PERCEPTION OF CHIROPRACTIC STUDENTS IN THEIR PREPAREDNESS IN THE DIAGNOSES AND MANAGEMENT OF HEADACHE DISORDERS AT A SELECTED UNIVERSITY OF TECHNOLOGY

By

Tamia Abrahams (21815075)

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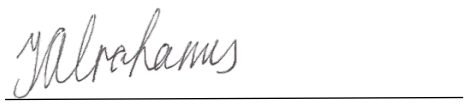
I, Tamia Abrahams, do declare that this dissertation is entirely my own work in both conception and execution (except where acknowledgements indicate to the contrary)



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Dr Ashura Abdul-Rasheed

MTech: Chiropractic

PhD Health Sciences

DEDICATION

To my GP and my Father, this is for you. The Almighty is indeed the best of planners, Alhamdulillah!

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These past six years have felt like the longest and shortest years of my life, simultaneously! There are numerous people that have played an integral role in getting me to this point.

"*For -I can do everything through Christ, who gives me strength. Whatever I have, wherever I am, I can make it through anything in the One who makes me who I am. I am able to do all things through Him who strengthens me"* Philippians 4:13

Father and Mom — you have sacrificed your lives for me. For that I will be eternally grateful and indebted to you!

Zi — I trust that you will be inspired to chase after your dreams, no matter how scary they may seem.

To my family, Abrahams, Adonis, Matthews and Moodley, thank you for believing in me and encouraging me along every step of this journey. I am grateful for your presence and thoughtfulness.

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DEFINITIONS AND TERMS

Headache: Pain found in the head above the orbito-meatal line and or nuchal ridge (Olesen *et al.* 2018).

Self-perceived preparedness: How one views themselves in terms of confidence and competency with regard to certain skills (Manakil and George 2013).

Chiropractic: A health profession concerned with the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system, and the effects of these disorders on the function of the nervous system and general health. There is an emphasis on manual treatments including spinal adjustment and other joint and soft-tissue manipulation (WFC 2001).

ABSTRACT

Background

A headache is defined as “pain found in the head above the orbito-meatal line and or nuchal ridge” and widely affects both males and females globally. Chiropractic treatment and the management of headaches is substantial, with one in five new patients’ chief complaint being a headache and, thus, the use of chiropractic care in the management and treatment of headaches is popular. The term “self-perceived preparedness” refers to how people view themselves in terms of confidence and competency with regard to certain skills. Self-perceived preparedness is essential as it relates to one’s confidence and the ability to accurately diagnose and manage headache disorders. There is a definite scarcity in South African literature as to the self-perceived preparedness of students in the diagnosis and management of headache disorders. In a South African chiropractic context, the literature, with regard to students’ confidence, awareness and self-assessment of skills is lacking.

There are a number of advantages that can come from exploring the concept of self-perceived preparedness. The benefits include, but are not limited to, the assessment of whether or not the curricula goals have been achieved, the readiness of chiropractic students to confidently and correctly diagnose and manage patients sufficiently, and the different aspects that can lead to one feeling unprepared.

Aim

The aim of this study was to explore and describe the self-perceived preparedness of the chiropractic students’ in the diagnosis and management of headache disorders.

Methodology

This study design employed a qualitative, explorative and descriptive design. Purposeful sampling was utilised and individual, semi-structured interviews were conducted with 13 Master’s degree students in the chiropractic programme. These interviews took place “in-person” and an interview guide was utilised in each interview. The interviews were conducted over a week from the 18th to the 23rd of September 2023. The questions surrounded the topics of self-perceived preparedness, confidence, challenges (whether educational or personal) and the effect of clinical exposure on one’s confidence and skills. The interviews were analysed and themes were extracted utilising Tesch’s eight-step approach of data analysis.

Results

The chief themes that emerged from the data collection included the level of preparedness, educational and environmental challenges, as well as the positive role that clinical exposure had on students' views of their self-perceived preparedness. The participants felt largely unprepared to deal clinically with headache disorders. This stemmed from the feeling of isolation within academia, lack of support from staff and clinicians, lack of practical aspects within the curriculum and the COVID-19 pandemic, which resulted in a lack of in-person interaction.

Conclusion

The findings of this study highlighted the lack of confidence and feeling of under-preparedness to deal with headache disorders within a clinic setting by chiropractic Master's students. This was mainly attributed to educational and environmental challenges. However, the exposure students gained within a clinical environment greatly improved their feeling of overall self-perceived preparedness.

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CHAPTER 1 SCOPE OF THE STUDY

1.1 INTRODUCTION

This chapter introduces the study and it commences by providing an introductory general background and overview of self-perceived preparedness in students at a university of technology. The study will provide insight into how prepared students feel they are to diagnose and manage headache disorders.

According to the International Headache Society, a headache is defined as “pain found in the head above the orbito-meatal line and or nuchal ridge” (Olesen *et al.* 2018). Headaches have further been defined as a “clinical syndrome” that both widely affects male and females alike (Andrasik *et al.* 2013). In 2018, Steiner and Saylor (2018) undertook a global study and found that headaches are associated with “impaired quality of life, substantial lost productivity and high economic costs in every country surveyed”. Headache disorders can be divided into primary and secondary headaches. Primary headaches are benign and recurrent while secondary headaches are more infrequent and sinister (Steiner and Saylor 2018). Primary headaches have been noted to have the greatest prevalence worldwide with regard to quality of life and decline in individual’s productivity (Steiner and Saylor 2018).

There are different means by which headaches can be treated pharmacologically and include analgesics, triptans and dopamine-agonists. Surgery too is utilised as a non-pharmacological intervention (Chowdhury, Da Silva and Tepper 2012). Depending on their origin (namely primary or secondary headaches) they can be treated with pharmaceutical care only, chiropractic and allied care or a combination of the two (Chowdhury 2012; Bernstein *et al.* 2019).

Chiropractic treatment and management of headaches is substantial with one in five new patients’ chief complaint being a headache (Olesen *et al.* 2018). The general chiropractic approach to the treatment of headaches is holistic (Hawk *et al.* 2020). The person’s mental, physical, biomechanical as well as nutritional health is scrutinised. From these aspects, treatment interventions are applied accordingly. The treatment for headaches can include spinal manipulation therapy, myofascial work and release as well as nutritional advice. Rehabilitation exercises and lifestyle changes too can be recommended (Bernstein *et al.* 2019). The use of chiropractic care in the management and treatment of headaches is popular (Millstine, Chen and Bauer 2017).

The term “self-perceived preparedness” refers to how one views themselves in terms of confidence and competency with regard to certain skills (Manakil and George 2013). Self-perceived preparedness is essential as it relates to one’s confidence and the ability to

accurately diagnose and manage headache disorders (Hynes *et al.* 2016). It is imperative for diagnosis of headache disorders by chiropractors and students' alike to be accurate. In order for treatment and management to be appropriate, effective and safe, one needs to perceive themselves as being prepared (Moore *et al*. 2021).

There are a number of benefits that come from exploring self-perceived preparedness. The benefits include, but are not limited to, the assessment of whether or not the curricula goals have been achieved, the readiness of one to confidently and correctly diagnose and manage patients sufficiently and the different aspects that can lead to one feeling unprepared (Moore *et al.* 2021). Previous research has shown that health-care graduates perceive themselves as "unprepared with certain clinical competencies" which can demonstrate a difference in clinical knowledge and practical application with patients (Moore *et al.* 2021).

1.2 CONTEXT OF STUDY

Headaches are associated with a high prevalence and global burden on global socio-economic and healthcare systems (Steiner and Saylor 2018). Headache disorders are widely treated by chiropractors around the world with one in five new patients' chief complaint being a primary headache (Moore *et al.* 2018).

Chiropractic research around the diagnosis and management of headaches has been conducted within a South African context (De Busser 2001; Kleingelds 2016; Seejarim 2016). These studies have spanned an array of approaches. However, the chief approach has consisted of the diagnosis of headaches in patients as well as specific techniques that can be employed to treat and manage headaches disorders.

Literature, in a South African chiropractic context, with regard to student's confidence, awareness and self-assessment of skills is lacking. It is thus important to assess how prepared students feel in this aspect, as this knowledge can lay the foundation for the way they will practice going forward. There is a definite scarcity in the South African literature as to the self-perceived preparedness of students in the diagnosis and management of headache disorders. However, it would appear that self- perceived preparedness is not synonymous to that of South African setting. Globally, and more specifically in Australia, a study stated that chiropractic graduates had perceived themselves to be "lacking" in competency when it came to certain clinical aspects (Moore *et al.* 2021). Previous research has shown that health-care graduates perceive themselves as "unprepared with certain clinical competencies" which can demonstrate a difference in clinical knowledge and practical application with patients (Hynes *et al.* 2016). In a dentistry focused study it was noted that there was little material on the perception of student's preparedness for their working career (Manakil and George 2013). Khan, Salahuddin and Khan (2014) also commented that while the faculty performs all

assessments and evaluations at a student level, in practice it is the responsibility of the professional to account for their own competency.

This being said, in a chiropractic domain this will be beneficial as it was suggested that this mind-set of self-assessment be taken up at a student level and students be allowed to assess their own competence on a regular basis (Khan, Salahuddin and Khan 2014). Self-assessment is difficult to quantify as one normally uses educational achievements to yard-stick one's ability (Dey 2005). This use of educational achievements can occasionally not depict the true confidence of one and also the quality of the knowledge they have gained (Dey 2005). Therefore, it is important to utilise other tools such as in depth- explorative interviews to gauge the true feelings of self-perceived preparedness rather than educational achievements.

One of the factors that could influence self-perceived preparedness includes the quality of the education received. Education received directly impacts the confidence and ability of one to display knowledge of the subject (World Health Organization 2015). The 2030 Sustainable Development Goals, as set out by the World Health Organization (WHO), particularly Goal Three (Good Health and Wellbeing) and Goal Four (Quality Education) will be addressed in this study. The WHO supported these sentiments, which encourage the further need to assess ones' clinical experience due to the fact that there is a lack of training curricula in terms of the management of headache disorders as stated in their Global Burden study. This directly impacts the confidence and ability of one to carry-forth this knowledge to the diagnostic phase and create optimal deliverance of healthcare (WHO 2015).

Through the establishment of self-perceived preparedness one will also be able to bring to the fore the challenges one faces in being prepared as well as the impact clinical exposure has on one's self-perceived preparedness.

1.3 GAP IN THE LITERATURE

There is a well-established gap within the literature in regard to qualitative headache research of a chiropractic phenomenon in Africa (Hynes *et al.* 2016; Pulkkinen and De La Ossa 2019; Moore *et al.* 2021). In order to further this body of literature there needs to be more studies of this nature conducted.

The reason why students were chosen was to gain insight and understanding on how prepared they feel in this area. Due to the fact that headache patients frequent chiropractors, students need to well versed in the diagnosis and management of headache disorders (Mitsikostas *et al.* 2015).

This study will benefit students and faculty alike. Students will be given a chance to evaluate themselves which assists in the development of confidence and preparedness (Pulkkinen and De La Ossa 2019).

While faculty will have the ability to review if curricular goals are being met as set out. This study not only contributes to the body of literature globally, but as well as locally and provides benefit in an educational and clinical sense.

1.4 PROBLEM STATEMENT

Being clinically competent is essential in the accurate diagnosis and management of headache conditions (Moore *et al.* 2019). In order to assess one's true competency one looks to self-perceived preparedness (Ramahlo 2020). Self-perceived preparedness encompasses one's confidence, skills and preparation one feels they do or do not possess (Manakil and George 2013). One's self-perceived preparedness can determine their accuracy and ability to correctly diagnose and manage headache disorders (Moore *et al.* 2021). This concept has been investigated in other musculoskeletal conditions and there is a paucity in the literature concerning chiropractic students and self-perceived preparedness regarding clinical skills like treatment and management protocols pertaining to headache disorders, specifically in a South African context. The exploration into student's self-perceived preparedness with regard to clinical skills, is thus warranted and needed.

1.5 AIM OF THE STUDY

The aim of this study is to explore and describe the self-perceived preparedness of the chiropractic students' in the diagnosis and management of headache disorders.

1.6 STUDY OBJECTIVES

This study has three main objectives, namely:

Objective 1: To explore and describe the self-perceived preparedness (skills, confidence, awareness, preparation of) chiropractic students' in their diagnosis and management of headache disorders.

Objective 2: To identify and describe any challenges experienced in their preparedness for the diagnosis and management of primary headache disorders.

Objective 3: To describe the effect of clinical exposure on students' self-perceived preparedness to diagnose and manage headache disorders.

1.7 SIGNIFICANCE OF THE STUDY

This study has importance as a qualitative study for South African chiropractic students, as a study of this nature has not yet been conducted in the realm of South African chiropractic. This study will be an in-depth analysis into clinical competencies which leads to confidence and preparation which either one has the ability to demonstrate or lacks in demonstration.

Understanding that there are significant challenges that are experienced in the correct management of headache patients, further elaboration reveals that under-diagnosis and poor diagnosis is common with qualified chiropractors (Moore *et al.* 2018). An investigation into the present student populous and their preparedness, or lack thereof, is duly warranted. Within the field, there seems to be consensus that literature on student intern's preparedness for the chiropractic profession is lacking and further studies are necessary (Hynes *et al.* 2016).

Moore *et al.* (2021) further emphasised the need to further research barriers and reasons that impact clinic competence. The understanding to be gained from this research will have over-arching effects not only for South African students, but for African students, chiropractic institutions, facilitators and educators alike. An insight into preparedness, experiences, barriers, challenges as well as the impact of education will be gained.

1.8 OUTLINE OF THE DISSERTATION

Chapter 1: Introduction

Chapter one gives a broad overview and summary of the study at hand. It outlines the background to the research problem so that one can begin to understand the significance and the objectives of the research. The reason for the research is also contained in this chapter.

Chapter 2: Literature Review

Chapter two brings forward the available international and local literature which is systematically reviewed and integrated in accordance with the topic. A discussion on the nature of headaches, their significance within a chiropractic context, self-perception and its importance in education as well as the overall integration of this topic will be outlined.

Chapter 3: Conceptual Framework

This chapter will focus on the conceptual and theoretical framework of the study.

Chapter 4: Research Methodology

The research methodology, research design as well as study population and sample size will be discussed. Additionally, participant recruitment, research setting and procedure, data collection and transcription process too will be presented.

Chapter 5: Results and Thematic Analysis

A substantial thematic analysis of the data collected will be analysed in this chapter.

Chapter 6: Discussion

This chapter includes a detailed discussion of the study's findings and provides a comparison to the pre-existing literature.

Chapter 7: Conclusion, Limitations and Recommendations

An overall conclusion will be outlined in this chapter. This chapter too, will include a brief discussion of the limitations and recommendations that are identified.

1.9 SUMMARY OF CHAPTER

This chapter outlined the preliminary details of this research study including a brief outline of the topic, the aims and objectives as well as the significance and outline of the dissertation as a whole.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this literature review is to systematically review and summarise the available literature in regard to the topic at hand. This chapter will bring forth the nature of what headache disorders are and what they encompass (including prevalence locally and internationally), the idea of self-perceived preparedness and essentially how the two spheres interconnect. Prevalence, self-perceived preparedness as well as education and training will be elaborated on.

2.2 UNDERSTANDING HEADACHE DISORDERS

According to the *International Classification of Headache Disorders* 3rd edition (ICHD-III) defines a headache as “pain found in the head above the orbito-meatal line and or nuchal ridge” (Olesen *et al.* 2018). Headaches have further been defined as a “clinical syndrome” that both widely affects male and females alike (Andrasik *et al.* 2013). Robbins and Matthew solidify this notion by stating that headaches are characterised by their production of acute or chronic pain in the cranium which may differ in locality and character (Robbins 2021). The principal and medically relevant classification standards only came about in 1988 after the International Headache Society published the first ICHD. This was achieved by the collaboration of more than a hundred headache experts worldwide (Olesen and Steiner 2004). Essentially this is the global standard for the classification, categorisation and diagnostic criteria of headache disorders. This has continued to be updated, with the latest version being published in 2018 (Olesen *et al.* 2018).

