patient.

2.6 CONTINUING PROFESSIONAL DEVELOPMENT

In healthcare, continuing professional development (CPD) is a fundamental tool for enabling practitioners to acquire and apply skills to enable patient-specific care delivered safely and effectively (Manley *et al.* 2018). This requires practitioners to engage in ameliorating their skills regularly to sustain changes in healthcare in addition to their complexity, as well as delivering new models of delivering care and public expectations (Filipe *et al.* 2014).

Draper and Clarke (2007) recognised the importance for a persuasive base of evidence to illustrate that CPD has the potential to provide the knowledge and skills which, in turn, will improve patient experiences and outcomes. However, the literature on the effectiveness of CPD is limited as practitioners are unable to articulate its influence, thereby, undermining confidence in the value of CPD (Moriarty and Manthorpe 2014).

2.7 CHIROPRACTIC CONTINUING PROFESSIONAL DEVELOPMENT REQUIREMENTS IN SA

In South Africa, according to the AHPCSA ACT, SECTION 4 (1)(G), ACT 63 OF 1982 (“THE ACT”), AS AMENDED:

- A CPD cycle is considered a period of one year.
- Continuing education units (CEUs) are considered the values attached to a learning activity for CPD.
- Therapists or practitioners who are registered with the AHPCSA for one profession are required to accumulate 40 CEUs per cycle, out of which 50% are to be profession specific, as well as include four CEUs for

AHPCSA-approved bioethics and jurisprudence course (paragraph 5.5 of the Guidelines).

- Therapists or practitioners who are registered with the AHPCSA for more than one profession are required to obtain 30 CEUs per profession, out of which 50% are to be profession-specific per profession and include four CEUs for the AHPCSA-approved bioethics and jurisprudence course (paragraph 5.5 of the Guidelines).

2.8 STUDIES REGARDING EVIDENCE-BASED PRACTICE IN SOUTH AFRICA

In South Africa, Gordon (2012) conducted a study exploring the perceptions that South African chiropractors have regarding the perceived role and impact of research within the profession. The results of this study portrayed that the general perception of research was overall positive. The findings of Gordon (2012) demonstrated that most respondents regularly utilised websites and textbooks to research areas of interest. However, respondents stated that research was unlikely to change their current treatment protocols in practice given that their utilisation of evidence-informed practice seemed low. Nonetheless, the study did not investigate this relationship to a greater extent. In addition, this study has not been published.

In a later study conducted by d'hotman de Villiers (2015), using a survey to determine 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, found that 51,4% of respondents had a favourable perception towards research. In addition, the study also found that 97.5% of respondents perceived research to be essential for the progression of the chiropractic profession. Respondents portrayed an adequate knowledge of research terminology (59.2%) and a high rate of research article utilisation (88.9%), more specifically in areas of interest or pertaining to specific patient conditions. However, a limitation to this study is that the study population is limited to chiropractors attending the World Federation of Chiropractic in 2013. as well as the fact that this study has not been published.

Similarly, based on a study done by De Wet (2015) on the knowledge, attitude and perception of private practitioners based in Gauteng, South Africa, regarding

evidence-based practice, it was found that participating doctors were positive towards the implementation of evidence-based medicine (EBM) in their respective practices. The majority of the participants affirmed that EBM would be of benefit to their patients' treatment and care. However, the minority of the participants use EBM in practice. The main barriers found pertaining to the implementation of EBM were a lack of training and time constraints. This study has not been published.

A comparison of the perceptions, use and barriers to evidence-based practice by chiropractors and general practitioners (GPs) in the eThekwini municipality was done by Koekemoer (2018). It was found that both practitioners had an overall positive perception towards EBP, acknowledging its necessity and benefit in patient care. The respondents portrayed the will to adopt and improve their skills and use of EBP. However, the GP respondents' perceptions portrayed greater favour towards the necessity regarding the application of EBP, as well as the use of research findings and literature pertaining to daily practice, as opposed to the chiropractic respondents. The greatest barrier found regarding the implementation of EBP during this study was insufficient time, as to which a significant number of GPs reported as their prime barrier as opposed to chiropractors.

Secondary to this, the other barriers were the inability of the professional to generalise the literature findings to allow application based on the patient population, as well as the inability of the professional to apply the relevant literature to the patient, enabling patient-specificity. A significantly larger number of chiropractors reported the inability to apply research findings allowing for patient-specificity, as opposed to GPs. More chiropractors reported a lack of collective support amongst their colleagues in their facility as their greatest barrier to EBP, as opposed to GPs. Although the findings of this study and significant, it has not been published.

In the same year, Naidoo (2018) conducted a study on the knowledge, attitudes, perceptions and perceived barriers of chiropractors within the eThekwini Municipality towards evidence-based practice. This study found that although respondents had a positive attitude and perception towards EBP and the willingness to improve skills and the utilisation of EBP, barriers identified were insufficient time, the inability to generalise research findings for application to a patient population and the inability to apply research findings to make it patient-specific. Furthermore,

respondents reported a belief in a strong academic foundation with regard to their knowledge and skills related to accessing and interpreting information. However, a lack of formal training in methods to search for and access literature was reported in 47.1% of respondents. This study highlighted the importance of academic institutions providing the necessary skills required to implement EBP efficiently. Alike, as with the aforementioned studies, this study remains unpublished.

2.9 STUDENTS TRANSITION FROM THEORETICAL SETTING TO A CLINICAL SETTING

The first year into the clinical practicum can be challenging as students may not be adequately equipped to implement EBP efficiently despite being introduced to the fundamental nomenclature of research and given a general appreciation for the principles of scientific research (Smith *et al.* 2004). Evidence-based practice is a required skill for chiropractors to possess in order to efficiently and effectively treat in competitive healthcare structures (Smith *et al.* 2001). The aim of all educational institutions is to ensure their faculties, programmes and students meet the criteria of quality control (Somenarain *et al.* 2010).

2.9.1 Transition Shock

In the undergraduate programme, the transition from a theoretical setting to a clinical setting is considered to be the most stressful period of medical education (Godefrooij *et al.* 2010). Students have described this as being “thrown in at the deep end” (Dornan and Bundy 2004). Transition shock is a term that describes the feelings of anxiety, instability and insufficiency when fulfilling the roles of responsibility, relationships, knowledge and expectations while adapting to a new environment (Kramer *et al.* 2013). Clinical practice grants students the opportunity to integrate the theoretical content learnt and apply it into practice while reaping the benefit of practical experience and knowledge gain (Ko and Kim 2022). Transition shock can provoke feelings of inadequacy during the execution of simple procedures, knowledge barriers and difficulty coping with the work load (Radcliffe and Lester 2003; Prince *et al.* 2005).

Duchscher (2009), in a study conducted in nurses, formulated a Transition Shock Model which illustrated the contrast between roles, responsibilities, relationships,

knowledge and performance expectations required within an academic environment as opposed to a practical environment. Furthermore, Duchscher (2009) narrated that poor adaptation occurs due to a lack of emotional and practical support, a lack of confidence, apprehension in developing relationships with new colleagues and unrealistic expectations with regard to performance. Despite probable solutions to alleviate transition shock for novice graduates, practical and logistical challenges still remain (Wakefield 2018).

2.9.2 Theory-Practice Gap

According to Kerthu and Nuuyoma (2019), the concept of theory practice gap is used to describe the discrepancies recognised between the theory component learnt in the formal classroom setting as opposed to the experience that occurs in the clinical setting. The theoretical aspect caters for knowledge and insight learnt in the classroom whereas clinical learning aims to improve clinical skills. There are several factors which account for difficulties in controlling the clinical setting, such as attitudes of health care providers, lack of work ethics, the condition of equipment, the environment and the conduct of patients and their family members.

In South Africa, a study carried out by Cassimjee and Bhengu (2016), on nursing students in KwaZulu-Natal, found that students received insufficient clinical teaching and support. Similarly, Waterson *et al.* (2006) revealed that students in Gauteng lacked mentorship and role modelling. In a study done on nursing students in Free State by Davhana-Maselesele (2001), it was found that students had a high stress level due to limited teaching. In addition, Davhana-Maselesele (2001) also noted that some registered nurses rejected their teaching role in the wards and there was the presence of uncaring behaviour portrayed by management in the clinical setting.

2.10 SIMILAR STUDIES PERTAINING TO THE IMPLEMENTATION OF EBP

An international web survey of chiropractic student attitudes towards EBP was conducted by Banzai *et al.* (2011) with participating institutions in Australia, Canada, USA, Denmark and New Zealand, and it was found that although the majority had a positive attitude towards EBP, they demonstrated poor knowledge of critical appraisal skills even though 66.6% of them received EBP instruction (Shreeve

2012). Several studies have underlined the importance of continuing to deliver EBP instructions to students throughout the entire curriculum, especially within the patient encounter during the student's clinical internship when higher-level critical thinking skills and application of EBP are acquired (Coomarasamy *et al.* 2003; Smith *et al.* 2004; Khan and Coomarsamy 2006; Aiyer and Dorsch 2008; Shreeve 2012). The key results of these studies are summarised in Table 2.2 below.

Table 2.2 A summary of the key results found in similar studies

Authors	Key results
Coomarsamy *et al.* 2003	The teaching of EBP and critical appraisal of literature at a postgraduate level increased knowledge in students, but insignificant changes were found in attitudes, skills or behaviour.
Smith *et al.* 2004	Implementing a consistent, EBP rich curriculum is beneficial in improving students' abilities and skills to search for, retrieve and critically evaluate literature. In addition, it was found that in order to alter a curriculum, routine student evaluations should be conducted over a given period of time to provide a realistic idea of the changes needed as opposed to single evaluation.
Khan and Coomarsamy 2006	Teaching and learning strategies should be incorporated and integrated into routine clinical practice either in real-time or traditionally, such as having journal clubs. Learning of evidence-based medicine (EBM) should extend from classrooms into clinical settings and this concept should not be limited to EBM but rather a general rule pertaining to all topics in healthcare.
Aiyer and Dorsch 2008	Student skills with regard to EBM improved over a ten year period where the curriculum evolved from a teacher-centred approach with the use of computer-based case scenarios to a learner-centred, patient centric approach.
Shreeve 2012	The chiropractic curriculum requires EBP teaching strategies beyond instruction and educational assessment regarding its practice. There is a need to develop and assess skills of students with regard to incorporating evidence-based principles in its entirety, namely considering patient preference and clinical decision making during a patient encounter. Developing an institutional design to encompass this necessity may equip future chiropractors with evidence-based clinical expertise needed for improved patient outcomes with ultimate practice success.

A study done in Canada by Bussières *et al.* (2015) found that although chiropractors held positive attitudes toward EBP and found it useful, many did not use research evidence or clinical practice guidelines to guide clinical decision making. The study found that 10% of the participants indicated they never had any training in critical thinking or analysis included in their chiropractic education. A large portion of the sample reported that they had never received any education or training on clinical research or on conducting systematic reviews (Bussières *et al.* 2015).

In another study done in USA by Wyatt *et al.* (2005), it was found that basic EBP skills were lagging in chiropractic students. Similarly, Evans *et al.* (2012) found that students, as well as faculty members at their institution who taught Eastern medicine, acupuncture, massage and chiropractic medicine, valued EBP but lacked the adequate skills for its implementation (Odhwani *et al.* 2019). The reason for

inadequate skills of the implementation of EBP in a doctor of chiropractic programme by students and faculty members was found to be a lack of a structured EBP programme (Odhwani *et al.* 2019).

For occupational therapy students, in a study done in Canada by Thomas *et al.* (2017) there were several challenges identified. The students revealed mixed feelings about the value of EBP, barriers to the application of EBP, opposing worlds and the vital and imperfect role of the curriculum. In the first theme, where students had mixed feelings about the value of EBP, it was found that EBP was generally viewed as positive but reported that research literature may not be the only source of evidence-based information to make an informed clinical decision and, hence, attending conferences and adequate training are essential. Other findings within this category were that EBP affords credibility and identity to the profession; it ensures that students are guided into providing the best practice, and it allows the students to proactively choose the best practice based on evidence, rather than being told what to do by an institution.

In the study by Thomas *et al.* (2017), the students experienced barriers towards the implementation of EBP; it was found that students reported dealing with a lack of time, challenges in integrating EBP, a lack of appropriate and sufficient resources required to implement EBP, and a lack of clarity on how to apply evidence in occupational therapy. The students reported contrasts between the implementation of EBP in an ideal world, as opposed to its implementation in everyday practice, and it was found that there was a vast disparity between a resource-rich academic environment and the realities of clinical practice where challenges like limited time, scarce resources, and competing client wishes were present, amongst the numerous clinical responsibilities. Students also reported facing numerous personal challenges. Other challenges found were differences between students in the level of EBP knowledge and skills based on previous academic backgrounds; a lack of support and guidance; a lack of experience-based knowledge from seniors; a lack of allocated time and lastly, a lack of direct communication between students and professors. Students reported that they learned how implement EBP as well as overcome its barriers best during their time doing clinical fieldwork.

In another study conducted in Britain on nurses and physiotherapists, the barriers identified were lack of time, lack in confidence, lack of resources, difficulty

overcoming barriers, difficulty understanding research reports, lack of authority and to a minor degree, lack of knowledge on how to find organisational information (Palfreyman *et al.* 2003).

2.11 SUMMARY OF THE CHAPTER

This chapter provided insight on the commencement of EBP and its importance in the healthcare sector. Insights on the chiropractic profession were highlighted with the framework of the curriculum at the DUT was provided. In addition, the clinical requirements at the DUT CDC was explained. Additionally, the results of previous and similar studies were stated.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the methodology used for this study. It provides insight into numerous aspects regarding the research procedure such as research location and population, participant recruitment, sampling characteristics, the tools used, and the procedures followed to carry out this study.

3.2 RESEARCH DESIGN

A research design depicts a conscientious process of planning on how to collect and analyse data to allow for a greater understanding of a particular topic (Abutabenjeh and Jaradat 2018). This study was qualitative in nature using an exploratory, descriptive design. A qualitative research approach aims to develop a theory or theme from an understanding of how people construct their worlds and interpret their experiences. A researcher aims to convey their experiences into meaning (Butina *et al.* 2015).

An exploratory design is used when a concept is identified and the researcher delves further into the concept (Williams 2007). This was suitable for the study and it was utilised for this study as the aim was to understand the experiences of registered Chiropractic Master's students towards the implementation of EBP during their clinical practicum.

A descriptive design captures the information in its entirety and highlights certain aspects to understand its meaning and relevant relations (Sandelowski 2000). This design was utilised for this study as it allowed for the researcher to interpret concepts and identify its relevance within the context.

3.3 RESEARCH LOCATION

The research location is the place where data is collected. Interviews were conducted either at the DUT Faculty of Health Sciences research room or online via

Microsoft Teams. Permission was sought from the Research Director at DUT to conduct research at DUT (Appendix A). Permission was also sought from the Executive Dean of the Faculty of Health Sciences at DUT to conduct interviews at the DUT Faculty of Health Sciences research room (Appendix B).

3.4 RESEARCH POPULATION

The research population were fifth and sixth year registered Chiropractic Master's students who were clinically active for a minimum of four months at the DUT CDC.

3.5 PARTICIPANT RECRUITMENT

Registered Chiropractic Master's students in their fifth and sixth years who were clinically active for a minimum of four months at the DUT CDC were identified using a class list with permission from the head of the Chiropractic Department (Appendix C). The potential participants were approached or contacted telephonically and the procedure was explained to them verbally.

3.6 SAMPLING PROCESS

3.6.1 Sampling Strategy

Purposive sampling was used for this study as the study was directed at fifth and sixth year registered Chiropractic Master's students at the DUT CDC. Purposive sampling involves the selection of a sample population driven for a specific purpose (Tashakkori and Teddlie 2003).

3.6.2 Sample Size

A minimum number of 12 participants were required to be interviewed or until data saturation had been reached. In total 14 participants were interviewed of which eight were in fifth year and six were in their sixth year of study. Data saturation is reached once there is no additional information generated from the interviews and, therefore, further data collection is unnecessary (Saunders *et al.* 2017).

3.6.3 Sampling Characteristics

3.6.3.1 Inclusion Criteria

- All registered fifth and sixth year master's chiropractic students who had been doing their clinical practicum for a minimum of four months at the DUT CDC.

3.6.3.2 Exclusion Criteria

- Participants who did not sign the informed consent form.
- Participants who participated in the pilot study.

3.7 MEASUREMENT TOOL

Data were collected using a semi-structured interview guide (Appendix D). A semi-structured interview guide is a set of open-ended questions. Additional probing questions were used as this allowed for the researcher to explore the topic systematically and comprehensively to elicit in depth answers where necessary but still keep the interview focused on the desired subject (Jamshed 2014). According to Boynton *et al.* (2014), it is recommended that pre-validated and published questionnaires are used as interview guides given that it saves time and resources. However, Artino *et al.* (2014) acknowledged that many medical researchers preferred to develop their own set of research questions to use as an interview guide. Despite providing a consistent standard of education, every institution is distinct in their instructional offering and operating procedures, including the DUT chiropractic programme. Therefore, the researcher developed an interview guide tailored to suit the distinct structure of the DUT CDC (Appendix D).

The questions used in the interview guide elicit similar ideas as to those used in other studies which aimed to explore like concepts (**Table 3.1**).

Table 3.1 Examples of key questions used in comparable studies

Reference	Key questions
Thomas *et al.* 2017	In what ways has the programme helped you become an evidence-based practitioner?
Lehane *et al.* 2019	If you were developing a new EBP curriculum for healthcare professionals, what would it include?
Pashaeypoor *et al.* 2017	What is your experience of EBP education based on the model?

A summary of the three pertinent questions utilised in the interview guide are illustrated in **Table 3.2**. In addition to the questions, probes were utilised if necessary (Appendix D).

Table 3.2 A summary of the three main questions utilised in the semi-structured interview guide

Question number	Question	Facet of perceptions, experiences and barriers
Question 1	1) What are your perceptions towards evidence-based practice?	Perceptions of the student towards evidence-based practice giving an indication as to whether there is understanding of what evidence-based practice is
Question 2	2) What are your experiences on the implementation of evidence-based practice?	Patient care in the educational clinical environment
Question 3	3) What are your perceived barriers and challenges on implementation of evidence-based practice?	Challenges and barriers encountered on implementation of evidence-based practice

3.8 PILOT STUDY

A pilot study is equivalent to a trial run done with the purpose of evaluating the measurement tools in preparation for the main study. The tools can then be modified accordingly, if necessary (Shuttleworth 2015). After provisional approval had been obtained from the DUT Institutional Research and Ethics Committee (IREC) (Research Ethics Clearance Number 201/21), a pilot study was conducted on one fifth year and one sixth year Chiropractic Master's students using the semi-structured interview guide (Appendix D) to determine if the questions are pertinent and clear. The participants were given a letter of information (Appendix E), informed consent form (Appendix F), as well as a code of conduct and confidentiality form (Appendix G) to sign. There were no recommended changes to be made to carry out the main study.

3.9 MAIN STUDY

Once permission had been granted by the IREC (Research Ethics Clearance Number 201/21) at the DUT and verbal consent from the participants had been given, a date and time was set for the interview to be conducted. The participants were asked to sanitise upon arrival. Desks, chairs and pens were sanitised as well. A distance of 1.5 metres was always maintained between the researcher and

participant abiding by the COVID-19 regulations. The researcher verbally explained the procedure and informed the participants that they would be audio recorded. A letter of information (Appendix H) was given to them to read and an informed consent form (Appendix I) was given to them to sign. The participants were reassured that the data would be kept confidential; the interview would be audio recorded, and they were allowed to withdraw at any time if they felt uncomfortable. Once consent had been obtained from the participants, demographical information was obtained from the participant verbally, the interview then commenced and was audio recorded. Upon completion of the interview, the participant was thanked, provided with sanitiser and reminded that data would be kept confidential. The participants were allocated pseudonyms to protect their identity.

The interviews conducted on Microsoft Teams followed a similar procedure. Once permission had been granted by the IREC at the DUT and verbal consent from the participants had been given, a date and time was set for the interview to be conducted. The participants were offered 500MB of data given that they required it for the duration of the interview. A meeting was set up on Microsoft Teams and a link was sent to the participant via email along with a letter of information (Appendix H) and informed consent form (Appendix I) to be signed and returned via email prior to commencement of the interview.

The researcher verbally explained the procedure and informed the participants that the interview will be recorded. The participants were reassured that the data will be kept confidential and the interview will be recorded and they are allowed to withdraw at any time should they feel uncomfortable. Once consent had been obtained from the participants, the interview commenced and was audio recorded. Upon completion of the interview, the recording was stopped, the participant was thanked and the recording was downloaded. The participants were allocated pseudonyms to protect their identity.

3.9.1 COVID Protocols

Desks, chairs and pens were sanitised prior to the participants' arrival. Masks were worn by both the participants and the researcher at all times. The participants were asked to sanitise their hands upon arrival and a distance of 1.5 metres was maintained at all times between the researcher and the participant. Upon completion

of the interview, participants were provided with sanitiser. Desks, chairs and pens were sanitised again.

