

Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches

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Dedication

To my husband, Matt, for your unending love and support while pursuing my dreams. I thank you for being my pillar and strength.

To my girls, Hannah and Zoè, you are my greatest blessings.

Philippians 4:13

I can do all things through Christ who strengthens me.

Declaration

I, Mrs Marielle Camilla Robertson, hereby declare that this dissertation titled:

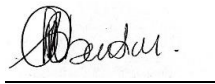
Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches

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Abstract

Background: Tension-type headaches (TTH) are primary headaches that have been indicated by the Global Burden of Disease study as the third most common pain condition worldwide and are more prevalent than migraines. People living with TTH may experience significant decreases in their ability to participate in work, social or leisure activities and housework.

Often persons living with TTH are managed by physiotherapists, and therefore physiotherapists should be knowledgeable regarding the therapeutic management of the condition. Currently, there is a paucity of literature in South Africa regarding the knowledge, attitude and beliefs, and practices of South African physiotherapists concerning the management of TTH.

Aim of the study: The aim of the study was to explore the knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of persons living with tension-type headaches.

Methodology: A cross-sectional research study was performed using a self-developed questionnaire sent via an electronic survey platform. All ethical considerations were taken into account during this process. Privacy and confidentiality were strictly maintained throughout the research process.

Results: One hundred and thirty-four physiotherapists provided electronic consent and completed the questionnaire. The participants were mostly female (89.5%) with a mean age of 36.5 and the median number of years of practice was 13 years. The majority of the participants were working in the private sector and most participants had an interest in Musculoskeletal and Pain management conditions.

For the knowledge section, 79 participants (58.96%) obtained a median score of 60%, which indicated that they had average knowledge regarding TTH. The majority of participants enjoyed providing treatment for TTH, favoured the multi-disciplinary team approach and agreed that evidence-based outcome measures should be utilized. In the belief section once again the majority favoured the multi-disciplinary team approach and believed that patients should be provided with alternative pain management strategies. The frequency of treatment varied from one to three times per week in the practice section and the participants preferred a combination of pharmacological and non-pharmacological interventions in the management approach.

Discussion and conclusion: This KABP study regarding the management of persons living with TTH among South African physiotherapists demonstrated that the majority of the participants in this study had average knowledge regarding TTH. Many of the participants were not able to identify all of the muscles involved in the symptoms of TTH, which is a concern in the physiotherapy profession since the anatomy of the body is a fundamental part of the understanding of presenting conditions and the development of treatment strategies. Intervention programmes in the form of accredited professional development training to address this shortcoming through online discussions or webinars could be undertaken. This study found that the participants were in favour of a multi-disciplinary team and an evidence-based practice approach in the management of persons living with TTH. It is recommended that further research should be done around this topic within the South African context.

Key terms: primary headaches, tension-type headaches, physiotherapy interventions, KABP study, pharmacological interventions, non-pharmacology interventions, multi-disciplinary team approach, evidence-based practice

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Glossary

Tension-type headache	Classified according to the ICDH-3, like a mild to moderate pain that is described as a bilateral tight feeling or pressing headache, but not throbbing or pulsating, which lasts for 30 minutes and may continue up to seven days (Olesen, J et al., 2013).
Neuro-musculoskeletal pain	A combination of neuropathic and nociceptive pain arising from the nerves, joints, muscles and other soft tissue structures (Zusman, 2008).
Central sensitisation	Amplified responsiveness of nociceptors in the central nervous system to either normal or sub-threshold afferent input that results in generalised or widespread hypersensitivity to stimuli, increased responsiveness to non-noxious stimuli and increased pain response aroused by stimuli outside the area of injury (Nijs et al., 2011).
Neuro-musculoskeletal clinical expert in physiotherapy	A qualified physiotherapist with more than five years of working experience, who frequently provides treatment to patients with neuro-musculoskeletal conditions. The clinician should preferably have completed the OMT 1/ Advanced Neuro-musculoskeletal (ANMS) course and additional post-graduate diploma or master's degree in Neuromusculoskeletal physiotherapy.

List of abbreviations and symbols

TTH	Tension-type headache
CTTH	Chronic tension-type headache
CBT	Cognitive Behavioural Therapy
KABP study	Knowledge, attitude, beliefs and practices study

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CHAPTER ONE

1. BACKGROUND OF THE STUDY

1. INTRODUCTION

1.1 Background of the study

1.2 Problem statement

1.3 Justification for the study

1.4 The research question

1.5 Aims and objectives

1.6 The layout of chapters

1.1 Background of the study

Headaches are a disorder that affects a significant portion of the population across the world and is a common reason for visiting a general practitioner (Sharon Tai et al., 2018). In 2016, the Global Burden of Disease study found that headache disorders were the third most prevalent pain condition worldwide, with tension-type headaches (TTH) the third most common medical disorder after latent tuberculosis and dental caries and among the most disabling conditions in the world (Webb and Raff, 2020; Stovner, 2018; Fuensalida-Novo et al., 2017). Due to the high prevalence of headache disorder, the International Headache Society published the International Classification of Headache Disorders, third edition (ICHD-3), which aimed to assist in identifying a presenting type of headache disorder according to certain diagnostic criteria (Olesen, 2013).

Fuensalida-Novo et al. (2017) stated that tension-type headache (TTH) is more prevalent than migraines with a global lifetime prevalence of 42%, even though migraines can be perceived by the individual as being more severe or disabling (Fuensalida-Novo et al., 2017). In South Africa, headache statistics indicate that 25% of the population experienced TTH with the majority of those affected being women between the ages of 15-49 years of age (Webb and Raff, 2020). This group of the population also represents those that are economically active or caring for young families.

Fuensalida-Novo et al. (2017) suggested that the general costs of headaches, mostly associated with primary headaches, which are migraine and TTH, in Europe in 2010, were €13.8 billion. The project additionally suggested that the headache burden is similar in low- and middle-income countries such as Lithuania and Ethiopia (Fuensalida –Novo et al., 2017). In the United States of America, statistics show that TTH was responsible for 43% of estimated annual lost workdays and that 25% of people living with TTH indicated a significant decrease in the ability to participate in social or leisure activities and housework (Webb and Raff, 2020).

Before the Global Burden of Disease study commenced in 2010, certain continents, which accounted for more than half of the world's population were initially excluded from the world statistics for headache data, among these continents was Africa (Steiner et al., 2014). Consequently, headache statistics from Africa were poor and the data from 2004 shows that the headache population is quite small (Onwuekwe et al., 2014; Haimanot, 2003). However, in 2012 a study conducted among medical students in Nigeria shows that TTH was prevalent in 36.8% of the participants and may have been related to the stressful

nature of the academic environment (Ezeala-Adikaibe et al., 2012). Another study that was done in Ethiopia showed that the one-year prevalence of TTH in Ethiopia was 10.4% which is below the global prevalence of 42%, but higher than the projected World Health Organisation (WHO) prevalence for Africa at 1.7% (Mengistu & Alemayehu, 2013). The Ethiopian study further indicated that in developing countries, TTH was on the increase (Mengistu & Alemayehu, 2013). However, as suggested by the Global Burden of Disease Study in 2016, minimal headache data is available, particularly in South Africa, Egypt and the Democratic Republic of Congo on the African continent, when compared to other high income, more developed countries (Stovner, 2018). Currently despite the Covid-19 pandemic, South Africa, according to the World Bank, has been classified as an upper-middle-income country with some of the infrastructures of a first world country (www.data.worldbank.org, accessed September 2021).

Although headache data in South Africa appears to be limited, a study conducted in 2016 among university students on the prevalence and the impact of headaches on their academic performance indicated that almost half of the tertiary institution population were affected by primary headaches (50.2%) (Basdav et al., 2016). These university students reported that headaches impacted their ability to concentrate while studying for tests or examinations; they experienced altered sleep patterns, and their social lives and activities of daily living were adversely affected. An interesting finding of this study was that 31% of this population were self-medicating for their headache symptoms (Basdav et al., 2016). From the data of the above-mentioned study, it could be suggested that a significant headache problem could exist within the South African population, however, it may be speculated that the relevant data is not captured, or the persons living with the headaches are not seeking appropriate or alternative help from professions like physiotherapists, but are rather self-treating with the use of medication.

1.2 Problem statement

According to literature, tension-type headaches are a prevalent condition worldwide (Kamali et al., 2019; Ferragut-Garcías et al., 2017; Lardon et al., 2017). Since headaches were identified as the third most prevalent pain condition on the list of the Global Burden of Disease Study in 2016, it could be hypothesised that a significant number of persons of the general population will experience headaches sometime during their life (Stovner, 2018). Although TTH is not as debilitating when compared to other headaches such as migraines, the persons living with the condition do tend to withdraw from social or

leisure activities, not to mention the impact the condition has on their daily activities. In Europe, the Euro-light project demonstrated that there is a significant burden of migraine and TTH present in the population, which is most profoundly related to lost days from work (absenteeism), lost days of household activity, or lost time spent away from family, social or leisure activities due to social withdrawal (Fuensalida-Novio et al., 2017).

Traditionally, it would appear that the most common method of treatment has been driven by pharmacological management for both the episodic and chronic forms of tension-type headache (Lardon et al., 2017; Magazi et al., 2015). This type of management can be a financial burden to the individual, but an even greater concern is the side-effects of the medication and the potential to develop additional co-morbidities associated with the prolonged or incorrect use of medication. Therefore, the need to find other non-pharmacological ways to manage the condition showed be explored. The gap found in the literature shows that there may be a disparity among South African physiotherapists and the therapy regimes used to effectively manage persons living with TTH.

The World Bank regards South Africa to be a developed country with sound infrastructure, however, it remains a country with significant social and economic challenges (www.data.worldbank.org, accessed September 2021). The rift that exists between the social classes of the country is most evident in the unemployment rate, which has consistently been reported to be around 27% for the last two years (www.data.worldbank.org, accessed September 2021) and due to the Covid-19 pandemic and the pandemic's effect on the economy, the unemployment rate may increase even further. The burden of costly health care is a significant challenge for many citizens of South Africa, many of which live in less than favourable circumstances. Therefore, finding a more cost-effective, alternative treatment option, which strives to include self-management strategies to lessen the burden for individuals living with conditions, such as TTH is essential. Physiotherapy could provide a low-cost option with minimal side-effects that offers effective and non-pharmacological therapy options.

The Health Professions Council of South Africa (HPCSA) has given physiotherapists first contact practitioner status, meaning that an individual seeking treatment does not first need to be referred to a physiotherapist by a medical doctor. Therefore, physiotherapy management may be a more cost-effective treatment option when compared to visiting a general practitioner or specialist, with the possibility of referral for specialised tests, and being prescribed expensive medication, with side-effects and risks involved. Physiotherapy is a safer and possibly more affordable alternative management option that could be provided to persons living with TTH. However, there appears to be minimal

consensus among professionals in South Africa regarding the management of TTH as not much research has been published about this topic in the South African context, which may lead to speculation.

Thus, the necessity for physiotherapists managing persons with TTH to be up to date with current evidence-based knowledge in the field of headache management is vital since it directly influences the level of care and advice given to the patients and could potentially affect the success of the recovery process of these individuals seeking treatment. It is therefore imperative that physiotherapists are knowledgeable regarding the condition and skilled to correctly identify the symptoms and plan an appropriate management plan for persons living with TTH.

1.3 Justification for the study

The physiotherapy profession has a significant role to play in the overall management, rehabilitation and prevention of musculoskeletal conditions, chest conditions, neurological conditions, education and promotion of recovery through the encouragement of healthy movements. According to the World Confederation for Physical Therapy (WCPT), South Africa's 2019 profile showed that there were 7937 registered physiotherapists in the country (www.world.physio.org, accessed December 2019) and when accessed again in September 2021 this number had remained unchanged. However, more accurately, the HPCSA's annual report of 2019/2020 indicates that there were 8058 registered physiotherapists in South Africa in April 2020, indicating that this number had increased from 7473 in April 2017, 7702 in April 2018 and 7906 in April 2019 (www.hpcsa.co.za, accessed September 2021). It could therefore be hypothesised that the number of persons that could potentially be assisted by a physiotherapist has increased whether, in the private setting or public health setting, as these services have become more readily available with the increased number of practising physiotherapists in South Africa.

Physiotherapy has a role to play in the management of TTH by providing a plethora of modalities that could be used to manage the condition. These modalities include but are not limited to joint mobilisations or manipulations, electrotherapy, soft tissue mobilisations, dry needling, client-specific exercises to initiate and promote recovery or maintain muscle strength or length, postural correction, health education promotion and advice, kinetic handling techniques and the use of psychological-based interventions such as Pain Neuroscience Education (PNE) principles to reduce the effects of pain and the behavioural response (Ferragut-Garcías et al., 2017; Fuensalida–Novo et al., 2017; Espi- Lopez et al.,

2014). Other medical professionals have also reported the benefits for the management offered by a physiotherapist, as part of the multi-disciplinary team, may have on patient recovery outcomes and rehabilitation even in conditions such as HIV, since the patient is treated as a whole entity and not just in part, thus emphasising the collaboration between health care professionals (Maddocks et al., 2018; Magazi et al., 2015).

The motivation for the current study was to explore physiotherapists' knowledge, attitude, and beliefs and practices (KABP) regarding the management of TTH as the South African government is on the verge of implementing the National Health Insurance (NHI), which aims to ensure a more cost-effective method of equal and free health care to all citizens across both the private and public sectors in South Africa. The need to explore alternative strategies, such as physiotherapy, other than only the more traditional pharmacological approach for management of TTH may become necessary once the introduction of the NHI commences. The need for the profession to have an impact in this field is imperative since there may be numerous benefits and fewer side effects. These benefits may allow for a more cost-effective manner to manage the condition without placing more strain on the health care system. This highlights the need to pursue a more affordable means of treatment for a condition such as TTH that may be available to patients across all income groups.

This study could potentially be the basis for future studies in the field of TTH and may even spark interest in epidemiology studies within the South Africa context, related to headache data and the prevalence thereof over several years, such as in the case of national health surveys.

1.4 Research question

What is the knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of persons living with TTH?

1.5 Aims and objectives

1.5.1 Aim

The main aim of the study was to explore the knowledge, attitude, beliefs and practices of South African physiotherapists towards persons living with tension-type headaches.

1.5.2 Objectives

1. To describe the socio-demographic characteristics of the study participants.
2. To determine the knowledge of South African physiotherapists regarding TTH.
3. To determine the attitude of South African physiotherapists towards individuals living with TTH.
4. To determine the beliefs of South African physiotherapists regarding persons living with TTH.
5. To determine what the practices of South African physiotherapists are regarding TTH.
6. To determine the associations between the socio-demographic characteristics and the knowledge, attitude, beliefs and practices of the study participants.

1.6 The layout of the dissertation

The outline of the dissertation is as follows. Chapter 2 will provide an in-depth overview of the relevant literature, while Chapter 3 will explain the methodology of the entire research study. In Chapter 4 the results of the study and the statistical analysis will be presented by making use of tables and graphs. The discussion of the results will follow in Chapter 5 where the researcher will critically reflect on the findings of the study and the available literature. In the final chapter, Chapter 6, the researcher will make appropriate recommendations and draw a conclusion about the study.

CHAPTER TWO

2. LITERATURE OVERVIEW

2.1 Introduction

2.2 Classification of headaches

2.3 The causes of TTH

2.3.1 Musculoskeletal factors

2.3.2 Pain mechanisms

2.3.3 Psychosocial causes

2.3.4 Contributing factors towards the pain and risk factors for children

2.3.5 Additional triggers

2.4 The prevalence of TTH

2.5 The burden of TTH

2.6 The assessment of TTH

2.7 The management of TTH

2.7.1 The team approach

2.7.2 Pharmacological approach

2.7.3 Non-pharmacological approach

2.7.4 Physiotherapy management

2.8 Current Health Care System

2.9 KABP studies

2. Literature Overview

2.1 Introduction

The literature regarding tension-type headaches (TTH) is diverse and certain aspects of the condition have been investigated worldwide. In Chapter 2, the researcher aims to review the current and relevant information regarding the topic of TTH, how TTH are classified, what the potential causes may be and the anatomical structures involved, the current methods of treatment that are used and how physiotherapy may play a role in the management of this condition. The discussion of this chapter intends to add perspective to the development of the questionnaire that was used in the study.

2.2 Classification of tension-type headaches

According to the International Classification of Headache Disorders, third edition (ICHD-3), headaches are classified as being either primary or secondary (Olesen et al., 2013). Primary headaches are unlike secondary headaches since the aetiology is mostly not known, whereas secondary headaches are related to a specific cause or origin, such as a brain tumour (Olesen et al., 2013). Primary headaches occur when the pain is present in the head, it may be a first-time occurrence or not, and can be without having a relationship with any pre-existing disorder or condition (Magazi et al., 2015). Most of these primary headaches are identified to be migraines, TTH and cluster headaches (Magazi et al., 2015). The ICHD-3 also identifies other primary headaches such as medication-induced headache or primary exercise headache to name only a few, however, TTH and migraines are the two most common primary headaches (Fernández et al., 2017; Olesen et al., 2013; Stuginski-Barbosa et al., 2011).

The categorisation of TTH is further divided into being episodic or chronic. Episodic headaches are either frequent or infrequent and both occur with or without peri-cranial tenderness (Olesen et al., 2013; Ashina et al., 2012). Episodic infrequent TTH is described as headaches that occur between one and twelve days per year, which lasts for at least 30 minutes and may continue for seven days (Olesen et al., 2013).

The general symptoms of TTH are depicted in *Figure 2.1* below. The experienced pain is mostly bilateral with a feeling of pressing or tightness (not pulsating or throbbing) with an intensity of being mild to moderate (Arendt-Nielsen, 2015; Olesen et al., 2013). Additionally, TTH is not accompanied by significant nausea and vomiting, does not worsen with physical activity such as walking or climbing stairs, which differentiates it from migraine, but TTH may present with either photophobia (extreme sensitivity to light) or phono-phobia (avoidance or the fear of loud sounds) (Olesen et al., 2013).

Tension-type headaches have not been linked to any dietary triggers or certain foods or smell that trigger the onset of the headache, according to a headache study done in Malaysia (Tai et al., 2018). Additionally, one or more headache types, such as migraine with TTH, may co-exist at any point in a person which further complicates the differentiation between the different headache conditions (Rinne et al., 2016).

Episodic TTH is also common in children from the age of seven years, teenagers and working adults (Arendt-Nielsen, 2015). The literature is suggestive of a link to muscular trigger points and contributory factors such as psychological stress, muscle overuse and poor posture, which may be noticeable or more pronounced in these younger age groups (Arendt-Nielsen, 2015).

Chronic tension-type headaches (CTTH) are also divided into headaches with or without peri-cranial tenderness (Olesen et al., 2013). Generally, CTTH last longer, the frequency may be up to 15 days per month and may proceed continuously for at least three months (Olesen et al., 2013). Mild nausea may occur, as well as either photophobia or phono-phobia. Although CTTH affects a smaller proportion of individuals who live with this condition (between two and four per cent), it affects more women than men (close to 65% of the cases) and these individuals are more likely to seek medical interventions due to the high frequency (almost daily) of their headaches (Ghadiri-Sani et al., 2016; Haywood et al., 2018). It is also important to note that the prevalence of CTTH declines with age (Ghadiri-Sani et al., 2016). According to Benito- Gonzalez et al. (2018) stress, sleep disturbances, anxiety, and depression seem to be common triggers for an individual that lives with a chronic headache, however, when in combination, the effect on the intensity of the headaches is significantly compounded.

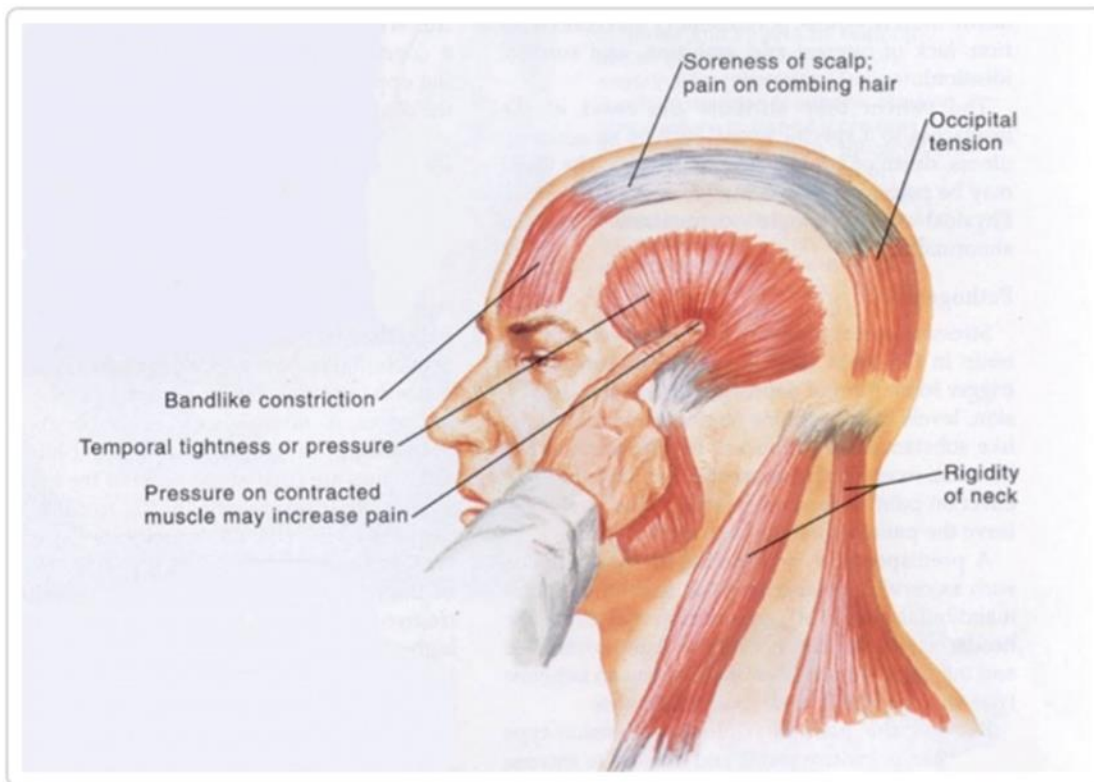


Figure 2.1: **The clinical presentation of** Tension-type headaches (www.physio-pedia.com, accessed June 2019)

2.3 The causes and risk factors of tension-type headaches

Although many individuals live with headaches, different causes could be related to the origin of any headache. **The cause of a headache is multifactorial and could be physical, such as a joint or muscle pain or tenderness, or even psycho-social in nature, whereas the origin of the headache may refer to a specific structure that is eliciting the symptoms and might even be a source of referred pain** (Monzani et al., 2018). **Previously TTH has been** named muscle contraction headache, psychomyogenic headache, stress headache, ordinary headache, essential headache, idiopathic headache, or psychogenic headache (Ashina et al., 2012). Therefore, the association was made between this headache condition and the pain and tension that arose mostly from the surrounding muscles and structures.

The main causes and contributory factors for the development of TTH include, but are not limited to anxiety and stress, work-related stress, depression, dietary changes, lack of sleep or altered sleep patterns, or modern lifestyle behaviours such as habitual sitting posture (Mingels et al., 2019; Fuensalida-Novo et al., 2017; Palacios-Ceña et al., 2017). Additionally, emotional factors such as stress, anxiety and sleep disturbances all play a role in the provocation or triggers of TTH (Benito-González et al., 2018). In 2016, The Global Burden of Disease Study found that additional lifestyle factors could contribute to the presence of TTH, such as the supposed level of stress, obesity, smoking, the level of physical activity and blood pressure variances (Stovner, 2018). Further triggers can also include muscle overuse, myofascial tenderness, psychosocial factors, and poor posture (Mingels et al., 2019; Arendt-Nielsen, 2015).

2.3.1 Musculoskeletal factors

Earlier literature regarding TTH demonstrates that there is a strong connection to a particular derangement in the muscular-skeletal system and this seemingly originated due to muscular pain from the adjacent tissues (Arendt-Nielsen, 2015). Thus, poor postural habits, muscle overuse or misuse that leads to muscle imbalances, could possibly contribute to the derangement in the musculoskeletal system. A cross-sectional study by Lidegaard et al. (2018) showed that there might be a correlation between TTH and the presence of neck and shoulder pain, with tenderness in the upper trapezius muscle. Thus, indicating that derangement in the musculoskeletal system might predispose an individual to experience TTH and that the tenderness in the upper trapezius muscle may be a risk factor for further worsening and developing into the chronic form of TTH (Lidegaard et al., 2018).

A systematic review done by Phu Do et al. (2018), found that referred pain elicited by active myofascial trigger points reproduced similar headache patterns as in TTH patients. As cited in Phu Do et al. (2018), a myofascial trigger point is a hyper-irritable spot within a skeletal muscle, which is associated with a hypersensitive nodule within a taut muscular band. This spot is usually painful on palpation and can cause local and distant pain (referred pain) and tenderness, motor dysfunction and autonomic phenomena (Arendt-Nielsen, 2015). According to Phu Do et al. (2018), the muscles most commonly found to have trigger points that could contribute to the presence of TTH are Temporalis, Masseter, Upper Trapezius, Sterno-cleido Mastoid and Splenius Capitis, which overlies the cervical muscle groups

which include: Semispinalis Capitus and Longissimus Capitis, Recti Capitus Posterior and Obliquus Capitus Superior. Although not all these muscles would be involved in every single person that presents with TTH, it is worth noting the anatomy of the muscles, such as the origin and insertion of each muscle, as well as the area of referral patterns that may or may not overlap with the painful areas involved in a particular person's presenting symptoms of the headache (Arendt-Nielsen, 2015).

Myofascial trigger points have been further divided into active and latent trigger points (Arendt-Nielsen, 2015). An active trigger point produces a constant pain that may accompany a local twitch in the muscle upon palpation, which is recognised as the familiar or known pain to the patient or that may be referred pain produced during an examination of the tissues that exhibit at least part of the TTH pattern usually experienced (Palacios-Ceña et al., 2017). On the other hand, a latent trigger point produces pain only during manual palpation, but may not be the familiar or usual TTH pain experienced by the patient (Palacios-Ceña et al., 2017; Arendt-Nielsen, 2015). According to Phu Do et al. (2018), a high occurrence of active and latent muscle trigger points was found in persons with TTH. In a review on TTH, Arendt-Nielsen (2015) suggested that referred pain elicited by active trigger points in the cervico-cranial region reproduced at least part of the same pain pattern as experienced during an episode of TTH (Arendt-Nielsen, 2015).

In South Africa, a study done by Joseph et al. (2016) showed that the prevalence of active muscle trigger points present in a group of persons living with CTTH, was between 65% -85 % of subjects and most commonly found in the temporalis and sub-occipital muscles, where other studies have shown that the upper trapezius muscle is commonly affected by trigger points and could be linked to postural strain due to computer-related desk work (Mingels et al., 2019; Joseph et al., 2016; Cathcart et al., 2010). However, a different study has shown that the presence of trigger points in the surrounding muscle tissues is also existent in other forms of headaches, such as migraines and mixed TTH/ migraine headaches (Maistrello et al., 2018; Joseph et al., 2016). Thus, the theory that TTH is solely caused by muscle trigger points present in muscles cannot be substantiated, since this would exclude the link that psychosocial factors or even mood disorders may have with TTH and with that the entire multi-disciplinary team approach required to effectively manage TTH (Sahai-Srivastava et al., 2017). According to Cathcart et al. (2010), some individuals present with increased muscle tone and tenderness in the muscles around the head, neck, and shoulders, with the absence of a headache, while others who are living with a headache have very little or no muscle tenderness at all. Hence, this increased muscle

tenderness cannot be the sole attributing factor for the development of TTH and the exact cause of these headaches remains to be explored.

Mingels (2019) and Monzani (2018) found that the symptoms of TTH are strongly linked to myofascial causes such as maladaptive postures and the nociceptive input from the surrounding musculoskeletal structures which could at least be partly responsible for the pain pattern experienced. Furthermore, according to Mingels (2019), maladaptive postures, such as slump sitting and forward head posture (FHP), seem to be a prevailing trigger for both TTH and cervicogenic headaches (Phu Do et al., 2018).

Postural deviations from the neutral spine position, such as FHP, that needs to be maintained for daily computer use, could also predispose an individual to either TTH or cervicogenic headache (Mingels et al., 2019). Prolonged sustained deviations such as FHP, results in creep of the spinal tissue, increasing the biomechanical torsion forces, limiting postural movements and reducing spinal proprioception (Mingels et al., 2019). The result of FHP may be craniofacial pain, headache, neck and shoulder pain, together with a decrease in the range of motion of the cervical spine, muscle stiffness and tenderness (Mingels et al., 2019). Thus, these seated postures and prolonged maintained positions may also contribute to the development of TTH. Lee et al. (2019) found that FHP and TTH were directly linked, in that a reduction of the FHP had a significant response to the improvement of TTH symptoms (Lee et al., 2019).

According to Mingels et al. (2019), in Europe people whose occupations demand it, spend an average of six or more hours per day performing seated activities, which predisposes them to the development of pain or symptoms such as strains of the head, neck and upper extremities. The position of altered biomechanics and imbalances could then potentially be a triggering factor for the development of TTH since it places more tension and strain on the surrounding muscles that keep the head in an upright position (Mingels et al., 2019). The muscles around the spine must also work harder to maintain a neutral seated posture for a prolonged time and might according to Monzani et al. (2018) be classified as an overuse injury to a muscle or a group of muscles. There is limited research to compare the occupational demands concerning TTH in the South African context as little evidence was presented at the time of this study, regarding the role that occupational demands and work-related stress could play in the development of TTH, which presents a gap in the literature in this field of study.

2.3.2 Pain mechanisms that may contribute to the development of tension-type headaches

The current rationale by authors for the development of TTH and factors that may predispose individuals to experience TTH has been demonstrated by the role of peripheral pain processing and central sensitisation (Mingels et al., 2019; Fernandez et al., 2014; Ashina et al., 2012). Although active muscle trigger points in the head, neck and shoulder muscles could be the potential cause for the persistent peripheral pain mechanisms present in TTH, this may not be the case, especially in the chronic form of TTH (Joseph et al., 2016). It has been suggested that the conversion from episodic to chronic TTH is the consequence of the sensitisation of the cervical-trigeminal nucleus in the brain stem. It is hypothesised that this could be a result of the nociceptive input of active muscle trigger points in the surrounding musculature (Maistrello et al., 2018). Since, the nerves in the head, neck and shoulders synapse centrally at the spinal dorsal horns and trigeminal nucleus caudalis, the nucleus could become an area of summation of the convergence of input over a period of time, which may alter the pain processing and eventually precipitate central sensitisation (Cathcart et al., 2010). The literature supports the role of peripheral and central pain processes being involved in the evolution of episodic to chronic forms of TTH, which is largely dependent on the duration or chronicity of the symptoms (Magazi et al., 2015; Fernández et al., 2014; Ashina et al., 2012). To understand the sensitisation of the cervical-trigeminal nucleus, an explanation of the origin of pain in the body is warranted.

Acute pain in the body is a protective mechanism (necessary for survival) that preserves the body from being hurt and is caused by a noxious input that stimulates the nociceptors in the peripheral tissues (Arendt-Nielsen, 2015). Under normal circumstances and in healthy individuals, the threshold for pain is high and the impulse conducted is only that which is potentially damaging to the tissues (Arendt-Nielsen, 2015).

Nociceptors are peripheral sensory receptors that are present throughout the body tissue and are responsible for conducting a stimulus towards the central nervous system (Mingels et al., 2019). The impulse is modulated at the level of the spinal cord and interpreted by the brain (Mingels et al., 2019). The dorsal horn sends the impulse upwards towards the higher centres of the brain via second and third-order neurons, where the impulse is interpreted as pain (Mingels et al., 2019). However, the perception of pain is highly subjective, as different pain thresholds are experienced by different individuals (Mingels et al., 2019). For instance, during childbirth, what one individual may experience as severe pain, may only be moderate pain for another individual. The higher centres of the brain,

including the cortex, in turn, modulate the impulse and then send it back towards the spinal cord via the descending pathways towards the efferent (motor) nerve root, which elicits a motor response by the muscles, such a pulling away from a hot stove plate (Fernandez et al., 2017).