Headache disorders are plentiful and can be divided into two main categories namely primary and secondary headache disorders. The primary and secondary headache disorders have further sub-classifications for each headache type. The principal headaches classified under primary headaches include migraine, tension type headache, cluster headache and other trigeminal autonomic cephalgias (Lipton *et al.* 2004; (Robbins 2021). Secondary headaches are more sinister and can be life threatening, including brain haemorrhaging and infection (Olesen *et al.* 2018).

2.3 CLASSIFICATION OF HEADACHES

The primary headache disorders comprise of migraines, tension type headaches (TTH), trigeminal autonomic cephalgias (TAC) as well as other primary headaches disorders including headaches related to activity such as coughing or exercising (Olesen *et al.* 2018). Secondary headaches have various possible causes and therefore fall under this category as

a result. The headache ensues secondarily as a result of a primary cause. Examples of these include headaches caused by traumatic injury to the body, cerebrovascular accident as well as the overuse or withdrawal from substances (Olesen *et al.* 2018). Primary headaches are less ominous than secondary headache conditions. Secondary headaches can mimic the symptoms of a primary headache (even being solved by the use of analgesics), but are habitually due to life-threatening causes (Mitsikostas *et al.* 2015).

According to the ICHD-III in order for a headache to be diagnosed and classified accordingly the presenting patient would need to experience a minimum amount of attacks of that specific headache. For each headache type this differs and can be confirmed with the headache classification manual. The classification (and therefore ultimate diagnosis) of headache disorders work on a hierarchical system. A full diagnosis according to the ICHD-III guidelines state that a headache can be classified using their system with a maximum of five digits. The first digit indicates the category of primary or secondary headache disorder while additional lettering criteria needs to be met for a full diagnosis to be mad. Should the patient present with more than one headache disorder concurrently each "*type, subtype and sub-form*" are coded for separately (Olesen *et al.* 2018). Upon the occasion where multiple headache disorders are diagnosed in one patient they should be ranked in significance to the individual (Olesen and Steiner 2004).

Migraines are classified according to their presence of auras. Auras are sensory, motor or autonomic phenomena which occur preceding the actual migraine headache. Autonomic phenomena refer to the activation of the sympathetic nervous system and the associated signs and symptoms that occur due to this. These include a vast array of symptoms including lacrimation, rhinorrhoea and altered sensation to areas (Jänig 2003). The most common aura phenomena manifestation was visual disturbances (Rasmussen and Olesen 1992). Migraines present as a unilateral, moderate to severe, pulsating, headaches that can last between 4 to 72 hours long. The associated signs and symptoms accompanying the headache can include nausea, vomiting as well as photo and phonophobia.

There are four sub-types of TTH, which are classified according to their chronicity as well as frequency (Olesen *et al.* 2018). Pure TTH have simple characteristics which do not include any associated signs or symptoms associated with migraine. However, some TTH headaches can mimic migraines by their symptomatology (Lyngberg *et al.* 2005). A TTH can be described as a "pressure-like" or dull and achy type pain. This pain surrounds the entire cranium from above the eyebrows (pre-orbital) to the sub-occipital area. Patients often describe the pain as a "tight band or cap being squeezed over their head" (Chowdhury 2012). Patients too may report peri-cranial tenderness which can be detected and confirmed by motion palpation. The muscles in the surrounding area including the pterygoids, splenius capitus as well as trapezius

muscle (among others) need to be manually palpated for pain and tenderness (Olesen *et al.* 2018). In order to diagnose one with a TTH the specific criteria as outlined in the ICHD-III need to be met. For this to occur a thorough case history and physical examination needs to take place. This is in order to rule out any other sinister causes of a headache (Olesen *et al.* 2018).

Trigeminal autonomic cephalgias (TACs) comprise of five headache types including cluster headache, paroxysmal hemicranias, hemicranias continua, probable TACs and short-lasting unilateral neuralgia form headache attacks (Olesen *et al.* 2018). TACs are classified as such if they occur unilaterally with the presence of cranial autonomic parasympathetic phenomena, which occur on the same side as the headache. Differentiation between migraines and TACs are made by the presence and absence of aura respectively (Olesen *et al.* 2018). CHs, although not very prevalent (with only 0.1% of the population being affected), have been classified as one of the severe and excruciating headache disorders (Wei, Yuan Ong and Goadsby 2018). These headaches can be episodic or chronic and can range from a few minutes to hours long. The headaches are characteristically severe, unilateral and frequently involves the first branch of the Vth (fifth-trigeminal) cranial nerve. Thus pain occurs mostly around the eye and temporal region (Wei, Yuan Ong and Goadsby 2018). There is a myriad of triggers for a CH and range from tobacco exposure to use of vasodilators like alcohol (Weaver-Agostoni 2013). For the period of an attack, autonomic phenomena are experienced including, but not limited to, lacrimation, ptosis and nasal congestion among others (Wei, Yuan Ong and Goadsby 2018). Restlessness, agitation and inability to relax is a well-noted associated feature present with this type of headache (Olesen *et al.* 2018).

Secondary headaches are classified according to their cause. The classification categories as set out by the ICHD-III comprise of headache due to:

- Trauma to the cranium or neck region.
- Cranial or cervical vascular disorder.
- Substance or withdrawal from substance.
- Infection.
- Disorder of homeostasis.
- Disorder of the structures of the face (eyes, ears, nose, sinuses, mouth, teeth or other structures).
- Psychiatric disorders (Olesen *et al.* 2018).

Secondary headaches may present “phenotypically” similarly to a primary headache (Green 2012), but are more a symptom than main condition (Mitsikostas *et al.* 2015). Despite the minority presenting with a secondary headache, due to their diverse and sinister nature, the treatment for each differs widely (Zhu, Born and Dilli 2020). A doctor needs to assess the

clinical features (signs and symptoms), as well as take an extensive case history to make an accurate diagnosis. Patients are more likely to present with severe headaches that have a sudden onset and can complain that they are experiencing “the worst headache of their life”. The headache is also more likely to be attributed to a certain event or timeframe (Starling 2018). Based on the patients reporting on case history, associated red flags and their presenting symptoms the patient will require further testing including neuroimaging (magnetic resonance imaging; computed tomography; blood tests, electroencephalogram and in certain cases a lumbar puncture) (Starling 2018).

2.4 PREVALENCE OF HEADACHE DISORDERS

According to Check and Shutt (2015), prevalence can be defined as the portion of the population that presents with a certain characteristic within a given time frame. By knowing the prevalence one can determine the degree of relevance of headache disorders within the healthcare sphere. Furthermore, by exploring prevalence and chiropractic one can determine the role chiropractors play in the diagnosis and management of patients. Epidemiological data are essential in determining the burden for which headache disorders are responsible (Steiner and Saylor 2018).

According to the ICHD-III, TTH are very common with a prevalence of between 30-78% in the general population (Olesen *et al.* 2018). Studies done in conjunction with the WHO have found that there is an extraordinary prevalence of primary headaches [TTH, migraine and medication overuse headache (MOH)] globally (Martelletti *et al.* 2013). There has been extensive research done on the prevalence of certain primary headaches including migraine, TTH and MOH while others have not been as widely researched (Organization 2011). These headaches are not only widely prevalent, but impact one’s life as a whole. They have found to be associated with a decreased life quality, extensive loss of productivity as well as having far-reaching economic costs in every single country that was included (Martelletti *et al.* 2013). Steiner and Saylor (2018) also noted that migraines alone ranked third among the age category of 15–49 years of age (Steiner and Saylor 2018). According to a study done by Robbins in 2021 an approximate of 90% of Americans experienced headaches in their lifetime (Robbins 2021).

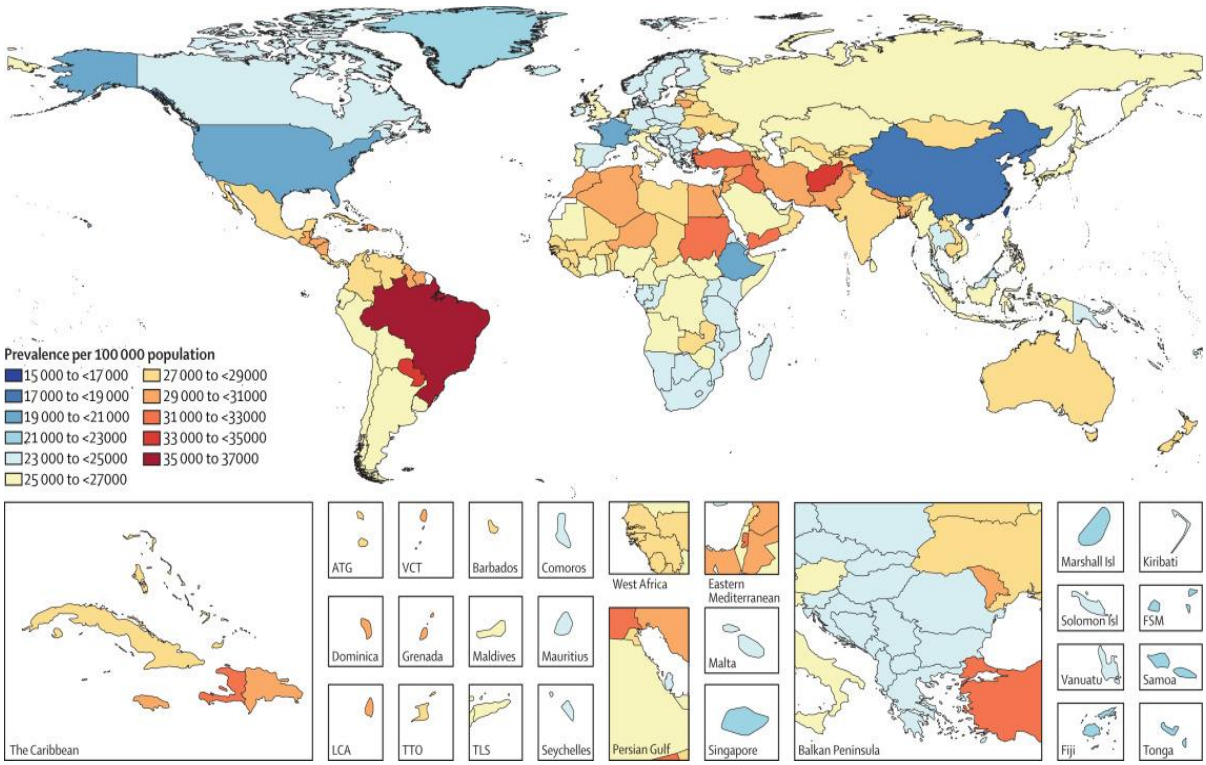

Figure 1.1: Age-standardised prevalence of migraine per 100 000 population by location for both sexes, 2016. Taken from (Lars Jacob Stovner 2018)

Studies conducted in Europe found a great prevalence of headache disorders (Steiner and Saylor 2018). An investigation that spanned Eastern Europe (Russia, Moldova and Georgia and Lithuania) recorded a 53%–75% prevalence of headaches over the period of a year. In Moldova it was found that TTH was more commonly occurring than that of a migraine headache disorder (Katsarava *et al.* 2009). Another study looking at the life time and period prevalence of headache disorders was conducted. This time spanning the continents entirety including France, Austria, Germany, Italy, Netherlands, Spain, the United Kingdom, Luxemburg and Lithuania. The study found that the life time prevalence of headache disorders was higher 90%, while period prevalence (measured over the annum) saw a staggering 79% of individuals experiencing primary headache disorders. Interestingly the ratio of migraines to TTH experienced was almost one to one (1:1) (Steiner *et al.* 2014). Furthermore, it was discovered that one in four men and women in this study lost more than 10% productivity per annum due to suffering with migraines (Steiner *et al.* 2014). Overall, the European region was found to have many comorbidities the presented with headache including mental health disorders such as anxiety and depression (Lampl *et al.* 2016).

In the Asia-Pacific region, in India (Kulkarni *et al.* 2015), Nepal (Manandhar *et al.* 2015), China (Yu *et al.* 2012) and Pakistan (Herekar *et al.* 2017), similar studies were conducted to determine the burden of headaches. When comparing these studies, China seems to be the anomaly with the period prevalence of headache disorders being the lowest when compared

to India, Nepal and Pakistan (Steiner and Saylor 2018). The period prevalence of headache disorders in China over a year was 24%, while India saw an average of 64% of the population experiencing headaches and Nepal a staggering 85% of the population experiencing headache disorders (Kulkarni *et al.* 2015; Manandhar *et al.* 2015; Takeshima *et al.* 2019). It was noted that women are more likely to experience primary headaches in the Asia-Pacific region than their male counterpart (Steiner and Saylor 2018). In 2010, according to the United Nations, the population of the combined Asia-Pacific region was 3.8 billion people. Looking at the period prevalence over a year, the amount of individuals suffering from TTH was estimated to be at about 624 million and migraine sufferers were 350 million individuals (Kuan-Po Peng 2014). In India many reported feeling isolated in their suffering emphasising that family, employers and in some cases medical professionals not understanding what they are undergoing. This has a cumulative effect and then begins impacting their economic, social and educational aspects of life (Kulkarni *et al.* 2015).

The American region has seen a slightly lower prevalence of headaches when compared to the European Region (Steiner and Saylor 2018). However, like Europe and Asia women are more greatly affected by headache disorders, specifically migraines (Manzoni and Stovner 2010). An estimated 40% of the American population has the presence of TTH headaches, the most affected group being white, female, under forty years of age with a higher education level (Schwartz *et al.* 1998). The prevalence of MOH is significantly increased in countries of increased opioid use, such as the United States of America (Cheung, Amoozegar and Dilli 2015). In a study conducted by Burch *et al*. (2015) it stated that in a year (2010–2011) headaches or “pain in the head” were the fourth most leading cause for individuals to report to the emergency room at a hospital. A further 52.8% of all primary headaches are reported to a primary care medical professional first, including general practitioners and chiropractors (Burch *et al.* 2015). While women of reproductive age are most likely to be affected by primary headaches on the North America continent, in 2015 it was reported that Native American’s had the greatest prevalence of migraines when compared to their other ethic counterparts (Burch, Rizzoli and Loder 2018).

The prevalence of headache disorders within the African continent and South Africa has not been studied as extensively as in Europe and Asia (Mateen *et al.* 2008; Health 2011; Zebenigus *et al.* 2016) (Tschirpig 2022) and Stovner *et al.* (2018) confirmed the lack of headache literature in the South Africa.

However studies have been conducted in Zambia (Mbewe *et al.* 2015) and Ethiopia (Zebenigus *et al.* 2016). In Ethiopia over the period of a year, 17.7% of participants suffered from migraines, while 20.6% suffered from TTH over the same period. The same result was found as within Europe and America with females being in the majority of those who suffered

headaches. In urban areas, MOH were more prevalent than in rural areas, due to the access of doctors prescribing pain medication and access to pharmacy's (Zebenigus *et al.* 2016). A study conducted in Zambia saw the period prevalence of headache disorders in general sitting at 61.6% (Mbewe *et al.* 2015). Only 5.3% of individuals suffered from secondary headaches, indicating that primary headaches are by far more in the majority (Mbewe *et al.* 2015). These studies actually looked at how headaches impacted economics indirectly within each country respectively. It was found that the gross domestic product in both Ethiopia and Zambia had decreased between 1.5% and 2% (Steiner and Saylor 2018). The conclusions within both studies emphasised that primary headaches were more common in higher income countries than that of lower income countries (Mbewe *et al.* 2015; Zebenigus *et al.* 2016). A study conducted in the Democratic Republic of Congo saw secondary headaches at a 57% prevalence. This was due to many infective causative agents including, but not limited to malaria and bacterial or viral meningitis (Mukendi *et al.* 2017).

Headache explorative literature within a South African context too is scarce (Stovner *et al.* 2018). There are few to no epidemiological studies that have been conducted on a large sample size from which generalisations can be drawn on the nations state of headaches (Achoki *et al.* 2022).