3.10 DATA ANALYSIS

The audio recorded data were transcribed verbatim and analysed using Tesch's method of thematic analysis (Creswell 2009). The eight steps are as follows:

1. The researcher transcribed the audio recorded interviews verbatim.
2. The researcher compared the transcribed data with the audio recorded data with the use of field notes to confirm certain aspects of the data.
3. The researcher read and reread the transcriptions as many times as needed to fully understand and conceptualise the data.
4. The most informative interview was selected and notes were made pertaining to that interview. This was repeated for the other interviews as well.
5. Similar topics were identified and clustered.
6. Themes were formulated from these topics.
7. An experienced person in qualitative research (in this case, the research supervisor) checked the data and transcriptions and confirmed the themes identified by the researcher.
8. Merging themes were identified and confirmed by the researcher and the supervisor supported by verbatim statements from the participants. The literature was reviewed to verify findings and draw a conclusion.

3.11 ETHICAL CONSIDERATIONS

3.11.1 Ethical Approvals

Permission to conduct this study was obtained from the DUT IREC (Research Ethics Clearance Number 201/21) (Appendix J). Permission from the participants was a requirement for the participant to be included in the study. The participants needed to read the letter of information (Appendix H) and sign the informed consent form (Appendix I) before commencement of the interview. The participants' personal details were omitted to ensure confidentiality and professionalism. The transcripts and recordings were only accessed by the researcher and supervisor. The transcribed data will be stored in the Chiropractic Department on a USB for a period

of five years, after which electronic data will be deleted and any paperwork will be shredded. Informed consent was obtained from participants prior to participation in the study.

3.11.3 Ethical Principles

The following four ethical principles were taken into account:

Autonomy – Participants have the freedom to make independent decisions irrespective of the research process (Polit and Beck 2006). The participants were informed that they were allowed to withdraw at any time they deemed fit.

Non-maleficence – This refers to the researcher taking necessary precautions to ensure no harm, risk or side effects will by experienced by the participants (Polit and Beck 2006). The participants were not be harmed in any way. This was verbally explained and stated in the letter of information.

Beneficence – The researcher will ensure maximal benefit and eliminates harm to the participants upholding their physical, financial, social and emotional legal well-being (Polit and Beck 2006). The participants were informed about the benefits of the study and reassured about confidentiality.

Justice – Participants have a right to their privacy and fair treatment (Polit and Beck 2006). All participants were treated fairly and given an equal chance to express their opinions and views.

3.11.4 Trustworthiness in Qualitative Research

Trustworthiness of qualitative research is established by using Lincoln and Guba's (1985) four criteria: Credibility, confirmability, dependability and transferability.

Credibility determines how plausible the information drawn from the research findings is and whether it is a correct interpretation of the participants' views. According to Polit and Beck (2014), the credibility and the confidence in the truth of the study and its findings is the most important criterion. This was ensured by issuing a letter of informed consent stating that participation is voluntary and they can discontinue at any given time.

Confirmability refers to the consistency in findings by two or more independent people (Polit and Beck 2006). This was elicited by asking the research supervisor to scrutinise the data through independent checking.

Dependability refers to the consistency and congruency of data over time (Polit and Beck 2006). This was ensured by consistent questions being asked by the researcher during the interview and the supervisor double checking the transcribed data.

Transferability refers to the point at which the reader can make a generalisation from the conclusions extrapolated from the study findings (Polit and Beck 2006). This was ensured by providing a detailed description of the research context, settings and processes utilised in the study.

3.12 SUMMARY OF CHAPTER THREE

The research design and methods used in this study were explained in this chapter. Ethical considerations ensuring validity and reliability of the study were elaborated upon in line with their relevance to this study.

The next chapter depicts the findings of the study.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

The results obtained from 14 semi-structured interviews conducted on Chiropractic Master's students at a teaching clinic in KwaZulu-Natal are presented in this chapter, along with themes and sub-themes which were derived using the Tesch's method of thematic analysis. The age, gender and approximate number of months participants have been clinically active at the DUT CDC are shown in **Table 4.1**.

Table 4.1 Demographics of participants

Participant	Age	Gender	Approximate number of months at the DUT CDC
1	25	Female	10
2	24	Male	10
3	23	Female	10
4	26	Male	20
5	22	Female	10
6	25	Male	10
7	24	Female	10
8	24	Male	10
9	22	Male	10
10	29	Female	20
11	33	Male	15
12	24	Female	20
13	28	Female	26
14	25	Male	16

4.2 THEMES AND SUB-THEMES

After analysis of the data, the following themes were identified:

Theme one: Perceptions and necessity regarding the roles of EBP.

Theme two: Undergraduate education and its role in the implementation of EBP.

Theme three: The importance of clinical experience in the implementation of EBP.

Theme four: The implementation of EBP.

These themes, with their associated sub-themes, are displayed in **Table 4.2**.

Table 4.2 A summary of the themes and sub-themes

Themes	Sub-themes
1. Perceptions and necessity regarding the roles of EBP	1.1 Positive aspects regarding EBP 1.2 Negative aspects regarding EBP
2. Undergraduate education and its role in the implementation of EBP	2.1 Pre-clinical preparation 2.2 Theoretical training 2.3 Measures of improvement
3. The importance of clinical experience in the implementation of EBP	3.1 Clinical training 3.2 Support structures 3.3 Self-perceived limitations
4. The implementation of EBP	4.1 Theoretical implementation 4.2 Practical implementation 4.3 Challenges of implementation

4.3 PRESENTATION OF THEMES AND SUB-THEMES

The results from the study, in addition to the themes and sub-themes, emanated from the thematic analysis of the interviews are detailed. Relevant extracts from the transcripts are presented to substantiate the results.

4.3.1 Theme One: Perceptions and Necessity Regarding the Roles of EBP

Participants expressed a strong belief in the necessity of EBP in general and its role in the chiropractic profession. However, one participant expressed the necessity of EBP, alongside a disadvantage of EBP.

4.3.1.1 Positive Aspects Regarding EBP

Participants vocalised the necessity of EBP and the benefits of if its role for the profession and individuals. Alongside these positive beliefs, some participants expressed limitations in its implementation.

> "*So, I've been liking the idea of evidence-practice based practice, as opposed to no practicing with information that's more anecdotal. So, using the available literature to make decisions with your patient, uhm, on what kind of course of action to take on based on their presentation but it's not necessarily as easy as you know, I thought it was before I started clinic, because you kind of get confused with your what you think there's evidence versus what the evidence actually says.*" (Participant 1)

The following five participants implied that an evidence-based approach provides credibility to the profession.

> "*Okay, in general. So, I think it is extremely important because as a scientific profession, you know, that science is based on evidence and it allows other people who are, uhm, in other domains or other practices, uh, in understanding into what we are doing based off of hard evidence so as soon as you provide evidence for something and reliable evidence and repeatable evidence, uhm, it provides a lot more authenticity and a lot more credit to what you are doing as opposed to just saying "Hey, listen, an adjustment, uhm, helps with headaches." But you've got no evidence to prove it. So, I think it's, it's of utmost importance to every profession no matter what it is*." (Participant 2)
>
> "*So, I think it grows our profession and it makes our, our treatment options and our profession much more concrete, if I could call it that.*" (Participant 4)
>
> "*Uhm, so, evidence-based practice for me, I think is very important, uhm, in order to be able to ensure that what we are learning and how we are treating our patients is uhm governed by something and evidence for me is the only way that can say whether you should or shouldn't be treating someone with whatever you're choosing to treat them with.*" (Participant 5)
>
> "*So, I obviously think it's, it's very beneficial and uhm, is something that you should base your treatment plans and approaches to different conditions, uhm, it always should be evidence-based and literature-based on the new and current literature. Obviously, in the medical fields, uh, different things are found out and uhm, like new ways of treating and new revelations come about quite often. So, me personally, I like to always have a evidence-based approach to, to care and treatment in the clinic, as well as just in life, I guess. I do find it difficult sometimes because we aren't really equipped with any tools other than the ones that we have to source ourselves, uhm, in the clinical setting, which is sometimes a bit of a limitation, I find.*" (Participant 6)
>
> "*Oh, uhm, ya, no, it's absolutely important because you can't… you can't make claims that you can't back up. So, when you using evidence-based, it's evidence based as it as it says. Uhm, so I think it's absolutely necessary. You*

can back up your claims and you know it's, uhm, you're then treating in the most appropriate way possible instead of just going with what you think is right. You go with what is actually right for… per case, you know. Uhm, so yeah, like I said, it's an absolute necessity." (Participant 8)

The following participant supports the idea of EBP but believes that evidence should not only be limited to a journal but also patient experience.

"*Uhm okay, I think it is… To start off, I think it's good. I do think, uhm, that's the way we should be guided. I mean, there's a lot of different opinions of how people do things, uhm, and I think that should also be taken into consideration… into consideration that evidence-based isn't necessarily always what's in a journal, but what's in someone's personal experience as well, because that they have evidence through what they're seeing but I do think it is important to be guided by evidence and not just do things willy nilly.*" (Participant 7)

The following participant shared a similar view to others and expressed that an evidence-based approach enables the chiropractic profession to move closer to mainstream medicine.

"I think it's useful, uh, based on the fact that we're trying to move more closer to mainstream medicine. So, in terms of protocols and aligning to mainstream medicine, it's quite useful because a lot of patients come in to chiropractors, to see us last, in general. So, they have all these different kind of terminologies and stuff that we have to familiarize ourselves with. So, I think that's useful. Uhm, also, keeping up to date is always good because patients will all benefit at the end of the day. Yeah, I think it's useful." (Participant 9)

"I think they're quite varied. I mean, obviously in some respects, evidence-based practice makes a lot of sense and it's a great concept. Uhm because obviously, we want to give people the best care possible and if something is proven to be effective, then… then it's a really great method to use." (Participant 10)

"I think it's necessary, uhm, obviously because if it's out there and it's being used, I mean it's being investigated, there's been studies done on it, I think it's very necessary to learn from that." (Participant 11)

"Uhm, I find it's most necessary, purely because… to require backing or foundation as to what kind of exercises, practices or ideology enforcements on to them, that you would be able to provide them with necessary literature. So, as not to be more like a quack or be less like a quack, especially when it comes to chiropractic in this instance and people become more litigious." (Participant 12)

4.3.1.2 Negative Aspects Regarding EBP

One participant reported a disadvantage pertaining to the implementation of EBP and its role in the chiropractic profession.

"…Uhm, on another note, I think coming from a profession that doesn't have a huge amount of literature behind it or doesn't have a lot of financial sort of… there isn't a huge amount of financial gain behind doing chiropractic research. So, in some circumstances, there isn't a huge amount of literature to actually support, uhm, some of the treatments we would perceive to be effective. So, to say that you can't implement a treatment just because we haven't got huge clinical trials and double blinded studies and "XYZ" to prove that, uhm, treatment is effective - that can be a hinderance as well because then, uhm, people, you know… We have… We have anecdotal evidence and people may report that certain treatments are very helpful for that condition and it helps the patient but we don't have the literature that backs it up. So, in that regard, then to have to only work on evidence-based practice means that it can actually hold you back from doing certain treatments that actually could be helping people and… and in… in that regard, almost holding us back from producing the evidence that is required, uh, to actually prove that certain treatments are helpful for certain people." (Participant 10)

Participant 10 was of the opinion that chiropractic is a holistic profession in comparison to medicine which treats in isolation. Contradictory to the opinion of Participant 9 above, this participant believed that a holistic approach is what makes chiropractic exclusive to mainstream medicine.

"… you want to treat, uhm, more holistically and less isolated but obviously evidence-based practice doesn't always suggest that or they try and isolate, you know. Medicine tries to isolate each area of the body so extensively, and treat everything in a little box, which is exactly how they try to teach us not to treat because it's not effective." (Participant 10)

4.3.2 Theme Two: Undergraduate Education and Its Role in the Implementation of EBP

Most participants had a theoretical understanding of EBP but identified discrepancies between what was taught in the undergraduate programme in comparison to what was expected during their clinical practicum. However, they also identified aspects that could have been improved during the undergraduate programme to make the implementation of EBP easier during their clinical practicum. A cohort of students were found to have a general idea of EBP and its importance but its implementation could be considered partially neglected.

4.3.2.1 Pre-Clinical Preparation

There were insufficiencies reported by participants' regarding their pre-clinical training, such as a lack of sufficient training on critical appraisal of literature, a lack of sufficient training on the implementation of EBP, a lack of sufficient training about the clinical environment and a lack of practical learning due to COVID restrictions, as well as a lack of reference of evidence for what they have been taught.

The five participants who reported a lack of sufficient training on critical appraisal of literature reported:

"I don't think in the undergrad, uhm, we are taught enough on how to criticize evidence. I don't think we are necessarily even taught on how to look for quality evidence and what kind of evidence is expected. Uh, so the best uhm the best kind of understanding of looking for literature is what I know how to do based on the research module that we do but other than that, we kind of really weren't exposed to it." (Participant 1)

"And I feel like for a lot of us, including myself, it was kind of like a light bulb when we did that journal club as in like "Oh, this is what it should be like and this is how we should critique and how strict we should be" uhm, because by the time we did our journal club, we're already halfway through clinic and if

we didn't know, which we became aware of… I became aware, I didn't really know how to, uhm, perform an appropriate critique of the evidence and so a lot of the treatments I was providing my patients for, we know, could have been based off of articles and literature and stuff like that that is not sound. It's not appropriate." (Participant 2)

"… the struggle behind it is we obviously never been taught how to critically be evidence-based and so on. Like we were told about it and this and that, but for me, like I've just kind of taught myself like, uhm, that's by reading articles that are relevant to… to the study and reading different literature, treatment plans, uhm, and yeah, I've actually, weirdly enough, bought, uhm, a book now which is current in literature, uhm, and it's… that helps me quite a lot with treatment plans and chiropractic and it goes on to basically people's nutrition and uhm different weird and wonderfuls from there and then it puts you into a certain category and then you kind of get your exercise regimes and uhm stretching and so on…" (Participant 6)

"I think that would have been so much more beneficial to me had I started something like journal club way earlier, where it wasn't necessarily a subject but maybe an hour or two a week where we sat down as a class and we discussed an article just for… for the fun of it, to get us into understanding how articles work, how to extract relevant information from them, what is considered a good article versus not because I think that's part of evidence-based as well because people can cherry pick what they want to out of information that's given and I don't think that's a good guide either, you know. Someone can pull a random fact out of context and use that, as you know, so called "evidence." Uhm, and I do wish that that had been introduced earlier, for my understanding." (Participant 7)

"Well, I mean, my theory theoretical grounding… Yeah, I mean, I guess it's not something we really get taught." (Participant 10)

Three participants reported a lack of sufficient training about the clinical environment as follows:

"So, we have a fully equipped rehab room. Not once have we been taken through the rehab room and explained all the equipment and explained how

we should be using it for patients or suggestions. We've got a lot of modalities, that you know, we haven't been taught how to use. We only got taught activator and impulse adjuster very recently and I just feel like we do have so much at our disposal but we haven't been given the tools to use that to optimise our patient care. Uhm, you know when there's that option for us to do a KT course, which we still haven't done so we still can't use that on our patients. Uhm, so from that way, I get frustrated that we have all of this at our disposal and it is not being utilised properly for patient care. You know, patients would really benefit from some of the things that we have and we're just not allowed to use it." (Participant 7)

"… I don't think our research foundation is very good in this institute. It's one of the reasons why we also get stuck in this system for so long because we are not trained in… or very well trained in academic writing at all. And I thought our research courses were pretty poorly conducted and then next thing we're supposed to write, like, this giant thesis project and so I feel like that comes back from implementing evidence-based practice. Uhm, I feel like yeah, we don't get trained, errr… or pointed a lot in the direction of evidence practice treatment protocols." (Participant 10)

"I wouldn't say we were taught much about evidence-based practice except make sure you've got something to back why you're doing it. Uhm, when we came into the clinic, it was sort of like "This is just a reference that you have to fill out" and there wasn't much more explained, uhm, so yeah, I think they possibly need to place a bit more emphasis on that so that you know what to do. We, I think, all - majority of us figured it out and realized okay, you're trying to back up each uhm treatment that you use, but that wasn't specifically taught on how to use it." (Participant 5)

The two participants who reported a lack of practical learning due to COVID restrictions stated:

"… the fact that we hardly spent any time in the clinic, the prac room practicing adjustments and this does go down to COVID. So, it's… it is what it is, but I do feel like a lot more emphasis on adjustments and the different types of adjustments and the different techniques of adjustments and the

different, uh, potential effects these adjustments have and why we're adjusting this way for this condition, uhm I think would have been a lot more helpful than just "Okay, here's the adjustment go for it." (Participant 2)

"… Uhm, I think having students coming into the clinic and treating patients, like especially in the last couple of years after COVID when they've barely even treated anybody else isn't ideal…" (Participant 10)

Participants were asked if they felt like they were sufficiently trained in the undergraduate programme with respect to EBP and how to apply it. Most participants reported a lack of sufficient training on the implementation of EBP. However, one participant reported sufficient training on the implementation of EBP and another participant reported that training was unnecessary.

"I don't… and this goes back to the question where you asked me what do you think would be better implemented to apply EBCC's. I think we got taught purely based off of like two YouTube videos and watching each other critique articles. For a… a practice that, for a profession that is supposed to pride ourselves off of evidence-based and the ability to choose appropriate evidence-based techniques. We were hardly taught at all. As a matter of fact." (Participant 2)

"No, I don't. Ah. If you combine… If you look at research, I think actually in research, we were taught more of how to actually find evidence for things. Uhm, if you combine that with your clinical practice and what you… what treatment you're using, uhm, I guess relatively, we were taught but I don't think that they made enough emphasis on it when it came to actually teaching us the modalities or adjustments in that and how to make sure that we've got evidence for that." (Participant 5)

"I think for me personally, the… the… the struggle behind it is we obviously never been taught how to critically be evidence-based and so on. Like we were told about it and this and that, but for me, like I've just kind of taught myself like uhm that's by reading articles that are relevant to… to the study and reading different literature, treatment plans, uhm and yeah…" (Participant 6)

"… In terms of evidence-based, I think, uh, we only actually came to, uh, fully understand, fully use it when were in clinic. Before that, I don't think we actually used evidence-based. It was more of covering the topics uhm for the… for the subject." (Participant 9)

"Uhm no, as I said before, I don't think… I don't think we touched on it. In our undergrad, I don't think we were touched on it at all. I know like in… in, uhm, in our master's programme, I know Dr… Some of the lecturers, and stuff did recommend certain textbooks that… that things like this chiropractic practice, uhm, textbook that has got fairly good protocols with… That I think are evidence-based and that I think some of the articles and stuff that lecturers sends us are, uhm, evidence-based practice protocol-type, certain/different types of pathologies but in our undergrad, I don't think we covered anything. It was just… it was just… all separate. It was just pathology separate from treatment protocols and everything like that. So, we never really… were really never really trained on how to implement evidence-based practice. Unless I guess they just assume that, you know, they, everything they're teaching us is evidence-based and I mean, it's not always really, like the fact that you can do chiropractic treatment for ba… babies when they have colic and for bed wetting. I mean, we do learn that and there's nothing evidence-based about that but I mean, it works, you know. Not really… doesn't work for anybody but it does work so I mean, I think that's why it's called the chiropractic art and science. It is a little bit uhm understudied in some regards." (Participant 10)

"… I did feel that this was the area (that we had sort of had the least amount of training in and it was supposed to be the most… essentially is the most important area of our training and also to implement our treatment modalities…" (Participant 10)

One participant reported sufficient training on the implementation of EBP by stating:

"Uhm we were taught pretty well how to look things up in terms of research and articles." (Participant 11)

Another participant reported that training on the implementation is unnecessary and stated:

> *"Look, I don't think a lot is given into it in terms of, uhm, training, but I think it's some… It's not really a skill. It's just something which is added to the programme itself, uh, I don't think it's, uhm, I don't think it's something which was really given much attention to, but in terms of… adding it to the curriculum, I don't think it could carry that much weight."* (Participant 12)

4.3.2.2 Theoretical Training

All participants had an existing knowledge of what EBP was and how to search for literature. The participants reported that notes for relevant subjects had no reference of evidence, a disparity between what was taught versus what literature portrays and the need of a re-evaluation of the structure of subjects. Furthermore, two participants appeared to have a general idea of EBP but its practice seemed inefficient.

