The primary headaches in Allied Health students at the Durban University of Technology (DUT)

By

Johan Prangley

Dissertation submitted in partial compliance with the requirements for the Master's Degree in Technology: Chiropractic Durban University of Technology

I, Johan Prangley, do declare that this dissertation is representative of my own work in both conception and execution (except where acknowledgements indicate to the contrary)

_____ _____

Johan Prangley Date

Approved for Final Submission

_____ _____

Mr. J.D. Pillay Date

B.Med. Sc; MPH

_____ _____

Dr. C.M. Korporaal Date

M.Tech: Chiropractic, CCFC, CCSP, ICSSD

Dedication

To Lynne de Welzen, who has always been there for me and supported me during the research process.

Acknowledgements

I would like to thank the following people:

- My mom, dad and my sister for all their support, financially and emotionally, throughout the last 6 years.
- Les Trollope for all his help and all those hours we studied together.
- To all my lecturers that I have had from the 1st to the 6th year.
- My supervisors (J.D. Pillay and C.M. Korporaal) for all their help and guiding me in the right direction throughout the research process.
- The Durban University of Technology for their financial support in the research process.

Abstract

Background: A headache is a common complaint in daily practice and occurs across all ethnicities and both genders. These headaches can cause a decrease in productivity and quality of life. Studies carried out in defined population groups are useful in developing an understanding of the factors that influence headaches, however these are limited.

Objective: To determine the prevalence of primary headaches in Allied Health students at the Durban University of Technology (DUT), identify the factors that influence the prevalence of these headaches and to determine the association of these headaches with activities of daily life and productivity.

Methods: The study was an epidemiological, cross sectional survey of primary headaches with a study population of ±420. Each willing participant received a Letter of Information outlining the study and a questionnaire for completion.

Results: Three hundred and eleven questionnaires were used for statistical analysis. Of these 24.1% (n=75) did not experience headaches and the remaining 75.9% (n=236) were classified as having had either non-primary headache, migraine-type headache (MTH), tension-type headache (TTH) or cluster-type headache (CTH). Headaches were prevalent amongst the student population and several factors were associated with the headaches. CTHs tended to have the most impact on the student as an individual, due to its intensity. MTHs and TTHs tended to have a greater effect on the student population, mainly due to their high incidence.

Conclusion: The study supports previous findings on the prevalence of headaches in student populations. Smoking, sleeping disorders, stress and depression were the factors that had the greatest influence on the headaches. Additionally, primary headaches were found to have an effect on student productivity, attendance at university and an overall negative effect on the quality of life.

Table of Contents

List of Appendices

List of Tables

List of Figures

Definitions

Accompanying symptoms: A symptom that accompanies or is associated with a headache, rather than occurring before or after the headache (International Headache Society (IHS), 2004).

Allied Health Professions Council of South Africa: A statutory health body that controls all allied health professions (established in terms of the Allied Health Professions Act, 63 of 1982) (Republic of South Africa, 1982).

Allied Health profession: "Chinese medicine and acupuncture, chiropractic, homeopathy, naturopathy, osteopathy, phytotherapy, therapeutic aromatherapy, therapeutic massage therapy or therapeutic reflexology, or any other profession contemplated in section 16(1)" of the Allied Health Professions Act, 63 of 1982 (Republic of South Africa, 1982).

Attack (headache): A headache that increases in intensity, remains at that intensity for up to 72 hours which then reduces until no pain is experienced (IHS, 2004).

Aura: Early symptoms that are associated with migraines with auras. The aura occurs before the migraine and lasts between 20-30 minutes (IHS, 2004).

Calcium channels (P and Q-type): Calcium channels that control the release of neurotransmitters at many of the synapses in the nervous systems of mammals (Bourinet, Soong, Sutton, Slaymaker, Mathews, Monteil, Zamponi, Nargeot and Snutch, 1999).

Circadian rhythm: According to Stedman's Medical Dictionary (1999: 352), the meaning of circadian rhythm is a biological rhythm that has a cycle of about 24 hours.

Duration (of attack): The time from onset of the headache attack until termination of the headache attack (IHS, 2004).

Dysnociception: According to Stedman's Medical Dictionary (1999:550), the meaning of "dys" is "bad, difficult, un- or mis-" and "nociceptive" is "capable of appreciation or transmission of pain" (1999:1221); therefore dysnociception is a difficulty perceiving pain.

Epidemiology: According to Stedman's Medical Dictionary (1999:604), it is "the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems".

Frequency (of attacks): The rate at which the headache attacks occur in a certain time period (commonly one month) (IHS, 2004).

Headache: An acute or chronic pain at the head which may vary in character and location (Curry and Green, 2007).

Incidence: According to Stedman's Medical Dictionary (1999:886), it is "the number of specified new events, during a specified period in a specified population".

Intensity (of attacks): The degree of pain as scored on a numerical rating scale or visual analogue scale (IHS, 2004).

Lancinating: An electrical shock-like pain that is brief in duration and travels along a nerve root or a nerve (IHS, 2004).

Miosis: According to Stedman's Medical Dictionary (1999:1120), the meaning of "miosis" is "contraction of the pupil".