A study conducted by Basdav (2016) on university students alone at a university of technology in the eThekwini municipality found that the presence of primary and secondary headaches was quite similar. TTH were the most prevalent with 68.5% of the participants' experiencing them while only 16.2% of participants experienced migraines. An unpublished study conducted by Hughes (2016) on geriatrics living in care homes within the eThekwini municipality found that the main headache this population presented with was TTH. The incidence of suspected secondary headaches was lower than the results obtained by Basdav, but both studies have in common that migraine was the second highest most prevalent headache (Basdav 2016; Hughes 2019). Another study on health science students reported that primary headaches were prevalent amongst the cohort (Prangley 2010). Similar results were obtained in a study done in Nigeria in 2017 (Sanya *et al.* 2017).

Overall, even though there is limited literature on headaches within Sub-Saharan Africa due to a myriad of reasons, the literature that does exist has brought to the fore the high prevalence and occurrence of primary and secondary headaches within the continent.

2.5 GLOBAL IMPACT AND BURDEN OF HEADACHES

It is widely recognised that headache disorders contribute greatly to the ill health of the globe (Steiner and Saylor 2018). Furthermore, in the determination of the Global Burden of Disease,

headache disorders were categorised as "*the second leading cause of years lived with disability worldwide*" (Steiner and Saylor 2018).

According to the 2018 study by Steiner and Saylor (2018) headaches ranked as the sixth leading cause for years lived with disability. In spite of the difference in geographical location, climate, health care systems, social and economic factors the migraine period prevalence (over an annum) is consistent globally, at 10% (Kuan-Po Peng 2014). Due to the headaches significant prevalence it has also been associated with great socio-economic burden (Jensen 2018). It was noted in the Global Burden of Disease that in 2015 headache disorders were responsible for more disability-adjusted life years than any other neurological condition globally. This is keeping in mind that primary headaches are not responsible for mortality (Stovner *et al.* 2018).

The Global Burden and Disease Index report on headaches globally coupled with substantial literature has made it abundantly clear that the global prevalence of headache disorders is not only high, but is "*burdensome*" in all regions (Steiner and Saylor 2018).

2.6 TREATMENT AND MANAGEMENT OF HEADACHE DISORDERS

The treatment and management for headache disorders differs widely depending on the type (either primary or secondary disorder) of headache as well as severity, duration causative agent (Olesen *et al.* 2018). Migraine, TTHs and MOHs have been noted to have the greatest prevalence worldwide with regard to quality of life and decline in individual's productivity (Steiner and Saylor 2018).

The current conventional pharmacological treatment for acute migraine episodes include particular medications that result in a vasoconstrictive effect (which include tryptamine-based drugs otherwise known as triptans) as well as other broad-based non-steroidal anti-inflammatory (NSAID's) medicines. Analgesics, dopamine agonists as well as corticosteroids are also utilised (Da Silva and Tepper 2012). Non-pharmacological treatment and management can also be utilised. The avoidance of certain and particular triggers is also used in the management of migraines and include the avoidance of fasting, exposure to bright and flashing lights, as well as certain food items such as caffeine and preservative rich foods. Certain triggers, such as menstruation, are not able to be circumvented (Bartleson and Cutrer 2010). Electromyography biofeedback, Botox injections, chiropractic and acupuncture and acupressure are but a few interventions that can be utilised in the treatment and management of migraine headaches (Bhargava 2020).

Treatment for TTH includes pharmacological and non-pharmacological interventions. Analgesics and over the counter NSAIDs (such as ibuprofen, diclofenac potassium and

naproxen sodium) are the most effective and common treatment for acute-episodic TTH (Chowdhury 2012). More chronic TTH are treated using tricyclic anti-depressants which have shown to be most effective (Chowdhury 2012). Non-pharmacological treatment includes psychological treatment in the form of cognitive behavioural therapy and relaxation therapy. Physical therapy too can be utilised by postural correction, therapeutic ultrasound and cranio-cervical training (van Ettekoven and Lucas 2006).

Due to the nature of a cluster headache the treatment and management is complex in nature. The generic first line of treatment includes the use of triptans and high flow oxygen, however this does not work for all sufferers. One too needs to take into account the specific triggers (Weaver-Agostoni 2013). Daily intranasal civamide sprays and sub-occipital injections during episodes has also been proven to work for some (Francis, Becker and Pringsheim 2010). According to Weaver-Agostoni (2013), the long-term management sees the use of daily Verapamil at a dosage of no less than 240mg. Despite these pharmacological interventions the management of CH requires an integrated and multi-disciplinary approach accompanied by extensive patient education on trigger avoidance and lifestyle modifications (Weaver-Agostoni 2013). The use of complementary and alternative medicine (CAM) modalities as an adjunct to medication has also assisted in the holistic management of cluster headaches (Wells *et al.* 2011).

Trauma and vascular related secondary headaches, if extensive, can be treated through surgical intervention. These include headaches attributed to any bleeds or haemorrhages on the brain itself or the meninges as well as cerebrovascular accident (Zhu, Born and Dilli 2020). Analgesics and NSAID's can be utilised in the treatment and management of the pain accompanying a secondary headache. It is important to note that to successfully manage a secondary headache the underlying cause requires treatment (Schankin and Straube 2012).

The pharmacological and allopathic management of primary and secondary headaches differ due to their cause and symptoms.

2.7 CHIROPRACTIC TREATMENT AND MANAGEMENT OF HEADACHES

While most of the population seek headache treatment from a neurologist or general practitioner chiropractic treatment and management of headaches is substantial. In a 2017 critical analysis, the use of manual therapy was found to be the maximum mutual non-pharmacological treatment of choice with people suffering from recurrent headaches (Moore, Sibbritt and Adams 2017 J). The 2011, the WHO's study, in collaboration with Lifting the Burden (which aimed to create evidence-based recommendations for changes in headache management), noted that manual therapy was the most utilised "alternative and

complementary" treatment for headaches. The term "manual therapy" encompasses the use of spinal manipulation which are done by chiropractors, osteopaths and physical therapists (Saxena *et al.* 2011). There is a one in five new patients' chief complaint of a primary headache and a one in three patients complaint about a secondary headache (Moore *et al.* 2018). The majority of chiropractors treat primary headaches in a single patient for between 5–10 sessions; this is a substantial amount of treatment that a patient will receive (Moore *et al.* 2018).

In 2008, research done by Bigal *et al.* (2008) reported a United States chronic migraine population see relief with the use of chiropractic treatment. A 14.4% mean total was noted. It was found that the use of CAM was utilised by 62% of chronic primary headache sufferers in a global study, chiropractic having one of the highest prevalence (Kristoffersen *et al.* 2012).

Chiropractic assessment interventions for migraine therapy in particular includes treatment of the myofascial trigger point component that aggravate the headache, spinal manipulation therapy of patient specific facet joints as well as rehabilitation exercises. The rehabilitative exercises given for migraine headaches aim to decrease the strain on the muscles that worsen and can be noted as a potential trigger of the headache itself (Bernstein *et al.* 2019).

Chiropractic care too can be utilised in the management of TTH. The temporomandibular joint and surrounding muscles are most affected. Through the use of dry needling, manual manipulation of the temporomandibular joint as well as therapeutic ultrasound and cranio-cervical training these headaches can be treated. Additionally, recommending postural rehabilitation correction exercises also form part of long-term management (van Ettekoven and Lucas 2006). Exclusively utilising chiropractic in the treatment and management of TTH was thought to be sufficient by a majority of eThekwini chiropractors (Kleingelds 2016). Biondi (2005) reported that spinal manipulation therapy has seen to be most beneficial in the treatment of TTH.

Overall, treatment of primary headaches utilising chiropractic care and intervention sees a general decrease in numerical pain rating scales (NRS) and use of pharmacological drugs, more days with no pain and a greater patient satisfaction as patient's anxiety around their headaches too have decreased (Bernstein *et al.* 2019).

Headache sufferers utilise chiropractic as an adjunctive therapy along with traditional allopathic health-care to manage headache disorders (Moore, Sibbritt and Adams 2017). Added to this those that receive spinal manipulative therapy (SMT) (specifically of the cervical spine) are more likely to have a decreased duration of headaches according to a randomised-clinical trial conducted by Chaibi *et al.* (2016). Rossi *et al.* (2006) researched CAM modality use at a headache clinic and found that, of the 110 chronic TTH patients, 40% of them utilised

CAM therapies in the treatment of their headaches. Chiropractic was the preferred CAM therapy with 21.9% of participants rating chiropractic therapy to be beneficial to their headache disorder treatment.

There is substantial evidence for the treatment of headache disorders with the use of chiropractic. The main disorders treated are those of primary origin. This being said, a patient can present to a chiropractor with a secondary headache. A patient can also present with a headache that can mimic the features of a primary headache (Mitsikostas *et al.* 2015). A chiropractor needs to be competent in assessing and identifying red-flags in the relevant case history questions and physical examination (Chinthapalli *et al.* 2018). A chiropractor therefore needs to be able to differentiate between a primary and secondary headache in order to delivery treatment that will not harm (or further harm) the patient. Thus an accurate diagnosis needs to be made in order to make sure that the treatment plan followed is assisting the patient and will most likely have a favourable outcome (Moore *et al.* 2021).

2.8 SELF-PERCEIVED PREPAREDNESS

The term “self-perceived preparedness” refers to how one views themselves in terms of confidence and competency with regard to certain skills (Manakil and George 2013). According to Jansen and Van der Meer (2012), the term can be equated to readiness, relating to the theory of self-efficacy stating that self-confidence or self-efficacy in a task is a pointer for future performance. As a student, clinical skills are always assessed from a lecturer or teacher’s perspective, but there is rarely a chance for students to assess and reflect on their own skills (Pulkkinen and De La Ossa 2019). In order for a student to be better prepared for practice a reflection on their confidence and competency needs to take place in order for an increased self-awareness. There are a number of benefits that come from exploring self-perceived preparedness including the assessment of whether or not the curricula goals have been achieved (Yiu 2012), the readiness of one to confidently and correctly diagnose and manage patients sufficiently (Ramahlo 2020) and the different aspects that can lead to one feeling unprepared (Wiest 2002).

One’s perception of their confidence and personal competency has a great impact on their ability to accurately treat and manage a patient (Moore *et al.* 2021). There is a correlation between one’s confidence levels and the ability to record a substantial case history and create a list of relevant differential diagnoses (Moore *et al.* 2021). Hynes *et al.* (2016) provides evidence in his study as it was recorded that despite participants (student externs) being competent academically, it did not translate directly to being proficient within the clinical setting. The study concluded that those students that possessed an amplified level of confidence in their adjusting abilities possessed an increased success rate with performance

of the treatment (Hynes *et al.* 2016). A study conducted on 118 ophthalmology students found that education had a significant impact on the self-perceived preparedness of students. Additionally, it found that students conferring with competent faculty while busy with a case saw an increased confidence in their ability (Zafar *et al.* 2019).

The term clinical skills refer to the abilities one needs to utilise in a clinical setting. Specifically referring to the abilities of taking a case history, performing the relevant exams, identifying the pertinent red and yellow flags as well as being able to execute a suitable treatment for the patients presenting complaint (Al-Elq 2007). The clinical skills of students and new graduates has been extensively studied (Manakil and George 2013; Hynes *et al.* 2016; Zafar *et al.* 2019; Moore *et al.* 2021). It is imperative that one's clinical skills are assessed and quantified not only during their undergraduate and theory-based years, but also whilst treating patients. The importance of assessing these skills is to gain knowledge on the competency of a student and how they are projected to perform in a professional practicing capacity (Khan, Salahuddin and Khan 2014). Sufficient clinical skills are vital to efficiently and successfully care for one's patient. Furthermore, it was noted that even a number of graduates still struggle with some the basic clinic skills required (Khan, Salahuddin and Khan 2014; Moore *et al.* 2021). Clinical skills are at the core of being a competent professional. In order to produce competent graduates, the clinical skills of students should be regularly assessed from a personal perspective and a lecturer's perspective (Fred 2005). In the case of headaches specifically, chiropractic students need to have proficient clinical skills in differentiating between a primary and secondary headache, red flags and developing an appropriate and case specific treatment and management plan (Moore *et al.* 2021).

Despite extensive research on self-perceived preparedness being conducted in other health spheres, including nursing (Ramahlo 2020), ophthalmology (Zafar *et al.* 2019), internal medicine (Wiest 2002) and dentistry (Manakil and George 2013), the literature on a chiropractic specific view is scarce (Wangler 2009). The literature on student interns' preparedness for the chiropractic profession is lacking and further studies are necessary (Hynes *et al.* 2016). Details about the relevant and available chiropractic literature on the topic of self-perception within a chiropractic context are shown in Table 2.1.

Table 2.1: Chiropractic specific research on self-perceived preparedness and perception

Author	Title of Study	Study Objective	Outcome
Moore *et al.* 2021	Chiropractic student diagnosis and management of headache disorders: A survey examining self-perceived preparedness and clinical proficiency	This study explored the self-perceived preparedness and clinical ability in diagnosis and management of headaches by Australian chiropractic students who were in their senior years of study. This was a quantitative study that utilised a Likert score chart.	Moderate levels of self-perceived preparedness and clinical ability in diagnosis and management of headaches was found. It was noted that those who had been in clinic for longer period of time (5^{th} years as opposed to 4^{th} years) scored higher in self-perceived preparedness. The final conclusion proposed that there may be gaps in the self-confidence and diagnostic proficiency of soon to be graduates (Moore *et al.* 2018)
Haworth and Jones 2019	Student and new graduate perception of hospital versus institutional clinic for clinical educational experience	This study explored chiropractic final year students and new graduates from two different chiropractic colleges in North America. It aimed to explore the perceptions of the clinical educational experience in a hospital versus the college clinic. A qualitative design was employed, students and new graduates from the United States of America and Canada.	The outcome was that there was value to be gained from working in an institutional clinic as well as in a hospital setting. The separate environments both had their advantages and disadvantage according to the literature. Overall, those in an institutional clinic environment felt less prepared clinically for practice. In contrast to those at the hospital, the participants felt more confident in handling complex clinical cases and in their overall clinical preparedness (Haworth and Jones 2019).
Pulkkinen and de la Ossa 2019	Newly qualified chiropractors' perceptions of preparedness for practice: A cross-sectional study of graduates from European training programs	This study aimed to evaluate newly qualified chiropractors and their perceived preparedness for practice according to the 7 key competencies of the Canadian Medical Education Directives for Specialists	The results saw the lowest scores were found in the "collaborator" and "scholar" competencies whereas the highest scores were highest scores were in the categories of "medical expert" and "professional" The participants felt confident and well-prepared to utilise their clinical skills and medical knowledge for the advancement of the patient. The study concluded that the may be a gap between the education and practical skills the new graduates possess (Pulkkinen and De La Ossa 2019)
Hynes *et al.* 2016	Preceptor doctors' assessment of the clinical skills of chiropractic externs	This study looked at the perception of chiropractic extern's competence before and after their "preceptorship". The perception of these students was assessed by their preceptor doctors. This was a quantitative study that utilised a Likert score chart.	The preceptor doctors noted that a positive improvement in skills was made by majority of students as time passed and more exposure was gained. It was noted that at the onset the externs lacked confidence and office management skills. A vast improvement (a score of 2.7 to 3.9 on the Likert scale) was noted post preceptorship with regard to adjustments. The study concluded that externs while academically had no issues, had struggled with clinical application of theoretical knowledge (Hynes *et al.* 2016)
Wangler 2009	Usefulness of CanMEDS Competencies for Chiropractic Graduate Education in Europe	This study explored the perceived importance of certain competencies using the Likert five point scale. This was done by senior students and qualified chiropractors at selected universities and through selective national associations in Europe.	The results of the study presented that both senior students and qualified chiropractors perceived the presented competencies as equally important. Due to this it gives rise to better understanding and direction on what emphasis and focus needs to be placed on these certain aspects in education. It was concluded that this survey could even serve as a base for future graduate training (Wangler 2009).

The table depicts that the chiropractic specific literature pertaining to ideas on self-perceived preparedness and perception in general is scarce; also that insightful conclusions about the knowledge, attitude and perceptions of certain aspects are able to have been drawn. When looking at similar self-perceived preparedness studies within the healthcare sphere globally similar conclusions can be drawn.