The participants regarded as theoretically grounded stated:

> *"In theory, I think that evidence-based practice is using evidence that's based on randomized controlled trials and professional guidelines that have been published, and using those to structure the type of treatment, uhm, whether that's modalities or the education you give your patients uhm like using that to work out a treatment programme…"* (Participant 1)

> *"So, obviously, they have insisted that we do EBCC's, uhm, to reference all of our treatment that we use. I found it relatively helpful. I actually enjoy looking up research for… to back up my treatment. So, when I treat someone with something, I find research to back it, uhm, and then I do make a list not to be able to just have like an area to copy a reference from, but so that I know that there is actually evidence backing every time I choose to treat someone with an adjustment or a modality or anything like that. So, I found it relatively easy to do."* (Participant 5)

> *"So, I think evidence-based practice would be taking what information exists and taking the proof of what actually works and what doesn't. Uhm, and applying that with both your own knowledge and, you know, discretion on what you feel is necessary. You know, sometimes there might be*

recommendations, and they're not always applicable to every patient. Uhm, my application of it, I do feel like I'm quite evidence-based. I do read a lot of my patient's conditions try and do as much research as possible…" (Participant 7)

"… I think that, you know, throughout, you know, we forget, throughout all the years, how much evidence-based stuff we have actually learnt. Uhm, so in terms of my treatment, and what I've learned through all the articles of all the different modules and subjects that we've taken, I do think that I am pretty grounded and I do use those things that we have learnt in the past, to treat my patients." (Participant 11)

All the participants knew how to search for literature, of which most of them use the internet to do so. These participants stated the following:

***"**Uhm, I usually look at what I use for the patient. So, very often I will… If I had a diagnosis that was not necessarily, uhm, a runoff the mill, facet syndrome, I would look into the actual condition and recommended treatments and see if there are any guidelines that help with that or EBCC's. Alternatively, if I used a main part of my treatment – So, if I used medium as the main part of my treatments, I'd look for, uhm, a couple of articles on Google Scholar or PubMed that… that kind of, uhm, show how that modality would be useful in the condition that I'm treating."* (Participant 1)

***"**Okay, so basically what I do is I'll type in, uhm, on some platform whether it be, uh, on Google or on the library, but to be on the DUT library search where it gives you a whole bunch of stuff. To be honest, I do use a lot more of the internet, uhm, because I feel like it's got a lot more access to a lot more things. I'll type in whatever I'm looking for, uhm, and it'll… it'll come up usually with a whole lot of things, uhm. First thing I'll check is the date. Is it recent? Then if it is recent - falls within the four years - Ideally, a lot sooner than four years, then I'll click on it, and I'll see the journal that it comes from and oftentimes, I'll use my… What's the word? You've got certain journals that are a lot more, uh, accredited than other journals. Put it that way. Uhm, and I'll look at the journal that it comes from and if I enjoy the journal. Obviously, there are journals out there that write differently. Some are easier to read, some are*

not easier to read, that kind of stuff. So, I'll look at the date. I'll look at the journal, uhm, and then I will read the abstract, quickly. It usually gives a nice brief summary of it or, uhm, and then depending on if I need, uh, specific special access to log into this journal. I have myself signed up to a lot of, uh, different journals to have access. I know we as students also have access through DUT and then I'll go and usually I'll, uhm, read through the, the uh like the beginning part where it gives a brief summary of the methodology, the, uhm, conclusion and all of that kind of stuff. It's usually like a page long…" (Participant 2)

"Okay, so I kind of look online… Uhm, if I have any specific patients though, so, if I have a shoulder patient that I've treated in a specific way and used a specific something, something, uhm, I will reference that for what it is. The other thing that I've done with patients who have come with more complicated cases, and I've had to go home and research the condition before or I've done treatment that I can and then go home and research that condition further. And from there I then take what the literature says and I use that as my EBCC, that's the other way that I've done it, is used, you know, pre researched stuff to reference." (Participant 7)

"Uhm, I just go on to, uhm, the DUT library has such a, has a very good database. The… uh… oh I… I forget the name. Uhm, off the DUT library where you search the databases like that, uhm, and like EBSCO host and ya… There's… There's… There's a wide, off there… That's… That's… That's a go to one for mine and also off Google Scholar. So, you just, yeah, I mean, we… we had the… When we did our research, we had that bit of a breakdown on, uhm, using those databases and how to search efficiently and… and all of that. So, that's what I used to do search." (Participant 8)

"Usually Google Scholar. It's the easiest." (Participant 3)

"Uhm, okay, so, normally like when I first started, uhm, I would go straight to the internet before doing a reference, uhm, going on to the common journals, uhm, that I use, uhm, and that I've used for like research and that, uhm, in order to try and find, uhm, a reason that I can use conservative management, which normally covers manipulation, soft tissue and certain modalities for

whichever condition I'm treating. Uhm, from there, I do make, try and make a comprehensive list of references that support different, uhm, modalities of treatment, uhm, and when I have to treat that condition again, as long as that reference still links correctly to my patients, that's fine. I'll use it again. Uhm, if it's not, or of I've got, because obviously all patients present slightly differently. If it's not a generalised reference, uhm, it is a more specific treatment to this condition, then I will search again." (Participant 5)

"So, uhm, I usually look on DUT Summon. It is usually the first one. I also really like Physio… Physiopedia. It is quite a nice one just to… because it gives you kind of from anatom, uhm, to treatment plan and management, conservative and non-conservative. Uhm, and then like I said, I have this book now, uhm, it's like a Chiropractic Principles and how they treat and this and that, uhm, so I gain it from the internet, from books and uhm, ya, from different article pages." (Participant 6)

"*Uhm, yeah, so I may… basically, I use either Google S… Ok I use Google Scholar and then, uhm, I type in the keywords in which I'm looking for so if it's adjustments or cervical adjustment and then make sure it's within five years and then I either from EndNote, or I directly, from the article… Uh, well, I know how to edit the reference through research and I just use it from there."* (Participant 9)

"Uhm, I use Google Scholar and then I just search either, uhm yeah, I use like more specific search terms so I would be… If I'm treating a lower back or a knee, I might, uhm, I'll have an idea of what I want to do or I think I want to do. So, if it's an adjustment or dry needling then I might just say, you know, uh, I use those key terms "adjustments for chronic lower back pain, acute lower back pain." Uhm, if I'm struggling to find something like that, I might do like, uhm, treatment protocols for rotator cuff syndrome or for, you know, the presenting problem. Uhm, I might look up physiotherapy treatment protocols, because sometimes they're more similar, they're quite similar to treatment protocols we use. Uhm, I mean, often you can… There's actually quite a lot of research now for dry needling so I mean, again, like this isn't… Like, you don't follow the perfect evidence-based practice, you know. So, you might not be able to find adjustments for the treatment protocol that you want to

implement. So, you just… you find a reference for the dry needling of the muscles and the area and there's quite a lot of research for that. Uhm, yeah." (Participant 10)

"Uhm, through all articles that we've gone through in class, uhm, I would then, you know, see if there's been an updated version of the ones that we have, uhm, previously done, and then also through doing my own research, I find that uhm it just opens you up to exploring what else is really out there." (Participant 11)

Two participants had a general idea regarding EBP but its practice was deemed inefficient and perceived as only relevant at the DUT CDC. The following excerpts support this:

"So, theoretical grounding is pretty much, uhm, obviously, whatever has been done, or whatever coursework you provide. Practical applications is pretty much what is implemented or the protocol at our clinic and that is EBCC referencing and proficiency in implementing, I think that's… I can't really say a… That's rarely been practiced as yet but been it's a matter of just completing, uhm, your EBCC's as such, I think. Yeah, if that answers the question." (Participant 12)

"So, uhm, I commonly use just the articles that I know and don't think that I'm very proficient in, uh… So, I do read but I'm so used to quoting those few articles that I know in, uh, my research and my, uh, treatment." (Participant 14)

A further four participants reported that notes for the relevant subjects had no reference of evidence. These participants mentioned the following:

"... and most of our notes are… that they are from lectures, which is amazing. It's amazing to have notes from lecturers, but very often we kind of don't know the source of those notes and that means that we may learn for tests and exams in the undergrad programme. We don't know if those notes have any clinical grounding, any evidence-based basis or if lecturer's opinions, uhm, and even then we don't really have… we can't like look for the source and read more about it from there because we don't know about it." (Participant 1)

"Uhm, I do feel like the theory part of the course is… it leaves a lot to be desired when it comes to treating spinal patients. The theory behind treating a spinal patient, treating an extremity patient, the conditions that go along with it. I feel like that was a little bit disregarded, uhm, to be very honest with you." (Participant 7)

"So, for Module, I mean, we would just thrown a bunch of articles per… per region in upper limb and I mean, like, those articles are dated back ages. Uhm, and I mean, all the other previous years, I've seen the same articles and yeah, there's just a lot of times where in a lot of these subjects., it's like these same articles that we just, I don't know… kind of tossed at us and it was just only last year when that started happening. Uhm, and yeah, a lot of it isn't even about… about, uhm, the common things that we see in clinic, uhm, you know, so, I think using… going that route with current literature on things... common things seen in clinic, uhm, would… would have helped a lot because I haven't… I haven't read or been shown… I haven't been shown an article on facet syndrome as an example by any lecturer at any point, uhm, and it's the most common thing that people see in clinic. Uhm, and yeah, I don't know. I think that would have helped." (Participant 8)

"Uh, as much as we could do, we get taught a bunch of treatment modalities, then we get taught a bunch of pathologies, and then we just uhm sort of left up to our devices to kind of match them. I mean, maybe if we read all of the articles that were sent to us, we'd be better at it, but there's a lot of articles. Uhm, I think, ya, the delivery of those, like, materials could be better. Not that we need to be spoon fed. I know they don't like to spoon feed us but like, yeah not just a flash drive with 10… 100,000 resources on it. Needs to be more like "week one" and then like a little of reading information because I think yeah, students don't actually engage with material as well as they could do. They just study to pass tests, which at the end of the day actually helps to be a better practitioner or better at implementing evidence-based practice." (Participant 10)

The six participants who reported that there is a disparity between what was taught in the undergraduate programme versus what literature portrays, stated:

> *"… but what is interesting is that I've had the opportunity of watching and observing other chiropractors here, more specifically and chatting to other doctors and chiropractors, uh, but specifically chiros - watching them treat and asking them why they're doing certain tests orthopaedic tests, adjustments and that kind of stuff and talking to them about stuff we learn and… and we do and a lot of the time even though it is evidence based, it's proven this works, there's a lot of stuff out there that we're not necessarily taught, or we've not been shown to be evidence based or authentic, that is a lot more helpful as a matter of fact…"* (Participant 2)

> *"We have spent five years studying our profession, uhm, but ya, it does sort of… of feel like when you get into clinic, we are a little bit lacking on the sort of protocols or the hard evidence of what we doing. I mean, you know, we get told "Oh you know, you do…" We get taught everything in boxes, you know, so you get taught the prac and the adjustments and the dry needling and then yeah, I guess the actual… the actual instances when implement those treatments, maybe, aren't so clear."* (Participant 10)

The following four participants stated that evidence shows otherwise from what was taught and, hence, choosing treatment modalities could become challenging.

> *"Uhm, I find that a lot of the information available isn't necessarily information on manual therapy. Uhm, or if it is, often the results of studies have been, uhm, kind of saying that, like results are inconclusive or that it's not, uh, like adjustments are not more effective than mobilization, for example. Now I find that, that makes it difficult for me to decide whether or not I'm using a certain… doing treatment just because I've been told to for many years versus actually using evidence. Uhm, but other than that, I don't find it too difficult. I just usually know more about evidence on… at the second appointment."* (Participant 1)

> *"I do, however, have one patient who has like chronic headaches and always has trap trigger points and we spent six or seven sessions needling her trigger points and it wasn't helping for her and we switched over to TENS and*

that gave her so much more relief. So, although needles says… needles say that they work really well for trigger points, it's only not been the case for one patient so far." (Participant 3)

"I think just that we… We've been taught a whole lot of things that we are allowed to do and are allowed to treat and without having been given the evidence originally, there are certain things that if I can't find the reference for, I won't treat using that - if I don't have research backing it up, because that's how I want to practice as a… when I qualify, officially. Uhm, so not having that evidence originally provided for us - I don't understand why we'd be taught something if there isn't enough evidence to prove its efficacy. Uhm, so yeah, they definitely do need to implement a way to have all of that… some sort of research backing it when they teach us." (Participant 5)

"I do feel like my understanding of chiropractic after reading a lot of articles, you know, there's some research that says adjustments don't need to be specific - they have the same outcome, whether you're specific or not and things like that have confused me a lot on, you know, we get preached like "You need to be specific with your adjustments. The adjustment is like the be all and end all" but when you look at research, you look at the evidence that's been done. You know, everything taken out of context is obviously going to, you know, you can't just… as I say, cherry pick what you want, but a lot of the research points to saying your adjustment doesn't need to be specific. The adjustment is not everything, you know. To the patient, a lot of the soft tissue work and the advice that you give them has use... sway as well. So that's also been interesting to me to have that experience of learning that there is conflict within the profession of how we are treating…" (Participant 7)

There were four participants who implied that a re-evaluation of the structure of subjects in the undergraduate programme. They commented as follows:

"There's room for improvement, I feel in some of the courses… some of the courses – not courses - subjects! Uhm, I feel like a lot of the time, time was wasted in certain subjects, uhm, which hindered us in other subjects. Like for example, you've got subjects like, uhm, radiology. You've got subjects like, uh, psychopathology, where you move at such a slow pace where you could

make it so much shorter, a little bit more intense, a little bit shorter, which frees you up to study other things. Like other techniques. I know we're diversified and that in itself, but it's… it's really interesting to learn about, yes, we learnt, uhm, purely theoretically, but practically it would have been interesting to learn about different techniques and different concepts and, uhm, regarding chiropractics, I feel like we put a lot of emphasis on, uh, rehabilitation which is cool, but I would have loved a lot more - I'm not a Biokineticist, I'm a chiropractor… Like I'm studying to be a chiro. Yes, it's nice to have that foundation and that ground, but the fact that we hardly spent any time in the clinic, the prac room practicing adjustments and this does go down to COVID." (Participant 2)

"When we had cases in fifth year, that Souza textbook…. Like for every condition, like that… that book was so good, where it had every possible musculoskeletal condition but for something like a facet syndrome or a SI joint dysfunction, it… manipulation wasn't like the… the order of treatment. You know what, that's like what? That's all we've been taught. That's like our bread and butter and a list under the treatment strategy, manipulation wasn't there." (Participant 4)

"Uhm, I think learning how to treat the spine was not touched on as much as extremities and we did a lot more rehab and things like that, when it came to treating the extremities." (Participant 3)

"… uhm, personally, I think that in terms of diagnostic, uh, I think we were a little bit, uhm, I wouldn't say disadvantaged but I felt that we could have been taught a little bit more…" (Participant 9)

4.3.2.3 Measures of Improvement

Most participants expressed a general consensus that the chiropractic training provided a solid foundation, whereas others expressed reservations. In addition, the participants also suggested measures of improvement that could have been taken to make the implementation of EBP easier. The improvements suggested by the participants pertaining to their pre-clinical training were to implement a journal club much earlier, introduce evidence-based articles for treatments per condition, and to implement a workshop on EBCC references prior to their clinical practicum. One

participant suggested the need for more practical learning in the undergraduate programme.

The participants who believed that the chiropractic training provided a solid foundation stated:

> *"Look, I'm not in private practice yet so I can't really, like you know, be a 100% in my answer but I feel like they do. They do give us like enough of knowledge and clinical experience in the clinic, to hopefully excel, in private practice."* (Participant 4)

> *"I think that they've done really well to…to… to equip us with I think, a lot more knowledge than we will actually need in private practice one day but, uhm, yeah, I… I do feel very confident in the knowledge that we've been equipped with and I think in hindsight, even our diagnostics and stuff is really at a good, good level and, uhm, yeah, I do feel very confident with the knowledge we've been supplied with."* (Participant 6)

> *"I do believe that by the time we actually get out there we are… We are fairly prepared for clinical practice. Uhm, you kind of… I mean I don't know if everybody is, but certainly if you have an ability to… uhm, to sort of maintain and to hold all the knowledge that we have received and to be able to actually put it together, combine it with practical skills that we've received… but it actually is a really good course and that we are very good at… especially at DUT, at what we do and they really do… I mean, the clinic setting isn't very well streamlined and we have problems with backlogs with patients at sports events but if we actually are going to clinic and seeing patients and we actually are going to sports events, treating patients and you do actually see that three hundred and fifty patients, that by the end of that you should be proficient enough to be in private practice. Uhm, yeah."* (Participant 10)

> *"… in terms of what the training we provide and the other kind of individuals who have practiced chiropractic inside of Durban, I think that it's, uhm, suitable but obviously I don't know as to what other kind of training is done elsewhere in terms of, uh, UJ, that kind of stuff. In terms of whether they give any different kind of training, but from what I've seen, it's more than capable."* (Participant 12)

These participants believed that the DUT chiropractic training provides the basic skills required for students to go into practice.

> *"I think, because this goes back to the fact that a tertiary institution is there to teach you what you need to know, like they… they're not there to teach you the bare minimum, but they're there to give you a foundation for going forward and I do think they've done that. There is obviously a lot more that they could have taught us but taking into consideration that we're pretty jam packed. We're pretty jam packed in five years of studies. Uhm, so if you wanted to increase any more studies, I think you would have to increase the length of the course. So, I do think they gave us a solid foundation."* (Participant 2)

> *"I think the course will probably give as much as it can. I think you will go into practice and your first few years of practice are going to be the… the years where you really learn because you've got no one else to help you and assist you and guide you. I think there's only so much do DUT can do to prepare us."* (Participant 7)

> *"… it's a good… as good as any platform you can get to step out into private practice. So, uhm, yeah… Yeah, I think you just, uhm, as a student going through it, you just got to, you know, as much as you just want to get everything done, you also just, at the same time got to, I don't know, just grasp the fact that, uhm, everything that you're doing is trying to prepare you to step into the… pri… like private practice and just treat public patients you know, on your own. So, yeah, you just treat everything like a learning experience and yeah, I think it's good enough."* (Participant 8)

> *"Yeah, so I think that the basic skills it does, but if you want to be a little bit better, if you want to learn more, I think that outside observations and uhm, things like that can enhance your skills a lot more than just being taught how to needle and adjust by the same person, you know, for two years."* (Participant 11)

> *"… I don't think any theoretical and even the amount… Even though we have to do a lot of practical, I think you are proficient to treat people, absolutely but I think it also takes a lot of your own part and a lot of learning from other chiros and stuff. Uhm, so I guess… in like… if you encapsulate the question,*

yes, because I mean, you could utilize the hours and stuff that we need to learn from other chiros. So yes, in that sense, uhm, but I think the majority of what we learn and the way we become really good at what we're doing is when we go into practice, and we actually start treating on another level and adopt our own treatment techniques and stuff outside of the clinic but definitely from DUT, we develop like proficiency and an ability to treat patients therapeutically. It just enhances greatly once you leave." (Participant 13)

The two participants who expressed reservations regarding their chiropractic training stated in the following excerpts:

"… So, in terms of the chiropractic course alone, not necessarily (pertaining to the sufficiency of the chiropractic training) *but I do feel like with the additional portfolio, I would be okay."* (Participant 1)

"Uhm, so I think our training has been very in depth, uhm, and being in clinic is definitely helpful to to, uhm, prepare us for private practice. However, I think because it is an educational clinic and we've got so much paperwork, uhm, and other things to worry about where in private practice, that's not-obviously you have to make notes and there is paperwork involved uhm but I know that it's not to the extent that we have to." (Participant 5)

The six participants who suggested implementing a journal club a lot earlier reported:

"I think, uhm, that the cases module that we had, we kind of had to learn how to critique journal articles. I think that's a skill that we should have potentially learnt a lot sooner." (Participant 1)

"I think something that I would have enjoyed was how we had our… our journal club this year. I think if you implemented that a lot earlier, I would, I would say in third year, that would be extremely helpful because first and second year is a lot of… We get given a lot of notes and obviously this depends on the… the curriculum you're doing and the the… the education centre you're at. Maybe people teach different ways, but I feel for me personally, third year was the year where articles started getting thrown at us and doing your own research started becoming a regular thing whereas first and second year it was… I don't want to say spoon fed but we got a lot of our

notes, uhm, and that kind of stuff. Obviously, if you're an overachiever, you go do your own reading. I don't want to say overachiever, but if you really enjoy what you you're learning, uhm, and that falls on you but I feel like in third year If we had a lot more journal clubs, and a lot more discussions on how to critique an article, how to, uhm, reference appropriately and what to look for in, uhm, in articles and references to show the authenticity and the legitimacy and, uh, that kind of stuff just to help us understand from third year because then we've got fourth year, fifth and sixth year to solidify that uhm, those lessons and that concept in our brains, whereas right now, we didn't have any of that until fifth year." (Participant 2)

"I think if we had cases like the journal that we did have this year at an earlier stage, just to help us all see the different kinds of evidence-based research that is out there and also everyone put such different articles - something that we wouldn't necessarily look for ourselves was also great to see what the research everyone else is looking at." (Participant 3)

"Ooh so, so I honestly think that it would have been nice like, in fourth year or something like that… Like even though we did research as a subject, we were never really taught, how to interact and how to do it. Like something like cases, uh, which we do, which we did obviously this year, would have been really cool in like a fourth year kind of capacity to do like the articles critique and do the different journal reviews, because that, personally helped me a lot to critically analyse articles and to be a bit more open minded of… of, uhm, different kind of literature that we get, uhm, to be able to scrutinize it and be like "No, this is rubbish" or "This is actually really fruitful and will be… will be good… uhm, is credible." Uhm, if that makes sense and I think something like that in a smaller capacity before we go to clinic would really have been useful." (Participant 6)

"I think that would have been so much more beneficial to me had I started something like journal club way earlier, where it wasn't necessarily a subject but maybe an hour or two a week where we sat down as a class and we discussed an article just for… for the fun of it to get us into understanding how articles work, how to extract relevant information from them, what is considered a good article versus not because I think that's part of evidence-

based as well because people can cherry pick what they want to out of information that's given and I don't think that's a good guide either. You know, someone can pull a random fact out of context and use that, as you know, so called "evidence." Uhm, and I do wish that that had been introduced earlier, for my understanding…" (Participant 7)

"I think that they could implement, uhm… So for like, when we do articles and stuff in different modules, I think what they could do, instead of doing it as a generalised like syllabus programme, I think what they could do is they could kind of give students the opportunity to… or like even give them a list of possible, uh, topics to look for articles and look for evidence-based, uhm, articles, and then start actually, uh, looking into those so that they're doing it in a manner that's enjoyable and not something that they feel like has to be done according to the syllabus because I mean, also then you're kind of getting, uh, you're getting people that are kind of wanting to expand the knowledge in the areas that they like…. O.. O… Obviously, there's a basic general, uhm, syllabus that has to be covered, but over and above that, to actually show to students that it can be enjoyable and it's not just a case of reading for the sake of reading for the syllabus, like give students kind of… a bit of flexibility in terms of, uhm, looking into articles and going about it that way." (Participant 13)