Neuro-imaging: Imaging techniques such as Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) of the brain (IHS, 2004).

Neuropeptide: According to Stedman's Medical Dictionary (1999:1212), the meaning of "neuropeptide" is "any of a variety of peptides found in neural tissue".

Peptide: According to Stedman's Medical Dictionary (1999:1343), the meaning of "peptide" is "a compound of two or more amino acids in which a carboxyl group of one is united with an amino group of another, with the elimination of a molecule of water, thus forming a peptide bond".

Pericranial muscles: Muscles of the neck, mastication, facial expression, speech and the inner ear (IHS, 2004).

Phonophobia: "Hypersensitivity to sound"; therefore leading to avoidance to loud sound (IHS, 2004).

Photophobia: "Hypersensitivity to light"; therefore leading to avoidance to sharp light (IHS, 2004).

Premonitory symptoms: Symptoms that precede and forewarn of a headache attack by 2-48 hours such as fatigue or cravings (IHS, 2004).

Prevalence: According to Stedman's Medical Dictionary (1999:1443), it is "the number of cases of a disease existing in a given population at a specific period of time".

Prodrome: Synonym for premonitory symptom/s (IHS, 2004).

Ptosis: According to Stedman's Medical Dictionary (1999:1481), the meaning of "ptosis" is "a sinking down or prolapse of an organ".

Referred pain: Pain felt in a distant or surrounding area from where it arises (IHS, 2004).

Rhinorrhea: According to Stedman's Medical Dictionary (1999:1567), the meaning of "rhinorrhea" is "a discharge from the nose".

Students: "Any person registered as such in terms of section 18(1)" of the Allied Health Professions Act, 63 of 1982 (Republic of South Africa, 1982).

Tenderness: Discomfort/pain caused by a certain amount of pressure, which is normally insufficient to cause discomfort/pain (IHS, 2004).

Trigger/precipitant factors: A factor or combination of factors which induce a headache attack on exposure, example: Stress, smoking, alcohol and sleeping disorders (Molarius, Tegelberg and Ohrvik, 2008).

Unilateral: Either the right or left side, does not cross the midline (does not have to involve the whole one side, can be frontal, temporal or occipital) (IHS, 2004).

Warning symptoms: It is a vague/unclear term, can either be an aura or premonitory symptoms (IHS, 2004).

Zig-zag line: Synonym for or of fortification spectrum (IHS, 2004).

List of Abbreviations

CT: Computed tomography

CTH: Cluster-type headache

DUT: Durban University of Technology

IHS: International Headache Society

MRA: Magnetic Resonance Angiography

MRI: Magnetic resonance imaging

MRV: Magnetic Resonance Venography

MTH: Migraine-type headache

NSAIDs: Non-steroidal anti-inflammatory drugs

SLE: Systemic lupus erythematosus

STT: Soft tissue therapy

TENS: Transcutaneous electrical nerve stimulation

TMJ: Temporomandibular joint

TTH: Tension-type headache

CHAPTER 1: INTRODUCTION

This chapter provides an overview of the progression of research that has been undertaken in the epidemiology of headaches and justifies the purpose of this study, the aims, objectives and the underlying assumptions.

1.1 Background to the study:

A headache, defined as an acute or chronic pain in the head which may vary in character and location (Curry and Green, 2007). It is one of the most common complaints in daily practice (Bigal, Bigal, Betti, Bordini and Speciali, 2001 and Kurt and Kaplan, 2008). Headaches can be classified into three major categories (International Headache Society (IHS), 2004): primary, which can be further divided into sub-types (migraine-, tension- and cluster-types); secondary (headache occurring secondarily or caused by another disease or clinical condition) and the third category is cranial neuralgias, facial pain and other headaches.

In terms of primary headaches, tension-type headaches (TTHs) are the most common (IHS, 2004; Singh, 2008 and Blanda and Wright, 2009) followed by migraine-type headaches (MTHs) (IHS, 2004; Kurt and Kaplan, 2008 and Blanda and Wright, 2009) and then cluster-type headaches (CTHs) (Finkel, 2003). Currently, headaches have a global prevalence of approximately 47%, of which TTHs account for 38%, MTHs for 10% (Jensen and Stovner, 2008) and CTHs for less than 1% (Finkel, 2003). However, researchers have found that in many instances an individual may suffer from more than one headache type (Ulrich, Russel, Jensen and Olesen, 1996; IHS, 2004; Lyngberg, Rasmussen, Jorgensen and Jensen, 2005 and Jensen and Stovner, 2008). The lifetime prevalence of headaches is higher, accounting for 66%, of which TTHs account for 46% and MTHs account for 14% (Jensen and Stovner, 2008) (the remaining percentages accounts for the mixed headache types).

Based on the differences in these headaches, it is important to understand the prevalence, incidence and influencing factors of these headaches, as previous studies regarding headaches seem to differ (Kurt and Kaplan, 2008 and Jensen and

Stovner, 2008). Therefore, epidemiological studies on primary headaches are important as they assist health care providers to recognize the nature of such headaches and factors that influence them (Kurt and Kaplan, 2008).