The bottom-up model of pain processing (the ascending pathway) illustrated in *Figure 2.2* indicates that the longer the stimulus is present from the periphery (the peripheral nociceptors in the skin or joints), the more sensitised the central nervous system becomes (by continually sending the impulse towards the higher centres of the brain), thus lowering the threshold for the perception of pain (Mingels et al., 2019). In predisposed individuals, as demonstrated by Lidegaard et al. (2018), this may lead to sensitisation of the central nervous system, which may, in turn, contribute to the persistence, amplification and spread or referral of pain, as well as the conversion and worsening from episodic TTH into chronic TTH (Arendt-Nielsen, 2015). Therefore, the individual then only needs a small sometimes insignificant pain stimulus to lead to an over-exaggeration or perception of the pain. The threat value then no longer needs to be high enough to signal the protection or preservation of the body. This may additionally substantiate the origin of headaches, and especially the worsening from episodic into chronic TTH. Thus, CTTH could be in an already central sensitised state as central drivers for pain are reliant on the brain's ability to modify the input through pain inhibition (Mingels et al., 2019).

The main proposed mechanism leading to central sensitisation is 'wind-up', or temporal summation, where a repetitive noxious stimulation from the periphery causes cumulative activity in the central pain neurons that do not return to baseline levels between stimulations (Cathcart et al., 2010). This may be explained as a summation in pain for repetitive stimulations at a constant stimulus intensity, which peripheral and central mechanisms may contribute towards.

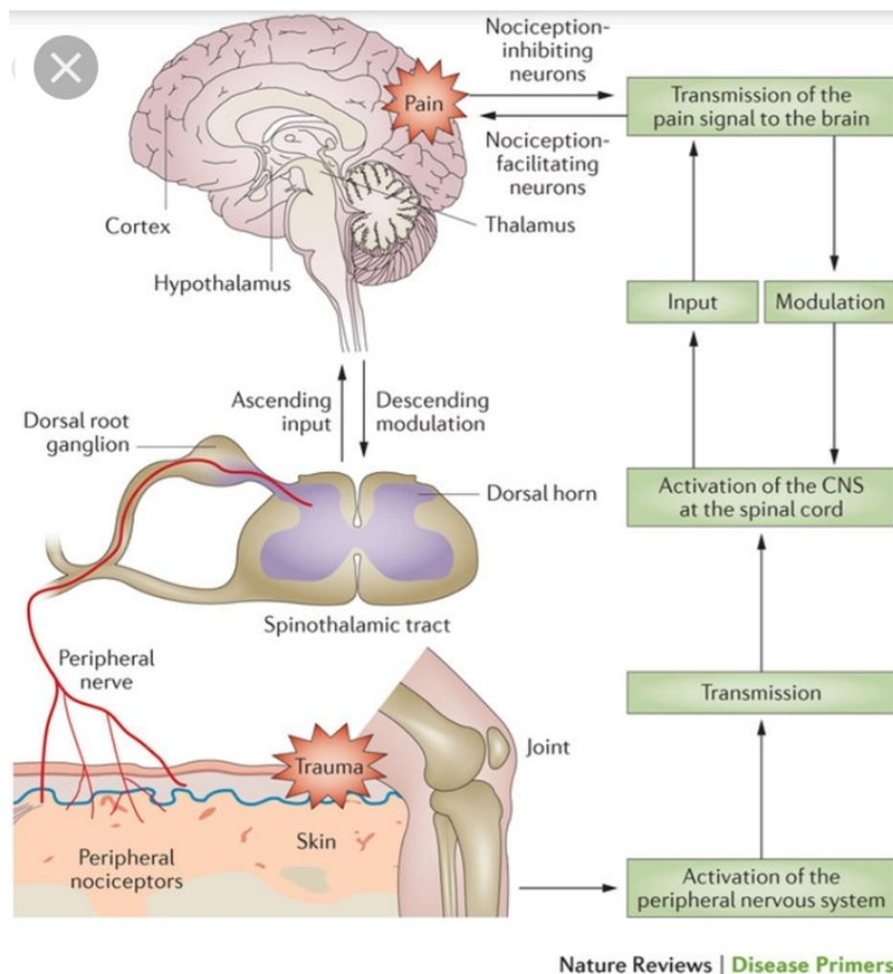


Figure 2.2: The pain processing pathways (www.physio-pedia.com, accessed 2019)

2.3.3 Psychosocial causes

Current research regarding pain has shed light on the fact that pain is not solely driven by a noxious input and that it is a far more complex entity that includes the multidimensionality of pain and the diverse nature of each individual (Cooper et al., 2021). According to Olesen (2013), persistent pain that continues beyond normal tissue healing time frames and after three or more months is regarded as chronic pain (Olesen, 2013). Over the years, research has suggested addressing acute pain with biomedical approaches, and bio-psychosocial or psychological approaches (Louw et al., 2019). Pain Neuroscience Education (PNE) is a strategy within the biopsychosocial model of therapy that aims to

address and teach the person in pain about the biological and physiological processes involved in their pain experience (Louw et al., 2019).

In acute and sub-acute conditions, the biomedical approach (or bottom-up) may be useful in the explanation of the pathology and biomechanics of the injury part of the pain, however, this may not be as true with persistent pain, where the approach has much been disputed (Cooper et al., 2021; Fernández et al., 2020; Phu Do et al., 2018). Whenever chronic musculoskeletal pain is present the focus of therapy shifts from the traditional biomedical approach that equates pain with injury, towards the psycho-social aspects involved or present, since it is strongly associated with the health-related quality of life and psychological distress (Consonni et al., 2021). The focus is placed on the top-down strategy or reconceptualising the pain for the individual and behaviour modification strategies of that individual with the additional psychosocial factors that have to be considered regarding the person's own belief system, their previous experiences and other psychogenic influences that may play a role (Fernández et al., 2020; Louw et al., 2019; Phu Do et al., 2018).

Psychological factors that influence the experience of pain are largely driven by fear and specifically, kinesiophobia (the fear of movement), as the belief exists that the movement is painful and therefore damage is occurring (Diener et al., 2016). Various factors that contribute to the experience of pain are catastrophising, hyperalgesia, kinesiophobia and focusing on the pain, fear avoidance and anxiety, secondary gain and environmental factors (Diener et al., 2016). Therefore, it could be deduced that the prior experience of pain can profoundly contribute towards the current behavioural response, which is further complicated by the belief system of the individual (Mingels et al., 2019). Associations between the pain, posture and behavioural responses, therefore, validate a biopsychosocial model, as seen in *Figure 2.3* below, that addresses the physiological, psychological and social aspects that affect a person living with TTH (Mingels et al., 2019). The social aspects refer to the interaction with the social surroundings of the individual such as cultural beliefs and values, social network support and socio-economic status (Crombez et al., 2012). The interaction of the individual within this sphere, such as the presence of fear-avoidance, offers insight into whether the pain and usually it would be chronic pain, is affecting this sphere of the individual's life (Crombez et al., 2012).

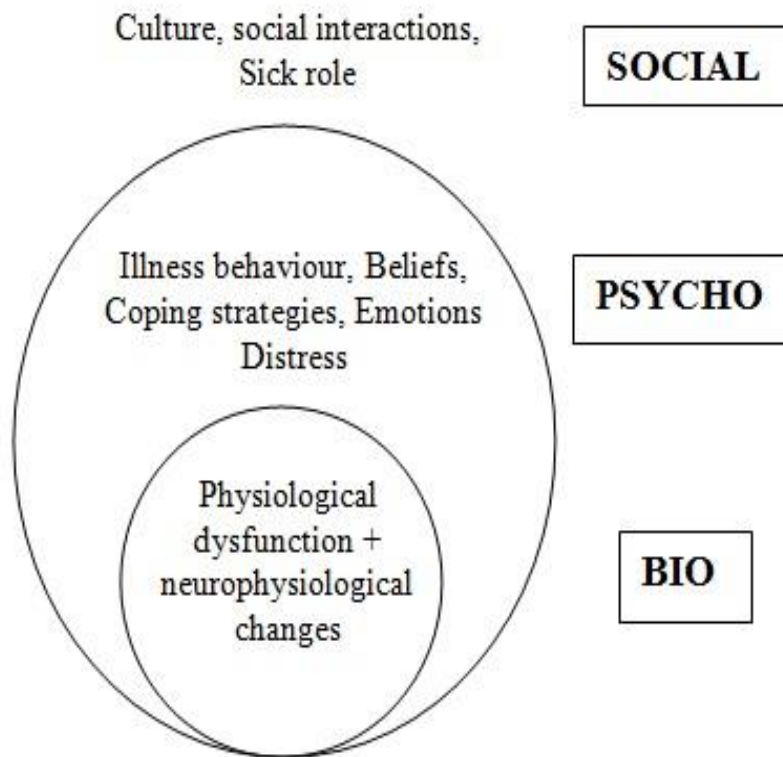


Figure 2.3: Biopsychosocial model (www.physio-pedia.com, accessed January 2020)

2.3.4 Contributing factors towards TTH and risk factors for children

In children, depression appears to be a strong risk factor that predisposes an individual to experience TTH and is strongly associated with migraine and TTH and is a common independent predictor of moderate to severe headache-related disabilities among adolescents (Kemper et al., 2017).

In a prospective cohort study in New Zealand, risk factors for migraine and TTH in 11-year-old children included sleep duration, maternal smoking, and having been previously bullied (Kemper et al., 2017). However, on the contrary, Lampl et al. (2016) found that there is a stronger association between TTH and anxiety as opposed to depression, which rather co-existed with migraines, even though anxiety and depression were simultaneously present in persons with migraine (Lampl et al., 2016). Higher depression scores and poorer academic performance was noted in children who had missed school due to headaches in addition to a higher prevalence of sleep disorders (Kemper et al., 2017).

2.3.5 Additional triggers

The additional triggers for the development of TTH in adults are reviewed in the section to follow. These factors are also linked to the psychosocial factors that were previously mentioned under the heading *2.3.3 Psychosocial causes* but are presented more thoroughly in the section below.

2.3.5.1 Sleep and depression

Similar to pain, sleep is another physiological mechanism used by the body for self-preservation, survival and protection, it is a basic need of life and almost half of the population of the world is living with different types of sleep disorders (Korabelnikova et al., 2020). Sleep is important for the maintenance of homeostasis within the body and it aids in optimising the function of the body across physiological systems (Finan et al., 2014). Lack of sleep, or sleep deprivation, has been associated with many health risks, such as the presence of neurological diseases like headaches (Fernández et al., 2018). There is a definite association between sleep disturbances and headaches, and both seem to have an effect on the other (Fernández et al., 2018).

In 2014, Finan et al. (2014) explained that the presence of insomnia, being the most common sleep disorder worldwide, is a major driver of transforming infrequent, episodic tension-type headaches into chronic tension-type headaches at a twelve-year follow-up, thus worsening the prognosis of pre-existing headache conditions. Fernandez et al. (2018) also stated that insomnia was found to be more prevalent in TTH conditions than migraine headaches and was even 1.8 times higher in persons living with TTH. Pain has less of an impact on sleep than sleep has on pain, implying that a person who had decreased sleep could experience worsening of the pain on the subsequent day (Finan et al., 2014).

Chronic pain and sleep disorders have a strong association, and as already mentioned psychological factors such as mood, anxiety, depression and quality of life are strongly linked to the lack and quality of sleep (Keilani et al., 2018). Chronic pain and sleep deprivation appear to be interlinked and Finan et al. (2014) suggest that sleep complaints occur in between 60 and 80 per cent of chronic pain conditions, including headaches. Magazi et al. (2015) stated that the majority of persons living with TTH also experience insomnia (Magazi et al., 2015).

The quality of sleep may also contribute to the development from episodic to chronic TTH, which have been linked to excessive daytime sleepiness and even snoring (Fernández et al., 2018). Poor quality of sleep has a direct relation to the individual's negative mood, depression; inability to cope with stress as well as associated diet-related issues (Finan et al., 2014). A study done in Korea noted that TTH participants with excessive daytime sleepiness had a higher headache frequency, severe headache intensity, increased impact of headache, and a higher prevalence of depression compared to TTH participants without excessive daytime sleepiness (Kim et al., 2019).

According to Fernandez et al. (2018), depression and poor sleep quality are associated with a central sensitised state, which leads to the lowering of pain thresholds and could further worsen the perception of pain, allowing for hyperalgesia and catastrophisation (Fernández et al., 2018). In addition, Magazi et al. (2015) stated that depression has been most commonly associated with TTH (Magazi et al., 2015). Therefore, a multidisciplinary approach may be vital to assess the psychosocial aspects of an individual to improve the overall quality of care that will in turn affect the quality of life of an individual by addressing the pain perception as well as the associated sleep disturbances (Keilani et al., 2018).

2.3.5.2 Anxiety and stress

Stress and pain appear to be interrelated and poor coping strategies, chronic or daily stress, sustained physiological arousal, negative mood states and anxiety related to pain have been associated with effects on experimental pain (Cathcart et al., 2010). Prolonged stress causes the release of cortisol in the body, which may result in tissue damage that leads to pain, or the impairment of descending pain inhibition (Cathcart et al., 2010).

Anxiety also leads to the development of TTH or can exacerbate the symptoms, especially in persons that are already predisposed or in an emotional state where their mental health is being affected, and could potentially lead to poor work productivity levels or even absenteeism (Monzani et al., 2018). A Korean population-based study found that anxiety and depression were higher among TTH participants compared to non-headache sufferers. The study further suggested that the prolonged presence of anxiety and depression could lead to a higher frequency of TTH, which directly affects the chronicity of these headaches that may precipitate the development of the chronic form of TTH (Song et al., 2016).

2.4 The prevalence of TTH

Fernandez et al. (2017) stated that TTH is more prevalent than migraine with a global lifetime prevalence of 42%, even though migraines can be perceived by the individual as being more severe or disabling. The persons affected by TTH vary since adults, adolescents and children can all experience episodic TTH, which is more common than migraine across each major age group (Arendt-Nielsen, 2015). The occurrence of TTH is higher amongst women than men, particularly those aged between 15 and 49 years, according to the Global Burden of Disease Study done in 2016 (Stovner, 2018). Lopez et al. (2016) stated that the prevalence of TTH appears to be higher in Europe than in Asia or America with a global estimation of 40% (López et al., 2016). Among the published literature available on the topic of TTH, there appears to be a bigger percentage from European countries, therefore either the prevalence of TTH is indeed higher in Europe or there are in fact more studies conducted in this population hence more persons living with TTH may be mostly European.

Arendt-Nielsen (2015) indicates that the prevalence of TTH does appear to decrease from 40 years of age onwards, which could possibly be due to the differences in perceived stress levels as the population ages, and coping mechanisms or additional management strategies that have been developed by an individual over time (Arendt-Nielsen, 2015).

In an academic hospital in Pretoria, South Africa, Magazi et al. (2015) found that over ten years, 22% of the primary headaches seen at the Department of Neurology were TTH, with a higher rate among females between the ages of 20 and 49 years (Magazi et al., 2015). Similarly, Webb and Raff (2020) stated that in 2016, one in four South Africans (25%) experienced TTH, which accounted for nearly 47000 Years Lived with Disease, even though it was still less than disability associated with migraine, it was still notably significant (Webb et al., 2020).

2.5 The burden of TTH

According to Stovner (2018), the burden of a disease is defined as the effect of a health problem as measured by several factors such as prevalence, financial cost, mortality, morbidity, or others such as work or environmental indicators. The burden of disease is measured in quality-adjusted life years or

disability-adjusted life years, which both aim to quantify the number of years lost due to disability (Stovner, 2018).

In 1990 the first study was conducted on the global burden of disease, which was a way to quantify the health effects of over 100 diseases, conditions, and injuries for eight world regions. This allowed for statistical data to be generated which related to mortality and morbidity by age, gender, and region. In 2016, the Global Burden of Disease study found that headache disorders were the third most prevalent pain condition worldwide (Fuensalida-Novo et al., 2017). Even though TTH does not usually prevent an individual from continuing with daily activities in the same way that a migraine headache would, it still is seen as debilitating (Arendt-Nielsen, 2015).

The burden of any disease can have emotional or physical components. These components are defined as any loss or deficit of health and wellbeing as a result of a disorder, such as a headache, that could impact the other spheres of life such as education, family and social areas (Fuensalida-Novo et al., 2017).

The personal and economic burden of a headache is substantial when compared to other chronic conditions such as congestive heart failure, hypertension, or diabetes (Haywood et al., 2018; Espi-Lopez et al., 2014). The young working-class adults are those who generally seek help or advice about TTH most probably as it would interfere with their ability to earn an income or difficulty in performing well while at work. The postulation could be that emotional factors such as stress or anxiety levels of this age group are such, that assistance can be pursued for the management of the condition in pharmacological, non-pharmacological, or alternate methods (Arendt-Nielsen, 2015).

In a study done in Brazil, the prevalence of headache types in a rubber company was studied and the associated rate of absenteeism related to the headaches was investigated. It was found that 30.6 % of employees experienced headaches such as migraine and TTH and 90% of those who reported missing work due to headaches belonged to the migraine group (Stuginski-Barbosa et al., 2011). Even those that came to work while experiencing a headache, reported the loss of productivity levels (by 86%) to the company and other workers, which is referred to as presenteeism (Stuginski-Barbosa et al., 2011).

According to Monzani (2018), a Dutch study showed that TTH presenteeism, meaning being at work while experiencing a headache, revealed a drop in work productivity levels of up to 20.7%, which may have been attributed to negative moods or emotions (Monzani et al., 2018). Also, headaches were the most common reason for lost productivity hours with almost 10.2 lost workdays per year (Lardon et al.,

2017). In addition, Monzani (2018) proposes that work presenteeism most likely increases the risk of worsening the severity of TTH, since the employee still needs to concentrate while working, most likely in prolonged seated positions which then could further strain the already symptomatic neck and shoulder muscles, thus contributing to the worsening of the condition and leading to making mistakes at work due to a lack of concentration and performing poorer than usual (Monzani et al., 2018).

However, on the contrary, Simic et al. (2020) showed that persons living with TTH most frequently worked for 9-24 hours per month, despite having a headache and their work efficiency was between 66-90% (Simic et al., 2020). Furthermore, Simic et al. (2020) also found that persons that experienced migraine with aura or TTH were spending the most time working while having a headache (Simic et al., 2020).

As far as the health care system, it would appear that most individuals that experience infrequent TTH do not seek medical attention, and use simple over-the-counter analgesics unless the headaches are becoming more chronic in nature and disabling to their lifestyles (Fernández et al., 2020; Chowdhury, 2012). The WHO (2016) noted that TTH were a health concern in that it led to financial costs to society with associated disabilities (WHO, 2016). Furthermore, the WHO noted that the impact of migraine could also be directly related to other headache types such as TTH and Medication Overuse Headaches (WHO, 2016).

Mostly the persons experiencing CTTH seem to present at medical doctors or practitioners that could assist them, as the WHO also noted that one-third of neurological consultations in a survey were solely for headache causes (Fernández et al., 2020; WHO, 2016). However, the management of these persons is not simple, since a centralised state could already exist and many of them have probably already been taking medication (and spending money), thus they should also be screened for medical overuse headaches, which is a result of regular and prolonged use of medication for the treatment of headaches or other pain (Steiner et al., 2019).

Persons living with CTTH may also have comorbid anxiety or depression, which both need proper assessment and effective treatment by the correct practitioners (Chowdhury, 2012). The emotional impact of living with TTH is quite significant due to the comorbidities such as anxiety, depression, sleep disturbances and mood disorders, which could have adverse effects on family and social activities as was already discussed previously under section 2.3.5 *Additional triggers* on page 20 (Fuensalida-Novo et al.,

2017). Consequently, all these factors need to be addressed individually, but also inter-dependently, to optimise the therapy approach for these persons living with TTH.

Several European countries, such as Austria, Belgium, Croatia, Denmark, Finland, and France among others, had collaborated in the Global Campaign against Headache in association with the WHO in the *Lifting the Burden* programme that was implemented to bring about appropriate care and information (Steiner et al., 2019). The programme commenced in 2004 and in 2011 the WHO subsequently published the Atlas of headache disorders that described the burden due to headache disorders and the resources available to alleviate them (WHO, 2016).

2.6 The assessment of TTH

Before a plan for therapy or treatment for persons living with TTH is done, the person needs to receive an assessment to establish and identify the underlying pain mechanisms or structures that may be symptomatic. Sahai-Srivastava et al. (2017) mentioned that the primary caregiver is usually a headache specialist, such as a neurologist, who designs a comprehensive management plan, which includes medical management, procedural therapy and advises about complementary or alternative medical approaches. At this point, different professional disciplines, such as psychology, occupational therapy, and physiotherapy, could be included in the assessment and management programme or diverse therapy approaches, such as homoeopathy with the use of vitamins and herbs, or new medication could be suggested. Each professional would set their own goals in collaboration with the individual that is seeking treatment, but collectively the team as a whole sets group goals that allow each team member to understand and work toward the same treatment plan.

Fernández et al. (2020) mentioned the challenge that many clinicians face when planning the strategic approach for the management and treatment of even one person's headache symptoms involves the intricate understanding, identification, and interpretation of the major underlying pain mechanisms at play. Steiner et al. (2019) stated that the diagnosis of migraine, TTH or cluster headaches are mostly based on the history taken and further proposed that the first step is health education, where the clinician explains the condition to the person, the therapy interventions available and the purpose of the management. Furthermore, only if the TTH become more frequent and chronic, the inclusion of

psychological interventions should be added that focus on the contributory lifestyle factors (Steiner et al., 2019).

Regardless of which additional disciplines are included in the approach to manage and treat a person living with TTH, the aims and outcomes of the treatment between the health care providers and the person should be established from the start (Sahai-Srivastava et al., 2017). Determining the outcomes as a team of professionals will assist with the number and duration of the treatment sessions, the presence of comorbidities and the impact of the headaches on the daily life of the person involved, such as missed days from work (Sahai-Srivastava et al., 2017). A measurement tool is an objective manner in which to track any deviation in the symptoms including progression or regression, as was suggested by Luedtke et al. (2020) for episodic TTH and migraine headaches. Furthermore, the tools most applicable for episodic TTH and migraine headaches were found to be the Migraine Disability Assessment, the Headache Impact Test-6, the headache frequency and an outcome measure for quality of life, such as the Short Form-36 Health Survey Questionnaire (Luedtke et al., 2020).

Moreover, Fernández et al. (2020) suggests that the physiotherapy assessment involves the assessment of the musculoskeletal system with the correct identification of any joint and soft tissue involvement. The clinician should at least assess the cervical spine and test active movements of the neck and shoulder joints to identify any potential causes or referral areas present. The determination of any underlying pain mechanisms should also be identified, correctly interpreted and should be explained in a simplified manner to the person living with the TTH (Fernández et al. 2020).

The physiotherapist decides on the most suitable manner to provide treatment based on the clinical presentation and the clinical findings. The main aim is to empower the person living with to become independent in coping and managing their own symptoms. The therapy should therefore be tailored according to each specific person and their clinical presentation.

2.7 The management of tension-type headache

2.7.1 The team approach

The multidisciplinary team approach is understood to be a collection of healthcare professionals working autonomously, but in a coordinated manner to improve the outcomes for especially chronic diseases (Sahai-Srivastava et al., 2017). According to Gaul et al. (2011), an interdisciplinary approach that provides a multi-disciplinary programme is of the utmost importance when providing therapeutic care to persons living with headaches (Gaul et al., 2011). The basis of this approach is to have different disciplines working together as a team that provides integrated therapy from each individual discipline to enhance the therapeutic outcomes for these persons living with headaches (Gaul et al., 2011). Each team member should have specific individualised outcomes that they are working towards, but these need to be in collaboration with one another and centred around the patient and not merely imposed upon the person living with the headaches (Gaul et al., 2011).

The main aims of the multi-team approach are to provide information and health education to these persons, to improve the therapy given that aids in decreasing symptoms such as headache intensity, frequency, and duration, which all helps to improve the quality of life (Gaul et al., 2011). Furthermore, Gaul et al. (2011) advocated the inclusion of a neurologist, behavioural or clinical psychologist, physiotherapist, a headache nurse and if indicated supplementary consultations from a dentist or a psychiatrist (Gaul et al., 2011). Sahai-Srivastava et al. (2017) mentioned that the main components of the team approach should at least include a psychologist, an occupational therapist, a physiotherapist, and a headache specialist (Sahai-Srivastava et al., 2017).

Sahai-Srivastava et al. (2017) further implemented a two or three-tier system, with the first tier being the interventions provided by physiotherapists or occupational therapists to address the chronic symptoms, and addressing factors that may play a role, such as smoking and possible lifestyle-related disorders such as regular exercise and healthy eating habits. The second tier is pain psychology, and the third tier may involve a specialist such as a neurosurgeon if indicated (Sahai-Srivastava et al., 2017).

Additional important strategies are that the person keeps a headache diary, where they track the onset of episodes and note the symptoms experienced, they should include any interventions undertaken in that period around the episodes, whether the use of medication or therapy sessions from a professional.

After the intervention, the symptoms must again be noted with changes (Steiner et al., 2019). A headache calendar should also be used to assess whether the onset of headaches occur around the same time each month, or not, which may allude to the influence of hormones on the symptoms (Steiner et al., 2019). The tracking and monitoring of symptoms as well as medication intake with these methods allow for more accurate diagnostic purposes and effective planning of therapy interventions.

2.7.2 Pharmacological management

Headaches can cause substantial pain and associated disability to the person living with the condition, which could burden the individual with considerable costs to manage the condition. Headaches are disabling disorders that decrease the health-related quality of life of persons living with them and pharmacological interventions are considered the therapy of choice for most headaches (Maistrello et al., 2018). According to Herranz-Gómez et al. (2021), pharmacological management is effective for especially acute cases of TTH and perhaps for prophylactic treatment, but should not be used for long term and chronic cases as the risk of developing medication overuse headaches increases (Herranz-Gómez et al., 2021). The biomedical model of therapy has been used for many years, and although it has been under scrutiny in the last few years, it does have its place in the management of acute cases of TTH (Chowdhury 2012).

According to Chowdhury (2012), the pharmacological management of TTH relies on a proper diagnosis of the condition. It is imperative to correctly identify the condition and then determine the appropriate drugs that should be administered for an effective treatment approach. Thus, taking a thorough history with a detailed description of signs and symptoms and the guidelines (such as the ICHD-3) should be used when determining the headache condition. Any co-morbidities of the patient should be disclosed as this would affect which drugs to be given, the best route of transmission would be chosen and the correct dosage of drugs. In addition, any drugs that are prescribed should be chosen carefully so as not to induce medication-overuse headaches and the patient should also be informed on the correct use and dosage of the medications (Steiner et al. 2019).

Since the association between sleep disorders and headaches have been understood, there is a significant benefit to addressing the lack or absence of sleep with medication (Korabelnikova et al., 2020). According to Korabelnikova et al. (2020), the use of a six-month treatment of melatonin in a pilot

study of adults living with migraine and TTH resulted in a decrease of symptoms such as headache frequency and an improvement in quality of life. Furthermore, the use of antidepressants for their analgesic effects are also utilised in the management of many headache conditions, but special attention should be paid to the time of the intake, the interaction with other medication and the side effects of the medication, which could cause other comorbidities in certain individuals (Korabelnikova et al., 2020).

According to Arendt- Nielsen (2015), the European Guidelines state that for the pharmacological treatment of episodic TTH, simple analgesics (such as acetaminophen) and non-steroidal anti-inflammatory drugs (NSAIDs), such as Ibuprofen and naproxen, are recommended as first-line therapy. The aim of the drugs is to relieve acute pain and inflammation that may occur as a result of musculoskeletal causes or referred pain from the surrounding structures such as joints and soft tissue. For the symptomatic relief of episodic TTH that occurs less than twice a week, Steiner et al. (2019) suggested that the use of over the counter analgesics is appropriate, however, an increase in the frequency of the headaches is directly linked to the increased risk in the development of medication overuse headaches (Steiner et al., 2019). Schytz et al. (2021) stated that NSAIDs are more effective than paracetamol in the treatment of TTH and encouraged the use of a headache calendar to monitor the use of the medications.

The second-choice drugs are those that are combination analgesics containing caffeine, while some experts caution against the use of triptans, muscle relaxants and opioids, such as codeine or morphine (Maistrello et al., 2018). Steiner et al. (2019) also cautioned against the use of opioids such as codeine and morphine, due to the risk of becoming addictive, the biggest implication in medication- overuse headaches and the general ineffectiveness in the management of TTH. Thus, medication to be avoided are opioids (potentially addictive, commonly linked to medication overuse headaches and proven to be ineffective for the treatment of TTH), triptans (specifically for the treatment of migraine headaches), botulinum toxin injections (proven to be ineffective in TTH) and barbiturates (not for use in TTH) (Steiner et al., 2019). The use of opioids for pain relief in the management of TTH would be controversial considering the effect is systemic and the risks for addiction are considerably increased.

According to Chowdhury (2012), the role of muscle relaxants in the prevention of CTTH is debatable. Although centrally acting muscle relaxants may have some benefit, it is not recommended routinely as dependence may occur with adverse effects.

Although drug addiction to certain medication is a possibility and can directly be related to medication overuse headaches, this depends on the frequency of the headaches that lead to the prolonged use of medication and is subject to the availability of the drug therapy (Maistrello et al., 2018). Therefore, although the medication in the episodic headaches will aid and assist the symptoms, the use of these medications for CTTH place the person at risk of developing medication-overuse headaches (Steiner et al., 2019). Persons who experience CTTH should also be managed with alternative pain management strategies and not solely medications. A combined approach may be the best option for the management since once the pain is under control and more importantly, the headache triggers have been identified, personal coping mechanisms and further management strategies should be emphasised to limit the prolonged use of medication.

2.7.3 Non-Pharmacological management

The entire aim for the use of non-pharmacological therapy is to minimise the consumption of drugs, reduce their risks and side effects, minimise the interaction with other drugs that could also lead to co-morbidities and optimise the quality of life for persons living with headaches (Maistrello et al., 2018). According to Fernandez et al. (2020), the non-pharmacological approach is included in most of the international guidelines related to primary headaches, however, it was emphasised that not all non-pharmacological interventions are effective for all types of headaches (Fernández et al., 2020). Krøll et al. (2021) stated that the non-pharmacological approach could either supplement the pharmacological approach or be offered as a complete alternative, especially if side effects of the medication have been noted. Also, those persons with more chronic headache conditions seeking alternative help than what they had already been exposed to, are more likely to explore the non-pharmacological approach (Fernández et al., 2020). Thus, implying that there is no magic way to manage and treat all headache conditions. There are different professionals that form part of the non-pharmacological approach such as a psychologist, behavioural therapist, occupational therapist, physiotherapist and social worker (Sahai-Srivastava et al., 2017).

The main focus of the non-pharmacological approach is to affect either the intensity of the pain, the frequency or the duration of the pain experienced (Gaul et al., 2011). Moreover, additional factors may further include the quality of life, the degree of disability and the effect on the person's ability to earn

an income or livelihood. Other effective non-pharmacological approaches include electromyography biofeedback, cognitive-behavioural therapy, relaxation training, advice on dietary intake, the place of aerobic exercise, the use of additional electronic devices, homoeopathic and herbal treatment, as well as alternative medicine in South Africa, including the role of traditional healers (Steiner et al., 2019). However, the non-pharmacological therapy approach is often criticised for the lack of scientific evidence or even conflicting evidence (Fernández et al., 2020; Maistrello et al., 2018).

Each approach is unique in its application and the effect will be discussed in more detail. Electromyography biofeedback is utilised as a non-invasive approach that is used in the rehabilitation process of muscle retraining. The device is an air-filled inflatable pressure sensor that is usually placed behind the neck to provide the subject with feedback once a muscle contraction of the deep neck flexors is performed and the curve of the cervical spine is flattened to a certain range of motion (Jull et al., 2002). These exercises are used to retrain the stabilising muscles of the neck which may be weakened due to misuse. According to Fernandez et al. (2020), the use of biofeedback is effective in reducing the intensity and frequency of headache attacks in both TTH and migraine, and it is included in the management approach of TTH and migraines in some European guidelines. However, there remain discrepancies in other guidelines regarding the effectiveness of the use of biofeedback due to the lack of high-quality evidence that supports the use (Fernandez et al., 2020).