According to Manakil and George (2013), it is of equal significance that one assesses students in this regard. The same degree of valuable information is gained from this method of

assessment as when compared to formal examinable assessments. The study established that dental students on the cusp of graduation and entering into practice were prepared, but would benefit from more time in a clinical setting. Overall, from the information gathered, it was concluded that through this type of assessment the curriculum philosophies were able to be reviewed (Manakil and George 2013).

A study conducted by Ramahlo (2020) at the University of the Western Cape, on nursing students and their self-perceived preparedness, saw that students did not feel prepared and proficient in their clinical midwifery skills; low self-confidence levels were reported. It is highlighted that despite one being found academically competent to practise one needs to have confidence in ones skills to act self-sufficiently in their practice (Usher *et al.* 2015; Ramahlo 2020). In order to ultimately run an independent, clinically accurate, ethical and respected practice, one needs confidence in the skill they are offering (Treatment 2009). Over all one's self-perceived preparedness can determine their accuracy and ability to correctly diagnose and manage headache disorders (Moore 2021). Ultimately the ideas surrounding self-perceived preparedness all point to the importance of the concept as a whole and its direct impact on the way one is to practice.

2.9 INFLUENCE OF PREPAREDNESS ON THE DIAGNOSES AND MANAGEMENT OF HEADACHE DISORDERS

One's perception of their confidence and personal competency has a great impact on their ability to accurately treat and manage a patient (Moore *et al.* 2021). There is a correlation between one's confidence levels and the ability to record a substantial case history and create a list of relevant differential diagnoses (Moore *et al.* 2021). Furthermore, Moore found that increased exposure to clinical experience resulted in a greater self-perceived preparedness as well as increased "correctness" in treatment and management. It was noted that those who had been in clinic for longer period of time (5th year as opposed to 4th year students) scored higher in self-perceived preparedness. Thus, the more students utilise their clinical skills, the more confident they become in them (Moore *et al.* 2021).

In a study done by Hynes *et al.* (2016), it recorded that despite student externs being competent academically, this did not translate directly to being clinically proficient. The study concluded that students that possessed an increased level of confidence in their abilities (specifically adjusting) had an increased success rate with performance of the treatment (Hynes *et al.* 2016). Thus, the more students utilise their clinical skills, the more confident they become in them (Moore *et al.* 2021).

In a study conducted by Pulkkenin and de la Ossa (2019), students were asked to evaluate their preparedness for practice using the seven key competencies of the Canadian Medical

Education Directives for Specialists as a guide. These competencies included medical expert, communicator, collaborator, leader, health advocate, scholar and professional. The results of this study found that the lowest scores were found in the “collaborator” and “scholar” competencies. This translates to the students not feeling confident in their skills to integrate a multidisciplinary approach to cases they handle as well as engaging in life-long learning opportunities. The highest scores were in the categories of “medical expert” and “professional” The participants felt confident and well-prepared to utilise their clinic skills and medical knowledge for the advancement of the patient (Pulkkinen and De La Ossa 2019).

According to Hynes *et al.* (2016), the time allowed for students to work in a clinical setting, such as practicing as an extern in a parting chiropractor’s office, serves as a connection-bridge between the academic counterpart and practical practice. This one can conclude that the longer one is clinically exposed to cases and patients the more prepared and confident one ought to feel. This sentiment is supported by the results obtained by Manakil and George (2013) wherein a majority of 71.4% of the respondents desired that there could be more time spent in clinical settings. They emphasised that this would assist in the honing of their skills, resulting in them feeling more confident and competent and ultimately more prepared for practice (Manakil and George 2013).

It has been well documented that the influence of preparedness in a certain skill greatly impacts the ability of the individual to perform that skill. This notion has been shown in other medical professions in which it has been studied extensively. Thus, one can conclude that the chiropractic field can be painted with the same brush.

2.10 GAP IN THE LITERATURE

Chiropractic education has not been officially standardised globally (Innes, Leboeuf-Yde and Walker 2016). Every universities curriculum and training differs slightly. This is due to the technique which the school teaches. The different philosophies of chiropractic too play a role in the education a student receives (Dynamic Chiropractic 1999). The education curriculum set out for the Durban University of Technology’s Chiropractic Faculty is as follows: the undergraduate study of four years – Bachelor of Health Sciences where students cover all the basic sciences and delves into chiropractic specific modules including chiropractic principles and practice. The headache specific evidence-based education is encompassed within the Diagnostics IV lecture material. Students are educated on both primary and secondary headaches – their red flags, causes, clinical features and management and treatments. A Master’s degree is then obtained upon the completion of a Master’s level thesis and patient number requirements.

The DUT Chiropractic curriculum adheres to the International Chiropractic Education Collaboration . This alliance aims educate chiropractic students through an evidence-based practice paradigm. Furthermore, it aims to sustain the curricula to keep abreast of the change in community and societal needs and modern medical advancements and requirements. Some of the chiropractic schools involved in this collaboration include University of Johannesburg, University of Zurich, Macquire University, Murdoch University, Canadian Memorial Chiropractic College and International Medical University of Malaysia's Chiropractic faculty (Collaboration 2014). Through this education, students should be well versed in the diagnosis, treatment and management of headache disorders as described by the ICHD-III (Moore *et al.* 2019). The manner in which headaches are clinically treated corresponds to the education one has received (Innes, Leboeuf-Yde and Walker 2016). The way chiropractors treat varies greatly on their philosophy (Heale 2003). Thus, the way students practice can be attributed to their education in relation to chiropractic philosophy (Wyatt *et al.* 2005). Depending on what paradigm students are taught will determine whether they utilise evidence based practices or ideological dogma (Reggars 2011). The way students are taught also impacts their feeling of preparedness.

Aspects such as COVID-19 and the change from in-person to online and blended learning also impact students' feelings of preparedness (Hattar *et al.* 2021). In South Africa (in the chiropractic programme at the Durban University of Technology) headaches are taught as part of the Diagnostics III and IV curriculum. The Diagnostics IV module is however further focused and goes more in-depth into the variety of different headache disorders.

A study conducted on 118 ophthalmology students found that education had a significant impact on the self-perceived preparedness of students. Additionally, it found that students that conferred with proficient faculty while busy with a case saw an increased confidence in their clinical abilities (Zafar *et al*. 2019). In a study conducted by Wiest on internal medicine residents and family medicine residents were asked to rate their preparedness to handle 12 different clinical diseases – four inpatient cases and eight outpatient cases. These included cases such as myocardial infraction and diabetes mellitus. The results of the study were that both showed varying levels of preparedness, but that were in line with their training. Simply put, depending on which programme they were in, they had different education focuses. The results of the study lined up with this. In other words, education and the education received impacted on which clinical competencies they were more equipped to deal with (Wiest 2002).

The study conducted by Pulkkinen and de la Ossa (2019), the results of this study are important as it showcases that confidence is linked to ability. In an education context, the focus of a chiropractic college is to be a "medical expert" and this is for what the cohort felt most prepared. Ultimately, curricula goals will have been met. This study concluded that with

regard to perceived preparedness there was a *"gap between education and professional practice"* (Pulkkinen and De La Ossa 2019). According to Manakil and George, the majority of their cohort (85.7%) identified that their education prepared them well for practice. This again emphasised the importance of education on ones feeling of preparedness (Manakil and George 2013).

According to the European Council on Chiropractic Education there is an acknowledgment that the literature on preparedness of chiropractic graduates is limited. It is their belief that quality education is the cornerstone of the profession. They emphasise that it is only through education that graduates are "safe and competent" (Peterson *et al.* 2022).

Overall, education, in its deliverance, quality and intake, has a great impact on the preparedness of students.

2.11 SUMMARY OF CHAPTER

This chapter has brought forth and expanded upon the relevant literature that is available. It has shown the key existing literature pertaining to and underpinning this study.

CHAPTER 3 THEORETICAL FRAME WORK

3.1. INTRODUCTION

This chapter will outline the concept of a theoretical framework. It will specifically explore the concept of what a theoretical frame work is, the specific frameworks utilised in this dissertation as well as the rationale for their utilisation.

3.2. DEFINING THEORETICAL FRAMEWORK?

The importance of developing a theoretical framework cannot be understated. It serves as a schematic and blueprint on which a thesis is built around. It can be likened to the “plan” one has drawn up when building a house (Grant and Osanloo 2014). A theoretical framework assists in providing the structure and support that is needed to build the basis of a dissertation. This base includes rationale for (and significance of) the study, developing research questions as well as the purpose of the study (Grant and Osanloo 2014).

Researches utilise theoretical framework models to justify their research efforts (Lederman and Lederman 2015). According to Collins and Stockton (2018), a theoretical framework is “the use of a theory (or theories) in a study that simultaneously conveys the deepest values of the researcher(s) and provides an articulated signpost or lens for how the study will process new knowledge”.

The utilisation of a theoretical framework in the qualitative research paradigm allows for the intersection of the following:

a) Pre-existing knowledge and formerly formed ideas about intricate phenomena.
b) The epistemological nature of the researcher.
c) An approach that is methodical and allows for appropriate in depth- analysis.

The intersection of these three allows for coherence and value to be extracted from a study (Collins and Stockton 2018).

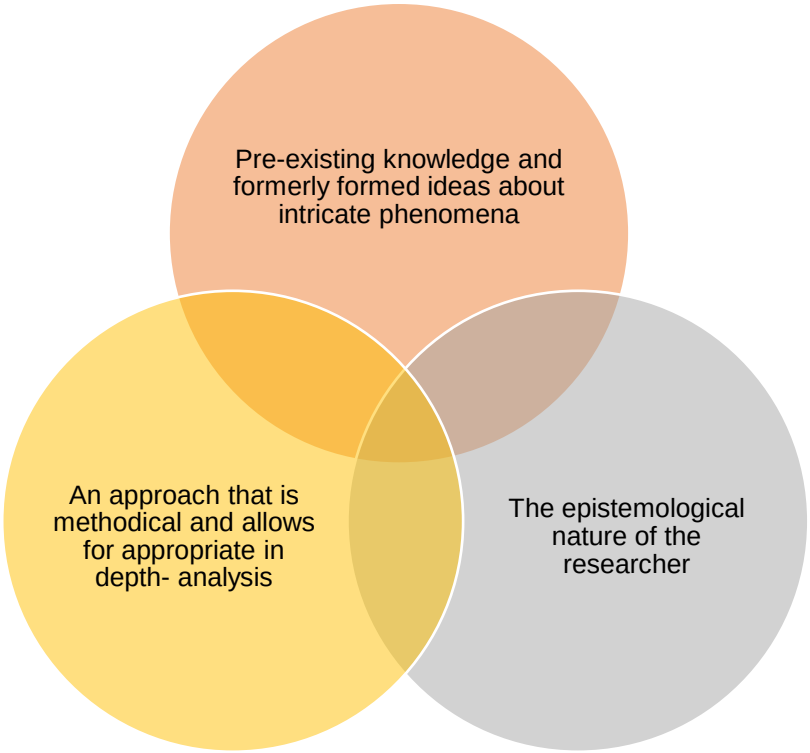

Figure 3.1: Theoretical framework and how the intersection of these three principles allows for study coherence and value

Overall, the use of a theoretical framework is necessary to render research valid (Guba and Lincoln 1994). There is a myriad of theories that exist and choosing the correct one is important. The choice will essentially bring structure to the dissertation as a whole.

3.3 THEORETICAL FRAMEWORK UNDERPINNING THIS STUDY

The two theoretical frameworks underpinning this study include Bem's 1972 self-perception theory and the theory of cognitive dissonance. Both are well-renowned theories underpinning published pieces of qualitative literature (Chabrak and Craig 2013; Bailey and Mohebi 2020). They both tie into and explain the idea of self-perceived perception and the life-world of the individual. It displays and elaborates on the factors that influence self-perceived preparedness of an individual. This includes their learnt behaviour and thoughts and thought processes that can impact their feeling of confidence.

3.3.1 Bem's Self Perception Theory

Bem, a behaviourist, based his theory of the belief that observable or learned behaviour supported by empirical evidence will yield certain actions or behaviours (Bailey and Mohebi 2020). Behaviourism is based on the premise that behaviour is based on observation. Therefore behaviour is learned and observed from the outward environment and not fully innately of the psychological realm of an individual (Graham 2000).

The reason the “self-perception theory” falls into this sphere is due to the fact that it’s centred around two basic ideas namely:

1. Individuals can only begin to understand themselves (in terms of their attitudes, beliefs and perceptions) when they unpack and learn their behaviour/actions and the circumstances that bring about these.
2. Individuals look, imitate and attempt to deduce the world outside themselves should an understanding not be gained from one’s own actions. (Bailey and Mohebi 2020)

Essentially, Bem deduces that in order for a man to understand his beliefs he looks to his behaviour as evidence. Therefore, the concept of self-perception itself is based on the proposition that people “are what they do” or people are able to gain insight into their inner beliefs, attitudes and perceptions from the behaviour they outwardly display. Thus marking the importance of the interplay between the internal world of self and the external world to self (Bailey and Mohebi 2020). The theory itself makes special note of the fact that the actions of one are influenced by their surrounding environment (Bem 1972).

Several studies have noted that there is correlation between both self-perception and the recurrent behaviour. The inverse of the relationship is also true (Arrowood, Wood and Ross 1970). In this specific study the “observer” and “behaviour” dicot is represented by the teacher/lecturer and student. The student’s self-perception and as a result their behaviour can be influenced by the teacher (Bailey and Mohebi 2020).

Education aims to influence and alter one’s attitudes, beliefs and behaviour with the introduction of new knowledge. This specific theory encompasses these tenants and seeks to gain a deeper understanding of self in this respect.

3.3.2 Framework 2 — Cognitive Dissonance

Cognitive dissonance is the opposite of Bem’s self-perception theory. Bem, as a behaviourist, had no regard for an individual’s free will and the influence on one’s internal environment. Cognitive dissonance makes provision for the internal environment and the conflict that can occur which can potentially lead to a change in behaviour. People have to face their personal lifeworld in order to see if the behaviour/idea being presented to them agrees or disagrees with their fundamentals (Chabrak and Craig 2013). If it indeed agrees with the current attitude, knowledge and perceptions the behaviour will not change. However, if it does not the idea that most appropriately resonates with the individual’s perception will be adapted. Simply put the idea that is most appropriate to the individual’s lifeworld will be acted on in behaviours. This may mean that the acquisition of new knowledge will lead to a change in behaviour (Bailey and Mohebi 2020). What this allows for is the development of critical and analytical thinking before a behaviour is acted upon (Graham and Jones 2011).

3.4 CORRELATION OF THE UNDERLYING FRAMEWORKS INTO THE STUDY

Self-perception theory is widely recognised as one of the main frameworks that supplies understanding on how self-knowledge is gained (Bailey and Mohebi 2020). This fits perfectly into the framework of this study as an exploration into one's self-knowledge is being explored. The way participants gain awareness about their preparedness directly relates to the acquisition of self-knowledge which is the one of the main aims of this study. The fact that self-perception is a deemed an artefact of social interaction, and that lecturers can have an influence over this phenomenon, renders this an appropriate framework to utilise in this study. In order to identify the confidence, awareness and preparation of students, consideration of those who have direct influence over them needs to be sought — which this study will conclude.

Self-perception theory and cognitive dissonance, though distinctly different, can both explain aspects of how behaviour can be changed to match beliefs. In order to efficiently diagnose and manage headache disorders students are required to have the basic skill of critical thinking. While lecturers may have an influence on ones behaviour and in turn self-perception, one's internal lifeworld too has an impact on how one will act (Bailey and Mohebi 2020).

Overall, both the use of self-perception theory and cognitive dissonance has warrant of use for forming the framework for this study due to how they interact with each other and explains how it affects one's behaviours and ultimately the outcome of confidence, skills, awareness and preparation.

3.5 SUMMARY OF CHAPTER

This chapter has detailed what a theoretical framework is and how it has been utilised in this research study. It has further given adequate reasoning and clarified the appropriateness for each of the framework's employment.