There were five participants who suggested teaching evidence-based treatment per condition would be beneficial. They mentioned the following:

"… I also think I think that like giving us more resources, from specific, uh, published guidelines or that kind of stuff while teaching us conditions and treatments for conditions in our senior years may have been helpful versus just the notes given by lecturers, to having treatments and conditions and the treatments being taught from the most recent published research, especially with auxiliary therapeutics." (Participant 1)

"… and besides adjustments and soft tissue, we don't really get told "Okay well this is what you do when someone presents like this or…" (Participant 3)

"I think if we were… I know it can't always be done, but if we were taught, per condition, like how in diagnostics three, we were taught, like the clinical

features, what do you do from, uhh, diagnostic point of view, like how do you refer and all of that but, per condition, if we were taught how to treat that, that would have been… In hindsight, I'd feel better." (Participant 4)

"Uhm, I think actually using articles to back up and giving us examples when it came to teaching us, uhm, for example, an adjustment, uhm, "Here's the resources that back why we should be using that for this treatment uhm and for this condition." I think it would have just been a little bit easier…" (Participant 5)

"I guess more like protocol-based treatment, so like, uhm, you know, when a patient presents with XYZ, these are the protocols that then you follow in terms of treatment or this is the evidence-based practice protocol that is best implemented, uhm, for the presenting complaint…" (Participant 10)

A further three participants suggested implementing a workshop on EBCC references before their clinical practicum by stating:

"Hmmm… I would say. Okay, so we were just told that we had to do it. Uhm, to be very honest with you, when we first started of clinic, no one told us uh that it had to be done until we got like, uhm, reminders and… and told from maybe a sixth year or from clinician. Uhm, so I would, I would think that going forward in other years to come and other students, I think it'd be nice to have a little discussion with them. Uhm, also, when I started doing it, I was unsure that we had to do, uhm, for example, if you're doing an adjustment and a… a modality, you could choose either one. Uhm, but apparently you can… You can do both. So, things like that were unclear and I think that if we were told from an earlier onset, I think would be nice. Maybe like little uh… Oh, including the workshop we had when we first started clinic, you know, uhm, a lot of things weren't told to us." (Participant 9)

"Uh, I think, they shouldn't have had a course but they should've explained to us better, in the sense that uhm… Well not explained it to us better because we… we… It's not very hard to do, but maybe we should have been more briefed on it." (Participant 14)

One participant expressed the necessity for more practical learning in the undergraduate programme by mentioning:

> *"I think undergrads that have more ex… more confidence, probably would be better, uhm, and if they try harder and you know and are more confident in adjusting in the younger years then they really don't feel like that and I've also had a lot of reports saying that, uh, it wasn't like this so much in the past. That by the time most students became into clinic, they were much more proficient than we are and that over the years, our proficiency at implementing chiropractic treatment has deteriorated dr… drastically."* (Participant 10)

4.3.3 Theme Three: The Importance of Clinical Experience and the Implementation of EBP

The participants expressed the necessity of clinical experience during their chiropractic training and its role in the implementation of EBP. The participants also had positive and negative views regarding the support structures available during the course of the clinical practicum. In addition, self-perceived limitations were reported.

4.3.3.1 Clinical Training

The participants spoke about their experiences with regard to their clinical practicum as well as its impact on EBP and their clinical training. The participants reported the necessity of the clinical experience at the DUT CDC, the necessity of the internship portfolio and the importance of clinician interaction.

There were seven participants who reiterated the importance of the clinical practicum for their chiropractic training and its role in the implementation of EBP. This is mentioned in the following excerpts.

These participants found that the clinical experience had a positive impact on their confidence in treating patients:

> ***"****I'm definitely a lot more confident now than I was the first day I walked into clinic so I do think that we are all getting more competent."* (Participant 3)

> *"Uhm, I personally like, within myself, I've gone through… I don't know what it's called but there's this little graph of expertise, when you have a lot of knowledge, when you don't have much knowledge on something, you have*

a lot of confidence and then the minute you get knowledge, it drops and then it slowly increases again and I think that was definitely a true representation of my experience with clinic this year. I started with a lot of knowledge and bombarded with information and my confidence dropped very quickly when I, you know, had to actually start applying myself and I've slowly been increasing, you know, my confidence. I've got a lot of… treated like a lot of certain areas like lower backs, necks and shoulders would be pretty much the… my standard things to treat. And I mean, it's not necessarily good to have like at the stage to get into a habit of doing things but I've noticed certain patients respond in very specific treatments so like my shoulder patients really respond well to shockwave and so I now have… Like I'm… gravitate towards using shockwave with the shoulder to help treat them so I do feel like you know, my experience over this year has made me feel more confident in what I'm doing, you know, we've seen the same conditions, you feel more confident with applying your knowledge from the, you know your treatments before with similar cases." (Participant 7)

"I think mostly it's just experience, uhm, it's clinical experience. It's just actually seeing patients, uhm, using your knowledge to try and diagnose and coming up with the best treatment plan and management plan. Uhm, so I think it's the experience of that, uhm, and then for sure, I think, uhm, just on what your research is about, on evidence-based, I think just taking time to actually read through articles, it helps out so much. Uhm, you really… You learn a lot that you don't find out, uhm, through the… through the course and you just get exposed to so much more, uhm, knowledge and ya, different methods and that. I think it helps out so much. So, uhm, yeah, I think the main thing is just clinical experience. But yeah, definitely, uhm, feel more confident I would say." (Participant 8)

"Uh, interacting with patients on a daily basis or when we are in clinic, it really helps us with confidence. Uh, it gives us a sense of what we're going to do out there, as well as the clinicians helping us to… prep us to… also look at other areas that we might, uhm, see out there so I… uh… I feel that being at clinic really preps you and helps you, uh, enhances your ability to walk out in the real world." (Participant 14)

These two participants believed that the clinical experience will enhance proficiency in treatment of patients.

> *"Uhm, I do think that with more experience in the clinic, we will be eventually prepared in private practice. Uhm, I think, uhm, doing these two years at DUT in the clinic, uh, will definitely prepare us for certain things. But then again, a lot of clinicians do say that you… you only tend to fully understand everything once you're out there in private practice, but I think for now we are getting, uhm, sufficient, uhm, practice."* (Participant 9)

> *"Uhm, anyway, needless to say, after two years in clinic and we'll be proficient enough."* (Participant 10)

This participant felt that the exposure to different conditions during the clinical practicum encouraged further research and the desire to explore the available literature.

> *"… I think as I've gotten more and more into practice and, uhm, spend more time in clinic, I think that's when I've… Like got a stronger grounding in that as I actually started to read articles and then reference articles that I've been… found interesting and I think that's what I've learnt the most."* (Participant 13)

A total of three participants reported the necessity of the internship portfolio for various reasons.

> *"I think I would have said no (regarding whether the participant felt that the chiropractic training is sufficient) if it - education had ended with clinic and the portfolio wasn't required because a lot of my understanding comes from the requirements of getting hours from webinars and a lot of my information. Uhm, well understanding of things that makes me more comfortable in treating patients comes from extra information that I've learnt there."* (Participant 1)

> *"Uhm, yeah, I just think that in the situation that we are in especially in clinic, uhm, I don't think a lot of people do use their articles and use a lot of stuff online to treat. I think people are more willing to learn from face to face. So, from having your lecturers teach you stuff from going and working at sports events from, you know, watching other chiros do work. I think it's more of a*

way that students will remember ways to treat uhm than from going home and reading all these articles that are online." (Participant 11)

"… because I've had exposure to a couple of chiros and I've also done a lot of my own evidence-based reading, uhm which is uh, like broaden my knowledge and also concentrated knowledge where I already had knowledge in certain areas…" (Participant 13)

There were five participants who emphasised the importance of clinician presence at the DUT CDC and their interaction stated:

"… and that sometimes it's nice to have some like – the clinicians. It's nice to have someone to talk to about ideas and listen to different opinions on treatment protocol." (Participant 3)

"*I've had some patients who have really responded to, you know, the guidelines that have been set out, and I've had other patients who… who haven't. So, like, you … you can use my example there… of that patient I had with the condition "Anterior Cutaneous Nerve Entrapment Syndrome" and there was no evidence for chiropractic there, and I really just had to go and use my own, uhm, expertise, my own like intuition on how I should be guiding my treatment along with, you know, clinician input."* (Participant 7)

"*So, at first it was, uhm, more like just getting it done but having different, uh, talks with different clinicians and when they speak to you about different things, it makes you… it makes you, uh, want to do more reading and more research… more research into applying these different, uhm, uh, interventions and stuff. So yeah."* (Participant 9)

"*Uh, when you're alone in the room with a patient it's much more overwhelming I'll say at first, but as you speak to clinicians, as you get different types of patients, uhm, you tend to pick up on things to look for, look forward to and then I think it becomes a bit easier as you go on."* (Participant 9)

"*… I mean, I know that in the past, there was much stronger clinician presence in the… in the… in the clinic. There were clinicians… It was essential that the clinicians came in with you. They had a bunch of clinicians and they… and you used to watch their interactions and used to watch them*

treating a lot more than we do now. Now the students are sort of… kind of feel almost shamed for wanting the clinicians to come in and… which I don't think is great for the patients." (Participant 10)

4.3.3.2 Support Structures

The participants were asked whether they feel that the DUT CDC had the necessary facilities and were equipped sufficiently for patient care. Positively, all participants believed that the DUT CDC had sufficient facilities and equipment. Despite this belief, participants mentioned various aspects as to how the supporting structures in place at the DUT CDC indirectly affected their desired treatment. Challenges regarding the rehabilitation room, waiting time, a lack of aesthetic and structural professionalism and excessive administrative duties were reported.

The eight participants who mentioned that the DUT CDC had sufficient facilities stated:

"Uhm, yes, I think they do have sufficient, uhm, area and equipment for it. Uhm, I think the only concern comes in like when it comes to using certain modalities. Obviously, there's only one of them and when you're having to sit and wait for other, uhm, students to treat using that modality. Uhm, obviously that can be a little bit frustrating time wise for, uhm, you as a, uhm, student treating as well as the patient who has to sit and wait, uhm, extra time and… and waste their time waiting for it. However, because it is a Teaching and Educational clinic, I understand why they, uhm, can't have more than one. So, obviously all the modalities are very expensive. Uhm, so within their capabilities as a teaching clinic, I think that there is sufficient resources." (Participant 5)

"Uh yes, I definitely do. Uhm, I think the clinic runs like a tight knit ship, uhm, and all the precautions all the kind of different modalities and… and… and treatment protocols and even the paperwork itself. Uhm, even as tedious as it is to us, I think it's very vital to… to it running very professional and really well. Uhm, so yeah, I do believe that the clinic itself provides all the necessary tools to equip us to treat our patients effectively." (Participant 6)

"I do feel clinic has somewhat sufficient facilities. I also feel that the facilities are not used how they should." (Participant 7)

The following participants stated that the clinic has several different modalities at their disposal, more so than private practices.

> *"I do. Uhm, plenty of rooms available, uhm, solid chiro beds - that's like step one, obviously. Uhm, you know, they supply… You can… You can buy dry needles from them so I think that's good, too. They've got enough sanitising stuff around, the towels, all of that stuff, the sharps bins, uhm, the waste disposal bins, and I mean, they… they got plenty of stuff there plus the modalities as well, they've got plenty."* (Participant 8)

> *"Yeah, definitely. I think clinic has a lot of, uhh, a lot of modalities, a lot of different interventions that can be used in treating patients. Uh, I can… I can say this because when we treat a lot of our patients, we have a lot of modalities and then we always get told like, uhm, not to always rely on it because when you starting a practice, you may not have it. So, that shows that they've given us the opportunity, they've… they made… they bought the stuff for us so that we can use and practice on. Uhm, so yeah, I do think it is more than enough sufficient for us."* (Participant 9)

> *"I'd say yes, and the reason being is I haven't had many patients, uhm, who are obviously stating that something is missing in terms of, uhm, treatment scope, especially ones who are massively educated so…"* (Participant 12)

> *"… The clinic is equipped, we have enough equipment to treat patients, we can treat patients adequately. In fact, a lot of my patients say that we do a lot more than what they have seen out there."* (Participant 14)

The following participant was of the opinion that the clinic had so much to offer, but reliance on equipment could become a problem given a case where various treatment modalities are unavailable once a student qualifies and goes into private practice.

> *"Yeah, absolutely. Uhm, definitely. They have more than enough, like equipment, especially in terms of modalities. I think 90% of practices don't even have the level of uhm the modalities that we have in clinic. I mean, it's such a, uhm, wide range of stuff that you have to choose from, uhm, which I think can actually almost also sometimes be a problem. Uhm, well just, purely because that's up to you independently as a… as a… an intern. I think you*

also need to kind of hone in on what sort of modalities you'd like to use. You can't be using a different modality for every patient. When you go into practice and then you only have one modality - I think we kind of needed to become proficient and more expert in one or two of the modalities so yeah, definitely have sufficient, uhm, equipment." (Participant 13)

Only one participant who faced challenges regarding the rehabilitation room reported:

> ***"****Uhm, I find that using the rehab room is very difficult, because a lot of the times I would love to send the patient home with some of the equipment because they don't have avail – like have it available to use there. I understand why it's not necessarily viable. But for example, if I was trying to do proprioceptive training on a wobble board, then I don't find that using the time in a treatment session makes sense - to use the rehab room for that but in terms of other modalities and beds I find the clinic sufficient."* (Participant 1)

The three participants who reported a lack of aesthetic and structural professionalism reported:

> *"So yes, they've got sufficient… We can definitely take care of our patients. I wouldn't say- uhm-yes, I would say yes, we do. We do, because as chiropractors being conservative manual therapists, we don't need a lot to take care of our patients and you will hear this a lot of times from any good chiropractor "Your best tool is your hands." So, all you really need is a room for privacy, a bed to treat them, oh and your hands which we're all given. Now, if you want to get fancy and go into all the modalities and… and all the rehab stuff, there's definitely, uhm, like the rehab room - there is definitely room for improvement, uhm, neatening it up a bit. I remember once I took a professional athlete into that, and it was I wouldn't say it was embarrassing, but it was just a big mess and it made it a little bit more, uhm, unappealing and obviously, professionalism plays a big role in… appearance plays a big role in, uhm, your care. Oftentimes, people say, you get judged based off of your appearance before you even say anything to someone and so there are these preconceived ideas, like walking into the clinic and beds all over the*

corridors and a broken toilet and a rehab room that's quite frankly, a mess. Uhm, that kind of stuff does influence the patients… I think psychologically which will have an effect on… on their treatment because we… we know as we treat by psychosocial, your psychological has a lot to do with the biosocial aspects. So, there is definitely room for improvement. I would say just regarding like the corridors cleaning up the corridors, having a fully functional toilet, please. I mean, it's not that hard, uhm, rehab room- cleaning it up, but besides just that making the clinic more professional, I don't think we necessarily need anything more." (Participant 2)

"I think we do, to a point. Uhm, you know, for example, our hallways are very long, so, if you're in room 23 and you've got a geriatric patient who is on a walker, you know, it's kind of hard to make him walk all the way down. Uhm, our toilets as well, our toilets don't work. I don't think that that's, you know, looking after our patients very well. Uhm, and then on the flip side, I… I think that we do. Uhm, ya, through what we've learnt, I think that we are provided with enough skills to be able to help our patients." (Participant 11)

"Yes, I think the clinic has sufficient facilities. We have like individual treating rooms and I feel like my room is big enough. I know they not all so big. Maybe sometimes the wall are a bit thin. You can hear people's conversations in the rooms next to you and that might not be so good for a person." (Participant 3)

The two participants who reported excessive administrative duties stated the following:

"*I think it* (regarding paperwork) *focuses our shift a little bit more on unnecessary things whereas our focus should be all on a patient and treating them and trying to get them better. We're stuck having to make sure we get signatures and, uhm, deal with so much elaborate paperwork where some things are actually not necessary and just take up further time. So, I think going into private practice is going to be a little bit of a shock, uhm, I would actually say that possibly sports events prepares you a little bit better, uhm, because you've got a more succinct sort of paperwork, uhm, and your treatments a little bit quicker, uhm, ya."* (Participant 5)

"Sometimes, the length and the duration, uhm, the length and duration of the interview and the consult time during the clinic can actually detract from the efficiency of the treatment itself but you kind of get disconnected from your patient and, uhm, there's such a long build up and the poor patient has to be sitting there for so long, by the time you actually get to the treatment part they… kind of gets lost, you know. Like the patient loses their confidence and I mean, the student loses the confidence and the treatment isn't as good because the… by end… isn't as good from the patient." (Participant 10)

4.3.3.3 Self-Perceived Limitations

The participants reported various self-perceived limitations which serve as a hinderance in the implementation of EBP. They reported limitations such as a lack of internet, a lack of reading literature, difficulty referencing and a lack of proficiency.

The one participant who reported a lack of internet commented as follows:

"I think in this country, access to the internet. If you, obviously if you don't have access to the internet, it's very difficult to find those things." (Participant 11)

A further two participants reported a lack of reading literature:

"Uhm, if there was anything, maybe it's that I haven't read enough research… on my own… if that makes sense." (Participant 3)

"Uh, so like I said, I use just a few articles that I'm very used to, uhm, to reference my treatment or my diagnosis. Uhm, so err… I think, very limited, my experience. I should be more out there and reading more or referencing more." (Participant 14)

The same participant reported a difficulty referencing as well a lack of proficiency.

"I think the only challenge for me, was… referencing like properly. Other than that, there was no challenge like… reading the articles or… uhm, understanding. It was just for me, referencing because I do manual referencing so…" (Participant 14)

"Uh, so like I said, I use just a few articles that I'm very used to, uhm, to reference my treatment or my diagnosis. Uhm, so err… I think, very limited,

my experience. I should be more out there and reading more or referencing more." (Participant 14)

4.3.4 Theme Four: The Implementation of EBP

The participants identified theoretical and practical aspects that hindered their implementation of EBP at the DUT CDC. They also identified challenges encountered which affected their efficacy in the implementation of EBP.

4.3.4.1 Theoretical Implementation

Most participants felt more confident in their capabilities due to the presence of evidence pertaining to their treatment. In addition, most of participants' outcomes of treatment were concurrent with current literature, whereas others reported variable responses. A few participants also reported that a general search for the purpose of EBCC references were done at the DUT CDC. It was found that students identified a lack of literature as a hinderance when attempting to apply evidence-based references to their treatment outcome.

The participants were asked whether they felt more confident in their capabilities as an aspiring chiropractor (in relation to EBP).

These participants felt confident in the treatment plans due to the presence of evidence.

> *"Yes, absolutely. It does, because it gives you grounds to justify why you're doing what you're doing. Uhm, which is always important that it's a lot easier to debate someone when you've got solid grounds to, uhm, work off of as opposed to just subjective experiences. So, EBCC's gives that objectivity that allows you to stand firm in what you are applying and what you believe."* (Participant 2)

> *"Yes, because I think it gives you something to refer back to or to say, "Well, this is what the research says."* (Participant 3)

> *"Yeah, I would say yes, 100%. I don't really believe in any of the, uhm, old sort of chiro where you don't use evidence, uhm, so if I've got evidence to back up what I'm doing it, it definitely makes me feel more confident with my treatment and feel that I'm doing something that, uhm, has been researched*

and has proven efficacy, uhm, which I think is important when treating patients." (Participant 5)

"Uhm, yeah. Uhm, I believe like you have to believe in yourself if you wanting to, to… to be good. Wanting to obviously give your patients that assurance that you know what you're doing. So that kind of "confidence is key" is a big thing and to be able to back it up with the medical knowledge that we get over the five years of studies, uhm, I feel pretty confident in my approach and also basing it off literature and not just kind of thumb… some… thucking… thumb sucking, uhm, it out and just kind of go with my knowledge. I actually look critically to… to… to treat my patients in a more holistic approach. So, I'm pretty confident in terms of chiropractic and treatment going forward." (Participant 6)

"I think so, yes. Uhm, you know, the fact that we… You know, chiros have only been around for like 100 years. To have actual evidence out there on the internet that says what we do is right, and it does actually work, I think it gives you the confidence. That's, uhm, I think other people can take away from you. You know, people don… You know there are people out there that don't really like chiros and think that we don't work so it's nice to be able to have that reference to say "Well, you know, if you don't know about it, here's an article that you could read that, you know, kind of proves that what we do is correct." (Participant 11)

"Yeah, I would say so, yes. That's just because, uhm, the treatments we're obviously providing are more… there's more… literature being attained in terms of what kind of treatment you're providing for the patient. So, there's more backing to whatever you're doing." (Participant 12)

These two participants felt more confident in their own skills after reading literature encouraged by special areas of interest.

"… I've also done a lot of my own evidence-based reading, uhm, which is, uh, like broaden my knowledge and also concentrated knowledge where I already had knowledge in certain areas. So, yes, absolutely." (Participant 13)

"I am more confident now, especially after doing like... So, if I'm unsure of something I'd probably read it up more and, uhm, investigate. Re… With the

evidence-based, it's very easy to find things that you can… help you, uh, in your treatment so I am more confident now, uhm, while treating and using evidence-based." (Participant 14)

In addition, the participants were asked whether their treatment responses were concurrent with applied evidence-based practice reference at the DUT CDC. There were six participants who reported that most of their treatment responses were concurrent with applied EBP references.