Relaxation training is incorporated in the therapy regime which is aimed at teaching the person living with the TTH how to recognise when muscles are tensed or have increased tone, or even when in a relaxed state, and what strategies could be employed to control the muscle tension in their daily activities (Soderberg, 2012). The use of relaxation training incorporates cognitive and behavioural techniques as well as breathing exercises and thus is not solely administered by a physiotherapist, but a trained professional such as an occupational therapist may also utilise the relaxation training in therapy sessions (Sahai-Srivastava et al., 2017). Furthermore, the occupational therapist could also provide input regarding dietary triggers, the eating routine and nutrition advice that may contribute to the headache attacks, and a headache specialist may provide information about the use of herbal therapy, vitamins or alternative medicine modalities (Sahai-Srivastava et al., 2017). Probyn et al. (2017) noted that these non-pharmacological sessions could be lengthy at a time, thus perhaps contributing to poor follow-up attendance by individuals living with TTH. However, the study concluded that the delivery of Cognitive Behavioural Therapy (CBT), or patient health education, or mindfulness therapy could potentially be administered by a trained professional nurse or any other health care worker, and not specifically only

by a trained psychologist, which would be more cost-effective (Korabelnikova et al., 2020; Probyn et al., 2017).

Among the many complementary therapies, which include CBT, psychological support and biopsychosocial approaches, physiotherapy is often considered the therapy of choice, based on the low cost when compared to medical costs of seeing a specialist as well as pharmacological management, and the side effects are minimal (Luedtke et al., 2016; Magazi, 2015). Mingels et al. (2019) and Jiang et al. (2019) stated that among these other therapies, physiotherapy is the most frequently reported intervention for headaches.

2.7.4 Physiotherapy management

The role of physiotherapy in the management of headaches is to aid in the prevention of further episodes rather than only bring about relief to the symptoms once a headache episode has begun (Sahai-Srivastava et al., 2017; Gaul et al., 2011). Physiotherapists are trained in the management and treatment of the musculoskeletal system and if any disorders of the system may contribute to the development of symptoms the physiotherapist is best suited to address the disorder (Sahai-Srivastava et al., 2017; Gaul et al., 2011). The physiotherapist will assist in identifying postural and cervical contributing factors to a patient's headache condition (Sahai-Srivastava et al., 2017). The goals of the physiotherapist are to decrease the frequency and intensity of the headaches, identify whether there may be any musculoskeletal dysfunction contributing to the headaches, help improve self-management strategies, develop a personalized exercise programme, and improve tolerance for work, home, and recreational activities (Sahai-Srivastava et al., 2017).

A subjective examination that covers a detailed history with symptoms, severity and pain distribution areas must be done, which is usually followed by an objective assessment where movement tests, range of motion of the joints and soft tissue structures are evaluated (Gaul et al., 2011). When considering the array of causes of TTH that could be present, the evaluation should at least cover the basic anatomical structures that may contribute to the causes of TTH. The clinical evaluation of a headache patient should include manual joint palpation, the craniocervical flexion test, the flexion-rotation test, active range of cervical motion, FHP measurement, trigger point palpation, muscle tests of the shoulder girdle, passive physiological intervertebral movements, reproduction and treatment of headache symptoms, screening

of the thoracic spine and combined movement tests (Mingels et al., 2019). Also, Mingels et al. (2019) concluded that there is no gold standard test for any headache type, and the authors suggested that it might be more suitable to evaluate the clinical efficacy of tests across all headache types, rather than for a specified headache condition.

Thereafter, the treatment plan could include a selection of modalities such as biofeedback, individualised therapy, health education on proper posture and reinforcement of the correct kinetics of the spine, appropriate home exercises, passive manual joint therapy, cryotherapy, acupuncture, massage and soft tissue mobilisations, lifestyle advice, ergonomics and pain education (Satpute et al., 2021; Ferragut-Garcías et al., 2017; Luedtke et al., 2016). According to Fernandez et al. (2020), the rationale for joint mobilisations and manipulations for the relief of TTH is the involvement of the cervical spine in the headache condition. The physiotherapist uses clinical reasoning skills to determine which level of the cervical spine may be involved and applies the technique based on the literature regarding the amplitude and depth of the joint mobilisation (Fernandez et al., 2020). There are certain pitfalls regarding joint mobilisations which include: 1) it is subjective to the treating therapist and another therapist may reason to use a different technique or amplitude altogether, 2) the literature is suggestive that the joint mobilisations are more accurate to use in secondary type headaches such as cervicogenic headaches where there is usually joint pain accompanied with the headache symptoms and 3) in most studies the joint mobilisations are often combined with soft tissue applications (Fernandez, et al., 2020).

Although physiotherapists could rely on a mechanical or a structural diagnosis, they are also trained to be able to identify and provide therapy for the psychosocial factors, which are just as important in any management approach (Mingels et al., 2019). To determine the most important factors that might affect the outcomes of therapeutic interventions, a clinical examination of patients with TTH should consider both biological (bottom-up or peripheral) and psychosocial (top-down or central) factors to determine the dominant pain trigger (Mingels et al., 2019). Thus, assessing the role that psychosocial factors and pain mechanisms may play in the therapy and recovery of individuals living with chronic pain (of any form), is essential to guide the treatment plan. The psychosocial factors such as the beliefs about pain, fear-avoidance or catastrophisation are examples of these inter-related factors, which need to be addressed accordingly since they may offer barriers to the treatment provided. For example, if the person does not lift the arm for fear that it may worsen the headache symptoms, then getting dressed without outside assistance may become a problem for the patient (Malfliet et al., 2018). The psychosocial factors that are addressed by the clinician in practice are not meant to be done in isolation,

but as an addition to other therapeutic modalities enhancing the treatment expectations and removing treatment barriers (Malfliet et al., 2018).

Three consistent outcomes used by physiotherapists to assess the effectiveness of interventions used for persons living with TTH are related to pain intensity, headache frequency and headache duration. (Luedtke, 2016). Cumplido-Trasmonte et al. (2019) performed a systematic review of the effects of non-invasive manual therapy in persons with different types of TTH including only randomised controlled trials and found that the most commonly used outcome measures pertained to the headache intensity and frequency (Cumplido-Trasmonte et al., 2019). Some outcome measures, such as the Visual Analog Scale, or the Numeric Pain Scale, however, do not relate to the definite well-being of the person receiving the therapy, since one or more headache conditions can be present at the same time, therefore other outcome measures could be used such as Quality of Life Assessment, or the Global Rating of Change questionnaires as they assess the global well-being of the person (Luedtke et al., 2016).

Manual therapy (low velocity, moderate-high amplitude movements delivered at the end of the available restricted joint range of movement) is the most requested non-pharmacological approach by most patients that experience primary headaches since it assists with biomechanical effects and modulates the sensitivity of the trigeminocervical nucleus involved in the pain experienced in most headache conditions (Satpute et al., 2021; Fernández et al., 2020). Krøll et al. (2021) showed that manual joint mobilisation techniques had produced a potentially positive effect on headache frequency and quality of life. In addition, Coelho et al. (2019) stated that at post-treatment and six-month follow-up for headache frequency, the effect of manual therapy interventions was directly comparable to the efficacy of tricyclic antidepressants. On the contrary, Rinne et al. (2016) suggested the use of passive modes of physiotherapy treatments, acupuncture, manipulative therapy, chiropractic, and homoeopathy, and although, not frequently suggested, active rehabilitative training, could instead provoke headache symptoms in certain individuals.

The results of a systematic review investigating the effectiveness of different physical therapy interventions such as spinal manipulations, soft tissue therapies, dry needling and exercise therapy for the management of TTH, indicated that physiotherapy had no negative effect on the interventions used for any headache type, including TTH (Luedtke, 2016). Furthermore, many of the studies under scrutiny reported findings that manual therapy produced positive results in the decrease of the intensity and frequency of the headaches, but the most improvements were seen with the combination of

craniocervical exercises, postural retraining and passive mobilisations using the Maitland approach (Cumplido-Trasmonte et al., 2019). Furthermore, Cumplido-Trasmonte et al. (2019) suggested the treatment dosage for the use of manual therapy in TTH varied between ten and thirty minutes for the duration of four to six weeks. Also, as stated in Cumplido-Trasmonte et al. (2019), the time was thirty to forty-five minutes every seven to ten days, with only one pre- and one post-treatment assessment. A systematic review done by Fernández et al. (2020) noted that the persons who present with prevalent neck pain in addition to the primary headache may benefit from manual joint interventions. Another systematic review done by Krøll et al. (2021) revealed that manual joint mobilisations had a positive effect on headache frequency and quality of life; acupuncture (which included dry needling) showed a positive effect on headache frequency and the quality of life, but seemed to have more risk for potential adverse effects; supervised physical activity showed a positive effect on headache frequency and intensity at follow up; psychological treatment had a low level of certainty and should be considered as a supplement to medical care; and patient health education demonstrated several positive effects for persons living with TTH and the management of the condition and their life. Thus, one could question the quality level and reliability of this study if the evidence levels were low. The doubt raises more questions such as whether either the sample was too small to draw concrete conclusions or whether the different modalities used in the study did not produce the wanted results. The conclusion however noted that some positive effects were seen in headache frequency, quality of life, pain intensity and stress symptoms (Kroll et al., 2021).

Herranz-Gómez et al. (2021) stated that the treatment of TTH included joint approaches (cervical and thoracic joint mobilisations or manipulations), soft tissue techniques applied to the trigger points present in the cervical area and the combination with therapeutic exercises. Jiang et al. (2019) advocated for the use of a combination of soft tissue and joint mobilisations in the treatment of TTH. Espi-Lopez et al. (2014) also supported the combination of soft tissue therapy and joint mobilisations and manipulations in the management of TTH since it enhances the effect of the therapy.

A systematic review done by Cumplido-Trasmonte et al. (2019) showed that soft tissue treatment produced better symptomatic relief on the impact and intensity of the pain, and also the quality of life of the people. Monzani et al. (2016) recommend treatments including soft-tissue techniques to be more effective to improve the quality of work-life of people living with headaches. Although the use of soft tissue techniques is more substantiated in the management of TTH than most other headache disorders, the skilled physiotherapist must likewise (as with joint approaches) use clinical reasoning skills to

determine which specific muscles could be involved in that person's condition (Fernández et al., 2020). The treatment of myofascial trigger points in headache patients is a common treatment utilised by physiotherapists, who determine the appropriate type of treatment based on the clinical findings during an examination of the patient and the clinical reasoning skills dependent on the tissues involved (Fernández et al., 2020).

The application of soft tissue techniques is also based on the reasoning that there is the involvement of the muscles and related factors that may contribute to the pain experienced with TTH (Fernandez, et al., 2020). The soft tissue techniques could involve pressure applications, stroking, stretching, myofascial release and massage of the appropriate structures to reduce the tension in the muscles which ultimately provides proper proprioceptive input to the central nervous system (Fernandez, et al., 2020). The physiotherapist uses clinical reasoning skills to determine which muscles are involved and which soft tissue techniques should be applied.

A study done by Ferragut-Garcías et al. (2017), showed that the treatment of frequent episodic TTH and CTTH was effective by using a combination of soft tissue and neural mobilisation techniques since both these influence the peripheral and central pain receptors that may reduce the perception of pain. Espí-López et al. (2014) found that cervical exercises, relaxation, massage, postural exercises, craniocervical techniques, thermotherapy, vertebral mobilisation, and muscle stretches are effective in reducing TTH symptoms. The application of a multi-modal approach to reduce the pain from TTH was mentioned to be more effective by Fernández et al. (2020). Furthermore, there have been results published in seventeen different studies, where eight studies included a meta-analysis that showed the combined effect of manual therapy with the prescription of local exercises of the neck muscles to be effective in reducing the pain and intensity of TTH, but not the frequency of the headaches and that aerobic exercises were more beneficial in managing migraine headaches (Herranz-Gómez et al., 2021). The neck exercises were specifically focused on the strength and endurance of the neck muscles (Herranz-Gómez et al., 2021).

According to Fernández et al. (2020) minimally, invasive therapy such as needling is commonly used in the management of headaches. In general, there are two types of needling, wet and dry. Wet needling is the administration of a local anaesthetic substance or medication that is administered by a medical doctor into a joint or muscle tissue for the main purpose of pain relief (Fernández et al., 2020). Dry needling includes both acupuncture and trigger point dry needling, and both are often used in the management of CTTH, but differ in their approaches because only trigger point needling requires insertion into the muscle fibres to find the muscle trigger point and not only into acupuncture pressure

points (Fernández et al., 2020). Furthermore, dry needling proved to be effective for the reduction of headache indicators (intensity, frequency and duration) and in CTTH is aided in improving health-related quality of life (Fernández et al., 2020). According to Kamali et al. (2019), both dry needling and friction massage had positive effects on the headache frequency and intensity while improving the cervical range of motion. In another study done by Gildir et al. (2019), dry needling proved to be effective and safe in its application with a decrease in the headache frequency, intensity duration and improvement in the health-related quality of life of persons living with CTTH.

Persons with headaches appear to be less physically active than those without headaches, therefore exercise prescription could assist with the overall health of an individual (Herranz-Gómez et al., 2021; Johansson et al., 2017). However, in a Swedish study done by Johansson et al. (2017), 267 undergraduate university students took part in a headache study and one of the findings of the study was that there was no correlation between the physical activity levels and the frequency of headache days per month. Exercise is an important top-down method used in the management of chronic pain (Fernández et al., 2020). Chowdhury (2012) claimed that the addition of craniocervical training to a management approach may be more beneficial than omitting it. Aerobic exercise has shown to be beneficial in migraines subjects, as opposed to strength training for neck and shoulder muscles, ergonomic and posture corrective programmes and motor control exercise programmes that aid in the management of TTH (Herranz-Gómez et al., 2021; Fernández et al., 2020; Johansson et al., 2017). An important factor to consider when prescribing any exercise programmes as an intervention strategy is the adherence to the programmes, as this directly is associated with the effectiveness of the intervention (Fernández, et al., 2020). It may also be worth noting that other important aspects to be considered include, the difficulty level of the exercises, variety of the programme and patient satisfaction with the aims of the exercises (Shirley et al., 2010).

According to Arendt-Nielsen (2015), health education is empirical and additional information regarding the condition, reassurance and identification of headache trigger factors such as poor posture or stress can be helpful to people living with headaches. The current concept in pain management that physiotherapists, among other specialities, have adopted is the use and practice of PNE, which strives to assist in pain behaviour modifications that address issues such as kinesiophobia, catastrophisation, anxiety, stress, beliefs, and expectations (Malfliet et al., 2018; Diener et al., 2016). The current focus in physiotherapy in the treatment of pain has shifted from a biomedical approach, where the search to find the structure responsible for pain is sought and then treated, to a more biopsychosocial approach,

where all contributory factors are taken into consideration that adds to the pain behaviour of the person (Louw et al., 2019; Louw et al., 2016).

The pain neuroscience education approach, centres on changing how the person living with the pain thinks about the pain and behaves, and this model influences anxiety, fear-avoidance, catastrophisation and other aspects that are affected (Diener et al., 2016; Crombez et al., 2012). The combination of the use of pain neuroscience education with movement appears to be effective and also influences the contributory factors that will lead to a positive effect on the pain experienced (Louw et al., 2016). The aim is to encourage safe movements despite the painful experience. *Figure 2.4* below illustrates the **fear-avoidance model of Woby as cited in Saw (2019)**, which shows how an individual can be caught in the cycle of pain (left-hand side of the figure) and disuse based on their previous experiences of pain and how they process the information when faced with a new painful stimulus or condition. The idea of the model on the right-hand side is to show how an individual could be led on the recovery path without fear and its negative associations, at the same time the left-hand side of the model demonstrates the pain cycle that leads to fear of movement and eventually disuse with or without depression (Saw, 2019).

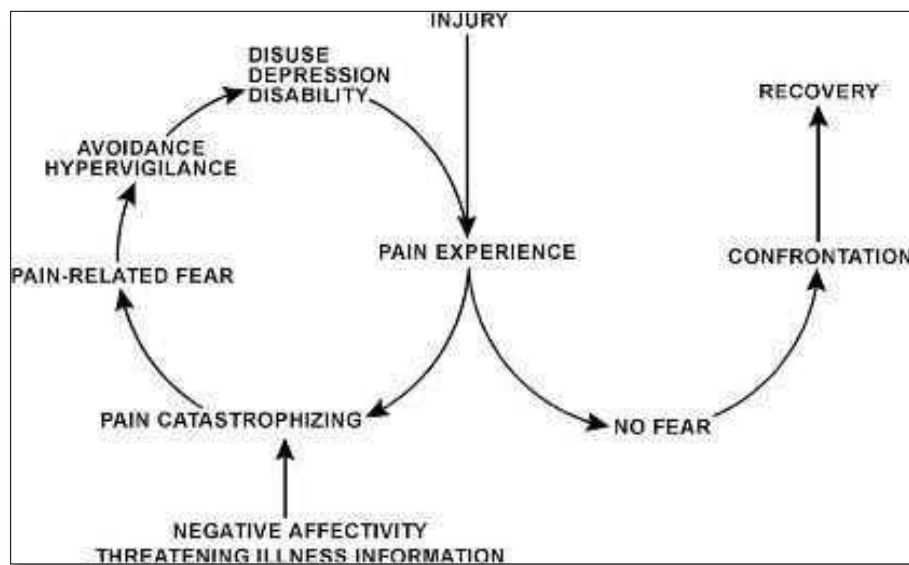


Figure 2.4: Woby's model of fear-avoidance (www.physio-pedia.com, accessed September 2021)

Not all physiotherapy techniques can be applied to one specific person living with TTH, and certainly, not all techniques will benefit all persons in the same manner (Fernández et al., 2020; Luedtke et al., 2016).

The application of some modalities such as joint thrusts or manipulations may be riskier to apply

especially if the therapist is not skilled in the technique, according to Fernandez et al. (2020), 13% of clinicians felt that it could be harmful to the patient even when all red flags and contraindications were taken into account.

The trained physiotherapist must employ critical clinical reasoning skills in the assessment and management of all headache conditions. Luedtke et al. (2016) felt that physiotherapy interventions were generally low cost, although the treatment sessions were more time-consuming and dependent on the adherence from the person living with the condition, they were effective in the alleviation of headache symptoms, had, in fact, no side effects and should be used as a supportive measure to the medical approach in the management of headache conditions. Therefore, the appropriate therapeutic management of patients with headaches should be multimodal, including pharmacological management where appropriate and focus beyond tissue-based impairment therapies (bottom-up interventions) that include central nervous system interventions (top-down interventions) and is tailored for the specific person, while empowering and educating the person about the condition, trigger factors that may precipitate the headaches and how to effectively cope with the management thereof (Fernández et al., 2020; Sahai-Srivastava et al., 2017).

In summary, there are many treatment options for the management of TTH, which should be based on the anatomical structures involved in a particular person's condition. There are pharmacological and non-pharmacological therapy approaches to assist the person living with TTH and each have their benefits and side-effects as discussed above. Physiotherapy forms part of the multi-disciplinary team approach and the application of the different techniques that could be employed in the management of TTH is based on the clinical reasoning skills of the physiotherapist after considerations have been made from the initial assessment. The general aim of the physiotherapist is to provide the patient with coping strategies, a tailored exercise programme to the individual's needs and alleviation of the headache symptoms.

2.8 Current Health Care System

In Gauteng, South Africa, the headache clinic is driven by a team of headache specialists (neurologists, surgeons, radiologists and dental specialists), nurses, and other health care professionals (including

physiotherapists) among others, that assist diverse people living with different headache types (www.theheadacheclinic.net). The clinic aids and treats an average of 100 patients every month and is run by a headache specialist, which specialises mostly in migraine headaches but assists with all other headache types (www.theheadacheclinic.net). The specialist strongly advocates that the clinic uses a non-pharmacological approach with all their patients.

The clinic claims that headaches arise from extra-cranial structures outside of the brain, such as the muscles of the jaw, neck muscles and the arteries in the scalp. Upon arrival, a thorough neurological assessment is done, thereafter specific tests, such as X-rays, EMG studies or other diagnostic tests will be done if indicated. Once the results have been obtained, which could take up to four hours, a discussion will be held with the headache specialist and the treatment options will be presented to the patient. The treatment is not identical for each patient, but muscle tension is treated by wearing a thin plastic plate against the pallet inside the mouth (also called a posture modifying device), which adjusts the position of the tongue, thus relaxing the jaw, followed by the muscles around the temples and then produces a summative relaxation effect on the muscles down the neck and back. Additional exercises and stretches are also prescribed to the patients as shown on their webpage.

The medical team at the clinic, believe that certain headaches arise from the arteries, which are treated with a minimally invasive procedure under local anaesthetic, which involves tiny superficial incisions on the scalp and does not restrict the blood flow to the brain. The arteries are located with the use of a scan and Doppler flowmeter and then closed, which brings about immediate relief according to the webpage. The Headache Clinic, although is producing world-class work and publications, the type of headaches seen and managed here, however, do not appear to be from TTH, but a vascular type of migraine it would appear. Although the results have been publicised widely and have aided many people in the country and potentially abroad, a vast percentage of the population in South Africa may never have the finances to be able to attend a specialised clinic as described above.

The World Bank regards South Africa to be a developed country with sound infrastructure, however, it is a country with significant social and economic problems (www.worldbank.org, accessed December 2019). The burden of costly health care is a significant factor for most citizens in this country, who live in less than favourable conditions with poor access to basic needs such as running water and may live far from public health care facilities.

In March 2020, most of the world was affected by the Covid-19 global pandemic. Some of the research that has been published during this time had pointed towards the fact that chronic pain patients may have suffered more during the time of isolation from family, friends and even health care providers (that one would regularly visit for follow up appointments) since the restrictive measures to contain the spread of the virus were put in place (Karos et al., 2020). The isolation brings about feelings of abandonment and loneliness and could be associated with depression, and anxiety which are both co-morbidities that directly influence the chronic pain cycle (Karos et al., 2020).

During the onset of the Covid-19 pandemic, the division between the social classes of income levels in South Africa had been even more pronounced since the underprivileged citizens were in a worse financial condition than before with scarcity of work, food insecurity and isolation from family or friends. Many of the persons in South Africa have high levels of unemployment (www.data.worldbank.org, accessed September 2021) and are reliant on government grants to provide for their basic needs such as food, therefore finding a more cost-effective, alternative option to assist in the quality of care for people living with common conditions, such as TTH is necessary. The division between social classes was even more evident from the social uproars, riots and looting experienced in certain parts of the country earlier in 2021. Also, the health system was overloaded in both private and public sectors with the number of Covid-cases, exposing current staff shortages, and redistributing staff to assist with the influx of Covid positive cases, rather than providing normal out-patient services to patients. The financial constraints on the health system were just as pronounced and the added pressure from the pandemic exposed the prevailing shortcomings in the health care system in South Africa.

Kamerman et al. (2020) demonstrated that 18% of the adults in South Africans are affected by chronic pain conditions, which is on the steady rise and features more prevalently in women (20.1%) and the elderly (33%) than in men (15.5%) (Kamerman et al., 2020). The most common sites of chronic pain indicated were the back and limbs, with the Northern Cape Province being the province whose people are the most affected in the country with 95% confidence intervals between 25.5% and 27.4% and the least affected province was the Free State with intervals between 11.8% and 12.6%, followed closely by KwaZulu-Natal with 95% confidence intervals between 12.5% and 13.7% (Kamerman et al., 2020).

Considering that the implementation of the National Health Institute (NHI) in South Africa is on the verge of occurring, where the government is attempting to find a more cost-effective way of ensuring equal and free health care to all citizens across both the private and public sectors, the current health system should make allowances for the provision of services to the average South African within the

public sector, where there are specialists that can guide the care of these persons living with specific prevalent headache conditions. The way that pain can be approached by means of pharmacological and non-pharmacological methods must be explored and implemented within this system to be cost-effective and beneficial for the person seeking the services. Physiotherapy certainly has a role to play in the non-pharmacological approach and the literature substantiates the minimal side-effects and the positive results that may be produced.

The medical doctors should be informed regarding the benefits of a non-pharmacological and multi-modal team approach for these persons living with TTH and the referral to these professionals should be encouraged. The multi-modal approach could assist in a decrease of costly medical management, and the patients could be better equipped to cope and manage their own headache condition, signs of chronicity could be identified earlier, and strategies could be employed to assist these patients. Therefore it is the opinion of the researcher that advocating for a more cost-effective, non-pharmacological approach to persons living with TTH is a necessity for an already overloaded health care system in South Africa.

2.9 KABP studies

Knowledge, attitude, beliefs, and practices (KABP) studies or surveys have been used to gather information for planning public health programmes and to explore knowledge, attitude, beliefs and practices of a targeted research population (Kaliyaperumal, 2004). The KABP survey offers insight into concepts, such as new approaches or interventions to treatment protocols, to present a baseline for comparison with subsequent surveys and provides a foundation for future implementation of programmes and studies (WHO, 2008). The principles of these studies are based on characteristics such as easy design, quantifiable data, ease of interpretation and concise presentation (Launiala, 2009). The use of the KABP survey could assist in the planning and implementation of further work in a specific field of study such as tuberculosis (WHO, 2008).

A KABP type survey can assist in identifying gaps in knowledge, existing cultural beliefs and norms, and practices that may both help in the understanding of certain actions or practices and aid in the identification of the cultural barriers that may exist in societal contexts (WHO, 2008). A KABP survey could also assist in the understanding of the magnitude of the needs for a certain programme or

intervention, and is a targeted approach to address key aspects or factors in a programme delivery once the gaps have been established. In addition, the KABP survey could assist in a team centred approach to include more health care professionals to address certain needs or shortcomings in public care facilities and hospitals (WHO, 2008). The type of survey also allows the researcher to determine the common needs of the group **studied, determine** the most appropriate channels of communication, as well as to establish baseline levels and later conduct the same survey to measure changes that may have occurred (WHO, 2008).

A KABP survey may also be beneficial when advocating for an intervention programme under development since the results could be used to support the reasons and specific needs. The knowledge part is utilised to assess scientific facts, truths and understanding regarding a specific topic under investigation (Launiala, 2009). The beliefs refer mostly to the traditional ideas, which may influence the appropriate behaviour and therapy seeking practices of the audience. Measuring the attitude is another intricate part of the survey since this is based on the opinions, or feelings towards a topic and to an extent the preconceived ideas and beliefs of the group being studied (Launiala, 2009). The practices section of the survey relates to how the study population demonstrate their knowledge and beliefs through their actions. Therefore, a KABP survey was deemed an appropriate way to conduct the current research study to potentially assist in obtaining relevant information required to formulate conclusive results regarding the specific research topic.

In South Africa, KABP and KAP studies have been used among various medical professionals in the country. Mogole et al. (2019) did a KAP study among final year students in pharmacy, medicine, audiology and nursing across universities in South Africa and noted that the knowledge of these students regarding drug-induced ototoxicity was inadequate. Hooblal et al. (2020) performed a KAP study among physiotherapists in South Africa to determine whether their undergraduate training prepared them for managing persons living with mental health illnesses and the result indicated that physiotherapists felt that they received minimal training regarding mental health at the undergraduate level. Another study done in South Africa aimed to determine the knowledge and attitudes among rugby players regarding concussions and the results showed that there was a substantial lack of knowledge among players which could directly affect their return to play attitude or behaviours (Viljoen et al., 2017).

For the purpose of this study, a KABP format was used to develop a questionnaire that could be utilised to determine the physiotherapeutic management of TTH in the South African context. Based on the

literature review done, very few publications had been found from South Africa physiotherapists or those from other African countries, which lead to the questioning whether the data about this topic was not represented in South Africa, or whether there could possibly be an absence of this condition among South Africans, or whether the physiotherapists did not provide therapy for the management of TTH. When considering the Global Burden of Disease, it was clear that there were most probably persons living with TTH in South Africa, thus the reasoning then followed logically that in all probability the physiotherapists were indeed providing treatment and assisting in the management of TTH, what knowledge did they have about the condition, what was the general feeling towards the management of the condition, which modalities were most likely being used and what were the therapy guidelines used in practice? Therefore, the choice to follow a KABP study was decided could best answer these questions.

In the next chapter, the methodology of the study will be described with the demonstration of the development of the research tool used in this study, the formulation of the different sub-sections of the questionnaire and the input from four experts in the field of physiotherapy.

CHAPTER THREE

3. METHODOLOGY

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3.1 Introduction

The current study investigated the knowledge, attitude, beliefs and practices (KABP) of physiotherapists in South Africa regarding the management of tension-type headaches.

The KABP format that was used in this study to collect information about the different aspects of the participants' knowledge, beliefs, feelings and ideas regarding the management of TTH, was distributed electronically as opposed to in-person (WHO TB control, WHO/HTM/STB/2008.46). Typically, most KABP surveys are done in person and the information is collected in an interview format, however, for this study, having been conducted during the Covid-19 pandemic, the benefit of making use of an electronic survey was the selected option to prevent in-person contact and the physical handling of any hard copies.

3.2 Aims and objectives

3.2.1 Aims

The main aim of the study was to explore the knowledge, attitude, beliefs, and practices of South African physiotherapists towards persons living with tension-type headaches.

3.2.2 Objectives

The objectives of the study within the targeted population were:

1. To describe the socio-demographic characteristics of the study participants.
2. To determine the knowledge of South African physiotherapists regarding TTH.
3. To determine the attitude of South African physiotherapists towards individuals living with TTH.
4. To determine the beliefs of South African physiotherapists regarding persons living with TTH.
5. To determine what the practices of South African physiotherapists are regarding TTH.

6. To determine the associations between the socio-demographic characteristics and the knowledge, attitude, beliefs, and practices of the study participants.

3.3 Methodology

3.3.1 Research design

A cross-sectional research study was conducted using a KABP questionnaire and using a descriptive study method. A descriptive study is usually the first step when exploring a specific field of research. This method was chosen to be able to best determine whether physiotherapists in South Africa were knowledgeable about TTH, what their current perceptions and attitudes towards persons living with the condition were and what approaches they use to treat the condition.

3.3.2 Study population

The study population consisted of all practising physiotherapists in South Africa at the time of the study, including partially registered community service physiotherapists in 2019.

According to the Health Professions Council of South Africa (HPCSA) annual report of 2019/2020, there were 8058 recorded physiotherapists in South Africa in April 2020, this number had increased from 7473 in April 2017, 7702 in April 2018 and 7906 in April 2019 (www.hpcsa.co.za, accessed September 2021).

According to the World Confederation for Physical Therapy, there were 7937 listed (with the HPCSA) physiotherapists in South Africa in June 2019 (www.wcpt.org/country_profile, accessed 5 June 2020, <https://www.wcpt.org/countryprofile/southafrica>).

A total of 4291 physiotherapists (54% of the number of all registered physiotherapists in 2019) were listed with the South African Society of Physiotherapy (SASP) and these included physiotherapists working in the private and public sectors. The SASP was also the largest member organisation in Africa during 2019 (www.saphysio.co.za, accessed 25 May 2020, <https://www.saphysio.co.za>).

Another member organisation in South Africa, The Physiotherapy Association of South Africa (PASA), had approximately 3000 recorded members in 2019 according to their Facebook page (<https://www.physioassociationsa.co.za>).

Not all registered physiotherapists belong to a specified member organisation since the HPCSA reported that in 2019 there were 7906 physiotherapists in South Africa. Thus, the remainder of the physiotherapists, who may not have been affiliated to any member organisation, could have been retired and thus no longer actively practising as physiotherapists but maintained their registration status. Therefore, being a registered physiotherapist did not imply that they were still actively practising.

3.3.3 Study sample

A sample of convenience was utilised in that all practising physiotherapists at the time of the study were included in the sampling frame. There was no randomisation or probability sampling and all qualified physiotherapists who met the inclusion criteria and agreed to participate were included.

For this study, a sample calculator was used in order to estimate how many participants based on the study population provided by the WCPT and the HPCSA, the researcher had aimed to reach. When calculating the sample size using a 95% confidence interval and the number (7937) of registered physiotherapists in South Africa, the sample size to be included in this study was approximately 350 (between 353 and 367) participants (www.calculator.net/sample-size-calculator.html, accessed 2020). In *Figure 3.1* below, the use of the online sample size calculator is indicated.