1.2 Aim:

To determine the prevalence of primary headaches and the factors that influence the prevalence in Allied Health students at the Durban University of Technology (DUT).

1.3 Objectives:

- To determine the prevalence of primary headaches in students at DUT.
- To identify the risk factors that influence the prevalence of these headaches.
- To determine the association of these headaches with activities of daily life and productivity.

1.4 Hypothesis:

- Hypothesis 1: The prevalence of headaches is not increased by risk factors such as smoking, alcohol, social drugs, caffeine, physical activity, sleeping disorders and stress.

- Hypothesis 2: The productivity and activities of daily life is not affected by primary headaches.

1.5 Rationale:

Studies carried out in well defined population groups are very useful in obtaining a better understanding of the factors that influence headaches (da Costa, Soares, Heinisch and Heinisch, 2000). This has been postulated to assist with the prevention and/or early diagnosis of headaches, therefore increasing the effectiveness of treatment (Jensen and Stovner, 2008). To support this Kurt and Kaplan (2008), indicated that due to the variability between population groups it is necessary to

determine their headache profiles in order to plan for the group's overall healthcare needs.

In this context MTHs and TTHs cause a decrease in productivity and quality of life in the general population (Rasmussen, 1999; Bigal *et al.,* 2001; Curry and Green, 2007; Jensen and Stovner, 2008 and Kurt and Kaplan, 2008). As a result Bigal *et al.,* (2001) recommended that further similar studies are needed to understand how to manage these headaches and increase productivity of the population that suffer from such headaches. Allied Health students were chosen as the preferred population group due to easy accessibility (students at the faculty) and a group that comprises a statistically valid and reliable population size.

1.6 Assumptions/Limitations:

The reliability of the results depend on the honesty of the student when completing the questionnaire. Incomplete data was also collected and this decreased the accuracy of the diagnosis (or no diagnosis could be established) depending on the amount of missing information. The reliability of this study also depended on the validity of the criteria that has been used (the diagnostic criteria of the second edition of the International Classification of Headache disorders). According to the IHS, (2004) and Jensen and Stovner, (2008) primary headaches can be diagnosed with great accuracy using the diagnostic criteria of the second edition of the International Classification of Headache disorders. Therefore, this criteria was the most appropriate at the time of study. A cross sectional study design, as in this study can only show associated factors and not necessarily causal factors. It can therefore only be established whether there is an association between two (or more) factors and not whether they are causally related.

1.7 Significance of the study:

This epidemiological study added to the current documented literature, particularly within the South African context, where information on the burden and prevalence of headaches is limited.

1.8 Organization of the dissertation:

The dissertation consists of six chapters:

Chapter One outlines background to the dissertation. Therefore, the chapter includes the rationale, as well as the aims and objectives of the study and identifies possible assumptions/limitations.

Chapter Two provides a detailed review of current literature in the area of headache epidemiology and includes information on the prevalence of each sub-category, the pathogenesis and the risk factors associated with these sub-types. The chapter also describes the impact of the burden of headaches on productivity and daily life activities of students.

Chapter Three describes the methodology of the study in terms of the formulation, administration and analysis of the questionnaire. The chapter also outlines the recruitment process and the inclusion/exclusion criteria.

Chapter Four provides a detailed report on the results obtained from the analysis of the data gathered. The chapter includes figures, and tables (with appropriate explanations) displaying the results obtained and the statistical inferences.

Chapter Five provides an overall summation of the results and compares the results obtained to current literature relevant to the topic.

Chapter Six indicates the conclusion/s derived from the study and provides recommendations for future studies. It also identifies the limitations identified during the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction:

The purpose of this chapter is to provide a review of current literature on headache epidemiology. This chapter includes information on the prevalence, the pathogenesis and the risk factors associated with these sub-types. The chapter also describes the impact of the burden of headaches on productivity and daily life activities of students.

2.2 Definition of headache:

According to the Stedman's Medical Dictionary (1999:789), the meaning of "headache" is "pain in various parts of the head, not confined to the area of distribution of any nerve". Whereas, the International Headache Society (2004), defines a headache as: a pain located above an imaginary line drawn from the outer/lateral part of the orbit of the eye to the center of the external auditory meatus of the ear. More recently, Curry and Green, (2007) defined a headache as an acute or chronic pain in the head which may vary in character and location.

2.3 Types of headaches:

Headaches can be primary or secondary (caused by another disease or clinical condition) (Aurora, 2004 and Scher, Midgette and Lipton, 2008). According to Kurt and Kaplan (2008), the severity and frequency of headaches can range from mild and infrequent to severe and frequent. Headaches can limit daily activities, quality of life and decrease productivity (Rasmussen, 1999; Bigal *et al.,* 2001; Curry and Green, 2007; Stovner, Hagen and Jensen, 2007; Jensen and Stovner, 2008 and Kurt and Kaplan, 2008). Not only do headaches cause all of the above-mentioned effects, but are also frequently misdiagnosed and wrongfully classified (Rasmussen, 1999 and Curry and Green, 2007) and this can lead to a higher incidence of depression, disability and stroke (Molarius, Tegelberg and Ohrvik, 2008).