"Uhm. Yeah, for the most part, I found that, uhm, a lot of the patient's reactions are based on evidence. So, a lot of uh patients that come in with acute spinal pain where the literature kind of says that that would resolve, uhm, with or without treatment relatively quickly, in most cases. Uh, they do kind of respond in a predictable way where they will usually get like acute cases, for example, get better very quickly. Where the literature can… makes it very obvious that chronic pain patients are often more difficult to control with – oh not control with but like to deal with and decide which modalities to use, uhm, and it definitely makes a difference." (Participant 1)

"Yes, it has. Uhm, anytime that I've chosen a certain modality or adjustment or, uhm, soft tissue work, uhm, and I've had references to back that up, uhm, I definitely have found that my patients have responded positively to those treatments…" (Participant 5)

"Well, yes and no. So, for example, the articles I've read about, uhm, ultrasound… the ultrasound that we use, there's not a lot of evidence out there that proves that ultrasound does work. Uhm, whenever I've used ultrasound, uh, on specific patients, I have actually got a positive response from them, uhm, in terms of their… For example, if it's swelling or, uhm, an old fracture area, uhm, I have had patients that have responded very well to that." (Participant 11)

"I'd say yes, because every single, uhm, treatment guideline you're providing, uhm, has to be firmly backed up by a, uh recent, uhm, literature reference which is less than five years old itself." (Participant 12)

"Shoh, uhm, yes. I would say it has because, uh, and the reason why is because you are essentially gaining knowledge, like more so than you have,

even with the… the studies that we do, because then you kind of honing in on specific conditions and stuff that you're treating. So definitely then, when you start looking into it in that way, from a practical setting, and looking into articles for the sake of increasing your knowledge, I think that's when it definitely has a… uhm, it's beneficial to the… Like outcomes and therapeutic outcomes of patient treatments." (Participant 13)

"Uh yes it has. Uh, so, uh, patients that I've seen, uh, they don't mimic the exact same signs and symptoms or, uhm, the exact same things that you read on your articles, but it's the similarities and it does help you and it does give you, uh, a better view on how to treat…" (Participant 14)

A further three participants reported variable outcomes regarding whether their treatment response has been concurrent with applied evidence-based practice references. The following excerpts support this:

"So, not all the time. You ever know. I wouldn't say it's always been… like up to, up to… because like, it depends, like I say, it depends from patient to patient. Some patients like likes needles, some not so much and some patients are just complicated, it's just… it's not like a textbook case or like a clinical trial. You know, it's, it's complicated." (Participant 4)

"Uhm, yes, like it… it… it has fluctuated. So, like some of my patients would get relief almost like textbook as to what evidence-based was and then some would react in different ways, uhm, where they'd get better and then they would just plateau, where in the literature it said that they should have a general decline after this amount of treatments and this and this if I did it in the way that was recommended. Uhm, so yeah, that's… that's the only kind of thing I have there is that it's… As much as they gave the evidence, like patients are sometimes very different, uhm, and respond differently. So, I would actually… if they weren't responding, as previously indicated, I would try and look for more literature to uhm try and change the approach of treatment." (Participant 6)

"Uhm, it has been… it's been a mix. I've had some patients who have really responded to, you know, the guidelines that have been set out, and I've had other patients who… who haven't…" (Participant 7)

Some participants mentioned a quick and general search regarding their treatments for the purpose of evidence-based practice references at the DUT CDC. They reported:

> *"I found that there seems to be a lot of cherry picking of the evidence. So, kind of picking evidence that supports your bias is a lot easier than actually implementing, uhm, the full realm of evidence available. Uhm, I do think that I've had a good time - you know, when a patient presents, doing extra research because I feel like I don't necessarily know enough to do more research and read more of the evidence and then be able to implement that after like after the first session. Uhm, but in terms of just using it for the EBCC's, I found the EBCC's often cherry-picked evidence just to get signatures."* (Participant 1)

> *"I'm not going to, to be honest, I'm not going to read through a whole full five-page article between patients to justify. I'll usually, in my own time when I'm at home when I'm finished work, and there's something on my mind regarding needling or adjustments. That's when I'll go and read through articles, but usually in clinic, in between patients, justifying my EBCC's, I'll mainly just look at the date, the journal comes from, and I'll look to see based off of the abstract and the… the one page introduction, if it, uhm, justifies or approves, or says what you're doing is appropriate. I'll look at the… the, uhm, what's the word? The, uhm, the - Not the methodology, but how many times they've done this, done this-not experiment, but done, done this trial, how many patients they used on the trial and how many times they've done it and the repeatability of it. That usually gives me a good idea if this is, uhm, a suitable reliable, realistic, well-done article. That's how I do it. I know it sounds like a lot but it takes you about 10 minutes, max."* (Participant 2)

> *"… Uhm, there are a couple things that I do struggle to find information for quite quickly when it comes to looking, uhm, at trying to get an EBCC done, but then I do normally go home and do more research on it and then make a list of – well that reference for next time so that I know that there is evidence backing up my treatment."* (Participant 5)

"So, at the beginning of the year, I looked online for a whole bunch of references for different areas. So, like I looked at ones for IFC, I looked at things for TENS and adjustments and blah blah blah. I do, myself, have a list of references that I use because, you know, in between patients… If it's a common patient where it's facet with some myofascial stuff, you know, if I have a… a solid reference for that, then I just keep using that. Uhm, you know, in no ideal world would I be able to research every patient but I just don't have that time clinic to go through everything and I can't take my paperwork home to go and look at references..." (Participant 7)

"Uhm, yeah, it can be time consuming and slightly futile, really, because, uhm, again, this is just a student-based sort of implementation is that we don't necessarily use it in the way that we should, you know. It could be a great investiga… investigative process of researching what is the best, uhm, practice for treating a certain type of pathology but mostly, you know, if you've got one reference for a lower back, chronic low back pain and adjustments, we just repeating that same reference again and again and again. So, my experience of it is that it is barely futile and not really fulfilling the purpose that there… have been intended it to fill. Uhm, and now would be I assume, to expand our knowledge on best practice or particular types of pathologies." (Participant 10)

"So, I think it's only really grown… I think the way in which it's implemented at DUT, it's kind of just set out so that we have a list of them and we, kind of referencing for the sake of our EBCCs." (Participant 13)

A total of seven participants reported a lack of literature in relation to various aspects. This is shown in the following excerpts.

"Uhm… Uh. I don't know, sometimes, or depending on what you read, on what article you read… Sometimes, they'll be using equipment that you don't have or ahh yeah, I don't know. It's difficult to answer. I think most of the time, you'll be able to find. uh, an article that's as close to home as you can get but, uhm, this is difficult…. Uhm." (Participant 8)

"Uhm, sometimes when you get different or more complicated patients, it's more difficult for us to, uh, find evidence on. Uh, other than that, I don't think

there's anything else. For example, certain patients may have different, uhm, issues that… that we weren't taught or exposed to and then when it comes to coding and then providing the evidence-based, uh, it's a bit more challenging and then we have to either ask permission for advice or… or not to do that at all." (Participant 9)

"Well, articles are long and tedious and there's a lot of information out there so to kind of sift through and trying to get the correct ones and the ones that are reliable as well. I think that that could be quite difficult." (Participant 11)

Participant 5 raised a concern regarding a lack of literature with regard to treatment modalities that have been taught.

"Uhm, I think they've all been relatively positive. Uhm, I have managed to find majority of the evidence I'm needing to support my treatment. However, once in a while, there are certain things that you put down and I've struggled to because I like to reference everything I treat, or at least make a note that I've found a reference for everything I treat - I'm treating. There are one or two things that seem to just - you can't find literature on and that's a little bit concerning that we taught something and we can't actually find the literature to back it, uhm, so yeah, that's where they had obviously implemented, giving us resources when we were taught the modality or the adjustment. It might have just given peace of mind that you are still actually doing evidence-based practice." (Participant 5)

Participant 10 reported a lack of literature regarding a simple chiropractic adjustment and the effect on the level of pain but this obliged the student to participate in further research, to which the participant found a different treatment protocol which addressed the same pain.

"Uhm, in some ways, yes. Uhm, I think one example would be, again, sort of going back on what I said before, like, I don't know, maybe I'm not very good at finding articles or I stopped trying to look very hard but if you want to try and find an article for C spine adjustments for C spine pain, you'll probably find it… I found it very difficult and I don't think I ever found any but what you… what I did find is articles on translatoric thoracic spine adjustments for C spine range of motion and pain. So, in fact, actually treating a different

region to where the pain is produced. Uhm, and I found personally that that protocol is very effective." (Participant 10)

These two participants reported a lack of literature with regard to manual therapy such as chiropractic.

> *"Uhm, and what the guidelines say are not always based on conservative treatments because that seems to be… have less research available for a lot of things versus surgical management has a lot more detailed information out there."* (Participant 1)

> *"Not all the research out there is necessarily pointed towards chiro. So, you kind of, like… to see how you can put it into the way that you practice. So, there's a lot more research for physios or just rehab in general, like for OA there's quite a lot of bio rehab and not necessarily chiropractic treatment."* (Participant 3)

4.3.4.2 Practical Implementation

The participants reported aspects of difficulty pertaining to the practical implementation of EBP. Only three participants believed they were competent in implementing EBP but not as proficient as they should be. A lack of supporting literature was reported, occasionally with an associated confusion with whether to implement the desired treatment protocol according to what was taught versus what evidence portrays.

The three participants who reported their competency in implementation of EBP, but not as proficient as they should be, stated the following:

> *"Uhm, not as good as I need to be. Obviously, I'm a fifth-year students so I'm only going upwards but I am definitely competent in, uhm, in doing it. Obviously, there is, uhm, there is constant learning going into the future. I mean, for when or maybe in five-years time, we can realize that a certain adjustment isn't actually the best way to go about it but right now, in today's day with the evidence we have, and, uhm, the training we get specifically around, uhm, performing EBCCs in clinic, which is extremely helpful. I do believe that I am, uhm, competent, proficient as of right now, but I do believe that I will get, uh, a lot better in the future…"* (Participant 2)

"I think I'm still growing and still learning, so yes." (Participant 3)

"I wouldn't say I'm very proficient. Uh, we just started with it." (Participant 9)

The three participants who reported a lack of supporting literature stated:

"Uh, I would say that, okay, what's nice about it is that it's, uh, I would say like, we are always constantly told that it has to be at least within five years, uh, most of it that… that I do is adjustments because modalities are a little non-specific to what we do. For example, if we doing solely TENS on acute back pain, uhm, sometimes you might not find an article that has only TENS. It may have TENS and versus or is compare it… comparing it to other modalities. So, a little bit more difficult, but I tend to focus on adjustments because, uh, I think it's more important for us chiropractors, and then yeah, I just use mainly adjustments." (Participant 9)

"… Like I mean, I guess our biggest thing is just to impart and implement an adjustment or dry needling for certain types of pain or neck stiffness or, uhm, myofascial pain or whatever, but then ya, to find research on that, you know, evidence-based literature that supports that isn't always that easy." (Participant 10)

"… Uhm, but I think also just… there's just a huge lack of literature in our field, uhm, and supporting the kind of treatment protocols we do and so ya, it does make it really difficult." (Participant 10)

Furthermore, two participants reported a lack of supporting literature with an associated confusion with regard to whether to implement the desired treatment protocol according to what was taught as opposed to what evidence portrays.

"I find that my confidence whe- during treatment is definitely in- like better when I'm like in a session with a patient. Uhm, if I know more about the condition and the current evidence and applying it, but it also does mean it gets overwhelming when I feel like maybe I'm not completely up to date and because I've found that a lot of literature doesn't necessarily support, uhm, manual therapy as much as they used to. I found that I struggle a bit with that portion of the treatment and navigate towards, uhm, active treatment and education a lot more which I fin- which is based on evidence because that seems to be more have like more long-term efficacy." (Participant 1)

"Otherwise, you know, sometimes the things don't have good evidence, you know, some… some of the things we're using doesn't have much benefit, you know, you… you look at the reference and it says ultrasound is so so to treating the shoulder, like it's not going to… it didn't make much more difference than the placebo and I've personally… Find it difficult to then use something where it's just as good as placebo. Uhm, in saying that I do really love using placebo effect. I do think it's important and it has its place for sure but it's difficult to put down those kinds of references when the ones I'm finding don't support it, and then it kind of makes me want to change my treatments. Uhm, I do… I do think that is frustrating for me. I mean, that's quite a specific example of that, but yeah." (Participant 7)

4.3.4.3 Challenges of Implementation

The participants encountered various challenges during the implementation of EBP. More popularly, clinicians' views versus students' views; COVID restrictions; a lack of updated literature; theory-practice gap and discrepancies between evidence, and patient responses were amongst the challenges faced. Unpopularly, particular participants experienced challenges such as paying for articles; patient expectations; patient preference; forgetfulness; discrepancy between what we have been taught and evidence versus administration, and difficulty implementing EBP due to the fact that diagnoses change.

There were four participants who reported a disparity between clinician's views versus student's views as shown in the following excerpts.:

"Yeah, I think I think the only thing that has - that I found a little bit challenging is the kind of paradigm or like frame of mind that I can see my patients with isn't always the same as clinicians, uhm, that were kind of educated a lot of years before the current paradigms. Clinicians are maybe more biomechanically focused and I might be like more biomedical and psychosocial. So, a lot of my focus is on the evidence of the clinical relationship and on other factors, not just biomechanics. Uhm, and I find that very often because I've- I then tend to look at research, that kind of due to my bias, I find it difficult to implement a lot more biomechanical viewpoints,

and that's something that the clinicians suggest. I don't know if that makes sense." (Participant 1)

"Uhm, I've actually… I've had a couple of run ins with clinicians where I've found solid evidence on how I should be using something and they've turned around and said "No. Do it this way" and that's been frustrating because you know, I've gone through the effort of researching something, only to be told "No" by someone who hasn't bothered to read my article or bother to have a discussion about it because they, from I assume, from practical experience, feel they would treat this condition in this certain way and they've had successful results so therefore, I should as well, but that's… that's been a bit of a challenge sometimes." (Participant 7)

"… uhm, because when we're in clinic, uhm, on numerous occasions, there was different times where there were values that was different and different clinicians had different answers so there was a little bit of a discrepancy there…" (Participant 9)

"Uh, yes, the fact that clinicians a lot of the time, are very limiting in the way in which they feel… and maybe it comes from a higher DUT, uhm, place, but I'm not too sure but they're very limiting in the sense that unless, and this is just generally - not all of them. But some of the time what we do find is that we… If clinicians don't know about the specific techniques or the way treatments we want to administer… administer or if we have knowledge in different areas, uh, it seems to be quite limiting in the sense that because they are the supervisors and clinicians in the clinic, uhm, you kind of have to go along with what their… kind of clinical knowledge and consensus would be, rather than starting to formulate our own." (Participant 13)

The three participants who reported clinicians lack of engagement with articles stated:

"And then also in clinic, discussing things with clinicians, uhm, because they have a different… how do you call it like they come with a different set of knowledge that might not necessarily be from evidence - they might suggest things that are not necessarily evidence-based, but they have used because of practical experience? So that's been difficult in the implementation for me,

because deciding between evidence-based practice and anecdotal evidence." (Participant 1)

"When you bring evidence to clinic and you still get told "No, not quite." Uhm, you know, it just gets disregarded. It would be nice sometimes to have proper discussions of articles or… or you know, things that are relevant to my cases with clinicians, but they're not always open to… to those discussions." (Participant 7)

"Uh, yeah, I mean, I don't think the clinicians are really that interested in, uhm, our articles or the fact that we implementing, I mean, you get some and I think maybe if you are, uh, a dedicated student, you'll ask. Like I often actually ask the clinicians like, "Look, this is what I think I want to do for this pathology, but what do you think I should do or what is the best practice for this?" And then, I mean, apparently they used to, or at some stage, some people get asked like, you know, "What did this article actually say?" (Participant 10)

Some participants reported that COVID restrictions impacted their desired treatment protocol. This can be seen in the following excerpts.

"So, like obviously with COVID, I would have… Well, we couldn't, but I would prefer to like, use the traction bed if we could." (Participant 4)

"Uhm, so yeah, I… I… I think in terms of strapping, uhm, and COVID and what the clinics allows, uhm, like sometimes KT, KT tape is indicated as a useful tool for… for, uhm, say oedema release and stuff in… in the lower limbs where the clinic doesn't allow us to do that on patients, because of COVID and so on, uh, that's the kind of experience I've had where I couldn't treat them fully because of those restrictions." (Participant 6)

"You know, patients would really benefit from some of the things that we have and we're just not allowed to use it. You know, COVID, we can't use the traction table, the automatic, you know, traction, and it's, you know, you're limiting your patients then you're saying "Sorry, we can't use that on you because of COVID" uhm when it could actually very easily be sanitized." (Participant 7)

"Then COVID protocols obviously comes into it, and then that's just frustrating, uhm, especially last year when traction, uhm, traction was… We weren't able to use it because of the Velcro straps, I think it was but, uhm… uhm, ya but I think overall I think we… we pretty… pretty well equipped, I would say and, uhm, definitely enough to, uhm, more than enough, I would say to… to treat patients." (Participant 8)

"Uhm, I think with COVID restrictions, everything has been, uh, restricted to a certain limit but other than that, I feel that there's uh… The clinic is equipped." (Participant 14)

Additionally, four participants reported a lack of updated literature as is mentioned in the following excerpts:

"I think sometimes finding up to date research especially on adjustments is a little more difficult because the date the research was done quite a few years ago." (Participant 3)

"Err… It's sometimes not always easy to get, uh, one (referring to a EBCC reference) *within the last five years."* (Participant 4)

"Some conditions just don't have current literature on it and I find that quite frustrating is… I have a perfect reference that's maybe six or seven years old and you know, they're so… they're so sticky about it having to be within five years and I find that a bit limiting sometimes but yeah, that's generally my approach." (Participant 7)

"Hmm… I generally find that, that dating of, uh, the evidence-based, like… With it being limited, there's certain things that I would like to date further back but we're not allowed to, uhm, I think that's the only limitation." (Participant 14)

A few participants encountered difficulties in adapting evidence-based treatment protocols specifically to individual patients. This translated to a theory-practice gap. These participants stated:

"So, my perceived barriers are basically… as much as literature and people that have… have done reviews, uhm, give you kind of a gauge, you still have to taper that to your individual client's needs and patient's needs. Uhm, so

the only barrier is kind of what to trust and how much of it you kind of implement in your treatments, uhm, in terms of… of the patient's specific and obviously, we have, uh, extensive knowledge, uhm, on how to treat and how to approach patients and yeah, I feel like your… the… the evidence-based should be looked at but you should also use your clinical judgment, uhm, in terms of patient care." (Participant 6)

"… I do think that our clinical experience is very important. I mean, having all my knowledge that I've had up to this point at the beginning of fifth year and having to have applied it now, uhm, I have noticed a big difference in how I understand things practically versus how I understood them theoretically a few months ago. So, I feel that DUT has done all they can to get us to the point of going out there." (Participant 7)

"Okay, so starting off from… just from the practical sessions we had, uhm, in moving to a clinical… clinical setting that… that is actually treating patients was a big jump. It was very different." (Participant 9)

"Uhm, I think patient specificity and differences. I think every single patient's different and respond differently. So, although it is a general consensus, you have to be very aware of the fact that patients respond differently. So, you can't just go and take stuff that you've read and apply it to every single patient. You have to be very, uhm, like capable of adapting to each specific patient and their specific condition even though… If it is the same condition, it could have different presentations and stuff which need to be addressed differently. So, I think there just has to be like… that taken into account when you are implementing those." (Participant 13)

Only two participants reported a discrepancy between evidence and patient response:

"Yeah, I think the only thing that maybe would have stopped me is that I treated the patients the way that evidence-based kind of looked at and there was no benefit then I would completely throw it out and have to kind of search for a different approach." (Participant 6)

"So, I guess it's not like so cut and dry like what you… what they… how they educate it to you, you know. Like "Ooh. This is going to be the diagnosis and

then you're going to do "XYZ" and then the patient is going to respond like "XYZ." It doesn't work like that." (Participant 10)

Only one participant reported paying for articles as a barrier:

"Things that do get challenging sometimes is when you need to pay for certain articles that are quite fascinatingly interesting, that does become a little bit of challenge but we can't expect everything to be free. So, I completely understand that." (Participant 2)

Further, one participant reported that patient preference calls for an obligation to provide alternative treatments, which evidence portrays as not being as effective as others. The participant stated:

"So, like the only thing that comes to mind is that a patient that's apprehensive to, uh, a C/spine adjustment so like, as an alternate, you need to not even mobilize because they won't let you put their cervical spine that position. Then you just have to like move over to like PNF stretching or if the patient doesn't want to get needled, all you can do is PNF stretch and you can't put a needle in so it makes your results a lot longer and not as effective as the treatment that you would have liked." (Participant 4)

Participant 9 reported that, occasionally, he forgets to find references for his treatments:

"… other than that sometimes you forget to do it and get reprimanded, there is no other barriers, I would say." (Participant 9)

Participant 10 reported a discrepancy between what was taught and evidence versus administration:

"I've had instances in the clinic where I'm treating a shoulder pathology and then they told me that I'm not supposed to. It's not… I can't then now treat the thoracic spine, which biomechanically, as a chiropractor makes perfect sense, you know? If the shoulder isn't moving adequately, uhm, then adjusting the thoracic spine as part of my treatment for the shoulder is perfectly logical. Uhm, but then, now I must diagnose a thoracic problem in order to adjust the thoracic spine as part of my shoulder treatment protocol. Where, in my opinion, that's not ethical or evidence-based. They don't have

a thoracic problem. They have a shoulder problem, but the thoracic spine is part of the biomechanical chain and that is part… like that is now being restricted because of that decreased range of motion or the pathology on the shoulder. Uhm, but then, I don't know, you have administrative staff telling you that that's not… like evidence-based because that's not the… the… the area that you're treating when we get taught the whole way through the course that you know, the body func… is… has a long functional biomechanical chain and you can't just look at different areas of the body in isolation." (Participant 10)

Another participant reported a difficulty implementing EBP in its entirety due to the occasional changing of diagnoses by stating:

"… the thing is, is that also you don't always have such a finite diagnosis, you know. I know that sounds… would be very attractive and very, uh, beneficial if you can have the exact diagnosis for every single patient, but often if you, unless you like… you can't really send every patient for imaging studies, you know. A lot of patients coming to the clinic can't afford it or people don't necessarily want… to… to go for imaging studies or... and the treatment protocol is kind of similar for different types of conditions that present similarly, you know. So, you are implementing uhm a treatment protocol that is… yeah, that is more than likely. It's like a process of elimination, you know, and then I know that is why they say you have, uh, uhm, differential diagnoses, you know, so you're implementing a treatment protocol that you think is going to fix that particular condition and if it doesn't work within three or four treatments then you change it or then you get imaging studies." (Participant 10)

4.4 SUMMARY OF THE CHAPTER

The findings of the study are presented in this chapter in relation to each theme with associated sub-themes. These findings are justified by relevant extracts from the interview transcripts. The following chapter discusses the findings of this study.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 INTRODUCTION

This chapter presents an interpretation of the results of this study, along with a discussion. It has been established that there is a paucity in the literature exploring the perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum in general. Although a study done by Banzai *et al.* (2011) found that chiropractic students in Australia, Canada, USA, Denmark and New Zealand had a positive attitude towards EBP, to date there have been no studies done on the perceptions and experiences of chiropractic students in South Africa. Due to limited literature and none in South Africa, to formulate a comparative critique in relation to chiropractic education, this discussion utilises relevant literature adapted from various studies of other healthcare professions.