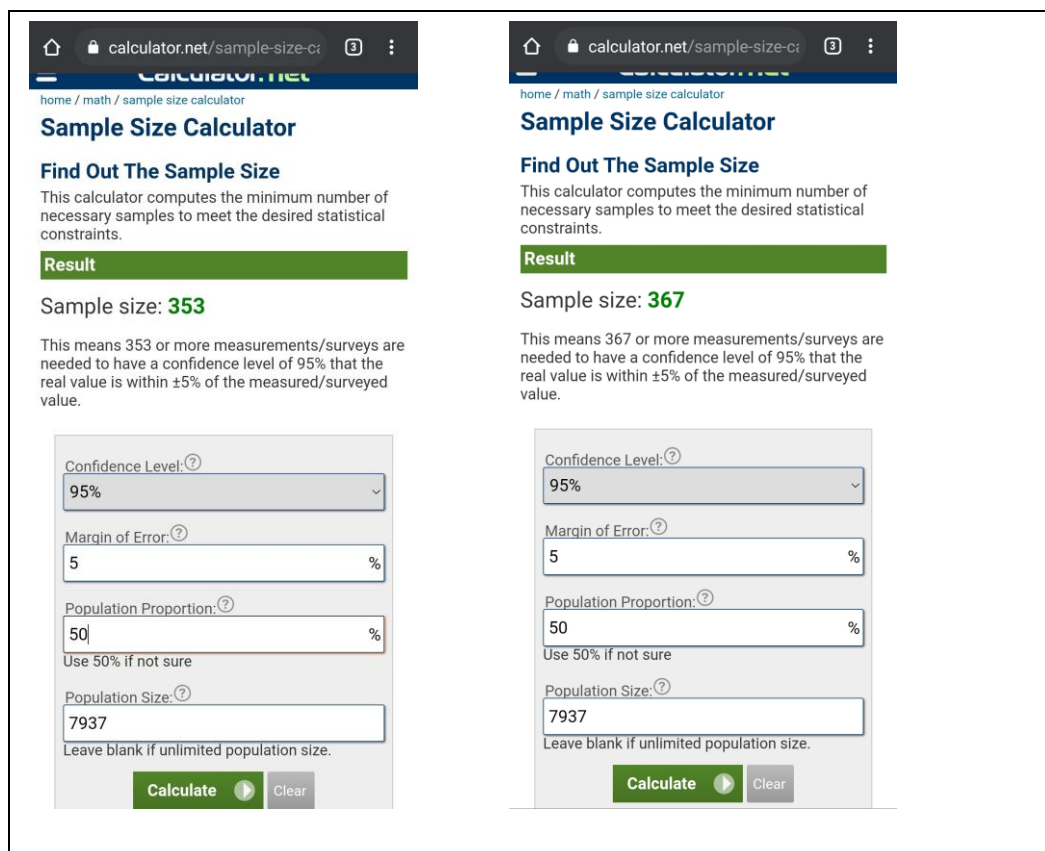


Figure 3.1: The online sample size calculator (www.calculator.net/sample-size-calculator.html), accessed September 2020)

3.3.3.1 Inclusion criteria

Participants should have been registered members of the Health Professions Council of South Africa (HPCSA) and able to communicate in English since it is the official language of communication of the HPCSA and the SASP. The participant had to be practising as a physiotherapist at the time of the study. Partially registered physiotherapists with the HPCSA, such as Community Service Physiotherapists, were also eligible to participate. Lastly, the participant should have had internet access and an electronic device or a computer to access the link to the survey/ questionnaire.

3.3.3.2 Exclusion criteria

Physiotherapy undergraduate students and physiotherapy assistants were excluded as they practise under supervision. Retired physiotherapists that may still have been members of the SASP but were no longer practising physiotherapists were excluded from the sample. Physiotherapists who did not provide informed consent were not included in the study.

3.4 Measurement tool

The measurement tool (questionnaire) was developed by the researcher, it was based on the available literature regarding TTH and was designed according to KABP guidelines. The formulation and structure of the questions were guided by the different sections of the study under the guidance and supervision of the two study leaders.

The questions used in the questionnaire were grouped into demographics, knowledge, attitude, beliefs, and practices categories. The questionnaire was developed by the researcher as there was no standardized KABP questionnaire available regarding TTH in South Africa.

The first section of the questionnaire, the demographic section was aimed at determining the characteristics of each participant, the whole sample group and general information that could be used to draw comparisons at a later stage. The section included eleven questions pertaining to the age of the participants, their gender, year of qualification, current workplace setting and if any courses or headache training were attended or obtained (refer to Appendix D). The questions asked are presented in Table 3.1 below.

Table 3.1: Demographic information

Demographics	Questions used
Question 2.1	What is your age?
Question 2.2	What is your gender?

Question2.3	For how many years have you been a practising physiotherapist?
Question 2.4	In which year did you obtain your highest qualification in the physiotherapy profession?
Question 2.5	What is your current work environment?
Question 2.6	What is your preferred area of interest in the physiotherapy profession?
Question 2.8	Have you done any accredited TTH courses?
Question 2.9	If yes, please specify which accredited courses you have done?
Question 2.10	How recently did you attend these accredited TTH courses?
Question 2.11	At the time of your attendance, were these accredited headache courses presented in person (seminar style)?
Question 2.12	Did the accredited headache courses involve any hands-on skills or techniques?

The knowledge section was labelled 'Section 1' and not "Knowledge section" in the questionnaire to elicit honest responses from participants rather than alerting them to the fact that their knowledge was being tested.

The knowledge section was structured to determine the anatomical background, musculoskeletal structures, the definition of TTH and the role of the pain processes in TTH by using a mixture of multiple-choice or closed-ended questions such as yes or no questions and true or false questions. In this section of the questionnaire as depicted in *Table 3.2* below, there were a total of twelve questions and each correct question scored one mark, even if the question had more than one correct answer, the participant would still score only one mark and no negative marking was used.

Table 3.2: Knowledge section

Section 1: Knowledge	Subsection test	Data form: question numbers	Authors
Categorisation	How are TTH categorised?	Question 3.1-3.3	Magazi et al., 2015
	What best describes TTH?		Magazi et al., 2015
	How are TTH categorised according to the International Headache Society?		Magazi et al., 2015; Olesen et al., 2013
Prevalence	How common are TTH when compared to migraine headaches?	Question 3.4	Fuensalida-Novo et al., 2017; Magazi et al., 2015; Stuginski-Barbosa et al., 2011
Structures	Which muscles would likely be involved in the occurrence of TTH?	Question 3.5	Joseph et al., 2018; Espí-Lopez et al., 2014;
Gender	Are women more affected by TTH than men?	Question 3.6	Joseph et al., 2018; Espí-Lopez et al., 2014; Stuginski-Barbosa et al., 2011
Age	Are persons above the age of 49 years affected by TTH?	Question 3.7	Joseph et al., 2018
	Are children under the age of 18 years affected by	Question 3.8	Joseph et al., 2018

	TTH?		
Causes	<p>Which are common triggers for the development of TTH?</p> <p>Muscle trigger points are the sole cause for the pain experienced in TTH?</p> <p>Which of the following pain mechanisms may play a role in the development of TTH?</p>	Question 3.9 and 3.11-3.13	<p>Lee et al., 2019;</p> <p>Lidegaard et al., 2018;</p> <p>Phu Do et al., 2018</p> <p>Ferragut-Garcias et al., 2017;</p> <p>Espi-Lopez et al., 2014;</p> <p>Ashina et al., 2012</p> <p>Cathcart et al., 2010</p>
Symptoms	Acute symptoms of TTH may continue for 7 days?	Question 3.10	<p>Ashina et al., 2012</p> <p>Olesen, et al., 2013</p>

The scoring system used to assess the knowledge section of the questionnaire as is also demonstrated in Table 3.3 below as taken from the guidelines of the University of the Free State (Department of Physiotherapy, University of the Free State Scoring System, 2019). The score obtained from the section of the questionnaire would determine what percentage of knowledge the participant had about the topic of TTH.

Table 3.3: Scoring system for knowledge

Marking system	Excellent, exceptional	Excellent, high quality	Very good	Good	Average can improve	Poor, but pass	Fail
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Knowledge	91-100%	81-90%	71-80%	66-70%	56-65%	50-55%	40-49%
Section							

The attitude and beliefs sections aimed to determine the perceived emotional, or cognitive feelings of the participant towards the topic of TTH. In addition, the aim was also to establish the perceived attitude and beliefs that the participants may have towards the management of the condition whether positive or negative and what the participant considered in their opinion to be the correct management of TTH. In the questionnaire, the attitude section was labelled 'Section 2' and the beliefs section was labelled 'Section 3'. There were thirteen and fourteen questions respectively in the attitude and beliefs sections. Once again, the headings were not included in the questionnaire to eliminate partiality by the participants. For both these sections, the researcher used a 4-point Likert Scale.

The Likert Scale was used to determine to which extent the participants agreed or disagreed with the statements posed in the questionnaire. The options were graded from 1 to 4 where 1=strongly disagree, 2=disagree, 3=agree and 4=strongly agree. The neutral option was omitted to force participants to either agree or disagree with the statements and not to be undecided or not provide an opinion, therefore only a four-point scale was used. Follow up questions were only included in the attitude section of the questionnaire to allow participants to explain or motivate the reason for their level of agreement or disagreement (please refer to *Tables 3.4 and 3.5* below). An example of the statements used in the questionnaire is provided in *Figure 3.2* below.

Table 3.4: Attitude section

Section 2: Attitude	Subsection test	Data form: question numbers	Authors
Motivation	I enjoy providing physiotherapy to persons living with TTH.	Question 4.1	Researcher, 2020
Physiotherapy only	I think that TTH should only be managed by a	Question 4.3	Madsen et al., 2018

intervention	physiotherapist.		Ferragut-Garcias et al., 2017 Lardon et al., 2017; Luedtke et al., 2016
Effects of the treatment regime	The therapy that I provide to these persons living with TTH produces positive results.	Question 4.5	Haywood et al., 2018 Ferragut-Garcias et al., 2017
Other intervention approaches	Alternative therapy options, for example, behaviour modification, is more effective to persons living with TTH.	Question 4.7	Fuensalida-Novo et al., 2017; Diener et al., 2016
Pharmacological management	Treatment such as analgesic use produces better outcomes for the management of persons living with TTH.	Question 4.9	Maistrello et al., 2018; Lardon et al., 2017; Arendt-Neilsen, 2015 Magazi et al., 2015
Outcome measures	An evidence-based measurable outcome should be used for each physiotherapy session.	Question 4.11	Haywood et al., 2018 Luedtke et al., 2016;
The average amount of sessions provided	Repeated follow-up physiotherapy sessions are necessary to provide positive outcomes to persons living with TTH.	Question 4.12	Haywood et al., 2018 Luedtke et al., 2016 Maistrello et al., 2018

Table 3.5: Beliefs section

Section 3: Beliefs	Subsection test	Data form: Question numbers	Authors
Which disciplines are believed to be used?	Physiotherapy is used more than any other discipline in the treatment of TTH.	Question 1	Luedtke et al., 2016
	Chronic TTH is managed by physiotherapists only.	Question 2	Researcher, 2020
	Acute TTH should only be managed by a medical practitioner.	Question 3	Phu Do et al., 2018
What are the beliefs about the management options?	TTH is only managed by soft tissue physiotherapy techniques.	Question 4	Luedtke et al., 2016
	The individual living with TTH should be assessed for additional joint involvement.	Question 5	Mingels et al., 2019
	The physiotherapy techniques used to manage the symptoms of TTH are solely based on years of clinical experience.	Question 6	Researcher, 2020
How do they feel about the use of the available	The physiotherapy techniques used to	Question 7	Researcher, 2020

research to guide the treatment approaches?	manage the symptoms of TTH are solely based on the currently available research.		
How do they feel about a team approach?	A multi-disciplinary team approach should be used in the management of all persons living with TTH.	Question 8	Probyn et al., 2017
	All persons living with TTH should be informed about all other alternative pain management strategies.	Question 9	Probyn et al., 2017
	All persons living with TTH should keep a headache diary.	Question 10	Chowdhury, 2012
How do they feel about the patient-empowering strategy?	All persons living with TTH should be encouraged to determine their own headache triggers.	Question 11	Sharon Tai, et al., 2018
	Persons living with tension-type headaches should be informed about the role of sensitization of the trigeminal cervical nucleus.	Question 12	Phu Do et al., 2018
	Persons living with TTH	Question 13	Researcher, 2020

	should always be referred for psychological support.		
	Persons living with tension-type headaches should always be managed using Pain Neuroscience Education principles.	Question 14	Diener et al., 2016 Louw et al., 2016

For example:

4.1 I enjoy providing physiotherapy to persons living with tension-type headaches.

1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree

4.2 Please motivate your response to the previous question:

Figure 3.2: Example of follow up question after Likert scale options

The practice section (Section 4) of the questionnaire aimed to determine what treatment practises the participants utilised to manage patients living with TTH. The section of the questionnaire was labelled 'Section 4' and included ten questions. A mixture of open and closed-ended questions and multiple-choice questions were used in this section and if indicated the participant was asked to motivate the answer.

The posed questions included the type of treatments provided to individuals with TTH by the participant, how many physiotherapy sessions the participant deemed as necessary to manage the individual living with TTH and to ascertain if any outcome measures were used by the participants to determine the outcome of the chosen treatment as seen in *Table 3.6* below.

Table 3.6: Practice section

Section 4: Practices	Subsection test	Data form: Question numbers	Authors
Frequency of treatment for TTH?	How often do you provide therapy for a new headache referral?	Question 1	Researcher, 2020
Pharmacological vs non-pharmacological therapies	What do you consider to be the best approach for TTH?	Question 2-3	Lardon et al., 2017
	What do you consider as a non-pharmacological approach for the management of TTH?	Question 4	Maistrello et al., 2018 Probyn et al., 2017
Physiotherapy modalities most frequently used	Which physiotherapy interventions do you most frequently use in the management of persons living with TTH?	Question 5-6	Haywood et al., 2018 Luedtke et al., 2016
	How many follow up sessions would be necessary for a physiotherapist to manage a person living with TTH?	Question 7	Maistrello et al., 2018
Number of sessions to provide therapy?	How many physiotherapy sessions would be necessary for	Question 8	Maistrello et al., 2018

	the individual living with TTH to report a positive subjective change in symptoms?		
Team approach?	Which different disciplines do you include in your therapy regime?	Question 9	Probyn et al., 2017 Fernandez et al., 2020
	Do you feel that physiotherapy has a significant role to play in the management of tension-type headaches?	Question 10	Researcher, 2020
Outcome measures used?	Please indicate which of the following outcome measures you may use in your management approach?	Question 11-12	Haywood, et al., 2018
	How often do you use the outcome measure to assess any subjective change in symptoms of persons living with TTH?	Question 13	Researcher, 2020

3.5 Face and content validity of the questionnaire

Once the draft questionnaire was completed, the questionnaire was sent to a panel of four experts via email to enhance the face and content validity of the questionnaire. The experts were also requested to provide feedback and make necessary recommendations regarding the content of the questionnaire; correct use of terminology, reliability of the tool to achieve the objectives of the study; the time it took to complete the questionnaire as well as the sequence of the questions (Appendix G).

All four experts completed a post-graduate course in musculoskeletal and/or pain conditions and were working in the private sector at the time of the study. In addition, two of the experts held doctoral degrees in physiotherapy. Each of the experts resided in three different provinces of South Africa and was practising at the time of the study with two of the experts being part-time lecturers at tertiary institutions that offer the undergraduate physiotherapy programme in South Africa.

The comments from each expert were taken into consideration by the researcher with the finalisation of the questionnaire and minor adjustments were made mostly regarding repetitive questions asked and ambiguity of certain questions. Most of the panel felt that the measurement tool would achieve the objectives of the study but suggested that the researcher should be more specific and precise in the delivery of the types of questions used and the purpose of the questions to provide the information required for the final data collection (Appendix D). The questionnaire was finalised after the necessary changes were made (Appendix D). The questionnaire was only available in English since this is the official language of communication used by the SASP and the HPCSA.

For the purpose of the current study, the results of the questionnaire were interpreted as follows: the knowledge of participants was defined according to the scoring system provided in *Table 3.1*, and the attitude and beliefs were defined as favourable or unfavourable; *the practices* were defined as effective or ineffective. Each question scored one mark and no negative marking was used. Thus, the total score was recorded and calculated according to the data analysed by a Biostatistician from the Department of Biostatistics at the University of the Free State.

All the sections of the questionnaire were coded and scored and each question scored one point, however, the means and median scores were used to interpret the results for the attitude, beliefs, and *practices* sections. The participants who scored below the mean scores would have an unfavourable attitude or beliefs and those who scored the mean and above would have favourable attitudes and beliefs towards *the management of TTH*. The participants who scored below the mean for the practice section would have ineffective practices, and those that score the mean or above would have effective

practices (Desalegn et al., 2016). With the assistance of the Department of Biostatistics at the University of the Free State, the categorical data was analysed and the mean scores were calculated based on the marginal distributions.

3.6 Pilot study

After obtaining ethical clearance from the Health Sciences Research Ethics Committee (HSREC) at the University of the Free State in November 2020 (**UFS-HSD2020/1840/2601**) the pilot study took place in December 2020. Under the advice and guidance of the Department of Biostatistics, a minimum of ten participants were required to take part in the pilot study. Fourteen potential candidates were contacted by the researcher, three were in the public sector and the rest were in private practices.

The potential participants for the pilot study were recruited by finding names of physiotherapists in Bloemfontein on social media platforms such as Facebook and LinkedIn. The potential participants were sent an invitational message on one of these platforms to partake in the pilot study. They were asked to respond with their email addresses or WhatsApp contact details to the researcher if they were willing to participate in the pilot study which would enable the researcher to provide the potential participant with the necessary information regarding the study. The recruitment method utilised for the pilot study was not the exact same method that would be utilised for recruitment for the main study as the researcher had to recruit participants for the pilot study. However, the similarity in the method used was that an information letter regarding the study (Appendix A) was sent electronically together with the informed consent letter (Appendix B). Once the participant clicked on the electronic “agree to participate in the study” button, they were directed to the link opening the questionnaire in the EvaSys System (Appendix D).

The link to the survey on EvaSys was available for three weeks for the duration of the pilot study. The results from the pilot study were not included in the main study as there were minor changes made to the questionnaire based on the feedback received from the pilot study participants. In addition, there were numerous incomplete questions of the questionnaire which severely

affected the data from the pilot study. Therefore, the data from the pilot study was kept separate from the main study.

3.7 Changes after the pilot study

After the pilot study was completed, the researcher clarified certain questions that were indicated to be challenging by the pilot study participants, thus aiming to ensure that the data obtained during the main study was valid and reliable. The following seven changes were made to the questionnaire as indicated in *Table 3.7* below, which illustrated the questions before the pilot study and the changes made to the research tool after the pilot study. These changes were declared to the HSREC for transparency and integrity during the data collection procedure.

Table 3.7: Changes made after the pilot study

Question	Before pilot study	Changes made
2.7	There was no question 2.7	An open-ended question was added to allow for the option 'other'
2.8	The "no" option was not available for choice	Corrected the yes/ no options
3.2	Option in the multiple-choice was unclear	A grammatical correction was made and added the word 'area' to the second option
3.13	There was no question 3.13	An open-ended question was added to allow for the option 'other'
6.3	There was no question 6.3	An open-ended question was added to allow for the option

		'other'
6.6	There was no question 6.6	An open-ended question was added to allow for the option 'other'
6.12	There was no question 6.12	An open-ended question was added to allow for the option 'other'

3.8 Data collection procedure/ Method

A quantitative study was conducted to objectively answer the aims and objectives of the research study. The researcher made use of an electronic self-developed questionnaire to obtain the necessary data.

After obtaining ethical clearance from the Human Sciences Research Ethics Committee of the University of the Free State (**UFS-HSD2020/1840/2601**) (Appendix E), a letter was sent by the researcher to all the physiotherapy member organisations (PASA and SASP) in South Africa, requesting the organisation to distribute the questionnaire via a bulk-mailing system to all their members (Appendix C).

In addition, the researcher utilised a snowball sampling method, which is a non-probability sampling method, to distribute the questionnaire to those physiotherapists who may not have been affiliated to the SASP nor PASA but was on public domain access lists, or social media platforms such as Facebook, LinkedIn and WhatsApp. The method used was to increase the likelihood of reaching the calculated sample size for the study (Showkat et al., 2017). The sample size also included physiotherapists working in academic institutions and those who worked in the public sector. Furthermore, due to time constraints, the link to the survey would only be active for six weeks, thus from January to March 2021.

Electronic correspondences (e-mails) were also sent to individuals in managerial positions or the heads of departments at public institutions or hospitals, to request them to forward the link of the electronic survey to their contacts or staff members since they would have access to e-mail addresses or contact

details of physiotherapists. These persons were contacted in their personal capacity and not from any specified institution.

Each individual received an e-mail with a link that invited them to participate in the study. Upon opening the link to the survey, the information regarding the study would be provided in the information letter (Appendix A), which contained relevant information regarding the study including the aim of the study, the method of the study and that there is no risk involved to participate in the study. The information letter (Appendix A) also included information regarding the ethical aspects, which included the participants' rights as outlined in the HSREC Preparation Guide (version 07.02) and the confidentiality of information obtained.

Each participant was then required to click on a tick box that confirmed electronic consent to participate in their private capacity (Appendix B). This consent was included at the beginning of the questionnaire where the participant was required to give their permission and that they willingly choose to participate in the study by completing the questionnaire (Appendix D) to follow. Only after providing electronic consent with the link provided to the survey, which opened in the EvaSys survey system.

The link to the survey also had a password and once the participant clicked on the link and entered the password, the questionnaire could be accessed. The link for the questionnaire was available only for six weeks, however, due to technical reasons, the SASP reported that it took two weeks before the link started circulating to their members on their electronic platform. To compensate for the delay of two weeks the researcher added another two weeks to the availability of the survey.

In an attempt to increase the number of participants the researcher searched social media platforms (Facebook, LinkedIn and WhatsApp) and other public domain e-mailing lists for potential participants and sent electronic messages to these physiotherapists containing the link to the electronic survey. The last sentence of the information document regarding the study requested each participant to keep sending the e-mail to other potential participants once they had completed the questionnaire, thus employing the snow-balling effect.

The researcher requested the member organisations, PASA and SASP, to send out two reminder e-mails to each member within two-week intervals, which would serve as reminders for the completion of the questionnaire. Two reminder messages were also sent by the researcher to the public domain physiotherapists at two-week intervals, as a reminder to complete the questionnaire and to share the link and the information of the study with eligible colleagues or friends.

The communication sent to the PASA member organisation did not elicit any response. The researcher contacted the organisation on their Facebook page, sent numerous e-mails and even attempted to phone the President of the organisation, to no avail. No response was received from the organisation to date.

Once the link to the survey had expired, the researcher retrieved all completed questionnaires from the electronic system (EvaSys) in the form of an excel spreadsheet for data analysis. The raw data was cleaned by the researcher in an excel spreadsheet before sending it to a biostatistician at the Department of Biostatistics at the University of the Free State for further data analysis.

3.8.1 EvaSys survey system

The EvaSys system was used to develop the survey. EvaSys is a free electronic platform offered under a licencing agreement by the University of the Free State for registered students and staff to generate, administrate, print, and send questionnaires, surveys, or reports (EvaSys quick start guide, 2019). The use of the platform provides anonymity for the users and allows the administrator to receive the completed surveys in an electronic format, or paper surveys if required.

The EvaSys system permits a user to take part in the survey by entering the password provided. For this study, the researcher chose to use the same password for the duration of the survey.

The EvaSys system allows for an array of questions types including multiple-choice, and open or closed-ended questions. Once the survey is completed, the link to the survey closes and does not allow any additional person to participate. The system then permits the data to be exported in an excel format for analysis and is accompanied by a basic statistics report regarding the information within the questionnaire. The EvaSys system also has a team for technical support that is situated in Gauteng, South Africa, who willingly assist, telephonically or via e-mails, with any issues or challenges that may arise while using the platform or exporting the raw data.

3.9 Statistical analysis

Data analysis was performed by the Department of Biostatistics at the University of the Free State. Descriptive statistics, namely frequencies and percentages, for categorical data, and means and standard deviations, or medians and percentiles using the Kruskal-Wallis or T-test for numerical data were calculated.

Furthermore, associations between demographic information, knowledge, attitude and practices, and beliefs and practices were calculated and described using the Pearson's Chi-squared test or Fisher's exact test for categorical data. For the open-ended questions, the coding was done by the researcher and each possible answer was coded according to the question asked. The list of possible answers were numbered and was then sent to the Department of Biostatistics for analysis.

3.10 Ethical considerations

Ethical clearance was obtained from the Health Sciences Research Ethics Committee of the University of the Free State (**UFS-HSD2020/1840/2601**). Participation in this study was voluntary and all information was treated confidentially. All information obtained from this study was stored on an external hard drive, which is password protected, locked away in a safe for safekeeping and accessible only by the researcher. A copy of the information was also stored on a cloud-based computerised storage application that is password protected and accessible only by the researcher. All the names and personal information of the participants were kept strictly confidential since the data collected on EvaSys was done anonymously.

3.10.1 Gatekeepers permission

Once Ethics approval was granted, the researcher requested additional permission from the President of the South African Society of Physiotherapy to make use of their data platform to send the link of the

survey to all their members. No additional permission was necessary for the commencement of this study.

3.10.2 Informed consent

The informed consent document (Appendix B) was included in the information letter (Appendix A) regarding the study. Each potential participant was informed that their participation was entirely voluntary and that they could withdraw from the study at any stage. Furthermore, the information stated that their participation was in their own personal capacity and no remuneration would be given for participation. Additional information included that the results may be published, but that no person's identity would be revealed, and that all information will be presented in a group format. Additionally, all information would be kept private and confidential.

On the link that was sent to the potential participant, there was also an information paragraph to reiterate the consent to the study, where it also was indicated that once they clicked on the link to access the survey, it was clearly accepted that they consented to the study.

3.10.3 Fair selection of participants

Participants were informed that they may withdraw from the study at any stage without any penalty; that no remuneration would be provided for participation in the study and that participation was completely voluntarily. All participants that met the inclusion criteria were included in the study and no exclusions were made based on age or gender.

The researcher decided to provide the questionnaire in only English since this is the medium of communication from the SASP and the HPCSA. This would also prevent any translation errors for terms such as central sensitisation for example.

3.10.4 Privacy and confidentiality

Firstly, there was access control regarding the link to the survey. The access to the survey was password-protected, thus no outside person could access any information on the EvaSys system containing the participants' personal information without using the password that was provided. The questionnaire was developed in such a manner that no personal particulars were requested, and the participants remained anonymous. Secondly, once the survey closed, all the information was automatically sent via an excel spreadsheet to the researcher's e-mail address, which was not accessible by any third party, and then was forwarded to the Department of Biostatistics for data analysis. Thirdly, all data regarding this study was stored and saved on an external hard drive, that was locked away for safekeeping and only the researcher had access to it. Lastly, for additional safety, the researcher saved all research data on a cloud-based storage application that is only accessible to the researcher by a password.

The data of this study will be stored and kept for a minimum of ten years as outlined in the World Health Organization (WHO) Handbook for Clinical Research Practice (2002) and according to the South African Good Clinical Practice Guidelines: Clinical Trial Guidelines, third edition (2020). Thereafter, all data will be deleted by the researcher. The findings of the research will be presented as a group, ensuring that no participants will be identifiable.

3.10.5 Researcher competence

The researcher was aware that to conduct a research study, one must be adaptable to an ever-changing world and sensitive to inter-cultural diversity. The skillset needed to successfully complete a quality research study should relate to values and attitudes of being respectful, ethical, knowledgeable, and flexible in one's thinking and approach.

Furthermore, all the changes made to the research tool after the pilot study was declared to the HSREC and the application for approval of an addendum to the study was done for the purpose of ethical considerations and transparency during the data collection procedure.

In the next chapter, Chapter 4, the results of this study will be presented using figures and tables that best portray the data gathered during the data collection procedure. All the data will be presented and will be deliberated on.

CHAPTER FOUR

4. RESULTS

4.1 Introduction

4.2 Pilot study results

4.3 Demographics

4.4 Knowledge

4.5 Attitude

4.6 Beliefs

4.7 Practices

4.8 Associations

4.1 Introduction

In this chapter, the results of the research study will be presented using tables, figures and graphs. The information will be sub-divided according to the research tool (questionnaire) used and be presented with the demographic information followed by the knowledge, attitude, beliefs, and practices sections that were discussed in Chapter 3. Lastly, the associations and comparisons made between different sections of this study will be provided. In addition, since the results of the pilot study were omitted from the research study based on the changes that were made to the questionnaire, the pilot study will be discussed and those results will be presented firstly in this section of the dissertation.

4.2 Pilot study results

By the last week in December 2020, only eleven of the fourteen participants had agreed to take part in the pilot study and the last participant submitted the completed questionnaire on 23 December 2020 when the link to the survey expired. Upon completion of the survey, each participant was asked to provide the researcher with feedback regarding the ease or difficulty of accessing the survey, the clarity of the questions, the time spent completing the questionnaire and the grammar used in the survey.

Only four of the eleven participants provided feedback to the researcher after completion of the survey. Once the survey link to the EvaSys system expired, the researcher was able to export the report of the raw data from the system and send the data to a biostatistician at the Department of Biostatistics, at the University of the Free State for data analysis. As indicated earlier the data from the pilot study was not included in the main study as there were minor changes made to the questionnaire based on the feedback received from the pilot study participants.

Eleven participants, three males, and eight female physiotherapists provided electronic consent to partake in the pilot study. The mean age of the participants was 31.2 years old, with the youngest participant being 26 years old at that time. The average number of years of practice was 10.2 years, with the longest in practice as a physiotherapist being 24 years. Two participants worked in

the public sector, one participant worked in an academic institution and the rest of the participants worked in private practice. The calculations specific for the KABP survey were not done in the pilot study, as the purpose of the pilot study was to evaluate the accessibility of the link, the clarity and simplicity of the questionnaire, whether the questions and terms used were understood and the time it took to complete the survey.

Eight participants indicated that they have an interest in NMS conditions, but only seven indicated that they have done accredited courses in headaches, with the most recent being in the last year or two as indicated by only one participant. In addition, six participants (50 %) referred to the OMT 1 course which only covers a portion of the material on headaches and the management thereof. The OMT 1 course has since been adapted as research emerged and the course has been renamed over the years according to the SASP webpage, it is currently called the Advanced Neuromusculoskeletal (ANMS) course that is still presented by the special interest group of the SASP, the Orthopaedic Manipulative Physiotherapy Group (OMPTG) which has also been renamed to the Neuromusculoskeletal Physiotherapy Group (NMSPG). The course covers content regarding the available scientific and clinical evidence-based research including the biopsychosocial management for each individual client presenting with neuromusculoskeletal pain and dysfunctions (www.saphysio.co.za), accessed November 2021. The ANMS course will be presented as a post-graduate diploma in 2022 in a collaborative approach between the University of Witwatersrand and the SASP, specifically targeted towards physiotherapists who wish to enhance their knowledge and skills about various musculoskeletal conditions.

Several challenges arose during the pilot study including, the link to the survey did not open on one participant's mobile device and showed only a blank screen. The participant who started to complete the questionnaire could therefore not complete the remainder of the questionnaire. Not all the questions of the questionnaire were answered by all the pilot study participants, which rendered some of the sections incomplete and no reasons were provided by these participants for the incompleteness.

In addition, two questions (2.6 and 3.12) were indicated where two participants felt they could not specify an answer in the space provided if they selected the option 'other'. The time spent to complete the questionnaire was indicated by one participant as being 17 minutes and another took more than 30 minutes to complete, which was deemed by the participant as being time-consuming. Fortunately, this was the case for only one of the participants. Three participants

responded positively regarding ease of opening the questionnaire with the link provided and found the questionnaire easy to complete.

The link to the survey was sent to the researcher's mobile device as a test run and to the device of two other independent people to test the compatibility since the concern was that it may pose a challenge during the study. However, there was no problem detected regarding the access to the survey on three different mobile devices or desktops.

4.3 Demographics of the research study

The overall response rate for this study was 37.9% and one hundred and thirty-four participants provided electronic informed consent to participate in this study and successfully completed the survey. Of these 134 participants that completed the questionnaire 119 (88.8 %) were female and 14 (10.5%) were male. In this study, one participant chose not to indicate their gender. To interpret the data in this study medians and percentiles were used since the normal distribution of the data for the study was calculated and determined to not be normally distributed.

The median age of the participants (n=134) was 36.5 years at the time of completion of this survey. The median years of practising for the participants were 13 years and the participants qualified at the median age of 22 years. In South Africa, the physiotherapy undergraduate degree as offered at any of the eight tertiary institutions is a four-year programme with one-year compulsory community service upon completion (www.saphysio.co.za), accessed November 2021. Considering that most scholars finish secondary school in South Africa at the age of 18 years, then the median age for this study implies that most entered straight into university after matriculation.

The participants could choose more than one option regarding their workplace and the majority of participants 110 (82.1%) worked in the private sector and 15 (11.2%) worked in the public sector, four participants (3%) worked at an academic institution, two participants (1.5%) were in administrative roles and seven participants (5.2%) indicated the option other, such as medico-legal reporting.