2.4 Classification of Primary headaches:

The primary headaches comprise of migraine-type headache (MTH), tension-type headache (TTH) and cluster-type headache (CTH) (Aurora, 2004; IHS, 2004 and Curry and Green, 2007). Of these types, the most common headaches are MTH and TTH (IHS, 2004; Curry and Green, 2007; Kurt and Kaplan, 2008 and Blanda and Wright, 2009).

2.4.1 Migraine-type headache:

A MTH is categorized as the second most common primary headache (IHS, 2004; Kurt and Kaplan, 2008 and Blanda and Wright, 2009). A typical MTH has a pulsating/throbbing characteristic and is most commonly unilateral (Blanda and Wright, 2009 and Chawla, 2009). A MTH occurs while the patient is awake, but may have started on awakening. It is very uncommon for the headache to cause the patient to wake at night (Chawla, 2009). The headache worsens over the next one - two hours to be moderate to severe and can last from a few hours to up to 24 hours (Chawla, 2009). The headache causes the patient to rest or lie down (Chawla, 2009) in a quiet dark room (Blanda and Wright, 2009) as physical activity worsens the headache (Chawla, 2009). The headache gradually decreases within 24 hours or after a period of rest/sleep (Chawla, 2009).

MTHs are classified into two types: MTH with auras and MTH without auras (IHS, 2004 and Blanda and Wright, 2009). A MTH with auras is the more common of the two types (IHS, 2004). The aura consists of visual, sensory and/or speech disturbances (IHS, 2004). It has a gradual development and does not last longer than an hour (IHS, 2004). There may be some blurring or loss of vision and the aura presents as zigzag lines (IHS, 2004 and Blanda and Wright, 2009). The sensory symptom is that of parasthesia (pins and needles) moving from the point of origin to one side of the face or body. Numbness may also occur (IHS, 2004).

2.4.2 Tension-type headache:

A TTH is the most common type of primary headache (IHS, 2004; Singh, 2008 and Blanda and Wright, 2009). The most significant finding in TTH sufferers is increased tenderness in the peri-cranial area due to manual palpation (IHS, 2004). The tenderness is proportional to the intensity and frequency of the headache (IHS, 2004). TTH is often described as having a pressing or squeezing characteristic (Singh, 2008 and Blanda and Sargeant, 2009), which occurs from frontal to occipital regions of the head and travels bilaterally (Blanda and Sargeant, 2009). The headache is usually of mild intensity and is not aggravated by physical activity (Singh, 2008 and Blanda and Sargeant, 2009). The causes include that of stress, poor posture (Singh, 2008 and Blanda and Sargeant, 2009), sleeping abnormalities (Singh, 2008) and depression (Blanda and Sargeant, 2009). The headache can last between 30 minutes to up to seven days and can be associated with either photophobia or phonophobia. Unlike MTH, TTH is usually not associated with nausea or vomiting (IHS, 2004; Singh, 2008 and Blanda and Sargeant, 2009).

TTHs can be classified into episodic or chronic (IHS, 2004 and Singh, 2008). The episodic TTH is usually a moderate, self limiting headache that responds to over the counter drugs (Blanda and Sargeant, 2009). The chronic type has a higher frequency and occurs daily and is associated with tight muscles in the head and neck region (Singh, 2008 and Blanda and Sargeant, 2009). Episodic TTHs can be further divided into frequent or infrequent types. The infrequent episodic type only has a minor impact whilst the frequent type causes a greater amount of disability (IHS, 2004).

2.4.3 Cluster-type headache:

According to Goadsby (2002) and Sargeant and Blanda (2009), a CTH is a primary vascular type headache, which is characterized by a severe unilateral pain and Kumar and Dafer (2009), described it as being excruciating, sharp and stabbing. CTH, identified to be an inherited disorder (IHS, 2004), frequently occurs around the eyes (orbitally) and is associated with parasympathetic autonomic features in the face (Goadsby, 2002 and Sargeant and Blanda, 2009) such as lacrimation, rhinorrhea, eyelid edema, ptosis and miosis (Mendizabal, Umana and Zweifler, 1998 and Sargeant and Blanda, 2009). CTH attacks are short in duration (Mendizabal *et al.,*

1998 and Sargeant and Blanda, 2009), normally lasting between 15 minutes- three hours and can occur as often as eight times a day, but most often, once a day, particularly when the patient is asleep or in the early hours of the day (Mendizabal *et al.,* 1998).

The attacks usually occur in what is known as “cluster periods” (period during which patient experiences the headache repetitively) (IHS, 2004 and Sargeant and Blanda, 2009). These can last for weeks to up to two – three months (IHS, 2004 and Sargeant and Blanda, 2009) followed by “remission periods” (periods without headache attacks) that can last a few months to years (IHS, 2004). During these cluster periods the headache occurs frequently and may be triggered by alcohol (IHS, 2004 and Kumar and Dafer, 2009), tobacco (Kumar and Dafer, 2009), histamine or nitroglycerine (IHS, 2004). The pain is mostly noted in the orbital and temporal regions of the brain, although it may be referred to other areas as well. The pain almost always keeps to the same side within a cluster period (IHS, 2004 and Sargeant and Blanda, 2009). The headache can be very severe and a patient often paces around as they are unable to lie down (IHS, 2004 and Kumar and Dafer, 2009). CTH can be divided into episodic (CTH with remission periods) and chronic types (CTH with no remission period (IHS, 2004) or the remission period is less than one month (Sargeant and Blanda, 2009)).