CHAPTER 4 METHODOLOGY

4.1 INTRODUCTION

This chapter will delve into and describe the methodology that was utilised in this study. It will detail the steps that was taken to obtain information. It will be inclusive of and elaborate on the research design and procedure, sample population in addition to the data collection and analysis thereof. Furthermore, the study's relevant ethical considerations will be described.

4.2 RESEARCH DESIGN

This study design utilised a qualitative, explorative and descriptive approach. Qualitative research allows one to delve deeper and explore the quality of one's experience. This method of research is often utilised to determine a subjects "relative worth" (Cleland 2017). Qualitative research aims to create a core theme or set of themes from which one can draw conclusions. These conclusions are drawn from the use of semi-structured interviews that ask open ended questions. From the answers to these questions views will be expressed on a certain concept/s (Creswell *et al.* 2007).

4.3 POPULATION

The population for this study was the students completing their chiropractic clinical activity within the DUT Chiropractic Day Clinic. This comprised of students mainly in their fifth year, sixth year and seventh year of study.

4.4 SAMPLE TECHNIQUE AND SIZE

Purposeful sampling was utilised. Purposeful sampling is a non-probability type sampling technique employed to select subjects from a population group. Purposeful sampling utilises the method of choosing specific participants to be part of a study due to the qualities they possess (Etikan , Musa and Alkassim 2016). In this study 13 participants (the sample size) were purposively sampled. The 13 interviews were conducted and participants were interviewed until saturation. A minimum of 12 participants was required or until data saturation was reached in order to render the findings significant. Data saturation was reached at 13 participants.

4.5 DELIMITATIONS OF THE STUDY

Inclusion Criteria

In order to be eligible to participate in this study, the participants had to meet the following criteria:

- Chiropractic students no less than 6 months in clinic and no more than 3 years in the Master's programme.
- Those who have signed the informed consent form.

Exclusion Criteria

In order to be eligible to participate in this study, the participants had to ensure they did not fall into the following category:

- Chiropractic master's students that have less than 6 months experience in clinic or have been in the master' s programme for more than 3 years.

4.6 PARTICIPANT RECRUITMENT

Potential participants were invited to participate via social media platforms through the use of advertisements in the form of recruitment posters (Appendix C). These were sent on class communication groups via the administrator of the group for all students within their first three years in the Master's programme.

4.7 RESEARCH SETTING

The interview took place the Durban University of Technology (DUT), in the Chiropractic Day Clinic, a private space where all information could be kept confidential and safe. A semi-structured interview (utilising the questions as seen in Appendix G) took place face-to-face. The interviews took place in a clinic room that was pre-booked for the purpose of data collection. An access controlled voice-recorder was utilised in order to record the findings. Confidentiality was ensured as only the participant and researcher were allowed in the room during the interview process and the researcher was the only one who had access to the recordings taken.

4.8 PRIOR TO INTERVIEWS

Firstly, permission from DUT Institutional Research and Ethics Committee (IREC) was obtained for the study (Appendix A) to commence and the data collection process to begin. Secondly, Gatekeeper permission was obtained from the research director at DUT to conduct research at DUT and for access to students. Permission was obtained from the Chiropractic

Department head to conduct research on chiropractic students. Permission from the Department of Chiropractic to conduct research on their students' was obtained. An explanation of the purpose and the role of each participant in the study was done. The letter of consent (Appendix C) was provided to each participant and if necessary explained and any questions answered.

An explanation of the interview process and the purpose of the interview was conducted. It was emphasised that the information received during this interview was to be utilised strictly for research purposes. Finally, willing consent from the individual research participant (Appendix E) was obtained before the commencement of the semi-structured interviews, ensuring that they understood the research process in its entirety.

4.9 DATA COLLECTION

Once eligible participants (who met the inclusion criteria) responded to the advertisement a date and time that suited both the participant and researcher was established. Once a date was established the participant was sent the information (Appendix D) and consent forms (Appendix E). The interview took place the Durban University of Technology (DUT), in the Chiropractic Department's boardroom, a private space where all information could be kept confidential and safe. Each participant was asked the same set of open-ended questions in an interview style. An interview guide was utilised as seen in (Appendix G). During the interview an audio recording was conducted to better allow for the researcher to listen and take note of what the participant was saying in real time. The use of the audio-recorder also allowed for transcription to take place at a later stage before an in-depth analysis took place.

4.9.1 Open-Ended Questions

The use of open-ended questions is most widely acceptable when conducting qualitative research. Due to the nature of qualitative research one needs to obtain rich and reflective data that is evident of one's personal experience. The use of open-ended questions allows for this to occur (Creswell *et al.* 2007).

4.10 THE TRANSCRIPTION OF INTERVIEW DATA

Once the interviews were conducted the data were transcribed accordingly. The audio data were transcribed onto word documents by the researcher themselves. All interviews were listened to carefully and made note of all information that was presented in the original audio recording (Seals 2022). The transcript data were re-checked that it was in accordance with the audio data obtained and was subsequently analysed as detailed as follows.

4.11 DATA INTERPRETATION

In order for one to gain an understanding and knowledge from the data that has been obtained a credible and reliable method of interpretation needs to be utilised. The most trusted analytical data interpretation tool for qualitative data were set out by Tesch (Creswell *et al.* 2007). Tesch's eight step approach to data analysis was utilised to establish and bring to the fore the themes and sub-themes from the data that has been obtained. The method was utilised as set out by the following framework:

Step One: Data Preparation

The interviews were fully transcribed and examined. The entire transcribed interviews were examined to acquire a sense of the whole and notes were made.

Step Two: Defining the Unit of Analysis

All transcripts were reviewed to ensure the audio recordings matched what had been transcribed. A single interview was selected and analysed for a deeper underlying meaning.

Step 3: Examining the Data for Themes

Once a number of interviews have been analysed in the same means as in step 2 a list was conducted with all the topics that presented themselves. Analogous topics or themes were grouped together accordingly.

Step 4: Developing a Coding Scheme

The common themes that have arisen are given a code. The interviews are re-analysed and the themes extracted are compared to the information obtained.

Step 5: Encoding of Data

The most descriptive wording is used for the topics established and categories are created. There should be fewer categories than topics that were established.

Step 6: Evaluation of Coding Consistency

A final decision on the abbreviations of codes are made and the codes are subsequently alphabetised.

Step 7: Producing a Report

The data in each category is accumulated and an initial analysis is performed.

Step 8: Recoding

Recoding of existing data can be done if necessary.

(Creswell *et al.* 2007; Seals, 2022)

4.12 DATA STORAGE

Data were stored on the researcher's laptop which is password protected, on a portable storage device (USB) (which only the researcher has access to) and the researcher's Google Drive which is password protected. Electronic copies of the interviews are password protected on the researcher's device. Only the researcher and supervisor had access to the information before the full study was been completed. The data will be maintained for a maximum of five years and will be password protected to the researcher's Google Drive. After this period the data will be disposed of in an appropriate manner.

4.13 TRUSTWORTHINESS

Research rigour for qualitative research refers to the trustworthiness of one's research. Sometimes referred to as scientific merit, it aims to explain the validity and accuracy of qualitative research (Polit and Beck 2010). The criteria utilised to establish trustworthiness too consist of 4 principles. These four principles are credibility, dependability, confirmability and transferability. Guba and Lincoln's (1986) model of trustworthiness will be used to ensure validity and reliability of the research project.

4.13.1 Credibility

Credibility refers to the confidence in the truth of the particular study (Connelly 2016). The most important aspect of this principle is the findings and results of the research. In order to solidify credibility, the normative methods of a qualitative study need to be utilised. The aspects include a significant period of time spent with the participant in order to properly identify the recurrent themes, returning to examine the data several times and reflective journaling can also assist in this process. Additionally, using alternative ways of explaining the same concept as well as iterative questioning of the sample data should be conducted (Connelly 2016). Credibility was maintained by adhering to the normative qualitative study methods including an interview that has taken a fair amount of time and from which pertinent recurrent themes was abstracted.

4.13.2 Dependability

Dependability refers to the reliability of the research which is mostly seen in quantitative studies (Golafshani 2003). The data's stability over a passage of time as well as the consistency of the data (Connelly 2016). The same questions need to be asked to all participants and the data collected and transcribed needs to be looked-over to ensure this has occurred (Polit and Beck 2010). The same set of questions was asked to each study participant and was transcribed accordingly.

4.13.3 Confirmability

Confirmability speaks to the consistency in the answers and outcomes. This consistency has to be found by two or more independent people. This principle validates the information each participant has provided and that they are real, true and not made up by the researcher. This principle ensures that the research is steered away from bias and motivations of the researcher's perspective (Polit and Beck 2010). Data collection was ceased when there were no new themes that occurred and the data were well saturated.

4.13.4 Transferability

Transferability is the qualitative equivalent of generalisation in quantitative research (Connelly 2016). Transferability speaks to the data that was captured and its ability to be transferred on to other settings or groups. Guba and Lincoln (1986) stated that the researcher's role was to provide one with as much descriptive data so that it can be compared to other sources and therefore its acceptability evaluated. The data were used to draw conclusions of self-perceived preparedness as a whole for chiropractic students' in the diagnosis and management of headache disorders.

4.14 ETHICAL CONSIDERATIONS

Ethical consideration is important and consists of four main principles namely justice, autonomy, beneficence and non-maleficence. Justice refers to the participant's right to privacy as well as fair treatment through the process of the research. Anonymity and confidentiality was maintained through this process due to the fact that the names of participants will not be published. The participants were numbered to ensure their privacy was maintained. DUT requires the hard copies and electronic copies to be kept on file. The electronic copies are password protected and once the five-year period is over the hard copies will be shredded and destroyed accordingly. Through this entire process, the only individuals that had access to the data were the researcher themselves and the supervisor (Polit and Beck 2010).

Autonomy or the protection of one's human rights speaks to the person's choice to participate in the research or not. In order to adhere to this principle an informed consent form was willingly signed (by the participant) outlining all aspects of the study and what the participant was to expect (Orb , Eisenhauer and Wynaden 2001).

Beneficence refers to looking out for good of others and not exerting any harm on participants. The researcher needs to ensure that the participants are not in harm's way during the conducting of their research. This principle was upheld by the fact that the study needed to be approved by IREC in order for it to commence. The study benefits needed to outweigh the risks, which in this study is definitely does (Polit and Beck 2010)

Non-maleficence aims to not inflict harm onto others. This includes principles of not causing pain and suffering, offense and incapacitation to research participants. This research study did not pose any harm to participants due to the nature of the topic. This was detailed in the information letter addressed to the relevant participants (Jahn 2011).

4.15 SUMMARY OF CHAPTER

Chapter four gave the methodology that was utilised in this research study. It detailed the aspects of participant recruitment, sample size, inclusion and exclusion criteria as well as the particular steps that were followed in order for information to be obtained. The myriad of ethical considerations, as well as trustworthiness, was elaborated upon.

CHAPTER 5 RESULTS

5.1 INTRODUCTION

This chapter brings to the fore the findings obtained from conducting 13 semi-structured interviews on chiropractic students within the Master's degree programme. The participants were asked questions surrounding their self-perceived preparedness utilising an interview guide as explained in the previous chapter. Basic demographic data on participants can be seen in Table 5.1.

Table 5.1: Demographic data of participants in semi-structured interviews

Participant	Gender	Age	Year in the Master's programme
1	Male	26	1st
2	Male	25	2nd
3	Female	23	2nd
4	Female	23	2nd
5	Female	22	1st
6	Female	24	1st
7	Female	24	3rd
8	Male	25	3rd
9	Female	25	2nd
10	Male	25	1st
11	Female	23	1st
12	Female	25	2nd
13	Male	25	1st

5.2 THEMES AND SUBTHEMES

The themes and sub-themes that were identified using Tesch's thematic analysis. After the interviews were transcribed, an in-depth thematic analysis was performed and the following themes and sub-themes were established. The themes surround the domains of student's self-perceived preparedness through looking at their skills, confidence, awareness and overall preparation, the challenges that one faced in the process of preparedness and the degree, impact or effect clinical exposure has had on one's feeling for preparedness. Table 5.2 provides a tabular overview and outline of the themes and sub-themes that were established. The themes identify the exact objectives addressed in student's self-perceived preparedness. Through looking at their skills, confidence, awareness and overall preparation. The challenges that one faced in the process of preparedness. As well as the degree, impact or effect clinical exposure has had on one's feeling for preparedness. The respective themes speak to the objectives as set out in Chapter One.

The objectives were as follows:

Objective 1: To explore and describe the self-perceived preparedness (skills, confidence, awareness, preparation of) chiropractic students' in their diagnosis and management of headache disorders.

Objective 2: To identify and describe any challenges experienced in their preparedness for the diagnosis and management of primary headache disorders.

Objective 3: To describe the effect of clinical exposure on students self-perceived preparedness to diagnose and manage headache disorders.

Table 5.2: Outline of themes and sub-themes

Objective	Theme	Sub-themes
Self-perceived preparedness pertaining to skills, confidence, awareness and preparation.	Level of preparedness	1.1. Clinical skills related to diagnosis and management 1.2. Confidence or lack thereof in diagnosis and management of headache disorders 1.3. Knowledge base in theory in comparison to practical application
Challenges experienced in the process of preparedness.	Educational Challenges	2.1. Extensive work-load in course module 2.2. Lack of educational support 2.3. Lack of practical education and clinical preparation 2.4. Role of learner within education
	Environmental Challenges	2.5. COVID-19
The effect of clinical exposure on preparedness	Clinical exposure	3.1. The positive effects of clinical exposure on self-perceived preparedness 3.2. Impact of clinical exposure on ones skills

5.3 PRESENTATION OF THEMES AND SUB-THEMES

This section will deliver and present the study results in the form of expansion on the aforementioned themes and subthemes as seen in Table 5.2. Relevant excerpts from the transcripts is provided to substantiate these results.

5.3.1 Theme One: Level of Preparedness

Participants' were asked questions pertaining to and surrounding the ideas of their skills, confidence, awareness and preparation. This was to directly gauge how prepared and confident they felt in *their* diagnosis and management of headache disorders. Based off this common a theme emerged as participants spoke of their level of preparedness and how it directly affected their clinical abilities relating to headaches.

The following extracts depict this main theme:

> "*I don't feel confident enough. I don't feel like I'm prepared in dealing with these conditions with patients Sometimes I just did not know which type of regional examination to do."* (Participant 3)
>
> *"I feel like I am prepared enough to be able to recognise a headache disorder and manage it appropriately."* (Participant 4)
>
> *"I don't feel like we adequately prepared."* (Participant 5)
>
> *"I don't feel confident in knowing or seeing that there is an underlying problem."* (Participant 12)

Sub-themes emerged from this core theme. The following subthemes confirmed and contributed as factors relating to the main theme. These were skills, confidence as well as knowledge base. These are presented in the following section.