The preferred area of interest for 95 participants (70.9%) were musculoskeletal or pain conditions, 70 participants (52.2%) indicated their interest was in the field of orthopaedics and sport and the remainder of the participants were divided between neurology, 18 participants (13.4%), and paediatrics, 12 participants (9%). The participants could choose multiple options if it was indicated, therefore the percentages may not equal 100%.

Of the participants that were interested in the other areas, 25 participants (18.7%) indicated Pilates as their area of interest and one participant (0.8%) Rehabilitation as their area of interest. Aquatics was indicated by one participant (0.8%) as their area of interest, Women's or Men's Pelvic health was indicated by seven participants (5.3%), geriatrics by two participants (1.5%), Vestibular rehabilitation by two participants (1.5%) and Cardio-Pulmonary, ICU or Respiratory rehabilitation by nine participants (6.7%). Once again the percentages will not add to 100% since more than one option could be indicated.

Only 56 (41.8%) of the participants indicated that they had attended accredited tension-type headache courses and 25 (44.6 %) of these participants indicated that the courses were completed in the last four years. The most mentioned headache course attended by the 56 participants was a headache course presented by Dr I Diener by 24 participants (42.9 %) and the OMT 1 course mentioned by 22 participants (39.3 %) with 55 of these participants (98.2 %) noting that the course attended included hands-on skills.

4.4 Section 1 (Knowledge section)

Seventy-nine participants (59% of the sample size) scored 58.96% for the knowledge section of this study, while 55 participants (41 %) had low or poor knowledge. Therefore, the knowledge of participants in the study regarding the management of TTH is deemed as average, when using the scoring tool set out in Chapter 3, the methodology of the study. Also, the median score for the knowledge section was 60% with an inter-quartile range of 50-70. The highest score obtained for Section 1 (knowledge) was 90% by only two participants. A summary of the knowledge section is presented below in *Table 4.1* with the correct and incorrect answers indicated according to the questionnaire and the answer sheet and how the participants responded. Not all the participants answered each question fully, thus the percentages may not add to 100% and the number of

answers is provided in the left-hand column after each question. In some instances, the participants were able to choose more than one answer. The number of respondents is presented first with the percentages in brackets ().

Table 4.1 Knowledge section summary

Question	Correct answer	Incorrect answer	Participants	Number of responses
3.1 How are TTH categorised?	1. Primary headaches	Secondary headaches	Correct 43 (32.8%)	n=131
			Incorrect 53 (40.5%)	
3.2 What best describes TTH? Choose all applicable	4. All of the above		Correct 68 (50.8%)	n=134
3.3 How are TTH classified according to the IHS?	5. All of the above		Correct 53 (39.6%)	n=134
3.4 How common are TTH when compared to migraine headaches?	1. Very common	Frequent Sometimes Rare	Correct 83 (63.4%)	n=131
3.5 Which muscles	5. All of the above		Correct 103 (76.9%)	n=134

would likely be involved in the occurrence of TTH?				
3.6 Are women more affected by TTH than men?	1. Yes	2. No	Correct 107 (81.1%)	n=132
			Incorrect 6 (4.6%)	
3.7 Are persons above the age of 49 years affected by TTH?	2. No	1. Yes	Correct 11 (8.3%)	n=132
			Incorrect 98 (74.2%)	
3.8 Are children under the age of 18 years affected by TTH?	1. Yes	2. No	Correct 68 (51.9%)	n=131
			Incorrect 31 (23.7%)	
3.9 Which are common triggers for the development of TTH?	2. Anxiety 3. Stress 5. Sleep disturbances	1. Food smells 4. Coffee or chocolates	Correct 107 (79.9%) Correct 116 (86.6%)	n=134

			Correct 100 (74.6%)	
3.10. Acute symptoms of TTH may continue for 7 days?	1. True	2. False	Correct 94 (72.9%)	n=129
			Incorrect 35 (27.1%)	n=129
3.11 Muscle trigger points are the sole cause for the pain experienced during TTH?	2. False	1. True	Correct 111 (84.1%)	n=132
			Incorrect 21 (15.9%)	
3.12 Which of the following pain mechanisms may play a role in TTH?	1. Peripheral 2. Central		Correct (peripheral) 80 (59.7%)	n=134
			Correct (central) 63 (47%)	

The results further indicated that 43 participants (32.8%) knew that tension-type headaches are classified as primary headaches and 35 participants (26.7%) did not know how these headaches are classified as described below in *Figure 4.1*.

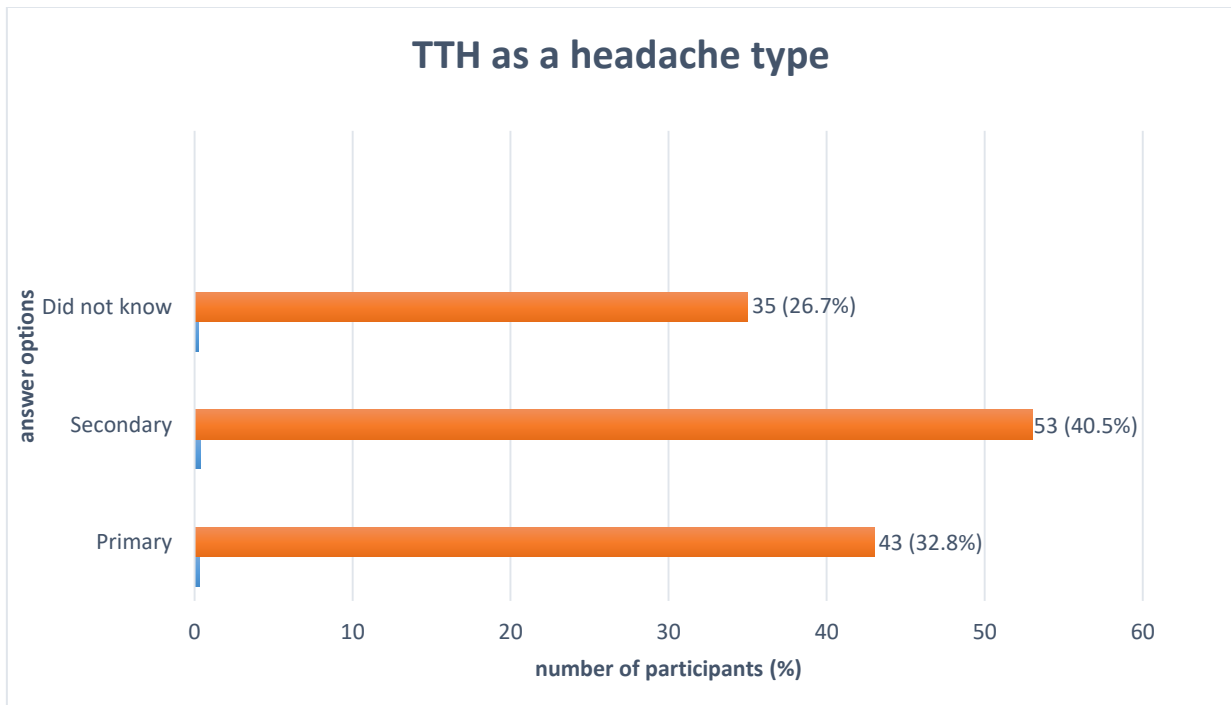


Figure 4.1: TTH categorised (n=131)

It was noted that 68 (50.8%) participants were able to identify the symptoms that may be present with TTH and at least 56 participants (41.8%) knew that one prominent symptom was a tight constricting band around the head.

A total of 103 participants (76.9%) indicated that they knew which muscles were mostly affected during TTH and 31 participants (23.1%) selected the sternocleidomastoid and sub-occipital muscles, as the muscles primarily involved in TTH.

The participants were asked how the International Headache Society classified TTH and 18 participants (13.4%) answered acute TTH, 19 participants (14.2%) answered frequent episodic TTH, eight participants (6%) said infrequent episodic TTH and 20 participants (14.9%) answered chronic TTH. The correct answer was 'all of the above' which 53 participants answered (39.6%) and a total of 49 (36.6%) participants did not know the answer to this question.

When TTH was compared to migraine, 83 participants (63.4%) answered that it was very common, 38 participants (29%) answered that it was frequent, only three (2.3%) participants answered that it was sometimes more common and seven (5.3%) did not know as seen in **Figure 4.2 below**.

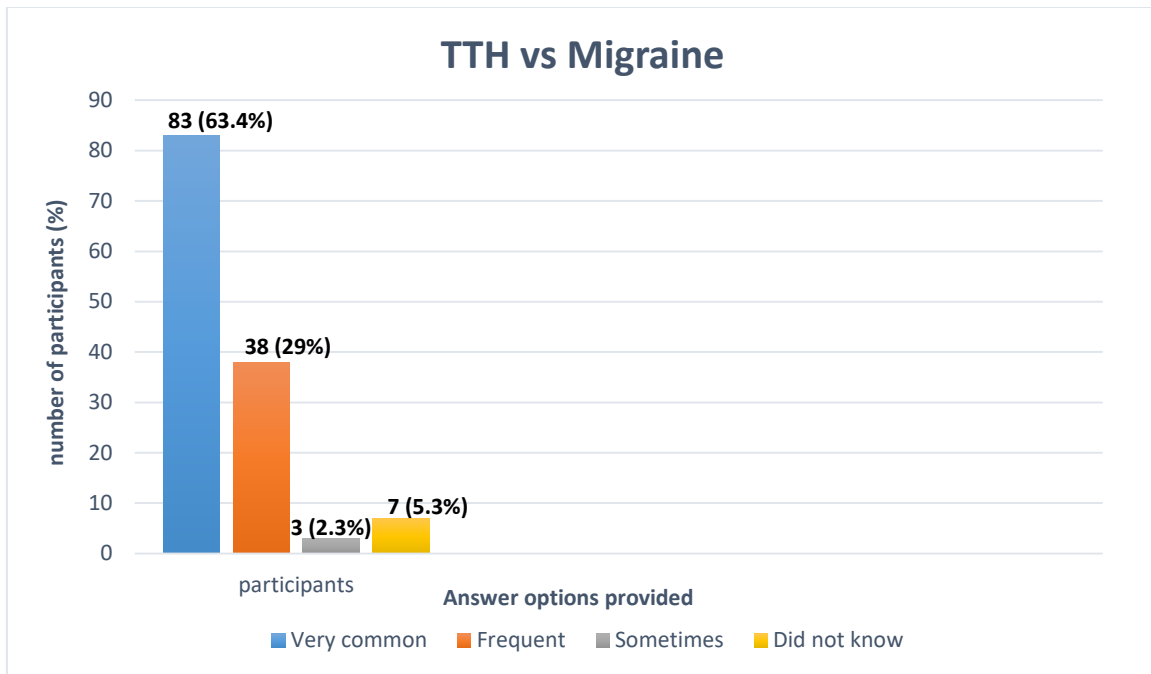


Figure 4.2: TTH vs migraine (n=131)

One hundred and seven participants (81.1%) indicated that women are more affected by TTH than men, individuals over the age of 49 years are more susceptible to TTH as answered by 98 participants (74.2%), which is incorrect, and children under the age of 18 years could also be affected by TTH as agreed by 68 (51.9%) of the participants.

The common triggers found for TTH are depicted in Figure 4.3 according to the literature. Anxiety 107 (79.9%), stress 116 (86.6%) and sleep disturbances 100 (74.6%) were answered correctly by most of the participants.

A total of 94 participants (72.9%) answered correctly that acute TTH symptoms may continue for up to seven days.

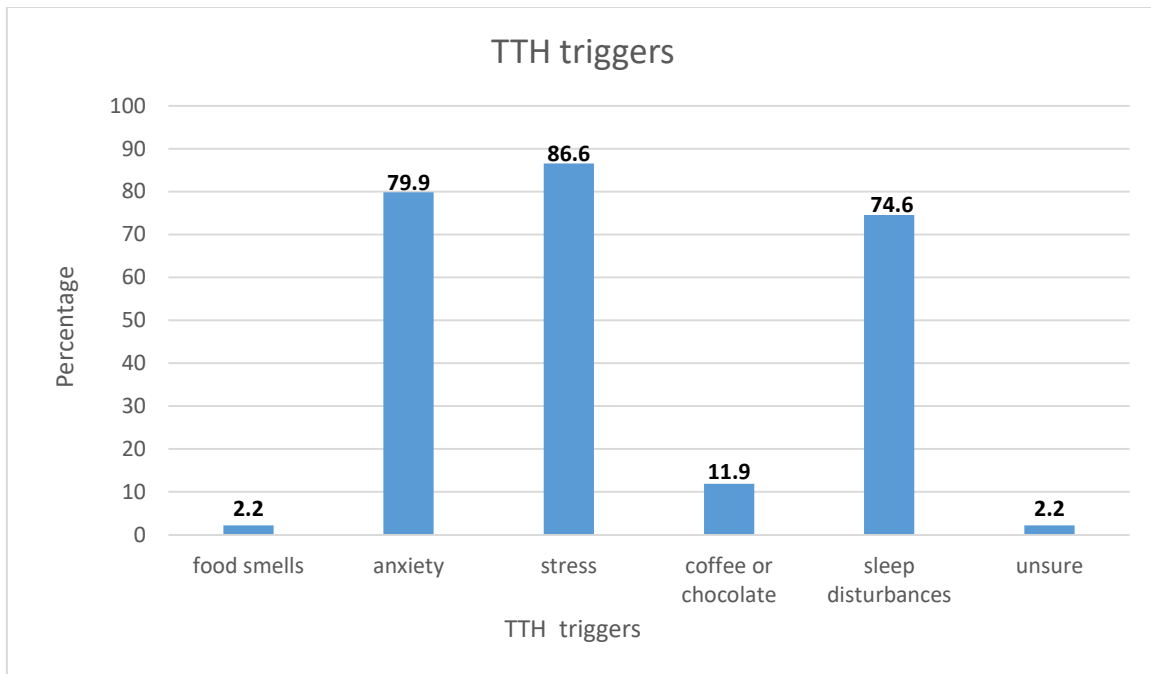


Figure 4.3: TTH triggers (n=134)

A total of 111 participants (84.1%) disagreed that muscle trigger points were the sole cause of the pain experienced with a TTH. The majority of participants noted that the main pain mechanisms involved in TTH were peripheral 80 (59.7%) and central 63 (47%) pain mechanisms respectively. Only nine participants (6.72%) indicated which other pain mechanisms could contribute to the pain in TTH. These mechanisms included psychological or lifestyle: two responses (1.5%); poor posture: three responses (2.25%); mechanical or motor elements: two responses (1.5%); stress: three responses (2.25%) and temporomandibular joint: one response (0.75%). Since the participants were able to indicate more than one option, the percentages may therefore not correlate to 100%.

4.5 Section 2 (Attitude section)

In the attitude section (Section 2), a Likert scale was utilised to determine the level of agreement or disagreement with the statements provided. Where indicated in the open question options provided, the participants were asked to motivate their answers chosen if applicable. A summary

of the results for the closed-ended questions for Section 2 (Attitude section) follows below in Table 4.2. The open questions were grouped by the researcher and coded according to the similarity. For instance, joint mobilisations or manipulations were grouped together and soft tissue therapy included words such as massage, myofascial techniques, trigger point pressure, or soft tissue manipulations. The coding was sent to the Department of Biostatistics for further analysis.

A total of 53 (39.9%) of the participants agreed that they enjoy providing physiotherapy for TTH and 54 (40.6%) strongly agreed with this statement. However, a total of 93 (70%) of the participants disagreed that TTH can solely be managed by a physiotherapist and 69 (51.1%) agreed that behaviour modification principles in addition to a team approach can be used as a therapy method.

When questioned whether analgesic use provided better outcomes for those living with TTH, 55% of physiotherapists (73 participants) disagreed with this statement, where a multi-disciplinary team approach was favoured. Also, when asked whether an evidence-based outcome measure should be used for physiotherapy sessions provided a total of 115 participants (86.5%) agreed to this statement. The number of respondents is presented first with the percentages in brackets ().

Table 4.2: Results of closed-ended questions of the Attitude section

Questions	Strongly disagree	Disagree	Agree	Strongly agree	Total responses
4.1 I enjoy providing physiotherapy to persons living with TTH.	8 (6.0%)	18 (13.5%)	53 (39.9%)	54 (40.6%)	n=133
4.3 I think that TTH should only be managed by	34 (25.6%)	59 (44.4%)	28 (21.1%)	12 (9.0%)	n=133

a physiotherapist.					
4.5 The therapy that I provide to these persons living with TTH produces positive results.	7 (5.3%)	6 (4.5%)	59 (44.4%)	61 (45.9%)	n=133
4.7 Alternative therapy options, e.g. behaviour modification, is more effective to persons living with TTH.	2 (1.5%)	46 (34.6%)	68 (51.1%)	17 (12.8%)	n=133
4.9 Treatment such as analgesic use produces better outcomes for the management of persons living with TTH.	41 (31.3%)	72 (55%)	16 (12.2%)	2 (1.5%)	n=131
4.11 An evidenced-based measurable outcome should be used for each	4 (3.0%)	14 (10.5%)	59 (44.4%)	56 (42.1%)	n=133

physiotherapy session.					
4.12 Repeated follow up physiotherapy sessions are necessary to provide positive outcomes for persons living with TTH.	4 (3.0%)	17 (12.9%)	66 (50%)	45 (34.1%)	n=132

The responses to the open questions in the Attitude section of the questionnaire were as follow:

1. Question 4.2: Please motivate your response to the previous question (n=107)

A total of 39 participants (36.5 %) enjoyed providing treatment for persons living with TTH and 48 (45 %) found physiotherapy to be helpful and feel that they achieve positive results. In addition, 10 (9.4 %) of participants found the treatment given to people living with TTH as being effective or that the individuals respond well to treatment. However, 10 (9.4 %) did not know or felt unsure whether the treatment makes any difference.

2. Question 4.4: Please motivate your response to the previous question (n=122)

Twelve participants (9.8 %) felt that physiotherapy alone helps people living with TTH. Twenty-six (21.3 %) participants felt that physiotherapy in addition to other treatments was the better choice. In addition, 11 (9 %) participants felt that physiotherapy and medication would be effective to manage TTH.

Forty-two participants (34.4%) felt that a multi-disciplinary team approach is the better option, eight (6.6%) participants felt that the condition should be managed by a medical specialist such as

a neurologist, psychologist or pain specialist and seven participants (5.7%) felt that using only medication will help persons living with TTH, but 16 (13.1%) of participants felt that combining medication and the assistance of other professionals were more likely to be effective in the management of TTH.

3. Question 4.6: Please motivate your response to the previous question (n=107)

A total of 39 (36.5%) participants felt that positive results were demonstrated by the therapy provided to people living with TTH and 33 (30.8%) participants felt that physiotherapy alone produced positive results for these individuals. A further 17 (15.9%) participants felt that physiotherapy in conjunction with a multi-disciplinary team approach produced better results for people living with TTH and 18 (16.8%) participants could not say or did not know if physiotherapy alone produced a better result.

4. Question 4.8: Please motivate your response to the previous question (n=108)

A total of 73 (67.6%) participants preferred a 'hands on' plus 'hands off' approach, or physiotherapy in combination with other disciplines. However, 21 (19.4%) participants preferred other approaches but excluded physiotherapy in the management and 14 (13%) participants were not sure which other approaches to include in the management of people living with TTH.

5. Question 4.10: Please motivate your response to the previous question (n=122)

A total of 32 (26.2%) participants felt that medication only worked for a short time and 30 (24.6%) participants felt that physiotherapy in addition to medication would be more effective. A further 13 (10.7%) participants felt that medications do not work at all and 28 (23%) participants felt that medication may not treat the cause or the origin of the problem, may create dependence on medication or may mask the symptoms. In addition, three (2.5%) participants felt that medication causes side effects and might be less effective in the management approach.

On the contrary, only seven (5.7%) participants felt that using medication alone are more effective; while five (4.1%) participants felt that physiotherapy alone was more effective, and four (3.3%) participants indicated that they did not know.

6. Question 4.13: Please motivate your response to the previous question (n=94)

A total of 48 (51.1%) participants felt that repeated follow up sessions were necessary to establish treatment principles, revise or reinforce education. Twenty-three (24.5%) participants felt that repeated sessions were needed to assess if any improvement of symptoms occurred, and the same number of participants (24.5%) felt that the number of treatment sessions solely were depended on the patient. Twenty-three participants chose not to answer the question.

4.6 Section 3 (Beliefs section)

In the beliefs section (Section 3), once more a Likert scale was used to indicate the level of agreement or disagreement to the statements provided.

A summary of the beliefs section is provided in *Table 4.3* which provides the questions asked and the answers provided by the participants being grouped together in the agreement and disagreement statements. In each instance, the number of participants is presented first and then the percentages are reported in brackets.

A total of 59 participants (45%) agreed that physiotherapy is used more than any other profession for the management of TTH, however, 48 (36.6%) of participants disagreed with this statement. Later in the practice section, 127 participants (98.5%) then indicated that physiotherapy has a role to play in the management of TTH. Just more than half of the participants agreed that TTH should be managed by more than one profession, while 67 (50.4%) of participants strongly agreed to this statement, however, 72 (54.1%) of participants disagreed that persons living with TTH should always be referred for psychological support as seen in *Table 4.4* below.

In addition, 72 (54.1%) participants strongly agreed that patients should be provided with alternative pain management strategies and should be encouraged to determine their own

headache triggers with 102 (76.7%) participants in total agreement that persons living with TTH should keep a headache diary. An additional 97 (74%) of the participants disagreed that the physiotherapy techniques used to manage TTH is solely based on their years of clinical experience, whereas 46 participants (34.6%) agreed that the management of TTH should be solely based on the currently available research as seen in the summarised statements in *Table 4.3*. The number of respondents is presented first with the percentages in brackets (). All the other results obtained in this section is presented in the tables below.

Table 4.3: Summary of the Beliefs section

Questions	Strongly disagree/ Disagree	Strongly agree/ Agree	Number of responses
5.1 Physiotherapy is used more than any other discipline in the treatment of TTH.	56 (42.8%)	75 (57.2%)	n=131
5.2 Chronic TTH are managed by a physiotherapist only.	120 (90.2%)	13 (9.8%)	n=133
5.3 Acute TTH should only be managed by a medical practitioner.	108 (81.2%)	25 (18.8%)	n=133
5.4 TTH are only managed by soft tissue physiotherapy	122 (91.7%)	11 (8.3%)	n=133

techniques.			
5.5 The individual living with TTH should be assessed for additional joint involvement.	4 (3%)	129 (97%)	n=133
5.6 The physiotherapy techniques that are used to manage the symptoms of TTH are solely based on years of clinical experience.	97 (74%)	34 (26%)	n=131
5.7 The physiotherapy techniques that are used to manage the symptoms of TTH are solely based on the currently available research.	87 (65.4%)	46 (34.6%)	n=133
5.8 A multi-disciplinary team approach should be used in the	9 (6.8%)	124 (93.2%)	n=133

management of all persons living with TTH.			
5.9 All persons living with TTH should be informed about all other alternative pain management strategies.	4 (3%)	129 (97%)	n=133
5.10 All persons living with TTH should keep a headache diary.	31 (23.3%)	102 (76.7%)	n=133
5.11 Persons living with TTH should be encouraged to determine their own headache triggers.	3 (2.3%)	130 (97.7%)	n=133
5.12 Persons living with TTH should be informed about the role of sensitisation of the trigeminal cervical nucleus.	20 (15.3%)	111 (84.7%)	n=131
5.13 Persons living with TTH should always be	79 (59.4%)	54 (40.6%)	n=133

referred for psychological support.			
5.14 Persons living with TTH should always be managed using Pain Neuroscience Education principles.	39 (29.6%)	93 (70.4%)	n=132

Table 4.4: Results of Beliefs section with answers

Questions	Strongly disagree	Disagree	Agree	Strongly agree	Number of responses
5.1 Physiotherapy is used more than any other discipline in the treatment of TTH.	8 (6.1%)	48 (36.6%)	59 (45%)	16 (12.2%)	n=131
5.2 Chronic TTH are managed by a physiotherapist only.	46 (34.6%)	74 (55.6%)	13 (9.8%)	0	n=133
5.3 Acute TTH	46 (34.6%)	62 (46.6%)	19	6 (4.5%)	n=133

should only be managed by a medical practitioner.			(14.3%)		
5.4 TTH are only managed by soft tissue physiotherapy techniques.	69 (51.9%)	53 (39.9%)	10 (7.5%)	1 (0.8%)	n=133
5.5 The individual living with TTH should be assessed for additional joint involvement.	2 (1.5%)	2 (1.5%)	46 (34.6%)	83 (62.4%)	n=133
5.6 The physiotherapy techniques that are used to manage the symptoms of TTH are solely based on years of clinical experience.	35 (26.7%)	62 (47.3%)	30 (22.9%)	4 (3.1%)	n=131
5.7 The physiotherapy techniques that are used to manage the	18 (13.5%)	69 (51.9%)	40 (30.1%)	6 (4.5%)	n=133

symptoms of TTH are solely based on the currently available research.					
5.8 A multi-disciplinary team approach should be used in the management of all persons living with TTH.	1 (0.8%)	8 (6%)	57 (42.9%)	67 (50.4%)	n=133
5.9 All persons living with TTH should be informed about all other alternative pain management strategies.	0	4 (3%)	57 (42.9%)	72 (54.1%)	n=133
5.10 All persons living with TTH should keep a headache diary.	5 (3.8%)	26 (19.6%)	59 (44.4%)	43 (32.3%)	n=133
5.11 Persons living with TTH should be encouraged to determine their own headache	1 (0.8%)	2 (1.5%)	58 (43.6%)	72 (54.1%)	n=133

triggers.					
5.12 Persons living with TTH should be informed about the role of sensitisation of the trigeminal cervical nucleus.	2 (1.5%)	18 (13.7%)	74 (56.5%)	37 (28.2%)	n=131
5.13 Persons living with TTH should always be referred for psychological support.	7 (5.3%)	72 (54.1%)	43 (32.3%)	11 (8.3%)	n=133
5.14 Persons living with TTH should always be managed using PNE principles.	2 (1.5%)	37 (28%)	61 (46.2%)	32 (24.2%)	n=132

4.7 Section 4 (Practice section)

In the practice section (Section 4) the participants were asked more open-ended questions to ascertain what practices they utilise to manage a person living with TTH, how many therapy sessions they typically provide before they can subjectively or objectively measure a change in symptoms and what type of measurement tool they mostly use to quantify these changes. The open-ended questions allowed the respondents to provide their own answers to the questions.

Sixty-five participants (48.9%) stated that they treat a new headache referral once a week, 37 participants (27.8%) twice a week, 10 participants (7.5%) three times per week and 20 participants (15%) never treat a new headache referral. A total of 117 participants (88%) indicated that they preferred a combination of pharmacological and non-pharmacological approaches for the management of people living with TTH, seven (5.3%) participants indicated that they preferred a non-pharmacological approach and nine (6.8%) participants indicated that they used other approaches in their management.

The other approaches were indicated as lifestyle and dietary changes by two participants (1.5%), medical management including specialist care by five participants (3.7%), psychology and Pain Neuroscience Education principles and psychotherapy (behaviour modification changes) were chosen by five participants (3.7%), physiotherapy with manual therapy techniques six participants (4.5%) and relaxation techniques were chosen by two participants (1.5%).

The answers provided by participants to clarify what a non-pharmacological approach could entail is provided in Table 4.5 below.

Table 4.5: Non-pharmacological approach (n=134)

Type of therapy	Participants	Percentages
Manual therapy or joint mobilisations	92	68.7%
Soft tissue techniques	58	43.3%
Mental health education or CBT	34	25.4%
Psychological management	23	17.2%
Postural correction and ergonomics	20	14.9%
Pain neuroscience principles	18	13.4%
Relaxation therapy	17	12.7%
Self-management or coping strategies	6	4.5%
Diet or Dietician advise	5	3.7%
Yoga, meditation, or Pilates	5	3.7%

No medication	3	2.3%
Occupational therapy or social worker	3	2.3%
Life coaching or motivational speaking	2	1.5%
Biokinetics or exercise therapy	2	1.5%
Dentistry	1	0.8%
Referral to other disciplines	1	0.8%
Craniosacral therapy	1	0.8%
Multi-disciplinary team	1	0.8%
Undecided or did not know	0	0

The different physiotherapy techniques utilised to manage TTH included joint mobilisations and manipulation 114 (85.1%), soft tissue techniques 126 (94%), rehabilitative exercises 109 (81.3%), behaviour modification principles 97 (72.4%), dry needling 85 (63.4%), electrotherapy 42 (31.3%) and other 23 (17.2%), which included posture correction. These techniques are shown in *Figure 4.4* below.

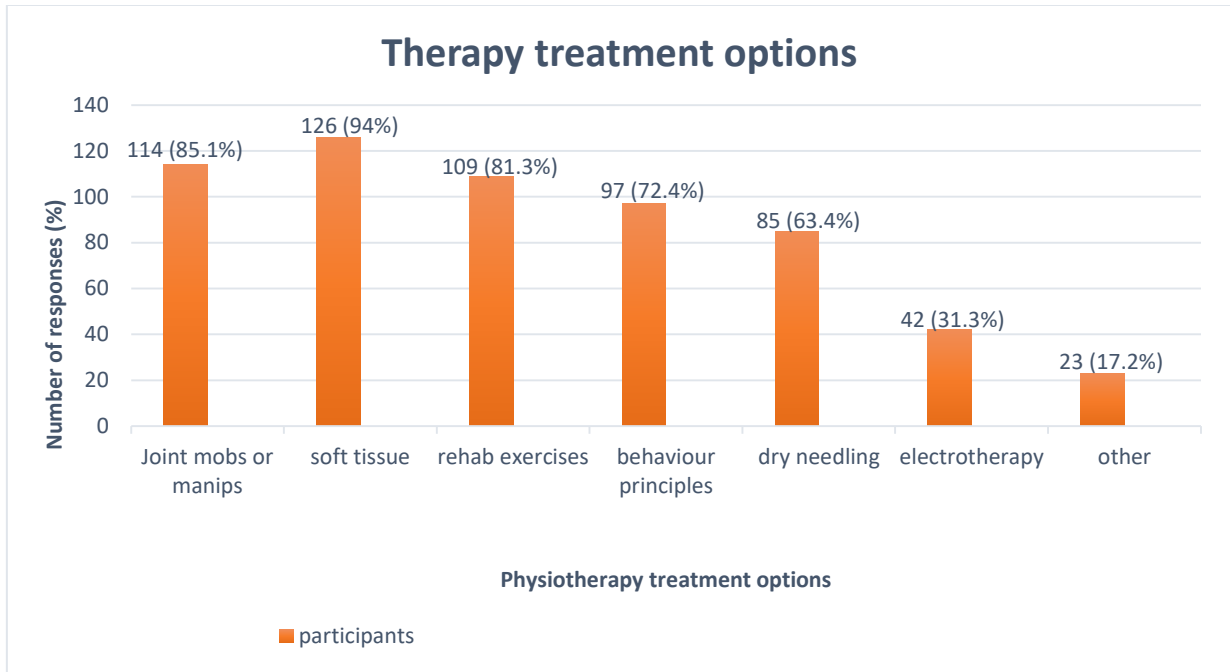


Figure 4.4: Different treatment modalities (n=134)

The different therapy treatment options that were given by the participants for the option 'other' chosen in the question are indicated below in *Table 4.6*.

Table 4.6: Therapy treatment option for the answer option 'other' (n=134)

Type of modality	Participants	Percentages
Pain neuroscience principles	9	6.7%
Relaxation techniques	8	6%
Psychology or mental health	6	4.5%
Electrotherapy	3	2.2%
Massage or soft tissue	3	2.2%
Craniosacral techniques	3	2.2%
Musculoskeletal techniques	3	2.2%

Exercise and stretches	3	2.2%
Client decides, self-management	2	1.5%
Posture and ergonomics	2	1.5%
Neutral or did not know	2	1.5%
Combined approach (pharmacology and non-pharmacology)	1	0.8%
Health education	1	0.8%
Dry needling or acupuncture	0	0

Seventy-one participants agreed (54.2%) that between four and six therapy sessions were usually given to manage a person living with TTH as depicted in *Table 4.7* below and in *Table 4.8* below (the number of estimated sessions required for positive subjective change in the symptoms of a person living with TTH) is indicated.