2.5 Demographic characteristics of headaches:

Headaches occur mostly in people between 25-55 years of age (the productive age) (Molarius *et al.,* 2008), although it can occur at any age outside this (Curry and Green, 2007 and Jensen and Stovner, 2008). They also occur more commonly in women than in men (Molarius *et al.,* 2008). MTHs most commonly occur during childhood and adolescence or second and third decade (Curry and Green, 2007 and Jensen and Stovner, 2008). Before puberty, MTHs can have a slightly higher prevalence in boys (Rasmussen, 2001; Zwart, Dyb and Holmen, 2004; Curry and Green, 2007 and Jensen and Stovner, 2008). However, from the late teenage years it is more common in girls (Rasmussen, 2001; Zwart *et al.,* 2004; Curry and Green, 2007 and Jensen and Stovner, 2008) due to the association with female hormones resulting in

"menstrual migraines" (Curry and Green, 2007). The onset of TTHs is most frequently within the third decade (Jensen and Stovner, 2008) and is more prevalent in females (Lyngberg *et al.,* 2005 and Jensen and Stovner, 2008). Age of onset for CTHs is between the ages of 20-40 or middle adult life with the prevalence higher in males as opposed to the other two primary headache types (MTHs and TTHs) where the prevalence is higher in females (IHS, 2004 and Sargeant and Blanda, 2009).

A study carried out by Steiner, Scher, Stewart, Kolodner, Liberman and Lipton (2003), in England showed that MTHs are more common in Caucasian females (19%) and males (7.7%) than in non-Caucasian females (9.3%) and males (5.1%). According to Schwartz, Stewart, Simon and Lipton (1998), TTHs are also more common among the Caucasian population in both females (46.8%) and males (40.1%) as opposed to non-Caucasian females (30.9%) and males (22.8%). In a meta-analysis of CTH epidemiological studies, the results of data were found to be very limited and as such, minimal information on demographics could be extrapolated (Finkel, 2003).

Table 1: Gender ratio of primary headache types

Reference	Headache Type	Ratio-Female(F):Male(M)
Rasmussen, 2001; Zwart *et al.,* 2004 and Jensen and Stovner, 2008	Migraine:	2:1 or 3:1[1]
Lyngberg *et al.,* 2005 and Jensen and Stovner, 2008	Tension:	5:4
IHS,2004	Cluster:	1:3-4

Table 1 illustrates that primary headaches are generally more common in females (Molarius *et al.,* 2008). However, whilst MTHs and TTHs occur more commonly in females (Jensen and Stovner, 2008), CTHs are more common in males (IHS, 2004 and Sargeant and Blanda, 2009).

Headaches frequently occur within the student age group (da Costa *et al.,* 2000 and Curry and Green, 2007) of both genders, ethnic groups and across socio-economic groups (Curry and Green, 2007). A study conducted at the Gaziosmanpasa University in Turkey included 2 023 students of which 53% were males and 47%

[1] slightly higher prevalence in boys before puberty

females. Their ages ranged between 17 and 38 (mean= 21 years) and the onset of their headaches ranged between 5 and 23 (mean= 14 years) (Kurt and Kaplan, 2008). However, the results showed that MTHs were more common in females and that there were no major differences between males and females for TTHs, CTHs or TTH with MTH (Kurt and Kaplan, 2008). Thus, Kurt and Kaplan, (2008) showed that there is variability between specific populations, as compared to the general population (Table 1) where TTH are more common in females (Lyngberg *et al.,* 2005 and Jensen and Stovner, 2008) and CTH more common in males (IHS, 2004).

2.6 Incidence and Prevalence of headaches:

According to Kurt and Kaplan (2008) and Stovner *et al* (2007), information on prevalence studies (students as well as the general population) is inconsistent and this is due to the nature of collecting data, such as face-to-face or telephonic interviews. Other factors that affect the consistency of information include age, gender, cultural background, ethnicity or a combination of these factors (Rasmussen, 1999; Stovner *et al.,* 2007 and Kurt and Kaplan, 2008). Table 2 summarizes the prevalence of MTHs and TTHs in different student populations and Table 3 summarizes the prevalence and incidence of headaches in the general public.

Table 2: Prevalence of primary-type headache among students

Reference	Population	MTH	TTH	CTH
Kurt and Kaplan, 2008	Turkish university students	18%	22%	-
Bigal *et al.,* 2001 Curry and Green, 2007	Brazilian university students	25%	33%	-
Ogunyemi, 1984	Nigerian university students	15%	12%	-
Kurt and Kaplan, 2008[1]	Other studies on medical students	12-40%	5-32%	-

[1] CTHs were not included in the student prevalence studies mentioned in Table 2.