5.3.1.1 Sub-Theme 1.1: Clinical Skills Related to Diagnosis and Management

The respondents were questioned about the skills and examinations they believed assisted them and this was met with inconsistent answers. Based off the level of preparedness it became apparent that clinical skills related to diagnosis and management of headache disorders varied. The participants cited history taking and neurological examinations as their key tool, but, overall, a consensus was not reached on any skills more than these. The following excerpts express this:

> "*So I'm not really like sharp in that area. But I will say doing your Brudzinski's and all your meningitis examinations they help because you know, whether it's meningitis problem or it's a headache, also to look at your myofascial stuff."* (Participant 3)
>
> "*Taking proper history in terms of like getting the things of what side it was and where exactly, it is. So chatting to the patient and seeing if it goes through episodes, and that kind of thing. As well as your cranial nerves and assessing like your arteries and that kind of stuff."* (Participant 6)
>
> *"So obviously, case history does give you a lot of information."* (Participant 7)
>
> *"Probably the case history is most important when it comes to headache." (*Participant *10)*
>
> *"Skills was mainly, mostly like case history."* (Participant 11)

5.3.1.2 Sub-Theme 1.2: Confidence or Lack Thereof in Diagnosis and Management of Headache Disorders

Confidence in the ability to diagnose and manage headaches emerged as a common subtheme. When questioned about their preparedness participants were asked to speak to their preparedness to diagnose and manage headache disorders by elaborating on their experiences with the disorder. They were asked to discuss their confidence when dealing with a patient and feelings towards being adequately prepared. There was an overall feeling under-preparedness and a lack of confidence cited. There were a few outliers that believed they felt prepared, but only to a certain extent and only with certain headaches. A singular participant stated that they were confident. The following excerpts communicate these results:

> *"No, I don't feel confident enough. I don't feel like I'm prepared in dealing with these conditions with patients who come with headaches or present with headaches."* (Participant 3)

> *"I don't think I'm adequately prepared to be treating headaches. I don't think I'm confident enough."* (Participant 13)

> *"To a certain extent, I feel like I have the knowledge and I feel like I have the book orientated presentation on how it should look and stuff but in terms of like, actually being fully prepared in knowing what to look out for, which headaches to be like conscious of in terms of weather its sinister or not, I don't feel like we adequately prepared."* (Participant 5)

> "*Uhm… I'd say like 50/50, not full confidence, like I feel there's a lot more that I can learn.*" (Participant 9)

> *"Well I definitely feel more confidence in treating Cervicogenic headaches compared to a lot of the other types of that there are. So in terms of my confidence, treating and diagnosing headaches that presents, Cervicogenic would definitely be the one I'm most competent with."* (Participant 2)

> *"With headaches? Yes, I do feel confident, especially as of the way that we were taught."* (Participant 8)

> *"So most of the time I have a patient with that kind of headache, I'd say that's outside of my scope. I don't feel confident in telling you what to do."* (Participant 1)

5.3.1.3 Sub-Theme 1.3: Knowledge Base in Theory in Comparison to Practical Application

The diagnosis and management of headaches require both theoretical knowledge and practical skills. It emerged as a sub theme that contributes to level of preparedness. Participants were asked to deliberate the skills (theory or practical) they consider are most important. A further elaboration on the skills that have assisted them were when diagnosing and managing headache disorders took place. It emerged that a widely held opinion by participants was that theory skills were of importance. There was a marginal agreement that practical skills were more important. It arose that both theory and practical aspects were of equal importance. The following excerpts display this:

> "*With headaches, it would be more theory for me in terms of practical like trying to discern whether it's a headache or maybe like a trigger point referral from like a trigger point or something like that."* (Participant1)
>
> *"I think it's more theory because unless obviously like Cervicogenic it's usually the cause from the neck. So it kind of really depends on the headache but I think more headaches it's usually theory."* (Participant 8)
>
> *Theory, definitely. I feel like we haven't been taught much practical base skills." (*Participant 5)
>
> *"Uhm, so I think, it's definitely a combo of both. You have to understand the theory to be able to practically be able to assess and diagnose." (*Participant 2*)*
>
> "*Uhm, yeah, I definitely think there's elements of both. Theory you have to know the different headaches in order to diagnose them.*" (Participant 10)
>
> "*Almost equal… I probably go like 40% theory. 60% practical. I think if you don't have any exposure to the practical of what you're actually going to be seeing in clinic, the theory can only do so much.*" (Participant 7)
>
> "*I think it's more practical. Like we need to be able to actually see these cases and see the manifestations of these headaches for us to, I guess, pick them up better in patients. So we're able to apply that theory.*" (Participant 9)

5.3.2 Theme Two: Educational and Environmental Challenges

Questions surrounding challenges were posed. The participants were given an opportunity to elaborate on educational and personal challenges faced that have hampered their preparedness in the diagnosis and management of headache disorders. It emerged that

challenges within the educational and environmental sphere impacted the feelings of preparedness.

These can be seen as expressed by the following excerpts:

> *"So I do feel educational."* (Participant 12)
>
> *"More educational just like I mentioned previously."* (Participant 11)
>
> "*Um, I think definitely COVID because that's when we're actually learning about the stuff.*" *(*Participant *6)*
>
> *"I felt mostly it was educational challenges. So there wasn't like a lot of help coming from outside there was also COVID*." (Participant 3)
>
> "*Learning during COVID was definitely a challenge that a lot of us experienced.*" (Participant 2)

The five sub-themes were established that contribute to the specifics surrounding the main theme of educational and environmental challenges. The sub-themes surrounding and contributing to the theme of educational challenges include the extent of the work-load, unsatisfactory support when dealing with headaches, insufficient practical education and the role the learner plays within their education. The main contributor that was cited as an environmental challenge was the COVID-19 pandemic. This is highlighted as the last sub-theme within this theme.

5.3.2.1 Sub-Theme 2.1: Extensive Work-Load in Course Module

Upon elaboration on educational challenges many expressed the sentiment that the module (Diagnostics IV) was rushed in and of itself. Specifically, the topic of headaches was quoted to be insufficiently dealt with and the work-load, too extensive for such a marginal period. These transcribed pieces reflect this:

> *"Again, as I said earlier, it was very short, the module. I think it was only a semester long, but it just felt very short compared to how often the complaint is and happens. Uhm in that class I understand there is as a lot of content, we got to get through for studies. Uhm… And we did cover it sufficiently, like the detail was good. But it definitely could have could have been improved." (*Participant 2)
>
> *"I don't know if I would say it's sufficient. I could say it was a lot! So I don't know if that means sufficient or what. But I feel like a lot of information was thrown at us. And it was like insufficient time rather than insufficient knowledge. Okay, so education wise, I would say it was enough. Maybe a bit overwhelming for students… so students just tend to just move past it."* (Participant 3)

"Okay, it was definitely not sufficient. I remember headaches been taught as a very quick sort of overview type lecture." (Participant 7)

"Honestly, like the year that I was in, everything was like crammed in, we had an extra amount because the whole change of the syllabus and stuff, so a lot of stuff was crammed in." (Participant 7)

"But the thing that I think where it lacks as for the fact that it wasn't its own module, which I feel like should have been something that should have been considered because there's so much information, and it's such a big topic that it requires its own attention." (Participant 5)

"There was, I don't even know what the number of headaches that they were, but I only retained like three types of headaches in my mind. So definitely the amount the content-content was a lot. Weren't necessarily able to grasp what we were being taught because it was so much over a short period of time, combined with diagnostics. So it just it wasn't… I don't know, it wasn't joining." (Participant 4)

"I feel like in terms of our module of headaches, it was very rushed was very brief." (Participant 13)

"*There was just so much of content going on with other subjects. That it made it difficult to actually, like, learn to understand like you were just learning to go and to write it in your exam afterwards (*Participant 9)

5.3.2.2 Sub-Theme 2.2: Lack of Educational Support

There was a lack of support from lecturers, clinicians and other parties involved expressed by the participants. This lack of support felt them feeling that on top of the heavy work-load, they had to go through it alone and when asking questions sometimes felt it was a fruitless exercise. The following passages express this:

"Very much self-study like here the notes and get through the work." (Participant 2)

"It was just a lot of not finding enough help to assist me understand the work, but rather me, making sure that I understand. We didn't know we didn't have a tutor. So there wasn't like a lot of help coming from outside there. Because even if you go to our clinicians, I'm sorry. And you ask them about that. They said, No, you need to go back to your notes. They never tell you like a straight answer as to say if this is what presents then this is what you need to do. So you never really know what to do. So that's parts challenging." (Participant 3)

"I think it was mainly educational- the lecturer who took us for headaches I think they were just concentrating on what's on the slides, reading off the slides and that was that. And I definitely felt that that was a massive challenge because I felt like I had to do so much extra work on my own in order to be prepared to deal with patients." (Participant 7)

"And there's a lot of self-study, articles high-lighted. Yeah, most of it was basically given to us and told go self-study, it wasn't taught to us in class." (Participant 11)

"Although some of the clinicians are very helpful, but I do find on certain days some can be more helpful than others. So it depends what mood you get them in." (Participant 6)

5.3.2.3 Sub-Theme 2.3: Lack of Practical Education and Clinical Preparation

A consensus was reached that in order to better facilitate preparedness a greater inclusion of practical aspects within the education needed to be established. Furthermore, it arose that the theoretical component was indeed a good base from which to grow. However, the lack of practical aspects within the educational sphere left participants feeling somewhat lost when dealing with a patient in the clinical setting. The lack of educational practical aspects left them feeling underprepared when it came to diagnosing and managing headache disorders clinically.

The following quotations that support this notion:

"But I would say just like introducing a better approach in terms of getting pupils to interact with patients, maybe that have these headaches that could potentially be beneficial to them or to the recognising these headaches." (Interviewee 13)

"So we learned the basics, and mostly theory not a lot of practical around headaches. So I think incorporating practical with the theory around headaches and treatment of the different types of headaches." (Participant 12)

"I don't even remember being taught much with regards to practical associated with headaches with neck pain. We were taught a lot of tests for neck pain, but for actual headaches, I can't identify anything specifically that they taught us that would say, Oh, this should explain this headache, or…" (Participant *7)*

"I feel like we haven't been taught much practical base skills. When it came to hear that it's like, how would you handle a patient if anything had to happen pertaining a very bad headache." (Participant 5)

"I would say maybe the physical aspect like for example to identify like sometimes patients with migraines." (Participant 8)

"I think the focus in the headache module we did there was absolutely no hands on practical part! I think the impact of not having a hands on stuff wasn't good for us." (Participant 2)

5.3.2.4 Sub-Theme 2.4: Role of Learners Within Education

It was established from the participants, that the role of student was an important aspect in within their learning process. Engaging with only the source material and lecturer was cites to sufficient for some participants. Contrary to this, others felt that the course work was not sufficient and had to source material from elsewhere. The following quotes bring these ideas to the fore:

"I did try and find more articles to guide those notes, but practically, I wasn't involved practically because I don't know how to." (Participant 12)

"But rather me, making sure that I understand the work for myself. When I go to YouTube, or I go to Google or books, yeah, that was the only thing that I could do." (Participant 3)

"I was just a student, I just sat there in the class listening… "Chuckles". Honestly, I didn't have any, like have any involvement in it. I was more like the lecture will tell me what I need to know. I mean, there's only so many ways you can ask a headache question. So for me it was just like learn to pass and get out obviously as yeah, it was like crap. So yes, just pass and get out…" (Participant 8)

"Okay, so I would say it was like lectures and also seminar talks. I felt like they provided a lot more information that was more directed towards the diagnosing and management and they gave a lot more practical aspects of it that assisted us. That was just extra on sites and those were like from MedTalkz." (Participant 9)

"So you have to sit down with the notes, you have to go through, you have to make your own notes. You have to make tables and things that are just going to make you understand so I was very involved in my learning because at the end of the day, I wanted to pass as well, while also trying to retain knowledge at the same time." (Participant 4)

5.3.2.5 Sub-Theme 2.5: COVID-19

The outbreak and subsequent presence of the COVID-19 pandemic was highlighted by the participants as the main environmental factor that posed a challenge. The way in which it

impacted respondents- it affected their ability to interact with the content and grasp the crucial concepts that were needed to leave them feeling prepared. Participants expressed that COVID-19 impacted their education. The following quotations speak about this notion:

> *"Learning during COVID was definitely a challenge that a lot of us experienced not to have the face to face option. Having to attend lectures online and not being able to in person. I don't know, I definitely learn better in in person environments and feel more comfortable to ask questions or just have a better understanding in in person. So that was a challenge."* (Participant 2)

> *"So there wasn't like a lot of help coming from outside there was also COVID. So a lot of things which are sent to us they will say these are the articles to go through the articles that will be in the exam*." (Participant 3)

> *"Okay, first of all, we will also impact by COVID. Yeah, so our learning was online. So I don't think you'll actually learn much online. Yes, you've learned some things but most of your learning takes place in an in person setting- you learn more."* (Participant 4)

> *"Um, I think definitely COVID because that's when we're actually learning about the stuff. So we didn't have that proper face to face lectures during that time, but when more difficult, that might be where the little bit of delay is in the knowledge."* (Participant 6)

> *"Our first year in clinic was COVID. So we didn't actually have a lot of patients and we struggled to get patients and going from having so many subjects and starting to treat patients to not having many patients, you kind of lose a little bit of the skills that you were taught because you're not practicing them on a regular basis."* (Participant 7)

> *"We started learning headaches, it was during COVID time. So personally, it was very difficult. Like focusing and trying to grasp so much of information at that point of time, and not really having a face to face interaction."* (Participant 9)

5.3.3 Theme Three: Clinical Exposure

Clinical exposure played a colossal role in the feeling of preparedness amongst participants. It emerged that clinical exposure was a positive experience that enhanced feelings of self-perceived preparedness and ability to deal with the diagnosis and management of headache disorders. The following excerpts express the positive feelings surrounding clinical exposure:

> "*Uhm, so yeah, I'd say clinic has had a positive influence.*" (Participant 1)

> "*Positive because I've gained a little bit more experience.*" (Participant 12)

"*I felt it was very positive*." (Participant 13)

"I would say positively because of those few interactions that I have had with patients that have headaches." (Participant 9)

Furthermore, there are two sub-themes that emerged and expand on the theme of clinical exposure. They allow for a deeper understanding and expansion of the main theme. These two sub-themes include the positive effects of clinical exposure on self-perceived preparedness and how exactly clinical exposure has impacted one's skills.

5.3.3.1 Sub-Theme 3.1: The Positive Effects of Clinical Exposure on Self-Perceived Preparedness

There was unanimous settlement that clinical exposure positively impacted one's preparedness and ability to accurately diagnose and manage headache disorders. Despite the amount of clinical exposure one had, weather it was a few months or more than two years there was no arguing that clinical exposure was viewed positively. A participant expressed the sentiment of COVID-19 having negatively impacted their clinical exposure. However, overall clinical exposure had a positive impact upon self-perceived preparedness. Another participant expanded on the fact that clinical exposure was ultimately positive, but was also viewed negatively as it showed the gaps in their knowledge. The following citations expand on their feelings:

"That's a, that's a very good question. Because I think the more you see of a certain condition, the better you get at identifying it and treating it." (Participant 2)

"I'd say it's been positive because it gives you that practice in a way and when you see the condition once you've dealt with it, and you know what to do, and how to treat the condition and manage it, then you're more confident to do it the next time. So it's been more of a positive" (Participant 3)

"I would say positively because of those few interactions that I have had with patients that have headaches, I found it more beneficial because I was actually able to try out the management routines we were taught and things that I've learned through seminars." (Participant 9)

"Positively impacts because it creates an environment for us to learn go back and research and get information." (Participant 13)

"No definitely increases the more patients to see the more experience you get. More quickly you can pick up where it's coming from the C spine or its coming from muscle referring up or whether it would be from tension with the migraine or something more sinister." (Participant 10)

"Our first year in clinic was COVID. So we didn't actually have a lot of patients and we struggled to get patients and going from having so many subjects and starting to treat patients to not having many patients, you kind of lose a little bit of the skills that you were taught because you're not practicing them on a regular basis. And me in the last year or so do I feel like I am now actually prepared to, to be treating them. I don't think when I came into the clinic, I was ready to treat headaches at all." (Participant 7)

"Positive because I've gained a little bit more experience, but negative because I need I see there's a big gap." (Participant 12)

5.3.3.2 Sub-Theme 3.2: Impact of Clinical Exposure on Skills

Many different answers were provided when asked how skills were improved. These answers included the ability to take a better case history and ask more relevant questions, identify red flags better and also how to better treat, manage and not doubt their ability.

The following excerpts show these different factors:

"I think I have more awareness about the impact of headaches and patients. And awareness that I need to find different treatment methods for headaches, and deeper understanding of where they come from and how to diagnose different types of headaches..." (Participant12)

"So I'm able to look at the red flags and build on some of the acronyms to use to identify in the clinic." (Participant 11)

"So I'd say yeah definitely the case history aspect. Would be also using your hands so your palpation skills you'd be better able to pick up myofascial trigger points." (Participant 10)

"I think a big one for me- has my confidence has improved, so I'm not doubting myself the whole time with it, as well as I'm able to pick out what's important now when I never used to be able to." (Participant 6)

"The more you treat patients or the more you manage patients and the more you work with patients, the better you are with your communication with your treatment, with your long term management of the patient." (Participant 4)

"So it's improved in the sense that I can pick up those red flags a lot easier and also asking the right questions related to those headaches." (Participant 10)

5.4 SUMMARY OF CHAPTER

This chapter has given the findings of the data collected through this study from 13 semi-structured interviews. The findings explain the common occurring themes and sub-themes, which are taken from excerpts from the semi-structured interviews. The chapter to follow will expand on these findings and discuss them in-depth.