Table 4.7: Number of physiotherapy sessions to manage a person living with TTH (n=131)

Number of sessions	Participants	Percentages
1-3	46	35.1%
4-6	71	54.2%
7 or more	2	1.5%
Did not know	12	9.2%

Table 4.8: Number of estimated sessions required for positive subjective change in symptoms (n=124)

Sessions needed	Participants	Percentages
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1	26	21%
2	38	30.7%
3	40	32.3%
4	10	8.1%
5	6	4.8%
6	4	3.2%

The most frequently utilised other professions than physiotherapy included in the management of persons living with TTH is psychology and mental health 63 participants (60.6%), followed by a medical management approach 45 participants (43.3%). Table 4.9 below shows the results for the rest of the professions that were included in the management of a person living with a TTH. Please note that the total numbers will not add up since, the participants answered in an open question and may have mentioned a few different disciplines, not only one answer per participant.

Table 4.9: The different disciplines that physiotherapists include in their treatment options (n=104)

Disciplines	Participants	Percentages
Psychology or mental health	63	60.6%
Medical management	45	43.3%
Occupational therapy or social worker	17	16.3%
Biokinetics	16	15.4%
None or did not know	12	11.5%
Dietician	8	7.7%
Neurologist	6	5.8%
Chiropractor	6	5.8%

Homoeopath	4	3.9%
Yoga or Pilates teachers	3	2.9%
Psychiatry	3	2.9%
Life coach	2	1.9%
Dentist	1	1%
Pain clinic for infiltrations	1	1%
Ergo therapist	1	1%
Reflexology or Reiki	1	1%

A total of 127 participants (94.8%) responded that physiotherapy had a role to play in the management of TTH, one answered no to this statement (0.8%), another did not know (0.8%) and five did not answer this question. The most common outcome measure used by the participants in this study was the Numeric Pain Scale 120 participants (89.6%) followed by the Headache Disability Index 46 participants (34.3%). The participants were allowed to choose more than one option and the results are shown in *Table 4.10* below.

The Numeric Pain Scale was also most strongly associated with the question of whether an evidence-based measurable outcome should be used for each physiotherapy session with a significant Chi-squared value of $p=0.01$.

Table 4.10: The number of Outcome measures used (n=134)

Outcome measure	Participants	Percentages
Numeric Pain Scale	120	89.6%
Headache Disability Index	46	34.3%
Headache Impact Test	14	10.5%
Other	9	6.7%
Global Rating of Change	5	3.7%

The different outcome measures used for the answer option 'other' in the questionnaire are set out in *Table 4.11* below.

Table 4.11: Answers for the option 'other' outcome measures (n=134)

Type of outcome measure	Participants	Percentages
Subjective assessment only	5	3.7%
Patient Specific Functional Scale	3	2.2%
Did not know	3	2.2%
Total Pain Pattern	2	1.5%
Fear-avoidance	2	1.5%
Flexion rotation tests	1	0.8%
Range of motion	1	0.8%
Neck Disability Index	1	0.8%
Quality of Life questionnaire	1	0.8%
Headache diaries	1	0.8%

A total of 73 (55.7%) participants indicated that they used a measurable outcome for each physiotherapy session to assess subjective changes as depicted in *Table 4.12* below, while 41 participants (31.3%) indicated that they only used the outcome measure at the beginning of the session and at the end of the series of physiotherapy treatment sessions.

Table 4.12: Frequency of outcome measures used (n=131)

How often outcome measures was used	Participants	Percentages
Every session	73	55.7%
Twice in a series	41	31.3%
Not at all	7	5.3%
Did not know	10	7.6%

4.8 Associations

The statistics for the associations between the different sections of the KABP study were calculated and reported either with the Chi-squared test or the Fischer's exact test with a p-value of (≤ 0.05) being statistically significant. For example, the comparisons were made between the approaches of the public sector and private sector physiotherapists to determine the type of modalities most frequently used, or the number of sessions provided to see a positive subjective change in the symptoms. Comparisons were also drawn between the different interest groups in the Physiotherapy profession and what their preferred treatment choices were and these were reported on.

The comparisons between public sector physiotherapists and the modalities utilised showed a significant association between the use of rehabilitative exercises and electrotherapy modalities and significance were found between the usage of joint mobilization, and manipulation, rehabilitative exercises, behaviour medication principles and dry needling in the private sector physiotherapists as opposed to rehabilitative exercises and electrotherapy in the public sector as seen in Table 4.13 below. To be noted is that statistical significance is indicated in bold.

Table 4.13: Comparisons between the public sector and private sector modalities used

Modality	Chi-squared		Fischer's test		Number of responses
1. Joint mobilisations and manipulations	Public sector	p= 0.18	Public sector	p= 0.24	n=134
	Private sector	p= 0.00	Private sector	p= 0.01	
2. Soft tissue	Public sector	p= 0.90	Public sector	p= 1.00	n=134
	Private sector	p= 0.14	Private sector	p= 0.15	
3. Rehabilitation exercises	Public sector	p= 0.02	Public sector	p= 0.04	n=134
	Private sector	p= 0.01	Private sector	p= 0.02	
4. Behaviour modification	Public sector	p= 0.25	Public sector	p= 0.36	n=134
	Private sector	p= 0.03	Private sector	p= 0.04	
5. Dry needling	Public sector	p= 0.15	Public sector	p= 0.17	n=134
	Private sector	p= 0.02	Private sector	p= 0.02	
6. Electrotherapy	Public sector	p= 0.01	Public sector	p= 0.02	n=134
	Private sector	p= 0.09	Private sector	p= 0.14	

7. Other	Public sector	p= 0.76	Public sector	p= 0.72	n=134
	Private sector	p= 0.21	Private sector	p= 0.37	

Table 4.14 below presents the comparisons between the different interests in the physiotherapy profession and the therapy given only once a week. There were significant statistical differences found across all the interest groups. The group ‘other’ included interests such as Pilates or aquatics, or pelvic health to name a few.

Table 4.14: Interests in physiotherapy profession and frequency of TTH treatment sessions

Area of interest	Chi-squared	Fischer’s test	Number of responses
1. Neurology	p=0.04	p=0.00	n=133
2. Paediatrics	p= 0.04	p=0.00	n=133
3. Orthopaedics and sport	p=0.00	p<0.00	n=133
4. Musculo-skeletal and pain	p<0.00	p<0.00	n=133
5. Other	p=0.21	p=0.00	n=133

There was no statistical significance found between those physiotherapists interested in neurology and the non-pharmacological approaches they considered as management options for TTH. In the non-pharmacological approaches used to manage TTH, there were only statistically significant differences found between the paediatrics group and the use of dry needling, joint mobilisations and the use of craniosacral therapy, but furthermore, there were none found. There was no statistically significant difference found between the orthopaedics and sport interest

groups and the non-pharmacological approach to the management of TTH, except for the use of CBT and mindfulness. There was no statistical significance was found between the musculoskeletal and pain interest group and the non-pharmacological management of TTH, except when using CBT and mindfulness and the use of postural rehabilitation and ergonomic advice. There was also no statistical significance found between the other interest groups and the non-pharmacological approach to managing persons living with TTH, except for a multi-team approach, as summarized in *Table 4.15* below.

Table 4.15: Interest Groups and the non-pharmacological approaches

Non-pharmacological approaches	Interest groups	Chi-squared test	Fischer's exact test	Number of responses
1. Dry needling, joint movements	Neurology	p=0.46	p=0.60	n=134
	Paediatrics	p=0.03	p=0.05	
	Orthopaedics and sport	p=0.73	p=0.85	
	*MSK and pain management	p=0.12	p=0.15	
	Other	p=0.58	p=0.64	
2. Psychology, Psychiatry	Neurology	p=0.54	p=0.51	n=134
	Paediatrics	p=0.40	p=0.69	
	Orthopaedics and sport	p=0.64	p=0.66	
	*MSK and pain management	p=0.24	p=0.31	

	Other	p=0.86	p=1.00	
3. PNE	Neurology	p=0.07	p=0.13	n=134
	Paediatrics	p=0.15	p=0.37	
	Orthopaedics and sport	p=0.19	p=0.21	
	*MSK and pain management	p=0.21	p=0.27	
	Other	p=0.68	p=0.75	
4. CBT, mindfulness	Neurology	p=0.36	p=0.56	n=134
	Paediatrics	p=0.47	p=0.73	
	Orthopaedics and sport	p=0.04	p=0.05	
	*MSK and pain management	p=0.03	p=0.05	
	Other	p=0.86	p=1.00	
5. Life coach, motivational	Neurology	p=0.13	p=0.25	n=134
	Paediatrics	p=0.66	p=1.00	
	Orthopaedics and sport	p=0.17	p=0.50	
	*MSK and pain management	p=0.51	p=0.50	
	Other	p=0.50	p=1.00	
6. Yoga, Pilates,	Neurology	p=0.66	p=0.52	n=134

meditation	Paediatrics	p=0.48	p=1.00	
	Orthopaedics and sport	p=0.72	p=1.00	
	*MSK and pain management	p=0.65	p=1.00	
	Other	p=0.28	p=0.58	
7. Occupational Therapy, social worker	Neurology	p=0.31	p=0.35	n=134
	Paediatrics	p=0.14	p=0.25	
	Orthopaedics and sport	p=0.07	p=0.11	
	*MSK and pain management	p=0.87	p=1.00	
	Other	p=0.40	p=1.00	
8. Biokinetics, rehabilitation	Neurology	p=0.58	p=1.00	n=134
	Paediatrics	p=0.66	p=1.00	
	Orthopaedics and sport	p=0.95	p=1.00	
	*MSK and pain management	p=0.36	p=1.00	
	Other	p=0.50	p=1.00	
9. Self-management	Neurology	0.81	p=0.59	n=134
	Paediatrics	p=0.43	p=1.00	
	Orthopaedics	p=0.47	p=0.68	

	and sport			
	*MSK and pain management	p=0.11	p=0.18	
	Other	p=0.35	p=0.31	
10. Massage, soft tissue	Neurology	p=0.36	p=0.45	n=134
	Paediatrics	p=0.18	p=0.23	
	Orthopaedics and sport	p=0.65	p=0.73	
	*MSK and pain management	p=0.96	p=1.00	
	Other	p=0.94	p=1.00	
11. Posture, ergonomics	Neurology	p=0.23	p=0.31	n=134
	Paediatrics	p=0.13	p=0.21	
	Orthopaedics and sport	p=0.09	p=0.10	
	*MSK and pain management	p=0.04	p=0.06	
	Other	p=0.43	p=0.53	
12. Relaxation therapy	Neurology	p=0.83	p=1.00	n=134
	Paediatrics	p=0.66	p=0.65	
	Orthopaedics and sport	p=0.27	p=0.31	
	*MSK and	p=0.55	p=0.57	

	pain management			
	Other	p=0.44	p=0.74	
13. Diet and Dietician	Neurology	p=0.08	p=1.00	n=134
	Paediatrics	p=0.38	p=0.38	
	Orthopaedics and sport	p=0.14	p=0.19	
	*MSK and pain management	p=0.12	p=0.15	
	Other	p=0.28	p=0.58	
14. No medication	Neurology	p=0.49	p=1.00	n=134
	Paediatrics	p=0.58	p=1.00	
	Orthopaedics and sport	p=0.61	p=1.00	
	*MSK and pain management	p=0.15	p=0.20	
	Other	p=0.51	p=0.47	
15. Dentist	Neurology	p=0.69	p=1.00	n=134
	Paediatrics	p=0.75	p=1.00	
	Orthopaedics and sport	p=0.34	p=1.00	
	*MSK and pain management	p=0.52	p=1.00	

	Other	p=0.63	p=1.00	
16. Did not know	Neurology	p=0.69	p=1.00	n=134
	Paediatrics	p=0.75	p=1.00	
	Orthopaedics and sport	p=0.34	p=1.00	
	*MSK and pain management	p=0.52	p=1.00	
	Other	p=0.63	p=1.00	
17. Cranio sacral	Neurology	p=0.69	p=1.00	n=134
	Paediatrics	p=0.00	p=0.09	
	Orthopaedics and sport	p=0.29	p=0.48	
	*MSK and pain management	p=0.12	p=0.29	
	Other	p=0.63	p=1.00	
18. Multi-team approach	Neurology	p=0.69	p=1.00	n=134
	Paediatrics	p=0.75	p=1.00	
	Orthopaedics and sport	p=0.34	p=1.00	
	*MSK and pain management	p=0.52	p=1.00	
	Other	p=0.04	p=0.19	

* MSK=musculoskeletal conditions

When comparing the interest in neurology and the type of intervention most frequently used in the treatment of TTH, the only statistical significance was found for the joint mobilisations and manipulations. No associations were found when comparing the interest group of paediatrics to the type of therapy provided for the treatment of TTH. Also, the interest group of orthopaedics and sport showed associations between the behaviour modification and dry needling therapy modalities provided for the treatment of TTH. Those interested in neuro-musculoskeletal and pain conditions showed statistical associations for joint mobilisations and manipulations, soft tissue techniques and behaviour modification principles when compared to the treatment provided for TTH. Other interest types such as aquatics or medico-legal reporting showed no statistical associations at all when compared to the therapy techniques most frequently used in the management of TTH, as seen in *Table 4.16* below.

Table 4.16: Interest groups and the types of therapy provided

Therapy type	Interest groups	Chi-squared test	Fischer's exact test	Number of responses
1. Joint mobilisations and manipulations	Neurology	p=0.00	p=0.01	n=134
	Paediatrics	p=0.50	p=0.69	
	Orthopaedics and sport	p=0.23	p=0.33	
	*MSK and pain management	p=0.00	p=0.00	
	Other	p=0.87	p=1.00	
2. Soft tissue techniques	Neurology	p=0.32	p=0.29	n=134
	Paediatrics	p=0.72	p=0.54	

	Orthopaedics and sport	p=0.11	p=0.15	
	*MSK and pain management	p=0.00	p=0.01	
	Other	p=0.65	p=1.00	
3. Rehabilitative exercises	Neurology	p=0.29	p=0.33	n=134
	Paediatrics	p=0.17	p=0.24	
	Orthopaedics and sport	p=0.17	p=0.19	
	*MSK and pain management	p=0.07	p=0.09	
	Other	p=0.34	p=0.41	
4. Behaviour modification	Neurology	p=0.25	p=0.27	n=134
	Paediatrics	p=0.07	p=0.09	
	Orthopaedics and sport	p=0.01	p=0.01	
	*MSK and	p=0.03	p=0.03	

	pain management			
	Other	p=0.96	p=1.00	
5. Dry needling	Neurology	p=0.20	p=0.29	n=134
	Paediatrics	p=0.70	p=0.76	
	Orthopaedics and sport	p=0.02	p=0.02	
	*MSK and pain management	p=0.14	p=0.17	
	Other	p=0.19	p=0.25	
6. Electrotherapy	Neurology	p=0.84	p=1.00	n=134
	Paediatrics	p=0.14	p=0.19	
	Orthopaedics and sport	p=0.47	p=0.58	
	*MSK and pain management	p=0.75	p=0.84	
	Other	p=0.94	p=1.00	

7. Other	Neurology	p=0.54	p=0.51	n=134
	Paediatrics	p=0.96	p=1.00	
	Orthopaedics and sport	p=0.07	p=0.07	
	*MSK and pain management	p=0.73	p=0.81	
	Other	p=0.32	p=0.38	

* MSK=musculoskeletal conditions

The follow-up sessions per interest group in physiotherapy showed strong associations for all interest groups using either the Chi-squared or Fischer's exact test, as seen in *Table 4.17* below.

Table 4.17: Interest Groups and the follow-up sessions

Interest type	Chi-squared test	Fischer's exact test	Number of responses
1. Neurology	p=0.02	p=0.00	n=131
2. Paediatrics	p=0.67	p=0.04	n=131
3. Orthopaedics and sport	p=0.28	p=0.00	n=131
4. Musculoskeletal and pain management	p=0.08	p=0.00	n=131

5. Other	p=0.57	p=0.02	n=131

The associations between the joint mobilisations and manipulations and the muscles involved were chosen as m. Trapezius (p=0.04 Chi-squared) and m. Sub-occipital (p=0.05 Chi-squared).

Rehabilitative exercises were compared to the muscles mentioned that may be involved in the symptoms of TTH and altogether the muscles had an association to the use of these exercises (p=0.03, Chi-squared test). Collectively all the listed muscles were associated with the use of dry needling (p=0.05, Chi-squared), but individually, only m. Trapezius (p=0.03 chi-squared), m. Sterno-cleido mastoid (p=0.02 Chi-squared test), m. Sub-occipital muscles (p=0.05 Chi-squared test) were associated with dry needling.

Anxiety as a headache trigger and the use of soft tissue techniques were associated with p=0.03 (Chi-squared test) as well as Fischer's exact test (p=0.05). Anxiety was also related to the use of behaviour modification principles with the Chi-squared test (p=0.03) and Fischer's exact test (p=0.05), as well as sleep disturbances that were associated with the use of behaviour modification principles, Chi-squared test (p=0.04) and Fisher's exact test (p =0.05). Stress as a TTH trigger was also, associated with the use of soft tissue techniques Chi-squared test (p=0.04). Sleep disturbances as a headache trigger were associated with rehabilitation exercises Chi-squared test (p=0.02) and Fischer's exact test (p=0.02). Furthermore, there were no statistical associations for the rest of the TTH triggers and dry needling or electrotherapy.

Association was also calculated if a measurable outcome must be used to determine the effect of a physiotherapy session. The Chi-squared test showed no association, but Fischer's exact test was calculated with p=0.00.

The different techniques used for the management of TTH are seen below in *Table 4.18*, as the response that physiotherapy is used more than any other profession in the treatment of TTH and the associations with the 'other' options included postural correction and ergonomics. The Chi-squared test showed no association and therefore the Fischer's exact test was used.

Table 4.18: Physiotherapy techniques most associated with TTH

Physiotherapy techniques	Treatment type	Fischer's exact test	Number of responses
	Joint mobilisations and manipulations	p=0.01	n=134
	Soft tissue techniques	p=0.05	n=134
	Rehabilitation exercises	p=0.01	n=134
	Behaviour modification principles	p=0.03	n=134
	Dry needling	p=0.02	n=134
	Electrotherapy	p=0.04	n=134
	Other	p=0.01	n=134

The management of TTH being based on the years of clinical experience was mostly associated with soft tissue techniques (Fischer's exact test $p=0.05$), dry needling (Fischer's exact test $p=0.03$) and other techniques such as postural correction (Fischer's exact test $p=0.03$), however, in the Beliefs section above, 97 participants (74%) disagreed with the statement that the management of TTH can be based solely on the years of clinical experience.

In the next chapter, the researcher will critically discuss the implications of the results presented using retrospective reflection and how these results integrate with the literature presented in Chapter 2.

CHAPTER 5

5. DISCUSSION

5.1 Introduction

5.2 Aim of the study

5.3 Discussion

5.1 Introduction

Physiotherapy has a significant role to play in the management of TTH and other health care professionals have acknowledged the role that physiotherapists can play in the management of people living with TTH as part of the multi-disciplinary team.

Tension-type headaches are a prevalent condition worldwide (Kamali et al., 2019; Ferragut-Garcías et al., 2017; Lardon et al., 2017). Since headaches were identified as the third most prevalent pain condition on the list of the Global Burden of Disease Study in 2016, it could be hypothesised that a significant number of persons of the general population will experience headaches at some time during their lives (Stovner, 2018). The WHO, in 2016, noted that TTH were a public health concern that was associated with disability and financial costs to society (WHO, 2016). As previously stated in Chapter 2, 25% of South African people experienced TTH in 2016, according to Webb and Raff (2020).

The Health Professions Council of South Africa (HPCSA) has given physiotherapists first contact practitioner status, meaning that an individual seeking treatment does not first need to be referred to a physiotherapist by a medical doctor. Therefore the physiotherapist must be skilled and knowledgeable to identify the key signs and symptoms of TTH. The WHO, in 2016, emphasised the need for adequate training of health care professionals, with proper diagnostic procedures, correct recognition of the different conditions, appropriate treatment, health education and information that is cost-effective for the person living with TTH (WHO, 2016).

Therefore, the necessity for physiotherapists managing patients with TTH to be informed and up to date with current evidence-based knowledge in the field of TTH is vital since it directly influences the level of care and advice given to the patients and could potentially affect the success of the recovery process of these individuals seeking treatment. It is therefore imperative that physiotherapists are knowledgeable regarding TTH to correctly identify the symptoms and formulate an appropriate management plan for persons living with these headaches.

5.2 Aim of the study

The main aim of this study, as was mentioned in Chapter 1, was to explore the knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of persons living with tension-type headaches. The researcher conducted an electronic survey as discussed in Chapter 3 and the results of the study were presented in Chapter 4.

5.3 Discussion

In this section of the dissertation, the researcher will critically discuss the findings of the study and compare the findings with available literature. Each section of the questionnaire will be discussed individually but comparisons will also be drawn between the different sections of the questionnaire if applicable.

5.3.1 Demographic information

The rate of response for this survey was 37.96% since only 134 participants consented to complete the questionnaire. During the Covid-19 pandemic with adherence to the protocols set in place to prevent the spread of the virus, many research studies were conducted electronically (de Koning et al., 2021). Electronic surveys was a manner in which to reach more people through platforms, such as e-mail addresses or social media pages without physically having to interact with them. In the current study, only 134 physiotherapists responded to the survey (a response rate of 37.96 %). This was a lower response rate than anticipated by the researcher. In a survey conducted by Rowe et al. (2020) a response rate of 21% was achieved and a rate of 33.9% was reported by Lottering et al., (2016). Daikeler et al. (2020) deemed a response rate between 14% and 35% for an electronic survey as sufficient which makes the current study's response rate acceptable.

Another reason for the lower than expected response rate is that there were other electronic surveys distributed by the SASP around the same time, which may have led to survey fatigue by the members of the SASP. Also, the researcher was unaware that the SASP had sent a number of surveys to their

members around the same time of the year. Although members did not necessarily respond to each of the surveys, the feeling of fatigue when the receipt of another email for a survey is sent might affect the willingness to respond to the request. Due to the Protection of Personal Information Act of South Africa, the SASP was not allowed to share any personal details of their members, making it hard for the researcher to attempt any follow-up phone calls or direct messages that would allow for a larger sample size. Therefore, the social media platforms were used often and reminders were sent at two-week intervals in an attempt to gain more participants.

Of the 134 participants, 119 (88.8%) were female, 14 (10.5%) were male and one participant did not indicate their gender. According to the WCPT, the 2020 annual membership reflects that 80% of physiotherapists in South Africa are female and worldwide the profession is still predominantly female (www.world.physio.org), accessed November 2021. Thus, the gender distribution of this study appears to be on par with the WCPT consensus.

The median age of the participants (n=134) was 36.5 years at the time of completion of this survey. Since most of the group qualified at the median age of 22 years and the median years of working experience was thirteen years, the clinical experience certainly reflects that the sample size in this study was experienced in terms of years of practice. However, the years of experience may not be an exclusive factor to determine a good outcome of each of the aspects of the KABP in this study. However, the years of clinical expertise cannot be ignored as the experience of the clinician to be able to reason around certain conditions with the presenting symptoms that are not always identical between patients, generally cannot be taught by a published article or textbook, but comes with the work experience.

The majority of the respondents (110) were actively working in the private sector at the time of completion of the study. According to the South African Health Review (2020), the public sector rehabilitation services is inadequate to serve the greater population (Tiwari et al., 2020). In 2019 there were 1 504 physiotherapists (42, 8%) of the total number of rehabilitation therapists in the South African public sector and 3.10 national density per 100 000 for the public health sector population (2019). According to the WCPT (2019), there were 7 937 physiotherapists in South Africa and 6433 of them were not working in the public sector. However, no mention is made whether the number of physiotherapists were actually working or were retired, currently not practising or emigrated but were accounted for.

In this study, the preferred area of interest for 95 participants (70.9%) was Musculoskeletal or Pain conditions and 70 participants (52.2%) indicated their interest was in the field of Orthopaedics and Sport. The researcher might ascribe the areas of interest among the participants to the fact that most of them may have been interested in the idea/ topic of this study, and therefore, were more inclined to complete the survey as opposed to the low interest represented in other areas of special interest, such as Paediatrics with only 12 participants (9%).

Only 56 (41.8%) of the participants indicated that they had attended accredited tension-type headache courses. The most frequently mentioned headache course attended was a headache course presented by a well-known, experienced clinician in the profession, Dr I Diener, by 24 respondents (42.9%). These respondents may have great respect and admiration for the contribution that Dr Diener has made to the profession and therefore felt that attendance of her courses may be more enriching. One of the other courses mentioned was the OMT 1 course by 22 respondents (39.3%). These percentages depict that at least one-third of this sample size had attended an OMT 1 course, which leads to assuming that they would have good knowledge about musculoskeletal conditions and the management of the related symptoms.

5.3.2 Knowledge

Seventy-nine (58.95%) of the 134 participants showed average knowledge, while 55 (41.04%) had low or poor knowledge according to the assessment tool used in Chapter 3 (Table 3.3).

Only two participants (1.49%) scored 90% for the knowledge regarding TTH yet to the best of the researcher's knowledge this particular study has not been done in South Africa before, thus the comparisons of the knowledge section cannot be drawn between the literatures as would be needed. This presented a gap in this particular field of interest as mentioned before in Chapter 2. Thus, speculations were made that there may be the need for specific training on the topic of TTH, since 35 (26.7%) participants did not know how TTH are classified, and 49 (36.6%) participants did not know which forms of TTH occur. The classification is easily accessed on the IHS (ICHD-3) webpage where it gives a brief overview of the signs and symptoms of TTH (www.internationalheadachesociety-headache.org), accessed November 2021. Perhaps the respondents felt that the effort of searching and reading up about the topic of TTH and the signs and symptoms was too time-consuming therefore, the

lack of knowledge about the classification and the specific forms of TTH. One reasonable explanation for not knowing the signs and symptoms and classification of TTH could be that these physiotherapists might not provide regular therapy sessions to persons living with TTH or may have another interest within the profession as indicated by the results that 70 participants (52.2%) were interested in Sport and Orthopaedics, 18 (13.4%) in Neurology, and 12 (9%) in Paediatrics.

The median number of years already working as a physiotherapist was 13 years and approximately half of the participants (48.9%) indicated in the practice section that they provide therapy for a new headache referral once a week. Previous research has shown that experience could have an effect on clinical decision making and therefore likely influence clinical practice (Wainwright et al., 2011; Smith et al., 2010). Although the current study exposed a lack of knowledge in some topic areas related to TTH, it is possible that the physiotherapists could still manage patients presenting with TTH by relying on their clinical experience. If the principles of pain management are being performed safely and effectively, the knowledge about the condition may not be the critical determining factor to provide safe and effective therapy for decreasing pain in persons living with TTH. The skills and results obtained throughout the years by applications of similar techniques or modalities may be relevant in the management of TTH. Consequently, the clinical expertise of the physiotherapist cannot be totally ignored. In this study associations between the number of clinical experience years and soft tissue techniques ($p=0.05$), dry needling ($p=0.03$) and other techniques such as postural correction ($p=0.03$) were found. Therefore, the associations indicate that the clinical experience of the participants in this study are suggestive of the use of dry needling, posture correction and soft tissue techniques and this information is supported with the study done by Fernandez et al., 2020.

A total of 103 participants (76.9%) correctly indicated the options provided for the muscles most affected during TTH and 31 participants (23.1%) selected only the sternocleidomastoid and sub-occipital muscles as the muscles primarily involved in TTH. According to Phu Do et al. (2018), the muscles mostly involved in TTH are Temporalis, Masseter, Upper Trapezius, Sterno-cleido Mastoid and Splenius Capitis. Therefore, the correct identification of some of these muscles was represented in this study. Further evidence to highlight the importance of anatomy is the amount of time spent teaching this subject at an undergraduate level. An example that may indicate the teaching of anatomy at a tertiary level is such as the Rule Book of the UFS, the study of anatomy is presented in the first year of undergraduate study at the UFS and it carries 32 credits (School of Health and Rehabilitation Sciences: Rule book 2021). Furthermore, anatomy forms the basis of knowledge regarding the assessment and treatment of any

condition presented to a physiotherapist. It is imperative that physiotherapists have a good understanding of the body's structural and functional anatomy. Therefore, the fact that not all participants could identify which muscles were involved in the clinical presentation of TTH shows that basic anatomic knowledge may also be lacking or forgotten. Furthermore, the knowledge attained for many at the undergraduate level may be forgotten over the years, especially if not applied often enough in practice, therefore attendance of accredited courses is an important element to remain updated and informed in certain aspects of the profession. For this study and according to the scoring system in Chapter 3, the knowledge of the anatomy was very good.

The majority of the participants, 111 (84.1%), correctly identified that muscle trigger points were not the sole cause of the pain experienced with a TTH. The respondents noted that the main pain mechanisms involved in TTH were peripheral 80 (59.7%) and central pain mechanisms 63 (47%) respectively. To determine the most dominant pain mechanisms at play to ultimately provide the most appropriate and effective therapy is vital during an assessment of the individual (Fernández-de-las-Peñas et al., 2020). Therefore, the entire clinical picture should be taken into account, and the focus should not only be on the tissues (or bottom-up approach) but should incorporate the top-down approach, especially when chronic pain is at play with the central drivers for pain production (Fernández-de-las-Peñas et al., 2020). The participants that may have had an interest in either the study of pain or musculoskeletal conditions, were most probably familiar with the pain mechanisms involved. A total of 73 (64%) participants preferred a 'hands on' plus 'hands off' approach, or physiotherapy in combination with other professionals.

This current study showed that physiotherapists in the private sector preferred the use of manual therapy, rehabilitative exercises, behaviour modification principles and dry needling to manage TTH, which speaks to the biopsychosocial model. On the other hand, the public sector physiotherapists preferred the inclusion of electrotherapy and rehabilitative exercises. Unfortunately, the researcher is unable to hypothesise why there is a difference in approaches between the public and the private sector physiotherapists as there is no literature available regarding the differences. This could potentially be an interesting topic for further research.

5.3.3 Attitude

A combined number of 93 (69.9%) respondents disagreed that physiotherapists alone should manage the symptoms of TTH and 42 participants (31.3%) favoured a multi-disciplinary team approach for the management of TTH. In the beliefs section, 57 (42.9%) participants agreed that a multi-team approach should be used and 67 (50.4%) strongly agreed to this statement. A total of 39 (36.1%) participants felt that positive results were obtained by the therapy provided to individuals living with TTH and 33 (30.6%) participants felt that physiotherapy alone produced positive results for these individuals. This finding is supported by literature as both Sahai-Srivastava et al. (2017) and Gaul et al. (2011) advocate the inclusion of at least a clinical psychologist, a headache specialist, a nurse, an occupational therapist and a physiotherapist in the management approach.

Literature supports a team approach in managing a person living with TTH as this team approach enhances therapeutic outcomes and integrates the therapy provided (Sahai-Srivastava et al., 2017; Gaul et al., 2011). A multi-disciplinary team approach allows each professional to set therapy goals in conjunction with the person seeking help; allows for the integration of the outcomes between team members, and allows team members to work independently but still in collaboration with each other. In addition, a team tier structure could also be implemented. However, this structure could only function if the team members are willing to collaborate and effectively communicate (Sahai-Srivastava et al., 2017).

In this study, 68 (51.1%) participants agreed that by using behaviour modification principles the therapy that they provide for TTH is enhanced, but 46 (34.6%) participants disagreed with this statement. According to Lee et al. (2019) and Sadat-Kahangi et al. (2015), the inclusion of CBT has been used by many professionals in the treatment of headaches. CBT and mindfulness when using the Chi-squared test were also strongly associated with the physiotherapists who were interested in Orthopaedics and Sport ($p=0.04$) and Musculoskeletal and Pain management conditions ($p=0.03$). The physiotherapists specifically interested in pain conditions could make use of physiotherapeutic approaches based on certain CBT principles including mindfulness, which could potentially enhance positive emotions such as problem-solving skills, a sense of control and feelings of strength and pride while reducing the negative moods such as anger, hostility and irritability. The physiotherapist should also consider referring the person to a psychologist who is trained and skilled in CBT to benefit the person. The inclusion of CBT is substantiated by Mackenzie et al. (2016) who suggested that the inclusion of mindfulness based cognitive therapy is effective in managing the negative moods that accompany the experience of pain. Probyn et al. (2017) also suggested the inclusion of cognitive-behavioural components in groups with chronic pain.