5.2 OVERVIEW OF THE RESEARCH DISCUSSION

The aim of this study was to explore the perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal. The four main themes were identified:

Theme one: Perceptions and necessity regarding the roles of EBP.

Theme two: Undergraduate education and its role in the implementation of EBP.

Theme three: The importance of clinical experience in the implementation of EBP.

Theme four: The implementation of EBP.

These themes, along with their associated sub-themes, are discussed as follows, and are validated by relevant literature.

5.3 THEME ONE: PERCEPTIONS AND NECESSITY REGARDING THE ROLES OF EBP

It is imperative to determine the perceptions of chiropractic students with regard to EBP to gauge the level of importance EBP has, in their opinion. In addition, it is important to fathom the reason behind a relevant perception to determine whether the concept of EBP is fully understood. The participants were asked a variety of questions in order to explore these aspects. In general, participants expressed a positive view towards the idea of EBP, similar to various studies (Banzai *et al.* 2011; de Luca *et al.* 2018; Leach *et al.* 2021; Bussieres *et al.* 2015; Schneider *et al.* 2015) but acknowledged limitations with regard to its practice.

5.3.1 Positive Aspects Regarding EBP

These participants expressed a general consensus that the presence of evidence serves as a guide on how to treat patients for various conditions. They also expressed that evidence enhances the credibility of the profession. These findings are congruent with a study done on occupational therapy students in Canada by Thomas *et al.* (2017), where it was found that EBP was generally viewed as positive, and EBP affords credibility and identity to the profession. In addition, Thomas *et al.* (2017) found that EBP ensures that students are guided into providing the best practice where it allows the students to proactively choose the best practice based on evidence rather than being told what to do by an institution.

In this study, limitations such as limited resources in the clinical setting and a discrepancy between what was perceived to be evidence versus what is evidence was found. Access to the internet and access to free online databases are considered fundamental enablers for chiropractors to uptake EBP in a clinical setting whereas access to critical reviews of multiple research articles was considered a moderately important tool (Bussieres *et al.* 2015; Schneider *et al.* 2015; Leach *et al.* 2021). At the DUT CDC, students have access to these perceived fundamental enablers, namely the internet, as well as access to a variety of free online databases, which can be considered important facilitators of the implementation of EBP, permitting the search for literature at their leisure.

5.3.2 Negative Aspects Regarding EBP

A downside to EBP was reported, including the opinion of a lack of literature because there is minimal financial gain on pursuing chiropractic research. Although there is a paucity in the literature in this regard, and a claim of such nature cannot be fully substantiated, a statement made by Kawchuk (2005) implies that there is a distortion of the base of evidence due to financial interests, which needs to be studied along with its hidden biases in sponsored research. This affects the implementation of EBP because, despite positive reports from patients, the lack of evidence for certain treatments can serve as a hinderance. A hard resistance against EBP from the chiropractic profession was substantiated since the best evidence is based on patient experience and not research (Walker 2016).

Another important aspect that was highlighted is that chiropractic is believed to be a holistic profession and in order to produce evidence-based literature, a method of isolating treatments is necessary which is contradictory to chiropractic teaching. A review by Tonelli (1998) found that evidence-based medicine provides an inadequate account of optimal medical practice and a broader understanding of medical knowledge with reasoning is necessary. In an article by Tonelli and Callahan (2001), a point was made that complementary alternative medicine (CAM) cannot be evidence-based due to the trials behind performing randomised controlled trials. Similarly, it is believed that chiropractic patients are cared for as they present, unlike in a hospital setting where there is lengthy prior preparation, bringing about the need for discussion as to whether there is a possibility of standardising chiropractic treatment in conjunction with the related chiropractic intervention (Ebrall 2016).

5.4 THEME TWO: UNDERGRADUATE EDUCATION AND ITS ROLE IN THE IMPLEMENTATION OF EBP

Educational strategies at institutions training CAM practitioners may assist in developing a skilled CAM workforce who are confident enough to engage in research (Veziari *et al.* 2021). It is crucial to determine the role, or lack thereof, that the undergraduate education plays in the implementation of EBP. There were diverse opinions voiced regarding the delivery of training in relation to evidence-based practice. Although there was an existing knowledge about EBP theoretically,

a general consensus was that there is a lack of sufficient training in various aspects, which directly and indirectly have affected the implementation of EBP. In addition, two participants in the study were found to have a general idea of EBP but its practice could be considered partially neglected which could suggest a cohort of students value the idea of EBP but not its implementation.

Areas of improvement were suggested to make the implementation of EBP easier. The sub-themes discuss the lack of training in relation to each segment of the course.

5.4.1 Pre-Clinical Preparation

The participants expressed a lack of training with regard to preparation for the implementation of EBP during their clinical practicum. A lack of sufficient training on critical appraisal of literature, the implementation of EBP, about the clinical environment and a lack of practical learning due to COVID restrictions were included in the reports.

A few of these findings, such as a lack of sufficient training on the critical appraisal of literature and the implementation of EBP are similar to those found in a study done by Bussières *et al.* (2015) in Canada, who identified Canadian chiropractors' attitudes, skills and use of EBP, as well as their level of awareness of previously published chiropractic clinical practice guidelines where it was found that 10% of their sample implied a lack of training in critical analysis or critical thinking. In addition, a large portion of participants who had received their chiropractic training more than 15 years ago reported no, minimal or minor foundational EBP chiropractic training.

A study done on the perceptions and processes influencing the transition of medical students from pre-clinical to clinical training by Malau-Aduli *et al.* (2020) in Australia found that 76% of medical students were of the opinion that clinical practice required crucial knowledge that was not emphasised during pre-clinical training. The findings of Malau-Aduli's study aligns to the findings of this study where students expressed feelings of a lack of training regarding certain aspects about the clinical environment, including a lack of training on the use of certain equipment, insufficient training regarding research as a whole and a lack of training regarding EBCC referencing, which affected efficient implementation of EBP.

Ismail *et al.* (2021) found that chiropractic students at the University of Johannesburg in South Africa, who were registered for a fourth year module of Clinical Biomechanics and Kinesiology favoured e-learning as opposed to a blended approach. Additionally, the cohort of students who experienced the blended approach deemed face-to-face time with a lecturer more important than the cohort of students who experienced a pure e-learning approach. This finding of the Ismail *et al.* (2021) study indirectly ties in with the finding of this study where a lack of practical learning due to the SARS-CoV-2 pandemic was found.

5.4.2 Theoretical Training

Although participants knew what EBP was and possessed the skill to search for literature, they reported not only a lack of evidence for what they have been taught but a disparity between what they have been taught versus what literature portrays and the necessity of a re-evaluation of the structure of subjects.

Haas *et al.* (2012) found that chiropractic student's knowledge in EBP improved over the first years of a new curriculum which differed from the old curriculum in that EBP values were emphasised. In the new curriculum, the research courses were converted to EBP courses with the content emphasising the user of clinical research rather than the clinical researchers themselves; the number of hours for the core EBP courses were increased and, lastly, EBP teaching was inculcated into the regular curriculum.

The findings of this study, which identified a void in the chiropractic curriculum at the DUT with regard to EBP teachings, can be filled by the improvements made to the chiropractic curriculum in the study done by Haas *et al.* (2012), who concluded that implementation of the new EBP curriculum in the first year of the undergraduate programme resulted in the chiropractic student's ability to acquire the knowledge necessary to find and interpret literature, retain and improve EBP skills over a period of time and enhance self-reported skills in utilising credible online resources.

In addition, although an unpublished study, Naidoo (2018) found that chiropractors in the eThekwini Municipality reported a belief in a strong academic foundation with regard to their knowledge and skill in relation to accessing and interpreting information, which is congruent to this study, where participants knew what EBP was and were able to search for literature.

5.4.3 Measures of Improvement

There was general consensus that the chiropractic training, in general, provided a solid foundation. To facilitate the implementation of EBP, measures of improvement, such as implementing a journal club much earlier, introducing evidence-based articles for treatments per condition, and implementing a workshop on EBCC references prior to the clinical practicum were among the suggestions. In addition, a suggestion of more practical learning in the undergraduate programme was made.

A common suggestion of a measure of improvement was to implement a journal club much earlier. In the new EBP curriculum Haas *et al.* (2012) had implemented to enhance EBP skill, as described in the previous sub-theme, the four core EBP courses consisted of two didactic courses and two journal clubs. As part of the new curriculum, EBP teachings were woven into the regular curriculum as well. According to the findings of his study, these strategies of improvement were deemed favourable. As such, the implementation of journal clubs should be considered earlier in the studies so as to impart skills related to EBP much earlier on.

Similarly, as described in the aforementioned sub-theme, the findings of Naidoo (2018) implied that chiropractors in the eThekwini Municipality came from a background of a strong academic foundation which suggests that the DUT provides an adequate chiropractic course. A recommendation made by Naidoo (2018) was that tertiary education institutes should inculcate EBP principles into the undergraduate programme to facilitate post-graduate compliance.

Another common suggestion made by participants was to introduce evidence-based articles supportive of treatments, per condition taught. Although this may seem like a straight forward method of linking EBP into the curriculum, it is imperative that pain classifications are understood with regard to musculoskeletal pain syndromes due to its variable presentation (El-Tallawy *et al.* 2021), which signifies that musculoskeletal conditions can present differently in each patient. Given this fact, the provision of a treatment protocol per condition could be considered limiting in that students would have been taught specific treatment protocols, whereas treatment could vary depending on the presentation. It is expected that the undergraduate programme in the healthcare sector aims to produce competent

graduates who are capable of implementing EBP with common sense in order to provide safe and effective care (Braithwaite *et al.* 2014).

A common expected standard between chiropractic regulatory authorities is that undergraduate institutions produce graduates who are capable in making decisions in the best interest of their patients (Innes *et al.* 2016a; Innes *et al.* 2016b; Innes *et al.* 2016c) and being able to determine indications from contraindications (Innes *et al.* 2018b). A treatment per condition based teaching method would limit the abilities of students with regard to treatment options, given the likely case of an encounter with a patient contraindicated to treatment. Therefore, implementing a teaching method as much in order to enhance the uptake of EBP could be considered impotent.

Although only one participant suggested more practical learning as a measure of improvement for the implementation of EBP, it was implied that this could increase confidence of undergraduate students which in turn, would amplify proficiency. Boysen *et al.* (2016) found that senior chiropractic students described an increase in clinical confidence after having an opportunity to deliver chiropractic treatment to patients in a more realistic setting, engaging in technical skills frequently as well as performing clinical decision-making with patient management and communicating with patients and other health professionals. At the DUT CDC, senior students are granted this opportunity at a post-graduate level during their clinical practicum.

5.5 THEME THREE: THE IMPORTANCE OF CLINICAL EXPERIENCE AND THE IMPLEMENTATION OF EBP

The importance of exploring student's perceptions and experience during their clinical practicum and how this impacts the implementation of EBP is essential as it allows for a broader understanding on how to aid a better environment for the implementation of EBP. Through students' clinical experience, it is critical to ensure that students practice safely and, at the same time, learn as much as they can (Haworth *et al.* 2020). It was found that students valued their clinical experience at the DUT CDC and acknowledged its role on the implementation of EBP. There was a common opinion that the DUT CDC is equipped efficiently. However, there were positive and negative views expressed with regard to support structures available

during the course of the clinical practicum. There were various self-limitations reported as well.

5.5.1 Clinical Training

According to Haworth *et al.* (2020), the number and type of cases seen by students learning through student-led and different clinical settings can be expected to have a direct influence on the development of student competencies. In this study, participants found that the clinical experience at the DUT CDC coerced competency, which, in turn, boosted their confidence. Interaction with patients allowed for exposure to different medical conditions which encouraged more research and aided in the implementation of EBP. Haworth *et al.* (2020) also found that the fundamental activity which assisted in developing a sense of professional identity and preparing for a transition into practice was an exposure to patients.

This study found that the experience of fulfilling the requirements of the internship portfolio was believed to amplify practical skills in students and encourage research. A dominant theme identified by Haworth *et al.* (2020) was that all clinical experiences prepared students for their transition into practice but clinical settings other than the university health clinic offered a higher-level of preparation. Although students undermined the value of the learning that took place at the university health clinic in comparison to other clinical settings, Haworth *et al.* (2020) found it clear that students would have been under prepared to withstand the experiences in other health care settings without the preparatory experiences encountered at the university health clinic. Even so, Moore *et al.* (2018) reiterated that the exclusivity of only one type of clinical placement is unlikely to provide optimal preparation in relation to a professional context.

Wallace (2008), Sheehan *et al.* (2016) and Haworth *et al.* (2020) all noted that regardless of clinical setting, students acknowledged the importance of having good clinical educators. Concurrently, this study found that engagement with clinicians during the clinical practicum served as a guidance for students and allowed for the opportunity of enquiring about various opinions regarding patient cases. This interaction with clinicians offering various opinions encouraged students to engage in more research.

The findings of Haworth *et al.* (2020) and this study are concurrent in that the importance of clinical experience is emphasised to warrant student competency for the transition into clinical practice. Although the findings of aspects in the clinical training at the DUT CDC have been portrayed positively, it is crucial to maintain a certain standard of education as the importance of the clinical practicum cannot be undervalued.

5.5.2 Support Structures

There was a general consensus that the DUT CDC was equipped sufficiently and had the necessary facilities for patient care. However, various aspects that indirectly affected the implementation of EBP at the DUT CDC challenges, such as the rehabilitation room, waiting time, a lack of aesthetic and structural professionalism and excessive administration duties, were identified.

Ellis *et al.* (2005) acknowledged that the implementation of EBP involves more than applying the best literature to a patient but rather it is influenced by various other factors, such as the environment, management structures and resources. A supportive institutional environment, an incentive to lead change and an established protocol by which change is initiated and managed can be complemented by accessible information, resources to make change and the presence of an experienced workforce to guide change in practice (Ellis *et al.* 2005).

Despite the findings of this study being challenges based on personal experiences which entailed aspects such as the need to have take-home equipment for rehabilitation, as opposed to using treatment time for rehabilitation; a lack of aesthetic and structural professionalism where walls between clinic rooms are thin; long corridors making it difficult for geriatric patients; an unappealing ambience in some areas; the frustration of waiting for modalities, and excessive administration duties taking away a patient-focused approach, there are numerous studies supporting the significance of assessing an institution in its context in order to understand how to best support the implementation of EBP (Stetler 2003; Rycroft-Malone *et al.* 2004; Rycroft-Malone 2004; Ellis *et al.* 2005; Gifford *et al.* 2007). A common finding in these studies was that, in addition to an evidence-based protocol implemented at a managerial level, it is imperative to delve into the content, purpose, dynamic, and infrastructure these evidence-based protocols hold and

idealise these elements into context. However, these studies were not based on chiropractic institutions specifically, proclaiming a paucity of literature about evidence-based practice protocols at chiropractic institutions, in this regard. At the DUT CDC, there may be benefit in analysing the framework in which the protocol functions to enhance the implementation of EBP and deciding whether its intended purpose is being fulfilled as desired or can be considered futile.

5.5.3 Self-Perceived Limitations

In this study, it was found that participants experienced individual limitations which hindered the implementation of EBP, such as a lack of internet, insufficient reading of literature, difficulty referencing and a lack of proficiency. Similarly, Leach *et al.* (2021) found that an important facilitator for EBP uptake was access to the internet, which enables chiropractors to search for literature. This implies that the lack of internet as a resource is likely to serve as a hindrance to a population in South Africa with no internet access.

A study done by Vongsirinavarat *et al.* (2020) on Thai physical therapists found that 14.2% of respondents considered a lack of interest as a barrier to the implementation of EBP, whereas two out of the 14 participants in this study reported insufficient reading of literature as a barrier. Only one of these two participants also reported difficulty referencing and a lack of proficiency which could imply that these barriers exist only due to a lack of interest. However, the necessity to have formal EBP training is yet to be disputed, given the findings of various studies where a lack of skills and application pertaining to EBP in healthcare professionals was due to a poorly structured EBP educational programme in former years (Bussières *et al.* 2015; Naidoo 2018; Odhwani *et al.* 2019; Vongsirinavarat *et al.* 2020).

5.6 THEME FOUR: THE IMPLEMENTATION OF EBP

The existence of a knowledge-theory gap is due to a lack of the ability to translate research into practice and policy, as well as to apply new technology in a safe and appropriate manner (Leavitt 2001). Practical and theoretical aspects were identified as hinderances to the implementation of EBP at the DUT CDC. In addition, various challenges were encountered by participants, affecting their efficiency of implementation of EBP.

5.6.1 Theoretical Implementation

The presence of evidence made the majority of participants feel confident in relation to their treatment plans. Synchronously, most participants' treatment outcomes were concurrent with current literature, whereas some participants reported variable treatment responses. Quon *et al.* (2015) carried out a study in Quebec which investigated the consistency of treatment outcomes where chiropractors delivered treatment for acute low back pain based on clinical practice guidelines, including spinal manipulative therapy, and it was found that there was a modest difference in the results between the groups. This suggests that treatment responses could be slightly variable even while following clinical practice guidelines, perhaps reasoning with the findings of this study.

Those participants who discussed their method of obtaining EBCC references in detail also mentioned that for the purpose of paperwork at the DUT CDC, a quick and general search is done and further research is done at home, if necessary. Although a protocol to encourage EBP at the DUT CDC is implemented, the findings of this study questions whether this method of implementation is sufficient or could be considered futile incidentally to the role the EBCC references are intended to fill. Chiropractic education requires courses which insist on intellectual evidence-based rigor, ensuring students acquire the necessary training to enable questioning and critical appraisal skills (Walker 2016).

Commonly, a lack of literature was reported as a hinderance when applying EBCC references to justify treatment plans. Even though the chiropractic profession has begun to shift away from early theories and hypotheses to a more evidence-based approach (Globe *et al.* 2016), numerous studies commonly report a lack of literature in the chiropractic profession as a barrier (Walker *et al.* 2014; Schneider 2015; Bussieres *et al.* 2016; Leach *et al.* 2021). There is a lack of a developed research culture across the chiropractic profession (Adams *et al.* 2018) and observing a consistency in the same report of a lack of literature over the last few years reiterates the need for further research in the chiropractic profession.

5.6.2 Practical Implementation

In this study, it was found that students were competent in the implementation of EBP but not as proficient as desired. This finding is relatively consistent with the

observation that a passive diffusion of knowledge does not warrant an automatic translation into clinical practice (Cabana *et al.* 1999), emphasising the importance of unfaltering high quality EBP education programmes in order to meet the needs of the chiropractic profession (Schneider *et al.* 2015).

A common report was a lack of supporting literature which was noted to cause confusion on the implementation of desired treatment protocols due to the discrepancy of what was taught versus what evidence portrays. In a similar context, various studies conducted on physiotherapists in the United States, Australia, Sweden, Canada, Brazil, Nigeria, Saudi Arabia, Malaysia and Thailand found that more than half of the respondents expressed one of their concerns being a lack of supportive evidence (Jette *et al.* 2003; Iles and Davidson 2006; Salbach *et al.* 2007; Akinbo *et al.* 2008; Nilsagård 2010; Bernhardsson *et al.* 2014; Silva *et al.* 2015; Yahui and Swaminathan 2017; Alshehri *et al.* 2017; Vongsirinavarat *et al.* 2020). This reiterates that the preparation of students to inculcate EBP principles is highly dependent on the ability of the faculty to teach and model EBP into clinical training (Melnyk *et al.* 2014).