CHAPTER 6 DISCUSSION

6.1 INTRODUCTION

This chapter will discuss, elaborate and deliberate on the findings as presented in the previous chapter. This will be done in the context of reviewing the results and paralleling them to the existing literature.

6.2 OVERVIEW OF THE RESEARCH DISCUSSION

The aim of this study was to explore and describe the self-perceived preparedness of the chiropractic students' in the diagnosis and management of headache disorders. Three main themes were identified and acknowledged:

Theme 1: Level of preparedness

Theme 2: Educational and environmental challenges

Theme 3: Clinical exposure

A number of sub-themes were identified under these three banners and will be elaborated on accordingly.

6.3 THEME ONE: LEVEL OF PREPAREDNESS

The term "self-perceived preparedness" refers to how one views themselves in terms of confidence and competency with regard to certain skills (Manakil and George 2013). The "level of preparedness" has presented as a longstanding theme that has been showcased within various pieces of literature (Manakil and George 2013; Zafar *et al.* 2019; Moore *et al.* 2021). According to Jansen and van der Meer (2012), the term can be equated to readiness. He relates it to the theory of self-efficacy, stating that self-confidence or self-efficacy in a task is an indicator for future performance. Ramahlo (2020) confirmed this notion through the study conducted in 2020. As a result, therefore, the subthemes surrounding clinical skills related to the level of preparedness include confidence, or lack thereof, within diagnosis, and management and knowledge base in theory in comparison to practical application.

6.3.1 Clinical Skills Related to Diagnosis and Management

Clinical skills are a requirement in any medical profession when addressing treatment and management protocols. This study revealed this to be a true reflection because participants highlighted the importance thereof. Skills that participants deemed significantly important, included being competent in performing a thorough case history. This correlates and is supported by the findings of a study conducted by Moore *et al.* (2021), which stated that one's

confidence (in diagnosis of headache disorders) can be directly related to the ability of one to perform a thorough case history and create a list of relevant differential diagnoses. Starling (2018) also expressed the same sentiment that an “extensive case history” needed to be taken in order to make an accurate diagnosis. Chinthapalli *et al*. (2018) emphasised the need for a chiropractor to conduct an accurate and concise case history in order to make a precise diagnosis and draw up a management plan accordingly. The results obtained therefore are in agreement with the existing literature as it was established that the capturing of an adequate case history is an imperative skill that assisted in the overall level of preparedness and accuracy within diagnosis and management.

6.3.2 Confidence or Lack Thereof in Diagnosis and Management of Headache Disorders

The general consensus of the cohort in this study was that they perceived themselves to lack confidence and felt under-prepared with regard to the diagnosis and management of headaches. Some felt that they were confident, but not to the full extent and were still lacking in some areas. According to Yiu *et al*. (2012), in order for a student to be better prepared for practice, a reflection on their confidence and competency needs to take place in order for an increased self-awareness.

Ramahlo (2020) found parallel results among midwifery students in their confidence with clinical proficiency. Low levels of self-confidence were reported, despite the students being academically competent. Pulkkinen and de la Ossa (2019) saw that there was a missing link between being academically competent and confident in one’s clinical skills. The study concluded that graduates ultimately felt unprepared in some areas of practice.

Moore *et a*l. (2021) elaborated that the confidence of one in their abilities directly correlates to one’s ability to accurately treat and manage patients. Moreover, the findings within this literature concluded that there may be cavities in chiropractic student’s preparedness to diagnose and manage headache disorders. (Moore *et al.* 2021).

Overall, the results obtained from respondents feeling under-prepared are well in line with the current published literature.

6.3.3 Knowledge Base in Theory in Comparison to Practical Application

The participants discussed the skills (whether theory or practical) that they deemed to be most important (and have assisted them most) in the diagnosis and management of headache disorders. Many elaborated on the importance of theory skills while a minority rated practical skills of most importance. There were few participants that rated theoretical and practical skills as equally important.

Despite their student externs being competent academically, this did not translate directly to clinical proficiency in practical aspects (Hynes *et al.* 2016). Furthermore, externs, while academically had no issues, had struggled with clinical application of theoretical knowledge (Hynes *et al.* 2016). This notion is supported by Pulkkinen and De La Ossa 2019 that a gap between the education and practical skills the new graduate possess, exists (Pulkkinen and De La Ossa 2019). This illustrates that even without a lack in certain educational spheres, students have had issues translating theoretical knowledge into practice.

Therefore, this contrasts the notion that theoretical knowledge is more important than practical knowledge. This is due to the fact that there seems to be an established "gap" between theoretical knowledge and practical application. Thus one can infer from this observation that theoretical knowledge is not more important than practical knowledge.

6.4 THEME TWO: EDUCATIONAL AND ENVIRONMENTAL CHALLENGES

Educational and environmental challenges were established as barriers in feelings of self-perceived preparedness. These overall challenges are further broken-down into specific aspects that contribute to the main theme.

6.4.1 Extensive Work-Load in Course Module

Upon reflection of their course-work, an overwhelming response was that many participants felt that the module was too rushed. The topic of headaches was said to be insufficiently dealt with and the work-load too extensive for such a marginal period. A point was established that the module should rather be independent. It should not be incorporated with the current module of Diagnostics IV.

There should be a focus to optimise student learning in order to increase preparation for the clinical setting (Moore *et al.* 2021). In contrast to this the optimisation of learning was not felt by the participants as the extensive work-load did not allow for this. Medical students also found that the work-load was substantial and certain aspects were rushed over (Tomas and Jessop 2019). Furthermore, they found that the modular structure of the course was not conducive for long-term learning (Tomas and Jessop 2019). This is a recurring theme that is evident where medical student's main struggle was the academic work-load; they struggled with self-adapted learning and the amount of self-study that the course required (Picton, Greenfield and Parry 2022).

The extensive work-load is a well-established concept amongst medical students. This study's finding is within agreement with the literature that exists. It, however, brings to the fore the chiropractic specific point of view for increased support within education.

6.4.2 Lack of Educational Support

There was a lack of support from lecturers, clinicians and other parties involved expressed by the participants. The lack of support left participants feeling, on top of the heavy work-load, that they were on their own. The “self-study” aspect had a negative inference. The established feeling was that it was relied on too heavily. Furthermore, the posing of questions at times was expressed as fruitless.

It appears that in midwifery students’ similar sentiments were noted. Mentors and nursing preceptors were not supportive of students in a clinical setting (Ramahlo 2020). Fenwick *et al.* (2012) concurred that learning was affected in a negative way due to the lack of educational support in the clinical setting.

A study conducted on one-hundred-and-eighteen ophthalmology students found that education had a significant impact on the self-perceived preparedness of students. Additionally, it was found that students consulting with internal competent faculty members (lecturers, clinicians etc.), while busy with a case, saw an increased confidence in their ability to perform effectively (Zafar *et al.* 2019). This demonstrates that a lack of educational support will ultimately result in lower levels of perceived confidence.

6.4.3 Lack of Practical Education and Clinical Preparation

There were unanimous consensuses that an educational gap exists due to inadequate practical aspects in the lecture material. An agreement seemed to be reached that the theory was a good base from which to grow. However, the complete lack of practical aspects within the educational sphere left participants feeling lost when dealing with a patient in the clinical setting. The gap in practical educational aspects, heavily contributed to the feeling of under-preparedness when diagnosing and managing headache disorders clinically.

Wiest 2002, confirms this by stating that the education one receives impacts on their clinical competency and how prepared they are. (Wiest 2002). This demonstrates his point succinctly. In this instance, the lack of practical education has left participants feeling unprepared in this area, clinically. The ECCE emphasises that education is the main characteristic that renders graduates “safe and competent” (Peterson *et al.* 2022). In this, the lack of education has left respondents feeling incompetent to accurately diagnose and manage headache disorders from a practical aspect. This therefore directly affects their self-perceived preparedness.

According to Manakil and George (2013), the majority of their cohort (85.7%) identify that their education prepared them well for practice, thus, again, emphasising the importance of education on one’s feeling of preparedness.

6.4.4 Role of Learner Within Education

Despite the extensive work-load that participants were made to bear, they still felt that the lecture material was not enough to full grasp the concepts of headache disorders. This need leads to the acquisition of knowledge from external sources. Essentially, participants needed to engage more than with the lecture material to gain a full understanding of the course work. Participants of this study established that that interaction with the lecturer were not entirely sufficient. This notion is supported by Ramahlo (2020) that despite the lecturer, midwifery students used the opportunity to develop their academics and skills independently.

An earlier study conducted by Sobral 2000 found that medical students who actively sought out external material, other than that provided by the lecturer, were left feeling more clinically competent (Sobral 2000). In a study on newly qualified doctors, it was found that the lecturer material not sufficient and external learning had to be done in order to be competent. (Fitzgerald *et al.* 2008). The findings are in agreement with the literature.

6.4.5 COVID-19

It was established that the COVID-19 pandemic was indeed a challenge that affected preparedness. This was mainly due to the way it affected one's ability to interact with the material presented and effusively grasp the key concepts. There was a struggle noted with the transition to online learning and being unable to interact with the lecturer face to face. A One student also felt that COVID-19 had negatively impacted their clinical exposure. Hattar *et al.* (2021) noted that the transition from in-person to online and blended learning also impacted ones feeling of clinical preparedness. (Hattar *et al.* 2021).

In a 2020 study by (Khalil *et al.* 2020) conducted on medical students in Saudi-Arabia, it was agreed that students benefitted from online learning. However, they emphasised that the teaching of clinical related subjects was not beneficial online and resulted in a struggle to grasp concepts essential for clinical practice. Rose (2020) is in agreement with the results obtained in this study, as comparisons can be drawn. Rose elaborated that medical students were left feeling isolated and almost stranded with the volume of work online learning had left them with. The pre-clinical subjects were where students struggled the most with online learning, much like in this instance. (Rose 2020).

The literature surrounding online learning are still scarce due to the COVID-19 pandemic having occurred only recently. Therefore, the findings align with the available literature at present.

6.5 THEME THREE: CLINICAL EXPOSURE

Clinical exposure was highly rated in the attribution to the feeling of preparedness. Clinical exposure was rated positively in regard to self-perceived preparedness. These sentiments are noted by literature within the chiropractic and general medical sphere. (Manakil and George 2013; Ramahlo 2020; Moore *et al.* 2021). The time spent in a clinical setting allows for certain competencies and skills to be improved upon which contributes to one feeling an increased sense of self-perceived preparedness.

6.5.1 The Positive Effects of Clinical Exposure on Self-Perceived Preparedness

There was an undisputed consensus that clinical exposure positively impacted one's preparedness and ability to accurately diagnose and manage headache disorders. Despite the amount of clinical exposure respondents had, whether it was a few months or more than two years, there was no arguing that clinical exposure was viewed positively. A participant felt that COVID19 had negatively impacted their clinical exposure, but ultimately that clinical exposure overall had a positive impact. Another student felt that clinical exposure was ultimately positive, but could be seen as negative because it showed the gaps in their knowledge.

According to Haworth and Jones (2019), students feel that exposure in any clinic environment, whether a hospital or university clinic, positively impacts their self-perceived preparedness. Overall, they felt more confident in managing more complex patient cases and in their overall preparedness to act in a clinic setting (Haworth and Jones 2019). Hynes *et al.* (2016) agrees as chiropractic externs saw vast improvement (a score of 2.7 to 3.9 on the Likert scale) post preceptorship with regard to adjustments; their time in a clinical setting had a positive effect on their adjusting capability.

In agreement with this and in slight contrast, dental students on almost at graduation and entering into practice were ultimately prepared, but would benefit from more time in a clinical setting (Manakil and George 2013). The results obtained are in contrast to that of Moore *et al.* (2021) which found students that had spent more time in clinical setting had scored higher in self-perceived preparedness than those that had spent less time. The results emphasised that regardless of the length of time spent in a clinical setting the overall result on self-perceived preparedness is positive. This reinforces the point that clinical exposure overall is positive and leaves students feeling more prepared and confident in their skills.

6.5.2 Impact of Clinical Exposure on Skills

In regard to clinical skills and competency, multiple aspects had been improved upon. These improved competencies included the increased ability to take a concise case history, ask

pertinent questions and better identify red flags. The improved ability to treat and manage headache disorders with confidence was also cited.

These findings are in alignment with Khan as he elaborated that sufficient clinic skills are vital to effectively and successfully care for one's patient. (Khan, Salahuddin and Khan 2014). An increased proficiency in the diagnosis and management of headache disorders was noted by those who spent additional time in the clinical setting by Moore *et al.* (2021). Increased proficiency includes the better formulation of treatment and management plans which is in agreement with the findings of this study. Moore *et al.* (Moore *et al.* 2021) elaborated that the students felt high levels of preparedness to identify the pertinent red flags of headache disorders. Haworth and Jones (2019) collaborated these sentiments as they found that the students had improved in taking a thorough case history, clinical assessment and drawing-up of an appropriate management plan.

Overall, the results obtained upon questioning were in agreement with the available literature as seen by the substantiation.

6.6 SUMMARY OF CHAPTER

There was an established feeling of under-preparedness. A lack of confidence in the sphere of diagnosis and management of headache disorders was noted. It was attributed mainly to educational and environmental challenges. These being the extensive work-load presented, coupled with the lack of support from facilitators and clinical staff as well as the COVID-19 pandemic posing a challenge in the way they were able to interact and grasp the lecture material. An exposure to patients within a clinical setting not only improved certain skills and competencies, but boosted ones feeling of self-perceived preparedness.

CHAPTER 7 CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS OF THIS STUDY

7.1 INTRODUCTION

This chapter will draw on the merits, limitations and recommendations of this study in accordance with the findings obtained. The conclusion will evaluate this study as a whole, making note of the pertinent discoveries made during the process.

7.2 RESEARCH POSITIONING

This research study brought attention to the self-perceived preparedness pertaining to the diagnosis and management of headaches in chiropractic students in the Master's programme. The findings narrate and identify with the responses that were presented by the participants within the study. This allowed for efficacious and productive communications when data collecting and ultimately appropriate and competent interpretations of this data.

7.3. SUMMARY OF THE STUDY

The aim of this study was to explore and describe the self-perceived preparedness of chiropractic students' in the diagnosis and management of headache disorders. The responses of the participants to the interview questions posed are outlined in chapter five.

7.3.1 Objective One: Describe Your Self-Perceived Preparedness When Related to the Diagnosis and Management of Headache Disorders

The data displayed that participants largely perceived themselves to be unprepared to deal with headache disorders in the clinic setting. While they had dealt with some headache disorders, it was cited that they did not feel confident in their skills to make an accurate diagnosis. The skills that assisted them the most included the inquiring into pertinent case history questions. Majority of the cohort believed that theoretical skills were more important than practical skills. This contrasted the literature which cited that having theoretical knowledge does not translate to confidence and accurate diagnosis.

7.3.2 Objective Two: Identify and Describe Any Challenges Experienced in Their Preparedness for the Diagnosis and Management of Headache Disorders

There were a number of challenges participants cited as hindering their preparedness in the diagnosis and management of headache disorders. These challenges included several educationally based challenges while COVID-19 was classified as an environmental challenge. Educational challenges included the extensive work-load as well as the participants

feeling they were poorly supported by lecturers, clinicians and other support staff. Furthermore, participants felt that the complete lack of practical aspects within the lecture material found them not knowing how to approach cases from a practical aspect. The role of the learner was questioned and even though a substantial work-load was an issue, participants had to seek information from external resources as they felt the lecture material was not sufficient.

7.3.3 Objective Three: Describe the Effect of Clinical Exposure on Students' Self-Perceived Preparedness

There was a resounding consensus that despite their length of time spent in the clinic, their time spent treating patients has greatly positively impacted their confidence and skills. Their specific case history questioning skills, identification of red flags and overall management of patients had improved. This time spent within a clinical setting has been beneficial and left students feeling more prepared to deal with headache disorders.