Psychological interventions generally with chronic pain have been demonstrated to produce moderate effects on physical function and quality of life. The focus of the therapy is to alert the patient about internal awareness of thoughts, perceptions and feelings and to change the way that they behave toward these feelings (Mackenzie, et al.,2016). The core of the therapy is built on the fact that thoughts should not control the person, but the person should see their thoughts and moods as only feelings that will pass, that they have control over and those thoughts are not necessarily reality. At the UFS, psychology as a subject forms part of the curriculum of the undergraduate programme of physiotherapy (BSc Physiotherapy) in the first two years of studies. The modules are compulsory and carry a total of 32 credits, thus allowing exposure to treatment techniques such as CBT or mindfulness in the therapy approaches (Rule book 2021). Thus, at an undergraduate level, there is already exposure to the use of a psychological perspective and framework when dealing with persons and certain disorders or conditions. In addition, the HPCSA has a booklet on the minimum guidelines for Physiotherapy at an undergraduate level, the biopsychosocial model is implicated under the communication skills that the undergraduate should be exposed to and this contains a minimum of 12 credits, which also depicts the exposure towards the direction of the training of skilled and knowledgeable physiotherapists in South Africa (HPCSA, Minimum standards for training: Physiotherapy, 2020).

Thus, the fact that just over half of the participants in this study indicated the importance of CBT or psychological interventions in their treatment approach to TTH is a definite step in the direction that not all conditions should be managed solely with 'hands-on' therapy techniques, but at times the patient may need advice on coping mechanisms and strategies to assist in activities of daily living. Each treatment modality has a place in the bigger picture of therapy provided and the clinician should use good reasoning skills to determine when it is best to consider CBT type interventions and when not to, since not all therapy interventions may be relevant to every person seeking help. For instance, for the patient that professes to have received numerous physiotherapy sessions without improvement, there should be clear clinical reasoning to determine which modalities were used, if patient compliance was a contributing challenge, or if central sensitisation factors are at play.

The majority of the physiotherapists in this study disagreed that analgesic use produces better outcomes for the management of persons living with TTH. Among the reasons and remarks presented in the open question was that some participants felt that medication was a temporary relief and that it did not address the origin of the headache symptoms because the medication masked other symptoms, and that medication could potentially create dependence and cause medication overuse headaches.

According to Steiner et al. (2019), the use of triptans, opioids and barbiturates in the treatment of TTH should be avoided due to the side effects, but the inclusion of ibuprofen, paracetamol and caffeine for episodic TTH and the use of amitriptyline (usually used to manage neuralgia and insomnia), nortriptyline (usually used to manage neuralgia and depression), mirtazapine (used for depression or mood disorders) and venlafaxine (for frequent episodic or CTTH) could be beneficial to the patient (Steiner et al., 2019). Some of the side effects of the medication used to decrease headaches include weight gain, dizziness, drowsiness, or constipation (Ghadiri-Sani et al., 2016).

The potential risk of developing dependence and the development of medication overuse headaches remains a concern (Cooper, 2013). The patient should be made aware that although the medication may relieve the symptoms, other non-pharmacological therapy methods should be explored to assess additional involvement from the musculoskeletal system or even the possibility of psychological interventions for coping strategies. Furthermore, in this study only 30 (22.4%) participants felt that physiotherapy in addition to medication would be more effective in the management of TTH, 13 (9.7%) participants felt that medications do not work at all and only seven (5.2%) participants felt that using medication alone are more effective. When comparing pharmacological treatment and physiotherapeutic treatment, the physiotherapy modalities are often less costly, have minimal potential side effects and are beneficial for the treatment and management of TTH (Luedtke et al., 2016).

Fifty-nine (44.4%) participants agreed that an evidence-based measurable outcome should be used when managing a person living with TTH and 56 (42.1%) participants strongly agreed with this. According to Lee et al. (2019), the evidence-based measurable outcome used should be based on the number of headache days per month, but Sahai-Srivastava et al. (2017) advocated for the outcome measure to include headache-related disabilities. In the practice section of the questionnaire, the Numeric Pain Scale was also strongly associated with the question of whether an evidence-based measurable outcome should be used for each physiotherapy session with a significant Chi-squared value of $p=0.01$. This may be true to use it as a scoring tool, but it does not include any impairments or health-related disabilities and perhaps the consideration to use another tool that includes this may be more beneficial (Sahai-Srivastava et al. 2017).

A total of 73 (55.7%) participants in this study indicated that they use a measurable outcome for each physiotherapy session to assess subjective changes. The use of specified outcome measures in the therapy provided by most physiotherapists was mostly the Numeric Pain Scale by 120 (89.6%) respondents, Headache disability index by 46 (34.3%) respondents, Headache Impact Test by 14 (10.5%)

respondents, subjective assessment by 5 (3.7%) and the Patient-Specific Functional Scale by 3 (2.2%) participants. Although one participant mentioned that they felt using outcome measures of any kind is outdated and not relevant anymore, the literature strongly supports the continued use of outcome measures in most headache conditions, since it provides an objective measurement of pain, or impairments, whether physical or otherwise (Luedtke et al., 2020; Haywood et al., 2018).

According to Luedtke et al. (2016) for TTH, the Visual Analogue Scale (VAS) or Numeric Pain Scale was indicated to determine the pain intensity; for the duration of headache episodes the number of hours or days without relief was used; headache frequency was determined by the number of episodes or days within a set period, such as one month. In the study done by Ferragut-Garcías et al. (2017), the HIT-6 was used as an objective outcome measure. Maistrello et al. (2018) found the use of the McGill Pain Questionnaire, the Quality of Life Short Form-36, the Headache Disability Index, the HIT-6 and the use of analgesics as objective measures for changes in the symptoms. The inclusion of an outcome measure that takes into account every sphere of the management of the person living with TTH (biopsychosocial model framework) is thus encouraged by Maistrello et al. (2018). The argument whether to use an objective measure from the literature appears to not be forced but rather encouraged. The use of objective outcome measures could assist the physiotherapist to determine a baseline for the specific person, monitoring changes in the condition, allowing for motivation for medical aid companies, for effective communication between professionals and motivating the patient to continue with the therapeutic interventions if the changes are demonstrating progress. If the patient sees improvement, they would more likely be inclined to persist with therapeutic sessions and comply with the therapeutic interventions (Luedtke et al., 2020; Haywood et al., 2018).

The majority of the participants agreed that follow up sessions were needed and 48 (35.8%) participants felt that repeated follow up sessions were justified to establish treatment principles, revise or reinforce education. Maistrello et al. (2019) suggested the treatment dosage for the use of manual therapy in TTH varied between ten and thirty minutes for the duration of four to six weeks and the time was thirty to forty-five minutes every seven to ten days, with only one pre- and one post-treatment assessment. However, Maistrello et al. (2019) stated that the number of treatments ranged from 4 sessions in 4 weeks up to a maximum of 14 sessions in 6 months; the duration of the session ranged from fifteen to fifty minutes with a post-treatment follow up period ranging from a minimum of two weeks to a maximum of nine months after the end of treatment. In this study, twenty-three (17.2%) participants felt that repeated sessions were needed to assess if any improvement of symptoms occurred, and the

same number of participants felt that the number of treatment sessions solely were depended on the patient. Although the literature is not clear about the exact duration of treatment for physiotherapy interventions provided for TTH, it can be speculated that the sessions could last as long as deemed necessary by the physiotherapist (within ethical constraints, such as not to repeatedly charge the patient for therapy when it is no longer required) and the patient, whom may not have the finances to return for therapy for once or twice per week sessions for four to six weeks. Both parties must be open to negotiation regarding the number of sessions, the behaviour of symptoms and the time needed to evaluate the implementation of coping strategies or exercises given. Steiner et al. (2019) also highlights that the most important factor should be that the patient is ultimately empowered to identify their own headache triggers and be able to manage the condition thus moving the treatment from the initial 'hands on' approach to a 'hands off' approach unless they experience flare-ups and need to be helped for a few sessions again.

5.3.4 Beliefs

Although it is difficult to separate the attitude of an individual from their belief system, both are equally difficult to measure. Some questions had similar answers noted between the attitude and beliefs sections. The response to the statement that physiotherapy is used more than any other discipline appeared to split the participants where 48 (36.6%) disagreed with this statement and 59 (45%) agreed. When compared to the attitude section where the statement was made that TTH should only be managed by a physiotherapist 59 (44.4%) participants disagreed with this statement. Perhaps the participants felt that physiotherapy is used more than other therapists such as occupational therapists. It could be speculated that perhaps the division was resultant of the different professions that some physiotherapists may already be included among when managing TTH, which in the attitude section 42 participants (31.3%) favoured a multi-disciplinary team approach for the management of TTH. The majority of the participants in this study also disagreed that CTTH is managed only by a physiotherapist or only by a medical practitioner, emphasising once more the importance of a multi-disciplinary approach.

Some headache types are viewed by literature as an already central sensitised state, therefore CTTH can be hypothesised to be a definite state where central pain mechanisms occur (Mingels et al., 2019). Thus,

the use of CBT or PNE principles should be included in the management of the person (Fernández et al., 2020). Although the application of hands-on therapy may bring about some relief of the symptoms, it will not bring about lasting changes to the symptoms, since these persons usually need additional support such as CBT, PNE and other coping strategies. The patient must be given a holistic approach to the treatment provided. Each individual must receive therapy based on their own clinical picture and presenting symptoms, their own headache triggers must be taken into account and the physiotherapist must use clinical reasoning to decide which treatment modalities to employ. In addition, the best evidence practice should also be followed.

Most of the participants disagreed that TTH should only be managed using soft tissue techniques. The use of soft tissue techniques was associated with the Musculoskeletal and Pain Management group when using the Chi-squared test ($p=0.00$). This implies that there was a significance found between the Musculoskeletal and Pain Management group and the use of soft tissue techniques. It could be logical to consider that this representative of the study would prefer the soft tissue techniques since the basis of the treatment principles is based on the physical structures and impairments. The majority of the participants also agreed that an assessment should be done for additional joint involvement in the clinical picture of the person living with TTH. Mingels et al. (2019) demonstrated that posture and habitual sitting could contribute to the development of headaches and specifically TTH. The modern lifestyle and working for prolonged hours at a desk in front of a computer could cause certain habitual sitting postures which could ultimately lead to syndromes such as forward head posture. The resultant symptoms could then include neck pain, shoulder pain or muscle imbalances where cervical flexors become weakened and the cervical extensors are shortened. Consequently, there could be secondary referred pain from the upper cervical joints or muscles innervated by C1, C2 and C3 that may cause pain (Mingels et al., 2019). Therefore, during the assessment of the condition, the cervical spine should be tested for any symptoms and discrepancies. The physiotherapist should inform the patient of ergonomics, good sitting posture and postural corrective exercises (Mingels et al., 2019).

Most of the participants disagreed that physiotherapy management of patients presenting with TTH should solely be based on clinical experience or solely on current research. The findings of the current study, therefore, support the use of evidence-based practices. The literature supports the use of evidence-based practice (EBP) in physiotherapy (Mota da Silva et al., 2015; Scurlock-Evans et al., 2014). The principle of EBP is described as a five-step process whereby the physiotherapist integrates clinical experience, research evidence and the preference of the patient to produce the most effective outcome

for the treatment (Scurlock-Evans et al., 2014). Professionals agreed that EBP is vital to clinical practice and is used to optimise treatment provided for any condition (Mota da Silva et al., 2015). Thus, the best evidence used should be the most relevant, reliable and valid research available about a condition such as TTH. Although years of clinical experience cannot be discarded, it could, however, mislead the physiotherapist into applying a 'one size fits all' approach in the management of conditions if prior results were obtained by using a specific technique or modality. Moreover, there are always new advances in research, one must remain abreast regarding these advances and apply the best evidence practice for the benefit of the patient.

Many participants agreed that people living with TTH should be educated to determine their own headache triggers and that all persons should keep a headache diary, but only one participant stated that they use a headache diary as a tool for outcomes. However, 26 (19.6%) participants disagreed that the practice of a headache diary should be used. The headache diary or calendars aids in tracking details regarding triggers, or relievers, symptoms or patterns, duration and intensity, loss of productivity or work absenteeism for a set number of weeks (Schytz et al., 2021; Steiner et al., 2019). The information can be used two-fold, firstly for the person living with the condition, since they can establish patterns or triggers resulting in headaches. Secondly, according to Steiner et al., (2019), the medical practitioner can use the information to ensure good management of the patient with TTH as well as monitor medication use.

Another interesting finding of this study was that 74 (56.5%) of participants agreed that the patient should always be informed about the role of sensitisation in trigeminocervical complex (TCN) and 37 (28.2%) strongly agreed with this, however, 18 (13.7%) participants disagreed. According to Sahai-Srivastava et al. (2017), the TCN warrants the evaluation and assessment of C1-C3, as well as both temporomandibular joints (TMJ) as sources or contributors to pain. Passive joint palpations of the cervical spine and TMJ could reveal whether these joints contribute to the pain, or are rather the source of the pain upon the assessment by the physiotherapist. The convergence of afferent nerve impulses at the TCN could also further aggravate and contribute to the headache or facial pain. Thus, the participants in this study indicated that they are aware of the role of the convergence of nerve impulses at the TCN and the role it plays in headaches.

Most of the participants in this study, 72 (54.1%), disagreed that the person living with TTH should always be referred for psychological support and only 43 (32.3%) participants agreed. When considering the additional psychological factors involved in the already complex headache condition, such as

depression, anxiety, the perception of stress, altered sleep patterns and even behavioural patterns, one cannot discredit the therapeutic intervention from a psychological perspective. Fernández et al. (2020) support the notion that the complexity of mood disorders and the relationship between pain perceptions and mood disorders warrants the inclusion of therapeutic interventions such as CBT, relaxation techniques or even mindfulness-based treatment. The therapy from a top-down approach is vital in the holistic management of the person living with TTH. However, the management of pain must be considered within the biopsychosocial model and the presenting pain mechanism. The reason most participants in this study disagreed might be because any psychological intervention is more time-consuming than for instance pharmacological treatment, and it requires active interaction and participation between the therapist and the patient to apply the therapy effectively (Fernández et al., 2020). Perhaps the physiotherapists should be reminded about the role that psychologists or psychiatrists could play in the management of predominantly chronic pain conditions and should be able to refer their patients to either a psychologist or psychiatrist depending on the need of the patient.

Furthermore, 57 (42.9%) of participants agreed that all persons were informed of alternative pain management strategies and 72 (54.1%) strongly agreed to this. Also, 32 (24.2%) strongly agreed, 61 (46.2%) agreed that and 37 (28%) disagreed that PNE principles should be included in the management approach to TTH. The use of PNE principles affects the top-down interventions where the central nervous system sensitisation is addressed (Fernández et al., 2020). The therapy options should extend beyond only tissue healing or management of the acute symptoms since the condition is often more complex than only tissue damage (Fernandez et al., 2020). Therefore, the correct identification of pain mechanisms whether central or peripheral is important, as it directly affects the management of the condition. Although results will most likely be obtained with the use of bottom-up interventions by a physiotherapist such as manual therapy or massage techniques, these may not be the best evidence practice in all situations and the treatment options should always be based on best clinical practice and evidence, as well as the clinical reasoning skills of the physiotherapist. The physiotherapist uses and implements PNE principles to educate the person about the underlying mechanisms of their condition and teaches the skills to manage it.

5.3.5 Practice

A meta-analysis performed by Luedtke et al. (2016) demonstrated that physiotherapy interventions had shown positive responses in all headaches types and no negative effects were detected. Therefore, the use of any techniques should be tailored to the specific patient and their presenting symptoms of the headache. The majority of the participants in the study, 117 physiotherapists (88%), advocated for combining the use of pharmacological and non-pharmacological approaches as therapy methods to manage TTH most effectively. The combination includes expertise from medical specialists such as psychiatrists or neurologists if indicated, as well as services and information provided by the rehabilitative therapists such as physiotherapy or occupational therapy, among others. Literature advocates for the inclusion of psychotherapy in the management since TTH are strongly associated with psychological disorders such as anxiety and depression, which both must be addressed effectively to reduce the associated symptoms (Krøll et al., 2021; Lee et al., 2019; Gaul et al., 2011). However, Probyn et al. (2017) noted that it is not necessary to receive this information solely from a qualified psychologist if a healthcare professional, such as an occupational or physiotherapist is trained to use psychological approaches and is proficient in applying these techniques as part of their management of patients. According to the Rule Book of the UFS, all undergraduate physiotherapy students have to complete 32 credits of psychology subjects within the first two years of study, therefore they all have minimal exposure to the psychological terms and approaches that may be employed in therapy, even though they may not be trained psychologists. However, the application of these psychological techniques is in conjunction with other physiotherapy techniques and only used to enhance the therapy effects presented by the physiotherapist, thus remaining within the scope of practice set out by the HPCSA.

Furthermore, the results showed that 93 (70.4%) participants felt that the inclusion of PNE principles should be included in the therapy approach, as particularly those persons living with CTTH should receive information and coping strategies on the factors associated with chronic pain, such as behaviour modification changes. The principles that the PNE techniques address, such as fear-avoidance or pain catastrophizing, are focused on altering or changing perceptions, cognitions and behaviours associated with pain, provided that the practitioner is familiar with the techniques. Malfliet et al. (2018) agreed that the inclusion of PNE principles aids in the improvement of perceptions and beliefs about any condition, thereby directly influencing the therapy outcomes.

Likewise, the literature supports the multi-disciplinary team approach that the person living with TTH should be managed more holistically and not only from a medical management method (Fernández, C et al., 2020). Collaboration, therefore, enables shared knowledge, decision-making and skills (Barnes et al.,

2021; Sahai-Srivastava et al., 2017; Gaul et al., 2011). This study found that the most common disciplines included in the management approach were psychology or mental health by 63 (47%) participants, medical management by 45 (33.6%) participants, occupational therapy or social worker by 17 (12.7%) participants, biokinetics by 16 (11.9%) participants and those who did not know were 12 (9%) participants. Therefore, it is clear from the results that the majority of the participants involved at least one other team member in the management of TTH and in certain cases more than one possible team member was indicated by participants.

In the current study, 65 (48.9%) of the participants reported that they treated a new headache referral once a week. Since the majority of the physiotherapists 110 (82.1%) in this study were working in the private sector at the time of completion of the survey, it could be argued that they would more likely manage the condition than a physiotherapist working in the public sector based on the rate of referrals from medical practitioners, who according to Barnes et al. (2021) could be biased. Even though physiotherapists in South Africa have first-line practitioner status, many still rely on referrals from medical doctors, as many patients seek medical assistance first from a general practitioner or they are not informed regarding the services that physiotherapists can provide, especially to persons living with TTH. Barnes et al. (2021) noted the different ways that medical practitioners decide on their referrals for persons with musculoskeletal disorders appeared to be based on their familiarity with the physiotherapist and their competence or expertise, as well as the feedback received from other patients regarding positive outcomes, which also determined whether the medical practitioner would continue to refer patients to physiotherapy. Lastly, communication skills between the medical practitioner and physiotherapist are essential to ensure effective management of patients with any condition including TTH (Barnes et al., 2021; Gaul et al., 2011).

In the current study, manual therapy or joint mobilisations were found to be the main type of non-pharmacological approach used in the treatment of TTH by 92 (68.7%) participants and joint mobilisations and manipulations were strongly associated with the private sector group with a Chi-squared test ($p = 0.00$) as well as the physiotherapists interested in Neurology ($p = 0.00$) and Musculoskeletal and Pain Management ($p = 0.00$). Although the literature showed that manual therapy is not effective for all headache types, the literature does not dispute that it could be effective in the management of pain especially when there may be coinciding joint involvement, such as in mixed headache conditions (Luedtke et al., 2016). According to Fernández et al (2020), many primary headache conditions occur with resultant neck pain, and therefore it could be speculated that the cervical spine

may be a contributing factor with primary headache conditions, and it would justify the inclusion of manual therapy techniques in the therapy provided. Thus, in this study, the inclusion of manual therapy may have been used based on the assessments done by the physiotherapists, which could have shown involvement of the cervical spine. However, the available literature does not advocate for the inclusion of manual therapy for every individual that presents with a primary headache condition, as the clinician must use clinical reasoning skills to base the use of this technique (Fernandez et al., 2020; Luedtke et al., 2016).

In the current study, strong associations were found with the physiotherapist in the private sector and the use of joint mobilisations or manipulations (Chi-squared test $p=0.00$), dry needling (Chi-squared test $p=0.02$), rehabilitative exercises (Chi-squared test $p=0.01$) and behaviour modification principles (Chi-squared test $p=0.03$) in the management of TTH. In the public sector, on the other hand, associations were found in the use of electrotherapy (Chi-squared test $p=0.01$) and rehabilitative exercises (Chi-squared test $p=0.02$) more than in any other modalities.

Certainly, there appears to be a difference in the approaches towards TTH within these two sectors. The difference in the modalities used could be as a result of the number of therapy sessions provided by the therapists per day. The choice of technique could be based on their own clinical expertise and years of experience as a physiotherapist, which may also be governed by the time it takes to provide treatment for the patient. The private sector physiotherapists, however, appear to provide a combination of both hands-on and hands-off therapy approaches in this study. As previously mentioned the researcher is unable to provide a hypothesis for the differences in treatment approaches and no literature could be found discussing the choices. Fernández, et al. (2020) advocated the use of a multimodal approach towards the management of TTH, such as the inclusion of bottom-up and top-down interventions, that aims at holistic management of the patient and the presenting condition.

In the researcher's experience working in a public sector setting, the attendance of follow-up sessions are often a challenge for the patients due to financial constraints as a result of unemployment, or only receiving social grants, thus the number of possible therapy sessions must be taken into account by the physiotherapist when planning the management of TTH, since it is dependent on the KABP of the treating physiotherapist. Another example of planning the therapy sessions, different professionals could schedule their sessions on the same day and perhaps once per month, to limit the number of travel times for a patient in a month.

The use of electrotherapy by public sector physiotherapists is intriguing since there appears to be limited literature that supports the inclusion and effect of electrotherapy for the management of TTH. Therefore the inclusion of electrotherapy in this study could once more be argued that the physiotherapists rely on their clinical experience in the use of electrotherapy and thus continue to use it based on the results they may have seen over a period of time and not based on the currently available research. Conversely, rehabilitative exercises are supported by the literature regarding the strengthening of weakened muscles and stretching of overactive shortened muscles of the neck and shoulder girdle (Sahai-Srivastava et al., 2017). However, physiotherapists employed in the public sector should still accurately identify and manage the symptoms of persons living with TTH, since other important factors, such as anxiety, stress, or sleep to name a few may play a role in the person living with TTH and these should be managed holistically and appropriately as stated in the attitude section. For example, sleep hygiene should be addressed in the therapy sessions, highlighting the role that sleep could play in the chronicification of pain.

Additionally, physiotherapists can influence the ergonomics of the person regarding sitting postures at a desk, spine alignment in the correct positions such as standing and sitting, the advice of reducing a sustained position for a prolonged amount of time and exercises to perform at work such as easy mobilisations of the spine to increase mobility and stretching of muscles (Mingels et al., 2019). In this study posture and ergonomics were strongly associated with the Musculoskeletal and Pain management group when using the Chi-squared test ($p=0.04$). The reason for the interest by the group may be the added training or attendance of accredited courses where the physiotherapists may have been exposed to the importance of addressing posture and the normal alignment of the spine, which is already covered in the undergraduate programme at UFS. The need to address correct sitting postures and the role it plays in the pain pathways as pointed out by Mingels et al. (2019).

In addition, physiotherapy has shown to be beneficial and a low cost for the management of TTH, according to Luedtke et al. (2016) and minimal side effects have been reported with the treatment given by a physiotherapist. It takes time for an individual to master the use of certain muscles in terms of strength, endurance and education of pain management strategies. The process may be further complicated by treatment preferences of patients as well as beliefs of patients regarding certain modalities for example dry needling (Luedtke et al., 2016).

The Numeric Pain Scale was strongly associated with the question of whether an evidence-based measurable outcome should be used for each physiotherapy session with a significant Chi-squared value

of $p=0.01$. A total of 73 (55.7%) participants in this study indicated that they use a measurable outcome for each physiotherapy session to assess subjective changes. Although one participant mentioned that they felt using **outcome measures** of any kind is outdated and not relevant anymore, the literature strongly supports the continued use of **outcome measures** in most headache conditions, since it provides an objective measurement of pain, or impairments, whether physical or otherwise (Luedtke et al., 2020; Haywood et al., 2018). Haywood et al (2018) further recommended that the treatment of headache conditions should aim to improve the general quality of life of the individual as well as the quality of life while experiencing **a headache (Haywood et al., 2018)**. Beltran-Alacreu et al. (2015) advocated the use of the Headache Impact Test6 (HIT-6), Visual Analogue Scale (VAS) scale, Neck Disability Index (NDI) scale and the Pain Catastrophizing Scale. The use of pain medication, the perceived clinical change, pressure pain threshold and quality of life were used among the intensity, duration and frequency of headaches per month, according to **Maistrello et al. (2018)**. The use of outcome measures allows for the physiotherapist to determine a baseline for the specific person, to monitor changes in the condition, to allow for motivation for medical aid companies and it provides a good objective guide, for effective communication between disciplines and to motivate the patient to continue with the therapeutic interventions.

The literature does not appear to be very clear about the frequency of use of an outcome measure for a person living with TTH. Ferragut-Garcías et al. (2017) conducted a randomised control clinical trial and used the HIT-6 four times in a series of treatment sessions. Maistrello et al. (2018) used two forty-five minute sessions per week for six weeks but assessed an outcome during the run-out period after each intervention. Luedtke et al. (2016) reported on outcomes such as intensity, duration and frequency of headaches after a six-week intervention programme and a repeated follow up at six months. Although the literature does not clearly define a period when to implement the outcome measures and how often it should be used as an assessment tool, there is consensus among authors that remain constant such as the headache intensity (often assessed with the VAS), headache duration (in terms of days per month) and frequency (in terms of days per month). In this study, 73 participants (55.7%) reported that an outcome should be used every session for therapy provided and 41 (31.3%) reported use twice in a series of treatments. The majority of participants 71 (54.2%), reported that they provide between four to six therapy sessions for a headache patient and that usually a subjective change in symptoms is reported around two or three sessions.

Headaches are a disorder that affects a significant portion of the population across the world as previously stated. Although headache data in South Africa appears to be limited, the findings of the current study are the first step in exploring the topic not only in South Africa but also amongst practising physiotherapists in South Africa.

In the final chapter, the researcher will mention the limitations and recommendations for this study. A conclusion will be drawn as the dissertation is resolved.

CHAPTER 6

6. CONCLUSION

6.1 Shortcomings

6.2 Recommendations

6.3 Conclusion

6.1 Shortcomings

6.1.1 Rate of response

Although the response rate of the study was acceptable according to the literature, the results should be interpreted with caution as a sample of convenience was used and may not be representative of the physiotherapy population. In addition, the sample group of physiotherapists that participated in this study is too small to be able to generalise the results of this study for the total population of physiotherapists in South Africa.

6.1.2 Sample method

The sampling method may have limited the study by using the snowballing effect, which is dependent on each participant to forward the information to their own contacts. The researcher was anticipating that the snowballing method would recruit more participants, however, the study was done between January and March and perhaps people returning from the festive season felt uninterested or were put off by the effort of having to access the survey electronically using their own data for internet access. The reminder messages were never sent by the SASP, and it was only communicated later to the researcher that this is a decision taken by the organisation not to overload their members with repeated information.

The researcher sent reminder messages on Facebook, LinkedIn and WhatsApp to various potential participants to keep momentum with the link being sent to the next person and public domain e-mail addresses were also used by the researcher to recruit possible participants. However, responder bias may have played a significant role in the recruitment for participation, since those physiotherapists who were interested in the topic may have decided to participate, while those who had no interest in TTH might not have considered agreeing to participate. Those who have an interest in the topic may respond with a more positive attitude than those who are not interested, therefore this bias may directly influence the results of the study. This was apparent from the specified areas of interest of the participants, where most were interested in musculoskeletal and pain management conditions.

Another limitation was the PASA never responded to any communication sent from the researcher, which may have excluded more potential participants from this study.

The sample size for this study was small, thus the findings can only be specified to this sample group and not generalised for the population. In future, a set number of electronic questionnaires could rather be sent out by still using social media platforms and the same sources for email addresses, instead of relying on a snowballing method to target the sample population. Also, if it were possible to find personal contact numbers for that participants and do follow-up calls to ensure the participation had been done, it may yield better response rates. This way, the researcher is in control of the number of responses and eliminates the additional variables such as the other participants that could decide to not forward the link of the survey. In addition, it personalises the plea for participation since many people may see the emails sent as spam, feel unsafe to participate in an online survey or forget about it in the email inboxes.

6.2 Recommendations

As mentioned previously, the headache clinic in Gauteng, South Africa, serves various persons from this country and across the world that live with different forms of headaches. A similar concept could be used in the public sector, where although funding may be a challenge, the idea could be considered and replicated. The researcher recommends that a pilot study could be run within an academic public hospital, in collaboration with doctors, psychologists and physiotherapists. Each profession can contribute towards the interventions of between ten and twelve individuals with TTH for an eight to twelve-week period and assess the difference before and after the sessions regarding headache intensity, frequency and duration. The results from the pilot study could be used as motivation to the Department of Health to start a headache clinic in the public sector and provide services to more persons living with TTH or other headache types.

Perhaps the inclusion of headache specialists in the public sector may assist with the screening at an outpatient department to sift through the number of patients that present with these symptoms and refer them to the appropriate disciplines. The researcher does acknowledge that this will be a time-consuming practice in the beginning, however in the long term, it may be more beneficial for the presenting person to be screened through a filtering system by a doctor that has adequate knowledge

about headache conditions and specifically TTH and then sent for the appropriate help. However, the screening method could also be used in the light of the implementation of the NHI, so that once the patient has been screened by the physician, then that specialist could refer the patient appropriately to other members of the multi-disciplinary team for further management. In so doing, the other professions could be included in the management of the condition of TTH, which also further emphasises the requirement for collaboration between members of the multi-disciplinary team. Furthermore, the results of this study could be used to motivate for the inclusion of all medical professionals that may assist in the appropriate management of TTH in the public sector.

Since the SASP had made a contribution in this study by assisting with sending the link to their members, the organisation should be informed about the results of the study and could therefore be advised to present an accredited training session or a short course about TTH and to apply the information obtained from this study. As the knowledge section of 55 (41%) participants showed that there may be individuals that could benefit from the information, to remain current and up to date, the information about TTH could be presented in the form of online accredited coursework over a few weeks, where each session aims to include more information regarding the topic making it more manageable for clinicians. Online webinars could be presented and the SASP could be approached in this regard to provide a large enough platform to reach more physiotherapists in South Africa. Train Pain is an organisation that provides further education and training in the area of pain and related musculoskeletal conditions and they have regular online discussions with a panel of experts in the field of the topic presented. This organisation could be contacted to request a webinar session on TTH with experts in the field to explore the topic, present current research and share information on the topic. The webinar could be open to all health care practitioners that offer treatment to persons living with TTH, including medical doctors or nurses.

The importance of the team approach must be emphasised among doctors that often first see these headache patients before other practitioners. The collaboration between team members in terms of respect for the different professions and the acknowledgement of the function that each member has in the team is probably the most important factor. The sharing of knowledge and the different skill-sets that each member brings to the therapy sessions must be highlighted and utilised accordingly. This information could also be presented in the form of online webinars, where a discussion panel could provide feedback and discuss the different therapy options and the role of each team member. Effective

communication between team members as well as regular feedback, among the team and towards the client, is imperative in the therapy process.

Furthermore, the education of undergraduate medical students in the importance of using a team centred approach and the inclusion of other health care providers such as physiotherapy and even occupational therapy in the management of conditions such as TTH should be emphasised. This suggestion could be sent to the head of the **School of Health and Rehabilitation Sciences** to address with the necessary managerial staff at the School of Medicine at the UFS that are involved in the planning and execution of the curriculum for the medical students.

Although the knowledge score showed that 76.9% was a very good score in this study, there may still be a lack of anatomy knowledge. This remains a cause for concern and could affect the practice of a physiotherapist, thus the attendance of an annual anatomy refresher course could be suggested to the HPCSA as a compulsory activity similar to the attendance of compulsory ethical workshops.

Even though this study aimed to assess the KABP of physiotherapists in South Africa, the importance of outcome measures should be highlighted to each professional that assists in the management of the person living with TTH as the outcome measures provide evidence for the improvement of the person or the relapse of the person. **A suggestion could be made that Organisations such as Pain SA, or Train Pain or other service providers that run courses or webinars, add the information in the courses that they present particularly when TTH are being taught.**

As mentioned in the discussion chapter physiotherapists should be reminded about the role **that** psychologists or psychiatrists could play in the management of predominantly chronic pain conditions and should be able to refer their patients to a psychologist or psychiatrist depending on the need of the patient. The referral of persons living with chronic pain should be included in webinars or online talks to emphasise the importance of the inclusion of psychological aspects in the management of TTH.