Specific to this study, congruent with the suggestions of participants, perhaps providing updated evidence-based articles for treatment modalities taught may be beneficial in formulating a more consistent evidence-based treatment guideline. However, the findings of this study have reiterated the lack of updated and supporting literature which makes it difficult to implement a protocol as such, which consequentially, could limit the teaching of treatment modalities purely due to a lack of recent literature which, in turn, could compromise the value of the chiropractic course.

5.6.3 Challenges of Implementation

Various challenges were encountered by participants during the implementation of EBP, some more than others. Challenges such as disparity between clinician's views versus student's views, SARS-CoV-2 restrictions, a lack of updated literature, difficulty adapting evidence-based treatment protocols to individual patients and discrepancies between evidence and patient responses were among the more commonly encountered challenges.

Clinical teachers and staff members in institutional clinics fulfil the role of a model for professional thinking, behaviour and attitudes (Wallace 2008). The main concern among students who reported a disparity between clinicians' views and theirs was that, aside from clinicians' lack of engagement with EBCC references justifying specific treatment plans, there seems to be a common trend where the clinicians only approve of treatment plans based on a self-perceived paradigm, which is not always in sync with the students'. A teaching environment like that could be considered contrary to the opinion a teacher in the clinical setting should implement formal and informal strategies of assessment providing sensitive, contextual and constructive feedback to enable further learning and, thereby, assisting the student to progress through the course (Spencer 2003). Although participants held a positive attitude towards EBP in this study, the disregard they experienced from superiors could later be demotivating, resulting in an inefficient method of the implementation of EBP.

Participating students found that the limitations put on the utilisation of certain treatment modalities as a precaution due to the SARS-CoV-2 pandemic restrictions served as a hinderance on the implementation of EBP. The restricted use of these treatment modalities impacted students' desired treatment protocol, coercing a different form of treatment. Likewise, Kotur and Kotur (2022) implied that the implementation of EBP has been affected by the SARS-CoV-2 pandemic and its acceptance in several ways.

A lack of updated literature was included among the common reports which proposed that, although there might be available literature, it may be considered outdated. A sustainable research culture is required by healthcare professions in order to establish chiropractic practice and justify effective, safe and a coordinated integration of care within a broader spectrum of the healthcare system (Myburgh *et al.* 2008). Since an applied EBCC reference at the DUT CDC must be within five years from the date of implementation, it is no shock that students expressed difficulty in finding literature.

Studies of similar contexts to this study found that healthcare students of healthcare professions, such as occupational therapy, physiotherapy and chiropractic, found difficulty adapting EBP to a specific patient (Thomas *et al.* 2017; Vongsirinavarat *et*

al. 2020; Leach *et al.* 2021). In this study, participants found that adapting EBP to a patient can be considered challenging but not a hinderance to its implementation.

Participants in this study found that patient responses vary and some responses are contrary to what evidence suggests which compelled them to look at other treatment protocols. Concerns about evidence-based treatments have been discussed (Westen *et al.* 2004; Norcross *et al.* 2005; Hunsley 2007) and a frequent concern is that the criteria set to carry out treatment research is too specific which differs vastly from patients seen in clinical practice and, therefore, raises the question on how to generalise the outcomes from the study into clinical practice (Hoagwood *et al.* 1995). Given this information, one would assume normality in the fact that patient responses to treatment could be variable.

Less commonly, some encountered barriers reported were paying for articles, patient preference; forgetfulness; discrepancy between what has been taught, and evidence versus administration and difficulty implementing EBP efficiently due to the changing of diagnoses.

A student reported paying for articles as a barrier to the implementation of EBP. Schneider *et al.* (2015) found that important enablers to the implementation of EBP were access to the internet and access to free online databases. The DUT does provide students with online access to various journals, as well as internet. Schneider *et al.* (2015) also found that 36% of chiropractors reported a lack of incentive for the implementation of EBP which could justify the findings of this study, where one student reported forgetting to fill in EBCC references.

There was a report that diverting away from a more effective evidence-based treatment to a less effective form of treatment served as a challenge in getting the desired treatment outcome due to patient preference. Concurrently, although the literature supports the value of patient preference in healthcare, a gap between EBP and patient-centred care exists, where the two are considered opposing ideas (Burman *et al.* 2013). This gap could potentially obscure the clarity of guideline recommendations, which could result in the inadequate use of these guidelines (Umscheid 2009).

Although only one person reported a discrepancy between what was taught and evidence versus administrative requirements that go along with it, it brings about an

important ethical consideration. At the DUT CDC, diagnostic and treatment coding is done by the students where, for each diagnostic code, correlated treatment codes are written. However, when taking a biomechanical approach and treating a different region in order to aid healing to another region, correlating a diagnostic and treatment code is challenging. Congruent to this report, chiropractors who identified themselves to be “wellness chiropractors” believed that the terms depicted through diagnostic coding were inadequate and would not describe their method of clinical practice (Testern *et al.* 2015).

In this study, the same participant found difficulty implementing EBP due to the changing of diagnoses at different treatment sessions for a similar reason: treating one problem required a diagnosis in relation to the region being treated with correlated treatment codes as opposed to diagnosing the problem and coding for treatment in different areas accordingly. Chiropractors who were less focused on specific symptoms and believed the diagnostic codes were structured to be more medically inclined voiced an opinion that a new coding system relevant to chiropractic should be formulated (Testern *et al.* 2015). The cessation of a diagnostic coding system at the DUT CDC would inherently undermine the value of EBP and its implementation at the CDC, let alone the upcoming chiropractic profession.

5.7 SUMMARY OF THIS CHAPTER

This chapter discussed the findings of this study in conjunction with the perceptions and experiences of Chiropractic Master’s students on practicing EBP during their clinical practicum at a teaching clinic in KwaZulu-Natal. There seemed to be a great correlation of the results of this study with other relevant studies pertaining to the perceptions, confidence and barriers of students, as well as healthcare practitioners. This study has explored the perceptions, undergraduate and clinical training, as well as the barriers and challenges faced by chiropractic students on the implementation of EBP, which are concepts that were previously vaguely explored.

The following chapter provides a summary of the aims and findings of this study, along with the associated strengths, limitations and recommendations.

CHAPTER SIX

SUMMARY, STRENGTHS AND LIMITATIONS, RESEARCHER'S REFLECTIONS, RECOMMENDATIONS AND CONCLUSION OF THE STUDY

6.1 INTRODUCTION

This chapter encapsulates the intended aims of this study and addresses the questions formulated prior to the commencement of this research study. The strengths, limitations, researcher's reflections and recommendations devised from the study are elaborated upon.

6.2 SUMMARY OF THE STUDY

The aim of this study was to explore the perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal. The research questions detailed were devised to meet this aim.

6.2.1 Research Question One: What Are the Perceptions of Chiropractic Master's Students Towards Evidence-Based Practice?

All participants of this study expressed positive views about the idea of EBP, signifying that the presence of evidence serves as a guide on how to treat patients for various conditions, as well as its benefit in providing credibility to the chiropractic profession. However, along with a positive outlook on EBP, two participants implied that their practice of an evidence-based approach can be considered partially neglected at the DUT CDC, suggesting that a cohort of students may not be implementing EBP to their best potential. In addition, one participant expressed the necessity of evidence and the benefits thereof, along with a negative perception, which may suggest that, although an evidence-based approach is favourable, it is necessary to contextualise this approach appropriately.

6.2.2 Research Question Two: What Are the Experiences of Chiropractic Master's Students on Implementation of Evidence-Based Practice?

The majority of participants had a theoretical understanding of EBP and knew how to search for literature but identified a disparity between what was taught in the undergraduate programme in comparison to what was expected during their clinical practicum. Some of the insufficiencies identified in the undergraduate programme were a lack of sufficient training on multiple aspects, such as the critical appraisal of the literature, the clinical environment and the implementation of EBP. A lack of practical learning due to COVID restrictions was identified as well. Furthermore, it was found that notes for relevant subjects had no reference of evidence; there was a discrepancy between what was taught versus what literature portrays and the need for a re-evaluation of the structure of subjects. This suggests that training regarding EBP was given but, given the standard of skill that is required to implement EBP in its entirety, the training seemed to be insufficient.

The participants reported that their treatment outcomes were concurrent with current literature and felt more confident in their capabilities due to the presence of evidence. The necessity of the clinical experience at the DUT CDC was reiterated, in conjunction with the importance of clinician interaction, with the necessity of the internship portfolio, and how these factors tie into the implementation of EBP. The participants also found the DUT CDC to be sufficiently equipped for patient care; however, they also identified supporting aspects at the DUT CDC to have indirectly affected their desired treatment plan.

The reported aspects were challenges regarding the rehabilitation room, a lack of aesthetic and structural professionalism as well as excessive administration duties. These findings propose that the DUT CDC is sufficiently equipped but has the potential to be better to enhance the implementation of EBP. Overall, the participants had positive experiences but with negative aspects as well.

6.2.3 Research Question Three: What Are the Perceived Barriers and Challenges of Chiropractic Master's Students on Implementation of Evidence-Based Practice?

Common challenges reported were a difference between clinicians' views versus students' views; SARS-CoV-2 restrictions; a lack of updated literature; adapting

evidence-based treatment protocols to individual patients, as well as discrepancies between evidence and patient responses. Less commonly reported challenges were paying for articles; patient preference; forgetfulness; discrepancy between what has been taught and evidence versus administration, and difficulty implementing EBP due to the fact that diagnoses change. Self-perceived limitations which served as barriers were found to be a lack of internet; a lack of reading literature, and difficulty referencing due to a lack of proficiency.

6.3 STRENGTHS OF THIS STUDY

This qualitative study provided an opportunity to the researcher to obtain the perceptions, understanding, challenges and experiences of Chiropractic Master's students on the implementation of EBP at a teaching clinic, which are concepts that were previously understudied in South Africa. In addition, this study contributed to the undergraduate and postgraduate education of the chiropractic profession. Furthermore, this study was conducted at the DUT highlighting aspects pertaining to the DUT chiropractic course, utilising a unique cohort of students.

6.4 LIMITATIONS OF THIS STUDY

This study was conducted in KwaZulu-Natal, concentrating on a specific cohort which were Chiropractic Master's students doing their clinical practicum at the DUT CDC. The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice may differ from chiropractic students at other universities, at which the structure of the curriculum may be different from that of the DUT. Therefore, it is important to exercise caution when generalising the findings of this study. However, the findings of this study may be useful in guiding the structure of a reviewed curriculum as well as allowing to incorporate more contextualised EBP approaches. In addition, it may be useful in guiding lecturing methods, clinicians in their interaction with students, as well as future EBP initiatives.

Furthermore, this study explored the perceptions of Chiropractic Master's students with regard to their confidence, knowledge and skills but did not necessarily employ methods to *appraise* their confidence, knowledge and skill. Hence, although Chiropractic Master's student felt theoretically grounded and were able to search for literature, there is a possibility of that being an unrealistic reflection of their actual

knowledge and skill. It is important to note that this cohort of students ended the undergraduate and started the postgraduate programmes amidst the SARS-CoV-2 pandemic and were the cohort of students that transitioned between the old to the new chiropractic programme at the DUT.

6.5 RESEARCHER'S REFLECTIONS

This segment provides a subjective assessment of the thoughts and perceptions the researcher experienced during the process of this study. For the researcher, it was pleasing to conduct the study on eager, timeous and vocal participants who shared their thoughts and views openly. The data collection process enhanced the researcher's interviewing skills.

Due to the presence of limited published literature pertaining to undergraduate education in the chiropractic profession, the researcher encountered difficulty obtaining relevant information with regard to these aspects, especially within the South African context.

6.6 RECOMMENDATIONS

The stakeholders of chiropractic education and the DUT are liable to acknowledge the hurdles and deficiencies in the chiropractic curriculum, as presented by the findings of this study. The suggested recommendations to improve the chiropractic curriculum in order to encourage the practice of an evidence-based approach, taking into account recommendations by participants are described as follows.

6.6.1 Recommendations for the Chiropractic Programme at the DUT

- It is suggested that implementing a journal club much earlier into the chiropractic curriculum, specifically into the undergraduate programme instead of the postgraduate programme would be beneficial as it allows students time to adapt to searching for literature and enhancing their critical appraisal skills earlier in the course, so as to perform optimally by the time they enter the master's programme.
- In the undergraduate programme, it would be beneficial to implement a method where lecturing is done for conditions with a reference of evidence-based treatments pertaining to those conditions so as to substantiate

treatment and encourage students to adopt an evidence-based approach during their clinical practicum. A method of providing notes with references for students to do their own reading would also encourage to adopt this approach.

- Inculcating an EBP approach into the undergraduate curriculum is recommended to promote self-learning and prepare students for their clinical practicum, as well as for their master's dissertation project
- Conducting a workshop prior to the commencement of a student's clinical practicum, where the importance and relevance of the EBCC references are reiterated, would allow for students to understand the purpose of the reference and how it substantiates their treatment. In addition, explaining the criteria that is needed to apply that reference is important for administrative purposes.
- Integrating frequent workshops, focussing on different evidence-based chiropractic techniques, along with other evidence-based chiropractic related treatment modalities, is recommended to allow the student to adopt different methods of practicing.
- Adopting a more practical method, in conjunction with or other than EBCC references, is suggested to fulfil the purpose of encouraging an evidence-based approach, ensuring students are consistently learning and keeping up with updated literature so as to remain proficient.
- Incorporating skilled personnel who have an affinity towards creating a shift towards EBP is recommended to enable interaction with students and encourage more research, as well as to be up to date with the literature so as to engage with a new era of students.

6.6.2 Recommendations for the Future Research

It is recommended that a comparative study be conducted on Chiropractic Master's students during their clinical practicum at the University of Johannesburg to determine relevant similarities, differences or further recommendations which will enhance the chiropractic curriculum. The findings of these studies could contribute to the improvement of the chiropractic education in South Africa.

Furthermore, this study explored the perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum with no accurate methods employed to assess their level of confidence, knowledge and skills. Therefore, it is suggested that further research be conducted to assess the confidence, knowledge and skills that chiropractic students acquire on the implementation of evidence-based practice during their clinical practicum.

6.7 CONCLUSION

This qualitative study assessed the perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal. The findings illustrate that students had a positive perception regarding EBP with some students reporting limitations to its practice in addition to a positive perception. Although students believed the chiropractic course at the DUT CDC provided a solid foundation, a lack of training in multiple aspects was found. The barriers and challenges encountered by chiropractic students on practicing EBP during their clinical practicum at the DUT CDC has been discussed along with suggested measures of improvement to aid in the implementation of EBP. The positive aspects with regard to the chiropractic training have also been highlighted. As a general consensus, students felt insufficiently trained in the undergraduate programme with regard to EBP and its implementation and, therefore, made recommendations to encourage the utilisation of an evidence-based approach a lot sooner in the programme.

This qualitative study is one of the few studies in relation to EBP and chiropractic education. The majority of the findings of this study correlated to previous studies but only a few of those studies were chiropractic-specific. Therefore, this study adds a valuable perspective from the insight of a Chiropractic Master's student on the necessary areas of improvement required in the chiropractic curriculum. A need for further investigation remains, regarding the evaluation of undergraduate student's perceptions, confidence, knowledge and skills on the implementation of EBP at the DUT.

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APPENDICES

APPENDIX A

GATEKEEPER'S PERMISSION TO CONDUCT RESEARCH AT THE DUT CDC

Directorate for Research and Postgraduate Support
Durban University of Technology
Tromso Annexe, Steve Biko Campus
P.O. Box 1334, Durban 4000
Tel.: 031-3732576/7
Fax: 031-3732946

12th November 2021
Ms Tasmiya Tayob
c/o Department of Chiropractic and Somatology
Faculty of Health Sciences
Durban University of Technology

Dear Ms Tayob

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers. I am pleased to inform you that the Institutional Research and Innovation Committee (IRIC) has granted **Gatekeeper Permission** for you to conduct your research "The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal" at the Durban University of Technology. **Kindly note that this letter must be issued to the IREC for approval before you commence data collection**.

The DUT may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

We would be grateful if a summary of your key research findings would be submitted to the IRIC on completion of your studies.

Kindest regards.
Yours sincerely

_____
DR LINDA ZIKHONA LINGANISO
DIRECTOR: RESEARCH AND POSTGRADUATE SUPPORT DIRECTORATE

APPENDIX B

GATEKEEPER'S PERMISSION TO UTILISE THE RESEARCH ROOM AT THE DUT CDC

From the Office of the Executive Dean: Faculty of Health Sciences, Professor G G Mchunu
Tel: (031) 373 2704, Fax: 086 674 0237, Email: GuguM6@dut.ac.za

24 November 2021

Ms T Tayob, 21905898
P O Box 1062
Houghton
Johannesburg
2041

Dear Ms Tayob,

RE: GATEKEEPER PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the Durban University of Technology, provided Ethical clearance has been obtained. We note the title of your research project submitted to the Institutional Research Ethics Committee (IREC) as: *"The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal"*

As per your proposal, you have requested permission to utilise the research room at the DUT Chiropractic Day Clinic for the purposes of data collection. You further requested access to the 5th and 6th year class lists of the registered Masters: Chiropractic Students. Permission is hereby granted for your request.

Please note that gatekeeper approval means that the researcher needs to adhere to the following conditions:

- No data collection can commence prior to full approval of your study by the IREC
- Prior arrangements need to be made with the facility and an assurance that clinic and academic services will not be disrupted.
- Ethical clearance number needs to appear in all your data collection instruments;
- Always display Research title and details of the research, the researcher and the supervisor;
- Identity numbers and email addresses of individuals are not a matter of public record and are protected according to Section 14 of the South African Constitution, as well as the PAIA and POPI Act. For the release of such information over to yourself for research purposes, the Durban University of Technology will need to express consent from the relevant data subjects.
- All collected data must be treated with due confidentiality and anonymity.

Yours sincerely,

Professor G G Mchunu
Executive Dean: Faculty of Health Sciences

APPENDIX C

GATEKEEPER'S PERMISSION TO ACCESS THE RELEVANT CLASS LISTS OF CHIROPRACTIC MASTER'S STUDENTS

From the Office of the Executive Dean: Faculty of Health Sciences, Professor G G Mchunu
Tel: (031) 373 2704, Fax: 086 674 0237, Email: GuguM6@dut.ac.za

24 November 2021

Ms T Tayob, 21905898
P O Box 1062
Houghton
Johannesburg
2041

Dear Ms Tayob,

RE: GATEKEEPER PERMISSION TO CONDUCT RESEARCH

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- No data collection can commence prior to full approval of your study by the IREC
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- Ethical clearance number needs to appear in all your data collection instruments;
- Always display Research title and details of the research, the researcher and the supervisor;
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- All collected data must be treated with due confidentiality and anonymity.

Yours sincerely,

Professor G G Mchunu
Executive Dean: Faculty of Health Sciences

APPENDIX D

SEMI-STRUCTURED INTERVIEW GUIDE

1) What are your perceptions towards evidence-based practice?

Probes:

Comment on your theoretical grounding, practical application and proficiency in implementing EBP.

In hindsight, what measures in your pre-clinical training do you think could have been taken to make the implementation of EBP easier your clinical practicum?

2) What are your experiences on the implementation of evidence-based practice?

Probes:

Has your treatment response been concurrent with applied EBP references in the clinic? Please elaborate

Are you more confident in your capabilities as an aspiring chiropractor and why?

Do you feel the clinic has the necessary facilities and equipped sufficiently for patient care? Elaborate on why you feel this way.

Do you feel your chiropractic training has prepared you to provide the necessary care in private practice once you complete the requirements for this qualification and why?

Describe how you obtain and search for your EBP references?

3) What are your perceived barriers and challenges on implementation of evidence-based practice?

Probes:

Can you comment on anything that has hindered your implementation of EBP during your clinical practicum?

Can you describe any challenges you have faced while implementing or trying to implement EBP during your clinical practicum? Please elaborate.

Do you feel that you were sufficiently trained in the undergraduate programme with respect to EBP and how to apply it?

Do you apply EBP differently in comparison to how you were taught and why?

APPENDIX E

LETTER OF INFORMATION FOR THE PILOT STUDY

Dear Participant,

I would like to take this opportunity to welcome you to my research study.

Title of the Research Study: The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal.

Principal Investigator/s/researcher: Tasmiya Tayob, B.Tech Chiropractic

Supervisor: Dr. D. Varatharajullu, M.Tech Chiropractic

Brief Introduction and Purpose of the Study: This study will identify, explore and describe the experiences of Chiropractic Master's students on the implementation of evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal. Students will be interviewed on various aspects regarding the implementation of EBP during their clinical practicum in order to gain an understanding of their perceptions, barriers and challenges which collectively constitute clinical experiences. The data will be collected via digital audio recording during the interview session. The interview will be approximately between 40 and 60 minutes in duration. The participant is simply required to provide answers to the interview questions. Any fifth or sixth year student who has been doing their clinical practicum for a minimum of four months at the DUT CDC will be eligible to participate in this study. You will be required to provide feedback regarding the questions that have been posed in the semi-structured interview guide.

Aim: To determine the experiences of registered Chiropractic Master's students on the implementation of evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal.

Research questions:

1) What are the perceptions of Chiropractic Master's students towards evidence-based practice?