Table 3: Prevalence and Incidence of headaches in the general population

Reference	Headache Type	Global Prevalence	Lifetime Prevalence	Incidence
Jensen and Stovner, 2008	Tension:	38%		
	Migraine:	10%		
Finkel, 2003	Cluster:	<1%		
Jensen and Stovner, 2008	Primary:	47%[1]		
Jensen and Stovner, 2008	Tension:		46%	
	Migraine:		14%	
	Cluster:		-	
	Primary:		66%[2]	
Jensen and Stovner, 2008	Tension:			14.2/1 000
and Lyngberg *et al.,* 2005	Migraine:			8.1/1 000
Finkel, 2003	Cluster:			9.8/100 000

Further to this, a study carried out in Denmark by Lyngberg *et al.,* (2005) showed the changes in the prevalence of primary headaches over 12 years (1989-2001); only MTH and TTH were investigated with outcomes as follows:

Migraine-type headache: There was no major increase from 1989 to 2001 with regards to lifetime or one-year prevalence (14.5%-18.4% and 11.3%-15.5% respectively). There was also no change in prevalence among the males in neither lifetime prevalence nor one-year prevalence (5.4% and 7.1% respectively). However, there was an increase in prevalence among females one-year prevalence and lifetime prevalence (15.6% and 23.5% respectively). The male-female ratio of the one-year prevalence changed from 1:2 to 1:4.

Tension-type headache: There was a major increase from 1989 to 2001 in both the lifetime- and one-year prevalence (81.9% to 89.4% and 79.2% to 86.5% respectively). However, the increase in the one-year prevalence was only among the males as the females decreased (66.1%-81.5% and 92.7%-90.4% respectively). The ratio for male to female changed from 1:1.4-1:1.1, thus there was no significant change.

[1,2] The remaining percentages accounts for the mixed headache types.

In many instances an individual may suffer from more than one headache type (Frequently TTHs can coexist with MTHs) (Ulrich et al., 1996; IHS, 2004; Lyngberg *et al.,* 2005 and Jensen and Stovner, 2008).

Cluster-type headache: CTHs are very rare (Finkel, 2003 and Haimanot, 2003) and often difficult to define in a set study population, thus there is no reliable conclusion about the prevalence of CTH (Finkel, 2003).

Table 4: Factors that increase the prevalence of headaches[1]

Lifestyle factors	Socio-economic factors	Working conditions
Physical inactivity	Single/Divorced subjects	Dissatisfaction with work/ occupation
Current/occasional smokers	Single parents (women more than men)	Constant worrying about losing job
Occasional heavy consumption of alcohol	Poor social support	Physical working conditions (to a lesser extent)
Missing breakfast	Economic hardship	Working hours (to a lesser extent)
Underweight/obese subjects		

It is unclear from different population survey studies whether there is an association between headache disorders and lifestyle factors or whether they are independent of each other (Molarius *et al.,* 2008). It has been found that headache disorders occur inversely to socio-economic status, thus headaches are more common in the less educated and lower income populations (Molarius *et al.,* 2008).

[1] (Molarius *et al.,* 2008)

A cross sectional study by Payne, Sterson, Stevens, Johnson, Penzien and Van Dorsten, (1991); Aamodt, Stovner, Hagen, Brathen and Zwart (2006); Wiendels, Knuistingh Neven, Rosendaal, Spinhoven, Zitman and Assendelft (2006) and Molarius *et al.,* (2008), showed an increased prevalence among smokers compared to non smokers. A study carried out by Wiendels *et al.,* (2006) and Shapiro (2007), found that a large intake of caffeine resulted in an increased risk of daily headaches. Molarius *et al.,* (2008) found that headaches were more prevalent in those who were physically inactive than those who were physically active. A study by Deleu, Khan, Humaidan, Al Mantheri and Al Hashami (2001) on medical students (N=403) in Oman, found sleep deprivation to be one of the most important factors. It also had the highest frequency of all the other factors they tested such as sunlight exposure, menstruation, mental and emotional stress.

In a study by Tietjen, Herial, Hardgrove, Utley and White (2007), (N=223), 37.2% of the participants suffered from CTH and also had depression as a co-morbid effect. Zwart, Dyb, Hagen, Odegard, Dahl, Bovim and Stovner (2003), conducted a large cross-sectional population based study (N=64 560) in Norway, on depression and anxiety and how it affected the frequency of headaches on individuals 20 years and older. Both headache groups (MTHs and other headache types) were significantly associated with depression ($p<0.0001$). Depression was more pronounced among individuals with MTHs, than other headaches types. Also, the depression rate doubled/tripled in those individuals that suffered from headaches more than 14 times a month, compared to those that only had it less than seven times a month.

2.7 Triggering Factors:

The common factors that are associated with triggering headaches (MTHs and TTHs) are represented in Table 5 (in descending order of the frequency of occurrence (Curry and Green, 2007 and Kurt and Kaplan, 2008).