Future studies could also be done to explore the inclusion and utilisation of the multi-disciplinary team approach for the management of patients with TTH, specifically in a South African context.

6.3 Conclusion

This KABP study regarding the management of TTH among South African physiotherapists showed that the knowledge about TTH and particularly the anatomy of the musculoskeletal structures, although was

very good but could still be lacking. Interventions to improve the knowledge of SA physiotherapists employing training sessions, courses and webinars in the form of accredited professional development training are suggested. The attitude and beliefs of the participants towards the management of TTH appeared to influence the practices of the participants. Some of the beliefs centered on the fact that clinical experience cannot be discarded and may affect the practices of the physiotherapists and the way they approach the treatment of TTH. The use of clinical reasoning to determine the best evidence practice was also demonstrated and the associations between the socio-demographics of the study were determined between the different interest groups of the profession and the most used therapy modalities.

Furthermore, this study revealed that many participants supported the use of multi-disciplinary and evidence-based approaches in the management of persons living with TTH.

Additionally, further research in this area of interest is required and is encouraged specifically within the South African physiotherapy context.

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APPENDICES

APPENDIX A: Informed consent

APPENDIX B: Information letter

APPENDIX C: Letter to the South African Society of Physiotherapy and
: Physiotherapy Association of South Africa

APPENDIX D: Questionnaire

APPENDIX E: HSREC approval

APPENDIX F: Amendments and changes

APPENDIX G: Face and content validity

APPENDIX H: Turn it in Report

Appendix A: Informed consent

CONSENT TO PARTICIPATE IN RESEARCH

You have been asked to participate in a research study, titled:

“Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches.”

You have been informed about the study by the researcher, Marielle Robertson.

The aim is to provide the researcher with current information regarding physiotherapy practices related to individuals living with tension-type headaches and not to investigate the participant in any way. The researcher relies on your participation, honesty and integrity to present a true reflection of the study. The information and knowledge gained from this study can form the basis for future studies in this field of interest.

Your participation in this research study is voluntary and you will not be penalized nor lose benefits if you refuse to participate or decide to terminate participation at any stage. Kindly please complete the questionnaire and answer all the questions to the best of your knowledge and ability. Please do not research or ‘google’ the questions if you are unsure.

You may contact Marielle Robertson (researcher) at the cell phone number (083 712 4569) or e-mail address (marielle.carson@gmail.com) should you have questions about the research.

You may contact the Secretariat of the Health Sciences Research Ethics Committee, UFS at telephone number (051) 4017794/5 if you have any questions about your rights as a research subject.

Please take note that by agreeing to participate in this questionnaire and undertaking to complete it, that you participate in your own private capacity and that it is implied and accepted that informed consent has been provided once you have clicked on the link to access the questionnaire.

The time it takes to complete the questionnaire is approximately 15-20 minutes

Appendix B: Information letter

Dear potential participant

Study title: Knowledge, attitude, beliefs and practices study of the South African physiotherapists regarding the management of tension-type headaches.

I, Marielle Robertson, am currently a Master's student in Physiotherapy at the University of the Free State. I wish to conduct a research study in the area of tension-type headaches, which is part of the requirement to complete a Master's degree. The main aim of the study is to determine what the general current practices of physiotherapists in South Africa are towards persons living with tension-type headaches.

I am inviting you to participate in this study as a qualified physiotherapist. You will be required to access the internet and click on the links provided. You will then be required to anonymously fill in a questionnaire. Please read all questions carefully before answering. You will not be asked to spend anything on this study, other than your time, this will assist with the data collection and the progression of this study.

- Risks: There are no associated risks or harm for participating in this study.
- Participation is completely voluntary and you may withdraw at any stage, with no reason.
- Confidentiality: Confidentiality will be maintained at all times and no personal particulars will be divulged. All the data will be kept securely by the researcher.
- Costs: Participation in this study is free from any cost and no remuneration will be provided for your participation.
- Results: The results of this study may be published and/or presented at meetings or congresses in a group format so as to maintain the privacy of each participant.
- Time: The questionnaires should take approximately 15-20 minutes to complete.

You may contact the researcher, Mrs M Robertson cell number (083712459) and e-mail (marielle.carson@gmail.com) should you have any questions relating to this study.

You may also contact the Secretariat of the Faculty of Health Sciences Research Ethics Committee, UFS at telephone number (051) 401 7794 if you have questions about your rights as a research subject.

Thank you for your consideration to participate in this study.

Appendix C: Letter to SASP and PASA

University of the Free State
Physiotherapy Department
Nelson Mandela Drive
Bloemfontein
9301

Dear Presidential Committee of the SASP

RE: Permission to conduct a research study using the physiotherapy members of the society.

I, Marielle Robertson, hereby wish to request to conduct a research study using all members of the SASP in order to obtain a Master's degree in Physiotherapy at the University of the Free State.

The title of the study: Knowledge, attitude, beliefs and practices study of the South African physiotherapists towards the management of tension-type headaches.

The study will entail using a self-compiled questionnaire that will be sent to each participant in an electronic format. The main aim of the study is to determine which current management strategies are used by physiotherapists to assist persons living with tension-type headaches.

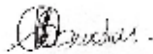
Participation is completely voluntary. Participants can withdraw at any stage. No money will be charged or offered to qualify for participation.

The SASP will be requested only to provide a platform from which to send out a bulk e-mail to all members with a reminder e-mail sent two weeks later. The SASP will in no manner be held liable for the participation of any member in this study.

I do hope that this study will meet with your approval. I thank you in advance for considering my letter and look forward to your response.

Sincerely,

Marielle Robertson



Researcher

Dr. R Barnes (Supervisor)



Department of Physiotherapy
(UFS)

University of the Free State
Physiotherapy Department
Nelson Mandela Drive
Bloemfontein
9301

Dear Presidential Committee of PASA

RE: Permission to conduct a research study using the physiotherapy members of the society.

I, Marielle Robertson, hereby wish to request to conduct a research study using all members of the PASA in order to obtain a Master's degree in Physiotherapy at the University of the Free State.

The title of the study: Knowledge, attitude, beliefs and practices study of the South African physiotherapists towards the management of tension-type headaches.

The study will entail using a self- compiled questionnaire that will be sent to each participant in an electronic format. The main aim of the study is to determine which current management strategies are used by physiotherapists to assist persons living with tension-type headaches.

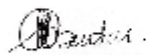
Participation is completely voluntary. Participants can withdraw at any stage. No money will be charged or offered to qualify for participation.

The PASA will be requested only to provide a platform from which to send out a bulk e-mail to all members with a reminder e-mail sent two weeks later. The PASA will in no manner be held liable for the participation of any member in this study.

I do hope that this study will meet with your approval. I thank you in advance for considering my letter and look forward to your response.

Sincerely,

Marielle Robertson



Researcher


Dr. R Barnes (Supervisor)



Department of Physiotherapy
(UFS)

Appendix D: Questionnaire

DRAFT

EvaSys	Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the	Electric Paper
Physiotherapy Department UFS		Marielle Robertson
TTHA		

Mark as shown: ☐ ☒ ☐ ☐ Please use a ball-point pen or a thin felt tip. This form will be processed automatically.

Correction: ☐ ☒ ☐ ☐ Please follow the examples shown on the left hand side to help optimize the reading results.

1. General information:

You have been asked to participate in the research study with the following title: Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches. The aim is to provide the researcher with current information regarding physiotherapy practices related to individuals living with tension-type headaches and not to investigate the participant in any way. The researcher relies on your participation, honesty and integrity to present a true reflection of the study.

The information and knowledge gained from this study can form the basis for future studies in this field of interest and the results may be published. Your participation in this research study is voluntary and you will not be penalized nor lose benefits if you refuse to participate or decide to terminate participation at any stage. Your data will be treated confidentially at all times and you will remain anonymous to other participants. Kindly please complete the questionnaire and answer all the questions to the best of your knowledge and ability. Please do not research or 'google' the answers if you are unsure.

You may contact Marielle Robertson (researcher) at the cell phone number 083 712 4569 or e-mail address, marielle.carson@gmail.com, at any time should you have questions about the research. You may contact the Secretariat of the Health Sciences Research Committee, UFS at telephone number (051) 4017794/5 if you have any questions about your rights as a research subject.

Please take note that by your voluntary agreement to participate in this survey, that you participate in your own private capacity and that it is implied and accepted that informed consent has been provided once you have clicked on the link to access the questionnaire.

The time it takes to complete the questionnaire is 15-20 minutes.

- 1.1 I hereby acknowledge that I have received the necessary information about this study and consent to participate, as explained above. ☐ Agree ☐ Disagree

2. Personal information

Please answer the following questions.

- 2.1 What is your age?

- 2.2 What is your gender?

☐ Male ☐ Female ☐ I choose not to answer

- 2.3 For how many years have you been a practising physiotherapist?

- 2.4 In which year did you obtain your highest qualification?

- 2.5 What is your current work environment?

☐ Public sector ☐ Private sector ☐ Academic institution
☐ Administrative role ☐ Other

- 2.6 What is your preferred area of interest within the physiotherapy profession?

☐ Neurology ☐ Paediatrics ☐ Orthopaedics and sport
☐ Musculoskeletal and pain ☐ Other

DRAFT

EvaSys

Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the



2. Personal information [Continue]

2.7 Have you done any accredited tension-type headache courses?

- ☐ Yes
☐ No

2.8 If yes, please specify which accredited tension-type headache courses have you done?

2.9 How recently did you attend these accredited courses?

- ☐ 1-2 years ago ☐ 3-4 years ago ☐ 5-10 years ago
☐ more than 10 years ago

2.10 At the time of your attendance, were these accredited courses presented in person (seminar style)?

- ☐ Yes ☐ No

2.11 Did the accredited courses involve any hand-on skills or techniques?

- ☐ Yes ☐ No ☐ I do not know

3. Section 1

Please answer the following questions. Please do not research or 'google' the answers.

3.1 How are tension-type headaches categorised?

- ☐ Primary headaches ☐ Secondary headaches ☐ I do not know

3.2 What best describes tension-type headaches? (Choose all applicable).

- ☐ A throbbing pain in the head ☐ Myofascial pain from the surrounding in the head and neck ☐ A tight constricting band around the head
☐ All of the above ☐ I do not know

3.3 How are tension-type headaches classified according to the International Headache Society? (Choose all applicable).

- ☐ Acute tension-type headaches ☐ Frequent episodic tension-type headaches ☐ Infrequent episodic tension-type headaches
☐ Chronic tension-type headaches ☐ All of the above ☐ I do not know

3.4 How common are tension-type headaches when compared to migraine headaches?

- ☐ Very common ☐ Frequent ☐ Sometimes
☐ Rare ☐ I do not know

3.5 Which muscles would likely be involved in the occurrence of tension-type headaches? (Choose all applicable).

- ☐ Trapezius ☐ Sternocleidomastoid ☐ Sub-occipital muscles
☐ Temporalis ☐ All of the above ☐ None of the above

3.6 Are women more affected by tension-type headaches than men?

- ☐ Yes ☐ No ☐ I do not know

3.7 Are persons above the age of 49 years affected by tension-type headaches?

- ☐ Yes ☐ No ☐ I do not know

3.8 Are children under the age of 18 years affected by tension-type headaches?

- ☐ Yes ☐ No ☐ I do not know

3.9 Which are common triggers for the development of tension-type headaches? (Choose all applicable).

- ☐ Food smells ☐ Anxiety ☐ Stress
☐ Coffee or chocolate consumption ☐ Sleep disturbances ☐ All of the above
☐ I do not know

3.10 Acute symptoms of tension-type headache may continue for 7 days?

- ☐ True ☐ False

3.11 Muscle trigger points are the sole cause for the pain experienced in tension-type headaches?

- ☐ True ☐ False

3.12 Which of the following pain mechanisms may play a role in the development of tension-type headaches?

- ☐ Peripheral pain mechanisms ☐ Central pain mechanisms ☐ None of the above
☐ I do not know ☐ Other

4. Section 2

Please indicate your level of agreement with the following statements and answer the questions where applicable.

DRAFT

EvaSys

Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the



4. Section 2 [Continue]

	Strongly disagree	Disagree	Agree	Strongly agree
4.1 I enjoy providing physiotherapy to persons living with tension-type headaches?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2 Please motivate your response to the previous question:

4.3 I think that tension-type headaches should only be managed by a physiotherapist?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------	--------------------------	--------------------------

4.4 Please motivate your response to the previous question:

4.5 The therapy that I provide to these persons living with tension-type headaches produces positive results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------	--------------------------	--------------------------

4.6 Please motivate your response to the previous question:

4.7 Alternative therapy options, for example behaviour modification, is more effective to persons living with tension-type headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
---	--------------------------	--------------------------	--------------------------	--------------------------

4.8 Please motivate your response to the previous question:

4.9 Treatment such as analgesic use produces better outcomes for the management of persons living with tension-type headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------	--------------------------	--------------------------

4.10 Please motivate your response to the previous question:

4.11 An evidence-based measurable outcome should be used for each physiotherapy session.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------	--------------------------	--------------------------

4.12 Repeated follow up physiotherapy sessions are necessary to provide positive outcomes to persons living with tension-type headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------	--------------------------	--------------------------

4.13 Please motivate your response to the previous question:

5. Section 3

Please indicate your level of agreement to the following statements.

	Strongly disagree	Disagree	Agree	Strongly agree
5.1 Physiotherapy is used more than any other discipline in the treatment of tension-type headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2 Chronic tension-type headaches are managed by physiotherapists only.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.3 Acute tension-type headaches should only be managed by a medical practitioner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.4 Tension-type headaches are only managed by soft tissue physiotherapy techniques.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.5 The individual living with tension-type headaches should be assessed for additional joint involvement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DRAFT

EvaSys

Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the

Electric Paper

5. Section 3 [Continue]

5.6	The physiotherapy techniques that are used to manage the symptoms of tension-type headaches are solely based on the years of clinical experience.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.7	The physiotherapy techniques used to manage the symptoms of tension-type headache are solely based on the current available research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.8	A multi-disciplinary team approach should be used in the management of all persons living with tension-type headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.9	All persons living with tension-type headaches should be informed about all other alternative pain management strategies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.10	All persons living with tension-type headaches should keep a headache diary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.11	Persons living with tension-type headaches should be encouraged to determine their own headache triggers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.12	Persons living with tension-type headaches should be informed about the role of sensitisation of the trigeminal cervical nucleus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.13	Persons living with tension-type headaches should always be referred for psychological support.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.14	Persons living with tension-type headaches should always be managed using Pain Neuroscience Education principles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Section 4

Please answer the following questions.

- 6.1 How often do you provide therapy for a new headache referral?
- ☐ Once per week ☐ Twice per week ☐ Three times per week
- ☐ More than three times per week ☐ Never
- 6.2 What do you consider to be the best approach for tension-type headaches?
- ☐ Pharmacological management ☐ Non-pharmacological management ☐ A combination of both pharmacological and non-pharmacological
- ☐ Other
- 6.3 What do you consider as a non-pharmacological approach for the management of tension-type headaches?
-
- 6.4 Which physiotherapy interventions do you most frequently use in the management of persons living with tension-type headaches?
- ☐ Joint mobilisations and manipulations ☐ Soft tissue techniques ☐ Rehabilitative exercises
- ☐ Behaviour modification principles ☐ Dry needling ☐ Electrotherapy
- ☐ Other
- 6.5 How many follow-up sessions would be necessary for a physiotherapist to manage a person living with tension-type headaches?
- ☐ 1-3 session ☐ 4-6 sessions ☐ 7 sessions or more
- ☐ I do not know
- 6.6 How many physiotherapy sessions would be necessary for the individual living with tension-type headaches to report a positive subjective change in symptoms?
-
- 6.7 Which different disciplines, if any, do you include as part of your therapy regime? e.g. Occupational therapy
-
- 6.8 Do you feel that physiotherapy has a significant role to play in the management of tension-type headaches?
- ☐ Yes ☐ No ☐ I do not know

DRAFT

EvaSys

Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the



6. Section 4 [Continue]

6.9 Please indicate which of the following outcome measures you use in your management approach?

- ☐ Numeric pain scale ☐ Global rating of change scale ☐ Headache Impact Test
☐ Headache disability index ☐ Other

6.10 How often do you use the outcome measure to assess any subjective change in symptoms of persons living with tension-type headaches?

- ☐ Every session ☐ Twice in a series of treatments (start and end) ☐ Not at all
☐ I do not know

7. Thank you for your participation in this survey.

8. Option to be excluded

8.1 Please provide a reason for your response.

Appendix E: HSREC approval



Health Sciences Research Ethics Committee

23-Nov-2020

Dear Mrs Marielle Robertson

Ethics Clearance: Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches.

Principal Investigator: Mrs Marielle Robertson

Department: Physiotherapy Department (Bloemfontein Campus)

APPLICATION APPROVED

Please ensure that you read the whole document

With reference to your application for ethical clearance with the Faculty of Health Sciences, I am pleased to inform you on behalf of the Health Sciences Research Ethics Committee that you have been granted ethical clearance for your project.

Your ethical clearance number, to be used in all correspondence is: UFS-HSD2020/1840/2601

The ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension.

We request that any changes that may take place during the course of your research project be submitted to the HSREC for approval to ensure we are kept up to date with your progress and any ethical implications that may arise. This includes any serious adverse events and/or termination of the study.

A progress report should be submitted within one year of approval, and annually for long term studies. A final report should be submitted at the completion of the study.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines: The SA National Health Act No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; The International Conference on Harmonization and Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH Tripartite), Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours Sincerely

Dr. SM Le Grange
Chair : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee
Office of the Dean: Health Sciences
T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za
IRB 00011992; REC 230408-011; IORG 0010096; FWA 00027947
Block D, Dean's Division, Room D104 | P.O. Box/Postbus 339 (Internal Post Box G40) | Bloemfontein 9300 | South Africa



Appendix F: Amendments and changes



Health Sciences Research Ethics Committee

12-May-2021

Dear **Mrs Marielle Robertson**

Ethics Number: UFS-HSD2020/1840/2601-0001

Ethics Clearance: **Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches.**

Principal Investigator: **Mrs Marielle Robertson**

Department: **Physiotherapy Department (Bloemfontein Campus)**

[Submission Page](#)

SUBSEQUENT SUBMISSION APPROVED

With reference to your recent submission for ethical clearance from the Health Sciences Research Ethics Committee. I am pleased to inform you on behalf of the HSREC that you have been granted ethical clearance for your request as stipulated below:

The following amendments are approved:

1. Spelling and grammatical error in question 3.2 on the data form corrected.
2. The answer options in question 2.8 corrected on the data form.
3. The survey platform used (EvaSys) did not allow participants to enter data if an answer option included 'other' as an option. Therefore, a follow-up question needed to be asked if the option 'other' was chosen in the answering process. This was changed on five questions on the data form: questions 2.7, 3.13, 6.3, 6.6 and 6.12.

The HSREC functions in compliance with, but not limited to, the following documents and guidelines:
The SA National Health Act.

No. 61 of 2003; Ethics in Health Research: Principles, Structures and Processes (2015); SA GCP(2006); Declaration of Helsinki; The Belmont Report; The US Office of Human Research Protections 45 CFR 461 (for non-exempt research with human participants conducted or supported by the US Department of Health and Human Services- (HHS), 21 CFR 50, 21 CFR 56; CIOMS; ICH-GCP-E6 Sections 1-4; International Council for Harmonisation (ICH) Harmonised Guideline, Integrated Addendum to ICH E6(R1), Guideline for Good Clinical Practice (GCP) E6(R2), 2016, SAHPRA Guidelines as well as Laws and Regulations with regard to the Control of Medicines, Constitution of the HSREC of the Faculty of Health Sciences.

For any questions or concerns, please feel free to contact HSREC Administration: 051-4017794/5 or email EthicsFHS@ufs.ac.za.

Thank you for submitting this request for ethical clearance and we wish you continued success with your research.

Yours Sincerely



Prof. A. Sherriff
Chairperson : Health Sciences Research Ethics Committee

Health Sciences Research Ethics Committee


Office of the Dean: Health Sciences

T: +27 (0)51 401 7795/7794 | E: ethicsfhs@ufs.ac.za

IRB 00011992; REC 230408-011; IORG 0010096; FWA 00027947



Block D, Dean's Division, Room D104 | P.O. Box/Posbus 339 (Internal Post Box G40) | Bloemfontein 9300 | South Africa www.ufs.ac.za

EvaSys	Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the	Electric Paper EVALUATIONSSYSTEME
Physiotherapy Department FS	Marielle Robertson TTHA	

Mark as shown: ☐ ☐ ☐ ☐ Please use a ball-point pen or a thin felt tip. This form will be processed automatically.

Correction: ☐ ☒ ☐ ☐ Please follow the examples shown on the left hand side to help optimize the reading results.

1. General information:

You have been asked to participate in the research study with the following title: Knowledge, attitude, beliefs and practices of South African physiotherapists regarding the management of tension-type headaches. The aim is to provide the researcher with current information regarding physiotherapy practices related to individuals living with tension-type headaches and not to investigate the participant in any way. The researcher relies on your participation, honesty and integrity to present a true reflection of the study.

The information and knowledge gained from this study can form the basis for future studies in this field of interest and the results may be published.

Your participation in this research study is voluntary and you will not be penalized nor lose benefits if you refuse to participate or decide to terminate participation at any stage.

Your data will be treated confidentially at all times and you will remain anonymous to other participants.

Kindly please complete the questionnaire and answer all the questions to the best of your knowledge and ability. Please do not research or 'google' the answers if you are unsure.

You may contact Marielle Robertson (researcher) at the cell phone number 083 712 4569 or e-mail address, marielle.carson@gmail.com, at any time should you have questions about the research.

You may contact the Secretariat of the Health Sciences Research Committee, FS

at telephone number (0 51)4 17794/5 if you have any questions about your rights as a research subject.

Please take note that by your voluntary agreement to participate in this survey, that you participate in your own private capacity and that it is implied and accepted that informed consent has been provided once you have clicked on the link to access the questionnaire.

The time it takes to complete the questionnaire is 15-20 minutes.

- 1.1 I hereby acknowledge that I have received the necessary information about this study and consent to participate, as explained above. ☐ Agree ☐ Disagree

2. Personal information

Please answer the following questions.

- 2.1 What is your age?

- 2.2 What is your gender?

☐ Male

☐ Female

☐ I choose not to answer

- 2.3 For how many years have you been a practising physiotherapist?

- 2.4 In which year did you obtain your highest qualification in the physiotherapy profession?

- 2.5 What is your current work environment?

☐ Public sector

☐ Private sector

☐ Academic institution

☐ Administrative role

☐ Other

- 2.6 What is your preferred area of interest within the physiotherapy profession?

☐ Neurology

☐ Paediatrics

☐ Orthopaedics and sport

☐ Musculoskeletal and pain management

☐ Other

2. Personal information [Continue]

2.7 If other, please specify which is your preferred area of interest in physiotherapy.

2.8 Have you done any accredited tension-type headache courses?

☐ Yes☐ No

2.9 If yes, please specify which accredited tension-type headache courses you have done?

2.1 How recently did you attend these accredited tension-type headache courses?

☐ 1-2 years ago☐ 3-4 years ago☐ 5-1 years ago☐ more than 1 years ago

2.11 At the time of your attendance, were these accredited headache courses presented in person (seminar style)?

☐ Yes☐ No

2.12 Did the accredited headache courses involve any hand-on skills or techniques?

☐ Yes☐ No☐ I do not know

3. Section 1

Please answer the following questions. Please do not research or 'google' the answers.

3.1 How are tension-type headaches categorised?

☐ Primary headaches☐ Secondary headaches☐ I do not know

3.2 What best describes tension-type headaches? (Choose all applicable).

☐ A throbbing pain in the head☐ Myofascial pain from the surrounding area in the head and neck☐ A tight constricting band around the head☐ All of the above☐ I do not know

3.3 How are tension-type headaches classified according to the International Headache Society? (Choose all applicable).

☐ Acute tension-type headaches☐ Frequent episodic tension-type headaches☐ Infrequent episodic tension-type headaches☐ Chronic tension-type headaches☐ All of the above☐ I do not know

3.4 How common are tension-type headaches when compared to migraine headaches?

☐ Very common☐ Frequent☐ Sometimes☐ Rare☐ I do not know

3.5 Which muscles would likely be involved in the occurrence of tension-type headaches? (Choose all applicable).

☐ Trapezius☐ Sternocleidomastoid☐ Sub-occipital muscles☐ Temporalis☐ All of the above☐ None of the above

3.6 Are women more affected by tension-type headaches than men?

☐ Yes☐ No☐ I do not know

3.7 Are persons above the age of 49 years affected by tension-type headaches?

☐ Yes☐ No☐ I do not know

3.8 Are children under the age of 18 years affected by tension-type headaches?

☐ Yes☐ No☐ I do not know

3.9 Which are common triggers for the development of tension-type headaches? (Choose all applicable).

☐ Food smells☐ Anxiety☐ Stress☐ Coffee or chocolate consumption☐ Sleep disturbances☐ All of the above☐ I do not know

3.1 Acute symptoms of tension-type headache may continue for 7 days?

☐ True☐ False

3.11 Muscle trigger points are the sole cause for the pain experienced in tension-type headaches?

☐ True☐ False

3.12 Which of the following pain mechanisms may play a role in the development of tension-type headaches?

☐ Peripheral pain mechanisms☐ Central pain mechanisms☐ None of the above☐ I do not know☐ Other

3. Section 1 [Continue]

3.13 If other, please specify which additional pain mechanisms could play a role.

4. Section 2

Please indicate your level of agreement with the following statements and answer the questions where applicable.

		Strongly disagree	Disagree	Agree	Strongly agree	
4.1	I enjoy providing physiotherapy to persons living with tension-type headaches?	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree

4.2 Please motivate your response to the previous question:

4.3	I think that tension-type headaches should only be managed by a physiotherapist?	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
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4.4 Please motivate your response to the previous question:

4.5	The therapy that I provide to these persons living with tension-type headaches produces positive results.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
-----	---	-------------------	--------------------------	--------------------------	--------------------------	---

4.6 Please motivate your response to the previous question:

4.7	Alternative therapy options, for example behaviour modification, is more effective to persons living with tension-type headaches.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
-----	---	-------------------	--------------------------	--------------------------	--------------------------	---

4.8 Please motivate your response to the previous question:

4.9	Treatment such as analgesic use produces better outcomes for the management of persons living with tension-type headaches.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
-----	--	-------------------	--------------------------	--------------------------	--------------------------	---

4.1 Please motivate your response to the previous question:

4.11	An evidence-based measurable outcome should be used for each physiotherapy session.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
------	---	-------------------	--------------------------	--------------------------	--------------------------	---

4.12	Repeated follow up physiotherapy sessions are necessary to provide positive outcomes to persons living with tension-type headaches.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
------	---	-------------------	--------------------------	--------------------------	--------------------------	---

4.13 Please motivate your response to the previous question:

5. Section 3

Please indicate your level of agreement to the following statements.

		Strongly disagree	Disagree	Agree	Strongly agree
5.1	Physiotherapy is used more than any other discipline in the treatment of tension-type headaches.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree
5.2	Chronic tension-type headaches are managed by physiotherapists only.	Strongly disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Strongly agree

170

5. Section 3 [Continue]

- | | | | | | | | |
|------|---|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------|
| 5.3 | Acute tension-type headaches should only be managed by a medical practitioner. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.4 | Tension-type headaches are only managed by soft tissue physiotherapy techniques. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.5 | The individual living with tension-type headaches should be assessed for additional joint involvement. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.6 | The physiotherapy techniques that are used to manage the symptoms of tension-type headaches are solely based on the years of clinical experience. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.7 | The physiotherapy techniques used to manage the symptoms of tension-type headache are solely based on the current available research. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.8 | A multi-disciplinary team approach should be used in the management of all persons living with tension-type headaches. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.9 | All persons living with tension-type headaches should be informed about all other alternative pain management strategies. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.1 | All persons living with tension-type headaches should keep a headache diary. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.11 | Persons living with tension-type headaches should be encouraged to determine their own headache triggers. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.1 | Persons living with tension-type headaches should be informed about the role of sensitisation of the trigeminal cervical nucleus. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.13 | Persons living with tension-type headaches should always be referred for psychological support. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |
| 5.14 | Persons living with tension-type headaches should always be managed using Pain Neuroscience Education principles. | Strongly disagree | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Strongly agree |

6. Section 4

Please answer the following questions.

- 6.1 How often do you provide therapy for a new headache referral?
- ☐ Once per week ☐ Twice per week ☐ Three times per week
- ☐ More than three times per week ☐ Never
6. What do you consider to be the best approach for tension-type headaches?
- ☐ Pharmacological management ☐ Non-pharmacological management ☐ A combination of both pharmacological and non-pharmacological
- ☐ Other
- 6.3 If other, please specify which alternative approach you are referring to.

- 6.4 What do you consider as a non-pharmacological approach for the management of tension-type headaches?

- 6.5 Which physiotherapy interventions do you most frequently use in the management of persons living with tension-type headaches?
- ☐ Joint mobilisations and manipulations ☐ Soft tissue techniques ☐ Rehabilitative exercises
- ☐ Behaviour modification principles ☐ Dry needling ☐ Electrotherapy
- ☐ Other

- 6.6 If other, please specify which additional interventions you would use.

- 6.7 How many follow-up sessions would be necessary for a physiotherapist to manage a person living with tension-type headaches?
- ☐ 1-3 session ☐ 4-6 sessions ☐ 7 sessions or more
- ☐ I do not know

6. Section [Continue]

6.8 How many physiotherapy sessions would be necessary for the individual living with tension-type headaches to report a positive subjective change in symptoms?

6.9 Which different disciplines, if any, do you include as part of your therapy regime? e.g Occupational therapy

6.1 Do you feel that physiotherapy has a significant role to play in the management of tension-type headaches?

☐ Yes

☐ No

☐ I do not know

6.11 Please indicate which of the following outcome measures you use in your management approach?

☐ Numeric pain scale

☐ Global rating of change scale

☐ Headache Impact Test

☐ Headache disability index

☐ Other

6.1 If other, please specify which outcome measure you would use.

6.13 How often do you use the outcome measure to assess any subjective change in symptoms of persons living with tension-type headaches?

☐ Every session

☐ Twice in a series of treatments
(start and end)

☐ Not at all

☐ I do not know

7. Thank you for your participation in this survey.

8. Option to be excluded

8.1 Please provide a reason for your response.

Appendix G: Face and content validity

	Question number	Comments made	Revised	New changes made by the researcher
Expert 1 (Dr I Diener)	1. Knowledge section: 2.11 and 2.12	1. Treatment approaches to Acute and Chronic TTH?	Question 2.12 and 2.13	1. The treatment was addressed under the Practice section
		2. Which structures to treat vs sensitisation?		2. Change the structure of the question to include Questions 2.12 and 2.13 as a multiple choice question
Expert 2 (Dr A Basson)	1. Knowledge section: Question 2.4	1. Add more options to choose from.	Question 2.4	2.4 Added the options: Very common Frequent Sometimes Rare I do not know
	2. Beliefs section	2. Too much repetition of the same concepts and asking similar	Question 4.9	2. Removed the repetitive questions

		questions in different ways		
	3. Practice section	3. Remove the similar questions and concepts	Questions 5.4-5.9	3. Removed duplication to eliminate biased answers
Expert 3 (Me K Grieg)	1. Knowledge section: Questions 2.2 and 2.3	Give clear instructions in the questions Write the muscle names in full	Knowledge section	Added the instructions at the beginning of each section Added the full muscle names
	Questions 2.12 and 2.13	Be clear with what the question must ask		Merged these two questions into a multiple choice question
	2. Attitude section Question 3.11 and 3.12	Be clear about the outcome measures you are referring to		The attitude section was changed to Likert Scale options with a follow up open question to explain
Expert 4 (Me K Swanepoel)	1. Demographics: Question 1.6	Allow for the choice of more than one option	Question 1.6	1. Changed the question type to multiple-choice and no single choice

	2. Beliefs section: Question 5.6 and 5.13	These questions are similar		2. No change was made since the questions asked two different concepts

Appendix H: Turn it in Report

November 29

ORIGINALITY REPORT

10%

SIMILARITY INDEX

8%

INTERNET SOURCES

6%

PUBLICATIONS

3%

STUDENT PAPERS



30 November 2021



30 November 2021