2) What are the experiences of Chiropractic Master's students on implementation of evidence-based practice?

3) What are the perceived barriers and challenges of Chiropractic Master's students on implementation of evidence-based practice?

Outline of the Procedures: If you are willing and have signed the letter of informed consent and code of conduct , an interview will be set up at your convenience. It will be approximately between 40 and 60 minutes in duration and will take place in the research room at the Chiropractic Day Clinic.

Risks or Discomforts to the Participant: There are no risks/discomforts involved from your participation in this study.

Reasons of Potential Withdrawal from the Study: This study may be terminated early under particular circumstances such as non-compliance, illness or government rulings avoiding personal contact between people. You may withdraw from the pilot study at any time should you wish to do so. I, as the researcher, under certain circumstances, may decide to withdraw you from the pilot study.

Benefits: This study will be useful to the Chiropractic Department as the findings may result in the modification and improvement of the potential problematic areas in this research study. This will be achieved by participant feedback regarding the questions posed in the semi-structured interview guide thus making the main study better. This could allow more efficiency in the implementation of EBP during students' clinical practicum and future clinical practice.

Remuneration: Participation in this research pilot study is voluntary and no remuneration will be awarded.

Costs of the Study: Participants will not incur any costs by participating in this research pilot study.

Confidentiality: The details and information obtained through the interview process will be treated with utmost confidence. With the exception of the letter of information, no personal identification details are required. The identity of participants will only be known by the researcher and supervisor. You may withdraw your participation of this pilot study at any time.

Research-related Injury: Due to the nature of the study, injury is unlikely to occur.

Persons to Contact in the Event of Any Problems or Queries

Please contact the researcher Tasmiya Tayob on 0826491819, my supervisor Dr. D.Varatharajullu on 031 373 25833 or the Institutional Research Ethics Administrator on 031 373 2900. Complaints can be reported to the Director: Research and Postgraduate Support, Dr. L Linganiso on 031 373 2577 or emailed to researchdirector@dut.ac.za

APPENDIX F

INFORMED CONSENT FOR THE PILOT STUDY

CONSENT Statement of Agreement to Participate in the Research Pilot Study:

- I hereby confirm that I have been informed by the researcher, _____(name of researcher), 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 of the Pilot Study) 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.

_____ _____ _____ _____

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 G

CODE OF CONDUCT AND CONFIDENTIALITY STATEMENT

This form needs to be completed by every member of the pilot group prior to the commencement of the interviews.

As a participant of this pilot study I agree to abide by the following conditions:

1. All information contained in the research documents and any information discussed will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. None of the information shall be communicated to any other individual or organisation with the exception of the researcher and supervisor.
3. The information gathered by the researcher will be made public in terms of a dissertation and journal publication. The researcher will ensure that any participants in the pilot study and main study remain anonymous and confidential.
4. The interviews will be voice recorded and the data will be transcribed verbatim. The transcribed data will then be stored in the Chiropractic Department on a USB for a period of five years after which electronic data will be deleted and any paperwork will be shredded.
5. All data generated from this study (including the recording) will be kept for a period of five years after which electronic data will be deleted and any paperwork will be shredded.

_____	_____
Full name of participant	Signature
_____	_____
Full name of witness	Signature
_____	_____
Full name of the Researcher	Signature
_____	_____
Full name of the Supervisor	Signature

APPENDIX H

LETTER OF INFORMATION

Title of the Research Study: The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal.

Principal Investigator/s/researcher: Tasmiya Tayob, B.Tech Chiropractic

Supervisor: Dr. D. Varatharajullu, M.Tech Chiropractic

Brief Introduction and Purpose of the Study: This study will identify, explore and describe the experiences of Chiropractic Master's students on the implementation of evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal. Students will be interviewed on various aspects regarding the implementation of EBP during their clinical practicum in order to gain an understanding of their perceptions, barriers and challenges which collectively constitute clinical experiences. The data will be collected via digital audio recording during the interview session. The interview will be approximately between 40 and 60 minutes in duration. The participant is simply required to provide answers to the interview questions. Any fifth or sixth year student who has been doing their clinical practicum for a minimum of four months at the DUT CDC will be eligible to participate in this study.

Good day. I would like this opportunity to welcome you to my research study.

Dear Participant,

I am a fifth year student at DUT doing research for my Master's of Health Science's degree in Chiropractic. I would like to invite you to participate in this research study and thank you for your interest in participation.

What is Research: Research is a systematic search or enquiry for generalised new knowledge. It is important that you fully understand the purpose and procedures of this study. You may ask as many questions as you wish and you are under no obligation to commit to participating in this study at this stage. You are entitled to discuss and enquire about this study with whomever you wish to hence a copy of the Letter of Information will be available for you to take home.

Outline of the Procedures: If you are willing and have signed the letter of informed consent, an interview will be set up at your convenience. It will be approximately between 40 and 60 minutes in duration and will take place in the research room at the Chiropractic Day Clinic.

Risks or Discomforts to the Participant: There are no risks/discomforts involved from

your participation in this study.

Reasons of Potential Withdrawal from the Study: This study may be terminated early under particular circumstances such as non-compliance, illness or government rulings avoiding personal contact between people. You may withdraw from the study at any time should you wish to do so. I, as the researcher, under certain circumstances, may decide to withdraw you from the study.

Benefits: This study will be useful to the Chiropractic Department as the findings may result in the modification and improvement in the current curriculum. This could allow more efficiency in the implementation of EBP during students' clinical practicum and future clinical practice.

Remuneration: Participation in this research study is voluntary and no remuneration will be awarded.

Costs of the Study: Participants will not incur any costs by participating in this research study.

Confidentiality: The details and information obtained through the interview process will be treated with utmost confidence. With the exception of the letter of information, no personal identification details are required. The identity of participants will only be known by the researcher and supervisor. You may withdraw your participation of this study at any time.

Results: The transcribed data will be placed in the Chiropractic Programme archive and stored for five years, after which it will be destroyed.

Research-related Injury: Due to the nature of the study, injury is unlikely to occur.

Storage of all Electronic and Hard Copies Including Tape Recordings: The interview will be audio recorded and transcribed onto a computer. The data will be transferred onto a flash disk and can only be accessed by the researcher and the supervisor. The participants' personal details will be omitted to ensure confidentiality and professionalism. The transcribed data can then be placed in the Chiropractic Programme archive and stored for five years, after which it will be destroyed.

If you have any further queries, please do not hesitate to contact me or my supervisors.

Your time, opinions and assistance in this study is invaluable and greatly appreciated.

Persons to Contact in the Event of Any Problems or Queries

Please contact the researcher Tasmiya Tayob on 0826491819, my supervisor Dr. D. Varatharajullu on 031 373 2533 or the Institutional Research Ethics Administrator on 031 373 2900. Complaints can be reported to the Director: Research and Postgraduate Support, Dr. L. Linganiso on 031 373 2577 or emailed to researchdirector@dut.ac.za.

APPENDIX I

INFORMED CONSENT

CONSENT Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, _____(name of researcher), 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.

_____ _____ _____ _____

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 J

INSTITUTIONAL RESEARCH ETHICS COMMITTEE CLEARANCE CERTIFICATE

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

13 December 2021

Ms T Tayob
P O Box 1062
Houghton
Johannesburg
2041

Dear Ms Tayob

The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal
Ethical Clearance number IREC 201/21

The Institutional Research Ethics Committee acknowledges receipt of your notification regarding the piloting of your data collection tool.

Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the IREC acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Professor J K Adam
Chairperson: IREC

APPENDIX K

EXEMPLAR TRANSCRIPT

Transcript 5 (P5)

Date: 15/12/21

Time: 9:15 am

Researcher: Hello.

Participant 5: Hi

Researcher: Before we start, I'd just like to thank you for opting to participate in my study. This interview is being recorded, is that okay?

Participant 5: That's fine, thanks.

Researcher: If you'd like to withdraw at any stage, kindly let me know and we will stop. Let me just double check it says it's recording.

Participant 5: Someone started recording.

Researcher: Oh, did it say so? Ok now mine says so.

Participant 5: Okay, cool.

Researcher: Can I get your age, please?

Participant 5: Twenty-two

Researcher: Thank you. How long have you been clinically active at the DUT CDC for?

Participant 5: Uhm, round about 10 months.

Researcher: Okay, so what are your perceptions towards-evidence based practice?

Participant 5: Uhm, uh, I actually got a question for you, sorry. This is qualitative research, hey?

Researcher: Yes

Participant 5: Okay. Alright. No, I was just making sure. Okay. Uhm, so, evidence-based practice for me, I think is very important, uhm, in order to be able to ensure that what we are learning and how we are treating our patients is, uhm, governed by something and evidence for me is the only way that can say whether you should or shouldn't be treating someone with whatever you're choosing to treat them with.

Researcher: Okay, and can you comment on your theoretical grounding, practical application and proficiency in implementing evidence-based practice?

Participant 5: Uhm, so, I think if I'm reading the question right, we're looking at like when it comes to clinic how we use evidence-based practice for our patients. Is that correct?

Researcher: Yes yes.

Participant 5: So, obviously, they have insisted that we do EBCC's, uhm, to reference all of our treatment that we use. I found it relatively helpful. I actually enjoy looking up research for… to back up my treatment. So, when I treat someone with something, I find research to back it, uhm, and then I do make a list not to be able to just have like an area to copy a reference from, but so that I know that there is actually evidence backing every time I choose to treat someone with an adjustment or a modality or anything like that. So, I found it relatively easy to do. Uhm, there are a couple of things that I do struggle to find information for quite quickly when it comes to looking, uhm, at trying to get an EBCC done, but then I do normally go home and do more research on it and then make a list of – well that reference for next time so that I know that there is evidence backing up my treatment.

Researcher: Awesome. Uh, in hindsight, what measures in your pre-clinical training do you think could have been taken to make the implementation of evidence-based practice easier in your clinical practicum?

Participant 5: Uhm, I think actually using articles to back up and giving us examples when it came to teaching us, uhm, for example, an adjustment, uhm, "Here's the resources that back why we should be using that for this treatment, uhm, and for this condition." I think it would have just been a little bit easier to know before you - like when you first start clinic, you kind of are told "Okay, find a reference to back that." You actually don't know where to even start. So, if they had implemented a way to give us resources or articles to go and read up on that prove while that treatment is effective, I think that would have helped a lot when it came to starting clinic.

Researcher: Okay. What are your experiences on the implementation of evidence-based practice?

Participant 5: Uhm, I think they've all been relatively positive, uhm, I have managed to find majority of the evidence I'm needing to support my treatment. However, once in a while, there are certain things that you put down and I've struggled to because I like to reference everything I treat, or at least make a note that I've found a reference for everything I trea - I'm treating. There are one or two things that seem to just - you can't find literature on and that's a little bit concerning that we taught something and we can't actually find the literature to back it, uhm, so yeah, that's where they had obviously implemented, giving us resources when we were taught the modality or the adjustment. It might have just given peace of mind that you are still actually doing evidence-based practice.

Researcher: All right and has your treatment response been from current with applied evidence-based practice references in the clinic? Please elaborate.

Participant 5: Yes, it has, uhm, anytime that I've chosen a certain modality or adjustment or, uhm, soft tissue work, uhm, and I've had references to back that up, uhm, I definitely have found that my patients have responded positively to those treatments, uhm, I wouldn't know for the one or two things that I can't find proper evidence for, uhm, specifically, like ultrasound seems to be a problem when it comes to trying to find the evidence. Uhm, but yeah, everything that I have, uhm, used the reference for to support why I'm treating that I found, uhh, a very good response rate from my patients.

Researcher: And are you more confident in your capabilities as an aspiring chiropractor and why?

Participant 5: Uh, is this worth having evidence to back it?

Researcher: Yes.

Participant 5: Yeah, I would say yes, 100%. I don't really believe in any of the, uhm, old sort of chiro where you don't use evidence, uhm, so if I've got evidence to back up what I'm doing it, it definitely makes me feel more confident with my treatment and feel that I'm doing something that, uhm, has been researched and has proven efficacy, uhm, which I think is important when treating patients.

Researcher: Do you feel the clinic has the necessary facilities and equipped sufficiently for patient care? And can you please elaborate on why you feel this way?

Participant 5: Uhm, yes, I think they do have sufficient, uhm, area and equipment for it. Uhm, I think the only concern comes in like when it comes to using certain modalities. Obviously, there's only one of them and when you're having to sit and wait for other, uhm, students to treat using that modality. Uhm, obviously that can be a little bit frustrating time wise for, uhm, you as a, uhm, student treating as well as the patient who has to sit and wait, uhm, extra time and… and waste their time waiting for it. However, because it is a Teaching and Educational clinic, I understand why they, uhm, can't have more than one. So, obviously all the modalities are very expensive. Uhm, so within their capabilities as a teaching clinic, I think that there is sufficient resources.

Researcher: Alright. Do you feel your chiropractic training has prepared you to provide the necessary care in private practice once you complete the requirements for qualification and why?

Participant 5: No. Uhm, so I think our training has been very in depth, uhm, and being in clinic is definitely helpful to… to, uhm, prepare us for private practice. However, I think

because it is an educational clinic and we've got so much paperwork, uhm, and other things to worry about where in private practice, that's not-obviously… you have to make notes and there is paperwork involved, uhm, but I know that it's not to the extent that we have to. I think it focuses our shift a little bit more on unnecessary things whereas our focus should be all on a patient and treating them and trying to get them better. We're stuck having to make sure we get signatures and, uhm, deal with so much elaborate paperwork where some things are actually not necessary and just take up further time. So, I think going into private practice is going to be a little bit of a shock, uhm, I would actually say that possibly sports events prepares you a little bit better, uhm, because you've got a more succinct sort of paperwork, uhm, and your treatments a little bit quicker, uhm, ya.

Researcher: Okay. Um, describe how you obtain and search for evidence-based practice references.

Participant 5: Sorry, say that again.

Researcher: Can you please describe, uh, how you obtain and search for your evidence-based practice references?

Participant 5: Uhm, okay, so normally like when I first started, uhm, I would go straight to the internet before doing a reference, uhm, going on to the common journals, uhm, that I use, uhm, and that I've used for like research and that, uhm, in order to try and find, uhm, a reason that I can use conservative management, which normally covers manipulation, soft tissue and certain modalities for whichever condition I'm treating. Uhm, from there, I do make, try and make a comprehensive list of references that support different, uhm modalities of treatment, uhm, and when I have to treat that condition again, as long as that reference still links correctly to my patients, that's fine. I'll use it again. Uhm, if it's not or… If I've got, because obviously all patients present slightly differently. If it's not a generalised reference, uhm, it is a more specific treatment to this condition, then I will search again.

Researcher: And what are your perceived barriers and challenges on implementation of evidence-based practice?

Participant 5: I think just that we we've been taught a whole lot of things that we are allowed to do and are allowed to treat and without having been given the evidence originally, there are certain things that if I can't find the reference for, I won't treat using that - if I don't have research backing it up, because that's how I want to practice as a… when I qualify, officially. Uhm, so not having that evidence originally provided for us - I don't understand why we'd be taught something if there isn't enough evidence to prove its efficacy. Uhm, so yeah, they definitely do need to implement a way to have all of that some sort of research backing it when they teach us.

Researcher: Can you can you comment on anything that has hindering your implementation of evidence-based practice during your clinical practicum?

Participant 5: Uhm, only the above of what I've just said. I don't think there's anything else that I know of.

Researcher: Okay that's perfect. Do you feel that you were sufficiently trained in the undergraduate programme with respect to evidence-based practice and how to apply?

Participant 5: No, I don't. Ah. If you combine - if you look at research, I think actually in research we were taught more of how to actually find evidence for things. Uhm, if you combine that with your clinical practice and what you - what treatment you're using uhm, I guess, relatively, we were taught, but I don't think that they made enough emphasis on it when it came to actually teaching us the modalities or adjustments in that and how to make sure that we've got evidence for that.

Researcher: And do you apply evidence-based practice differently in comparison to how you were taught and why?

Participant 5: Uhm, yeah, I wouldn't say we were taught much about evidence-based practice except make sure you've got something to back why you're doing it. Uhm, when we came into the clinic, it was sort of like "This is just a reference that you have to fill out" and there wasn't much more explained, uhm, so yeah, I think they possibly need to place a bit more emphasis on that so that you know what to do. We, I think, all - majority of us figured it out and realized okay, you're trying to back up each, uhm, treatment that you use, but that wasn't specifically taught on how to use it.

Researcher: Are there any other challenges you have faced by implementing or trying to implement evidence-based practice during your clinical practicum?

Participant 5: No, nothing else that I know.

Researcher: Awesome. We're actually done.

Participant 5: Oh, my goodness, am I too quick? Sorry, I talk…

Researcher : No, not at all. Thank you. I'm just going to stop recording.

APPENDIX L

EDITOR'S CERTIFICATE

Helen Bond
IMPELA EDITING SERVICES
impelaediting@gmail.com
079 395 5873

6 November 2022

CERTIFICATE

Tasmiya Tayob

Dear Tasmiya

Thank you for using Impela Editing Services to edit your dissertation entitled "*The perceptions and experiences of Chiropractic Master's students on practicing evidence-based practice during their clinical practicum at a teaching clinic in KwaZulu-Natal*".

I have proofread for errors of grammar, punctuation, spelling, syntax and typing mistakes. I have formatted your work and checked the references (this means checking the formatting), as according to the format specified by the DUT Harvard referencing style. I believe your work to be error free.

PLEASE NOTE: Impela Editing accepts no fault if an author makes changes to a document after a certificate has been issued.

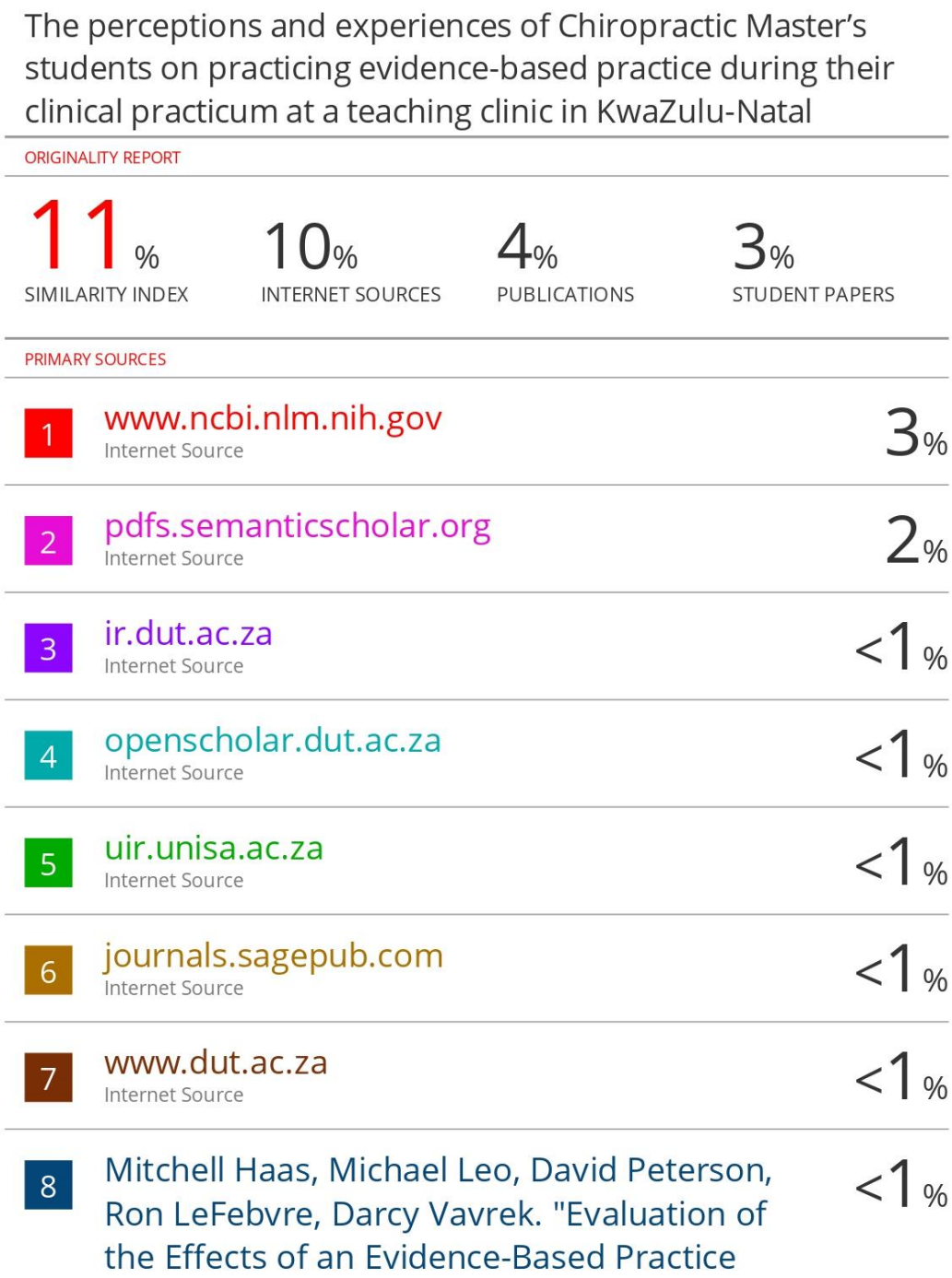
I wish you the very best in your submission.

Kind regards

Helen Bond (Bachelor of Arts, HDE)

APPENDIX M

PLAGIARISM REPORT



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