7.4 STRENGTHS OF THE STUDY

The qualitative nature of this study, has contributed to the global scientific body of literature which exists on the self-perceived preparedness in the diagnosis and management of headache disorders. This research also sheds light on chiropractic education in an African context. It brings to the fore the educational practices of a university of technology within Africa. It also allows for participants to evaluate themselves and the course and in this the academic staff to assess if the curricular goals have been met. The barriers and challenges have also been explored and further established through this study.

7.5 LIMITATIONS OF THE STUDY

The participants contributed insightful and relevant information to this study. As seen in strengths the findings of this study contributes to overall literature within an African chiropractic context. However, one must be cautious to generalise these findings and apply them to the general chiropractic student population as the entire student population has not been surveyed. This study is subjective and relies on personal perspective. The interpretation of questions may differ amongst participants and is dependent on the honesty of said participants. A noteworthy limitation pertains to the body of knowledge that exists surrounding this topic. There is limited literature (within a chiropractic milieu) to draw from, especially in a qualitative context.

7.6 **CONCLUSION**

This study explored the self-perceived preparedness of chiropractic Master's students in their ability to diagnose and manage headache disorders. There seems to be a lack of confidence and a feeling of under-preparedness to deal with headache disorders within a clinic setting. This was mainly attributed to educational and environmental challenges. Educational challenges affected the understanding, long-term knowledge gained and practical skills that can be utilised by the participants. COVID-19, as an environmental challenge affected the acquisition of knowledge due to the lack of face-to-face interaction and ability to fully engage with the lecturer and lecture material. However, this being said, the exposure participants gained within a clinical environment has greatly improved their feeling of self-perceived preparedness. This too has highlighted the gaps within their knowledge and allowed for their skills to be improved leaving them feeling more confident in their skills to diagnose and manage headache disorders.

7.7 RECOMMENDATIONS

There are a number of recommendations that can be made from this study. These findings have shown that the module's circular goals are not being met to the best of their ability. In order to maximise this finding, recommendations for amendments need to be explored. A participant's recommendation included the subject of "headaches" to be separated from the module and that it be made a standalone module. More support is needed with regard to education and indeed practical education requires attention within the module. Overall, the participants felt they would benefit from more clinical teaching and interaction.

In order to further the body of knowledge on this subject and increase understanding within an African chiropractic context, further studies should be conducted, specifically, at the other educational institution that offers the chiropractic course within South Africa. This can provide an African identity of the perceived preparedness of students within the realm of headache disorders.

7.8 SUMMARY OF THE CHAPTER

This chapter distinguished the appropriate merits, limitations and recommendations of this study in accordance with the findings obtained. Furthermore it noted the overall conclusive evaluation of the study as a whole.

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APPENDICES

APPENDIX A: ETHICAL CLEARANCE CERTIFICATE

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
3rd 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

15 September 2023

Ms T Abrahams
336 Florida Road
Windermere
4001

Dear Ms Abrahams

Perception of Chiropractic students' in their preparedness in the diagnoses and management of headache disorders at a selected University of Technology
Ethics Clearance Number: IREC 111/23

The DUT-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 DUT-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 DUT-IREC according to the DUT-IREC SOP's.

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

It is compulsory for a student or researcher to apply for recertification on an annual basis. The failure to do so will result in withdrawal of ethics clearance. It is the responsibility of the researcher and the supervisor to apply for recertification.

Please note that you are required to submit a Notification of Completion of Study form together with an abstract to the DUT-IREC office on completion of your study.

Yours Sincerely

Prof J K Adam
Chairperson: DUT-IREC

APPENDIX B: LETTER OF INFORMATION — PILOT STUDY

LETTER OF INFORMATION — PILOT STUDY

Dear Participant:

Title of the Research Study: Perception of chiropractic students in their preparedness in the diagnoses and management of headache disorders at a selected University of Technology.
Principal Investigator/s/researcher: **Tamia Abrahams; MHSc: Chiropractic**

Co-Investigator/s/supervisor/s: Dr A. Abdul-Rasheed, M. Tech: Chiropractic, PhD: Health Science

Brief Introduction and Purpose of the Study: Patients with headache disorders commonly present to a Chiropractor for treatment. In order to accurately diagnose and manage a headache disorder students need to be well versed in their clinical skills. This research study aims to discover and explore how prepared students feel in diagnosing and managing headache disorders as well as the challenges and clinical exposure that comes along with the education.

Greeting Good day I wish to welcome you to my research study

Introduce yourself to the participant I am a 6th year Chiropractic student at DUT doing research for my Master's degree in Chiropractic.

Invitation to the potential participant I would like to invite you to participate in my research project.

Outline of the Procedures: You will be required to participate in a semi-structured interview. The duration of which should not be more than an hour long. A request is made that the interview be voice-recorded for record purposes. The interview will be conducted in the Chiropractic Board Room.

Risks or Discomforts to the Participant: No foreseeable risks for participating in this study.

Explain to the participant the reasons he/she may be withdraw from the Study: You are free to withdraw from this study at any point. There will be no adverse effects or consequences should you do so.

Benefits: This research will establish how prepared students perceive themselves to be when it comes to the diagnosis and management of headache disorders. It too will bring about knowledge on the challenges and barriers students experience when being educated about headache disorders diagnosis and management as well as gauge the impact clinical activity has on ones self-perceived preparedness.

Remuneration: There is no remuneration or incentive for participating in this study.

Costs of the Study: There are no costs incurred on the research participant.

Confidentiality: All personal details will be kept confidential and allocated a code. The raw data will only be available to the researcher and research supervisor. Data will be stored on password protected devices and hard copies will be kept with the researcher at all times.

Results: The results of this study will be made available to the participants and a copy of the research study in its entirety will be kept on file on the DUT library website.

Research-related Injury: There is no risk of research related injury in this study.

Storage of all electronic and hard copies including tape recordings: The consent forms, voice recordings and interview material will be held electronically on a password protected device. The data will be held for five years after which it will be suitably destroyed.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher, Tamia Abrahams on 0715167437, my supervisor Dr A. Abdul-Rasheed on 076 11 44203 or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Acting Director: Research and Postgraduate Support Dr V Govender on researchdirector@dut.ac.za

APPENDIX C: LETTER OF CONSENT — PILOT STUDY

LETTER OF CONSENT — PILOT STUDY

Dear Participant:

Full Title of the Study: Perception of chiropractic students in their preparedness in the diagnoses and management of headache disorders at a selected University of Technology.

Names of Researcher/s: Tamia Abrahams; MHSc: Chiropractic, Dr A. Abdul-Rasheed, M. Tech: Chiropractic, PhD: Health Science.

Statement of Agreement to Participate in the Research Study:

•I hereby confirm that I have been informed by the researcher, Tamia Abrahams (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

I, Tamia Abrahams (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 Legal Guardian (If applicable)	Date	Signature

APPENDIX D: LETTER OF INFORMATION

LETTER OF INFORMATION

Dear Participant:

Title of the Research Study: Perception of chiropractic students in their preparedness in the diagnoses and management of headache disorders at a selected University of Technology.

Principal Investigator/s/researcher: **Tamia Abrahams; MHSc: Chiropractic**

Co-Investigator/s/supervisor/s: Dr A. Abdul-Rasheed, M. Tech: Chiropractic, PhD: Health Science

Brief Introduction and Purpose of the Study: Patients with headache disorders commonly present to a Chiropractor for treatment. In order to accurately diagnose and manage a headache disorder students need to be well versed in their clinical skills. This research study aims to discover and explore how prepared students feel in diagnosing and managing headache disorders as well as the challenges and clinical exposure that comes along with the education.

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Explain to the participant the reasons he/she may be withdraw from the Study: You are free to withdraw from this study at any point. There will be no adverse effects or consequences should you do so.

Benefits: This research will establish how prepared students perceive themselves to be when it comes to the diagnosis and management of headache disorders. It too will bring about knowledge on the challenges and barriers students experience when being educated about headache disorders diagnosis and management as well as gauge the impact clinical activity has on ones self-perceived preparedness.

Remuneration: There is no remuneration or incentive for participating in this study.

Costs of the Study: There are no costs incurred on the research participant.

Confidentiality: All personal details will be kept confidential and allocated a code. The raw data will only be available to the researcher and research supervisor. Data will be stored on password protected devices and hard copies will be kept with the researcher at all times.

Results: The results of this study will be made available to the participants and a copy of the research study in its entirety will be kept on file on the DUT library website.

Research-related Injury: There is no risk of research related injury in this study.

Storage of all electronic and hard copies including tape recordings: The consent forms, voice recordings and interview material will be held electronically on a password protected device. The data will be held for five years after which it will be suitably destroyed.

Persons to contact in the Event of Any Problems or Queries: Please contact the researcher, Tamia Abrahams on 0715167437, my supervisor Dr A. Abdul-Rasheed on 076 11 44203 or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Acting Director: Research and Postgraduate Support Dr V Govender on researchdirector@dut.ac.za

APPENDIX E: LETTER OF CONSENT

LETTER OF CONSENT

Dear Participant:

Full Title of the Study: Perception of chiropractic students in their preparedness in the diagnoses and management of headache disorders at a selected University of Technology.

Names of Researcher/s: Tamia Abrahams; MHSc: Chiropractic, Dr A. Abdul-Rasheed, M. Tech: Chiropractic, PhD: Health Science.

Statement of Agreement to Participate in the Research Study:

•I hereby confirm that I have been informed by the researcher, Tamia Abrahams (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

I, Tamia Abrahams (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 Legal Guardian Date Signature

(If applicable)

_____ _____ _____ _____

APPENDIX F: ADVERTISEMENT

ARE YOU A CHIROPRACTIC STUDENT?

COME AND PARTICPATE IN A RESEARCH STUDY!

DUT
DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

REQUIREMENTS:

- **BE NO MORE THAN 3 YEARS IN THE MASTERS PROGRAMME**
- **BE NO LESS THAN 6 MONTHS IN THE MASTERS PROGRAMME**
- **BE WILLING TO PARTICPATE IN A PRIVATE SEMI-STRUCTURED INTERVIEW**

Title of Study: Perception of Chiropractic students' in their preparedness in the diagnoses and management of headache disorders at a selected University of Technology.

FOR DETAILS:
CONTACT TAMIA ON 071 516 7437

APPENDIX G: INTERVIEW QUESTIONS

SEMI-STRUCTURED INTERVIEW QUESTIONS:

1. Describe your experiences when it comes to diagnosis and management of headache disorders?

Lead questions: Do you feel adequately prepared? Do you have confidence when dealing with a patient with this disorder? How have the skills you have learnt assisted you in the diagnosis and management?

2. Elaborate on the skills you feel are most important in being able to diagnose and manage headache disorders?

Lead questions: Do you think it is the theory or practical skills? Like examinations that have assisted you, can you elaborate on these components?

3. Discuss the impact and/or influence of the education you received on your ability to diagnose and manage headache disorders?

Lead questions: Do you think the education you received was sufficient? How do you think it can be improved? Which aspects assisted you the most? Do you feel there were areas that could be improved on? What was your involvement as a student in your learning processes?

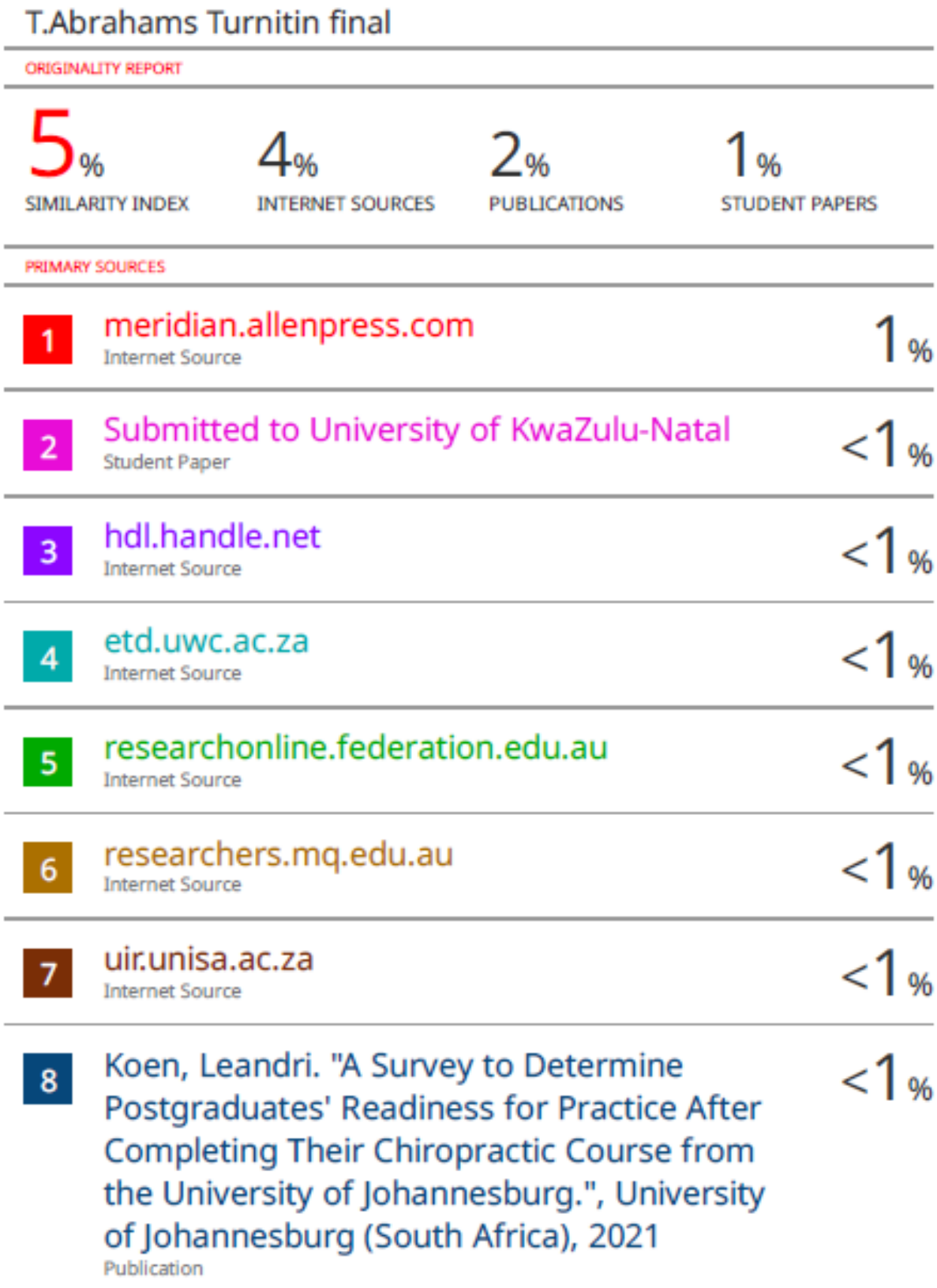
4. Describe any challenges that you have feel have affected your preparedness when dealing with a headache patient?

Lead question: Elaborate on them whether they be educational or personal

5. How do you think that your clinical exposure has impacted your ability to accurately diagnose and manage a headache disorder?

Lead question: Negatively or positively? In what way i.e. have your skills been improved, are you able to ask more relevant questions, better identify the relevant red flags etc?

APPENDIX H: PLAGIARISM REPORT



T.Abrahams Turnitin final

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APPENDIX I: EDITOR'S CERTIFICATE

Helen Bond
IMPELA EDITING SERVICES
impelaediting@gmail.com
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2 December 2023

CERTIFICATE

Tamia Abrahams

Dear Tamia

Thank you for using Impela Editing Services to edit your Master's dissertation entitled *"PERCEPTION OF CHIROPRACTIC STUDENTS IN THEIR PREPAREDNESS IN THE DIAGNOSES AND MANAGEMENT OF HEADACHE DISORDERS AT A SELECTED UNIVERSITY OF TECHNOLOGY"*.

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Kind regards

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Helen Bond (Bachelor of Arts, HDE)