Table 5: Trigger factors for migraine and tension-type headache combined

Stress [1]
Sleeping disorders [1,2]
Noise [2]
Fatigue [1]
Weather changes [1]
Studying [1]
Traveling [1]
Smoking [1]
Taking bath [1]
Flashing lights [1,2]
Physical activity [1]
Menstrual periods [1]
Tea/Coffee consumption [1]
Odours [1,2]
Alcohol [1,2]
Foods [1,2]

As illustrated in Table 5, undergraduate students showed that stress or tension was the most common triggering factor for a headache, whilst less common triggering factors included changes in food and alcohol (Curry and Green, 2007 and Kurt and Kaplan, 2008).

According to Sargeant and Blanda (2009), a subcutaneous injection of histamine can trigger a CTH in up to 69% of patients. Other less common trigger factors include stress, allergens, change in weather/seasons, medicines that contain nitroglycerin, alcohol (not during a remission period) and heavy smoking (Sargeant and Blanda, 2009).

[1] Kurt and Kaplan, 2008
[2] Curry and Green, 2007

2.8 Pathogenesis:

The pathogenesis of headaches vary according to the sub-type as described below:

2.8.1 Migraine-type headache:

Researchers have indicated that the pathogenesis of a MTH is not exactly known (Aurora, 2004; Blanda and Wright, 2009 and Chawla, 2009). But it is thought to be due to either a primary vascular mechanism (Aurora, 2004) or primary neural mechanism (Aurora, 2004 and Blanda and Wright, 2009). It is suggested by the vascular theory that the auras associated with migraines are caused by cerebral vasoconstriction (Aurora, 2004 and Chawla, 2009) and the headache itself by vasodilation (Aurora, 2004) and the trigeminovascular system (in the brainstem) plays a significant role in the migraine pain (the headache) (Aurora, 2004 and Chawla, 2009). It is hypothesized that an inflammatory response releasing neuropeptides causes this pain (Aurora, 2004; Blanda and Wright, 2009 and Chawla, 2009). Dopamine receptor activation is responsible for some of the symptoms that are associated with MTH; these include nausea, vomiting, yawning and irritability (Blanda and Wright, 2009).

There is growing evidence that a MTH is an inherited disorder and that central neuronal hyper-excitability is very important in the physiological disturbance that predisposes to MTHs (Bourinet, Soong, Sutton, Slaymaker, Mathews, Monteil, Zamponi, Nargeot and Snutch, 1999 and Aurora, 2004). Abnormalities in the calcium channels have been introduced more recently as a potential mechanism for this hyper-excitability (Bourinet *et al.,* 1999). The reason for these calcium channel abnormalities is mutant voltage-gated P/Q –type calcium channel genes that influence the release of pre-synaptic neurotransmitter, possibly of excitatory or inhibitory amino acid systems (Bourinet *et al.,* 1999). Thus it leads to the conclusion that genetic abnormalities results in a lowered threshold for triggering factors (Bourinet *et al.,* 1999 and Aurora, 2004).

2.8.2 Tension-type headache:

The exact pathogenesis of TTH is unknown (IHS, 2004; Kaynak Key, Donmez and Tuzun, 2004 and Fumal and Schoenen, 2008). The precise cause is unknown; although peripheral myofacial mechanisms (Kaynak Key *et al.,* 2004; Fumal and Schoenen, 2008 and Blanda and Sargeant, 2009), vascular factors (Singh, 2008), psychogenic factors (Kaynak Key *et al.,* 2004 and Singh, 2008) and central dysregulation of pain processing structures are implicated (Fumal and Schoenen, 2008 and Singh, 2008). The role it plays in the pathogenesis varies with the frequency and among the patient population. The peripheral pain mechanism is most probably involved with episodic TTH and the central dysnociception with chronic TTH (Fumal and Schoenen, 2008). There can be central sensitization at the level of the dorsal horn/trigeminal nucleus due to prolonged nociceptive inputs from the pericranial muscles (Bendtsen, 2000). The central neuroplastic changes can affect the peripheral mechanisms and cause increased muscle activity of the muscles around the cranium and the resultant release of neurotransmitters in the muscle tissue (Singh, 2008). This central sensitization may last long after the initial eliciting factors have been returned to normal and can thus cause the episodic TTH to progress into a chronic TTH (Singh, 2008).

2.8.3 Cluster-type headache:

Holle, Obermann and Katsarava, (2009); Kumar and Dafer (2009) and Sargeant and Blanda (2009) asserts that the pathophysiology of CTH is not entirely understood. Some of the hypothesized mechanisms are described below:

Hemodynamic/Vascular: CTH were previously hypothesized to be due to a vascular system, as there was inflammation around the cavernous sinus. The vascular theory could, however, not explain the circadian rhythm (Aurora, 2004). Neuropeptides that are released results in vasodilatation causing an intense pulsating pain. Mediators from the neurons such as nitric oxide play a pivotal role in the process of vasodilatation (Aurora, 2004). Vasodilatation may have an influence, but all studies on blood flow are inconsistent. Vascular changes are secondary to neuronal discharge as extracranial blood flow only increases after the onset of pain (Sargeant and Blanda, 2009).

Trigeminal nerve involvement: The maxillary and/or ophthalmic divisions of the trigeminal nerve may be responsible for CTH, as it causes neuronal discharge and the resultant release of substance P (Sargeant and Blanda, 2009).

Autonomic nervous system hyperactivation: The hypothalamus controls the autonomic activity of the body (Aurora, 2004 and Kumar and Dafer, 2009) and may stimulate efferent arcs resulting in sympathetic (Horner syndrome and forehead sweating) and parasympathetic (lacrimation, rhinorrhea and nasal congestion) symptoms (Aurora, 2004 and Sargeant and Blanda, 2009).

Circadian rhythm involvement: The occurrence of CTHs at the same time every day may suggest the involvement of circadian rhythms. This suggests that the hypothalamus may play a large role in the development of this headache type (Aurora, 2004; Kumar and Dafer, 2009 and Sargeant and Blanda, 2009). Other mechanisms include serotonin and histamine release as well as mast cells stimulation/activation, but findings are inconsistent (Sargeant and Blanda, 2009).

2.9 Clinical presentation of primary headaches:

Table 6 presents a summary of the characteristics of the different headache types according to documented literature.

Table 6: Clinical features of primary headaches

	MTH	TTH	CTH
Location	Unilateral [1,2,3,5]	Bilateral [1,6]	Unilateral [6,7]
Quality	Throbbing/Pulsating [1,2,3,5]	Tightness/Dull-ache [1,5,6]	Boring/Lancinating [7]
Severity	Moderate-Severe [1,2,3,5]	Mild-Moderate [1,5,6]	Severe [6,7]
Frequency	2-3/month [1,2]	2-3/month [1,2]	1-8/day [8]
Duration	4-72hours [1,6]	30min-7days [6]	15-180min [6,7,8]
Aggravating factors	Physical activity [3,5,6]	Physical palpation [6]	Alcohol and histamine [6,7]
Associated signs and symptoms	Photo- and/or phonophobia, nausea and vomiting [2,3,5,6]	None [3,5,6]	Lacrimation, nasal congestion, rhinorrhoea, facial sweating,miosis, ptosis and eyelid oedema [6,7]
Risk factors	Familial nature, no vocational education and great workload [3,4]	Poor health, constant stress and sleeping disorders [3,4]	Male sex, >30 years of age, alcohol. [7]

2.10 Diagnostic evaluation:

Diagnostic evaluation is performed to rule out structural, metabolic or other causes of headaches that can mimic a headache type, co-morbid diseases that complicate the treatment and to rule out any contra-indications to drug therapy (Blanda and Wright, 2009 and Chawla, 2009).

[1] (Kurt and Kaplan, 2008)
[2] (Curry and Green, 2007)
[3] (Molarius *et al.,* 2008)
[4] (Jensen and Stovner, 2008)
[5] (Rasmussen, 1999)
[6] (IHS, 2004)
[7] (Sargeant and Blanca, 2009)
[8] (Kumar and Dafer, 2009)

2.10.1 Migraine-type headache:

Neuro-imaging studies that could be used for the evaluation of a MTH include Magnetic Resonance Imaging (MRI) or Computed Tomography (CT) scans (Blanda and Wright, 2009 and Chawla, 2009). Other imaging studies such as angiography, Magnetic Resonance Angiography (MRA) and Magnetic Resonance Venography (MRV) can also be used (Chawla, 2009). Lumbar punctures can be used to rule out infections and heamorrhages that are not visible on CT scans (Blanda and Wright, 2009).

2.10.2 Tension-type headache:

The diagnosis of TTHs is usually made from a medical history and/or physical examination. Further studies/imaging techniques such as an MRI or a CT scan is only required if the characteristics, severity and the frequency of the headache changes from how it usually presents (Singh, 2008 and Blanda and Sargeant, 2009).

2.10.3 Cluster-type headache:

The diagnosis should be made from the medical history and the physical examination. The periodicity and rhythmicity usually helps with the diagnosis (Sargeant and Blanda, 2009). Neuro-imaging of the intracranial and cervical vasculature is required in patients with an atypical presentation (Kumar and Dafer, 2009).

2.11 Differential diagnoses:

Table 7 provides an overview of other clinical conditions that may present with similar signs and symptoms, according to current literature.

Table 7: Differential diagnoses for primary headaches

MTH	TTH	CTH
Vascular pathology [1,2]	Brain abscess [3]	Basilar artery thrombosis [6]
Cluster headaches [1,2]	Encephalitis [3]/Meningitis [3,4,5]	Brainstem gliomas [6]
Herpes Simplex [1]	Cluster [3,5] / Migraine headache [3,4,5]	Cavernous sinus syndromes [6]
Encephalitis [1]/Meningitis [2]	Otitis media [3]	Intracranial hemorrhage [6,7]
Intracranial hemorrhage [1]	Sinusitis [3]	Migraine headaches [6,7]
Brain tumor [1,2]	Stroke [3,4,5] (Hemorrhagic/ Ischaemic)	Pituitary tumors [6]
Sub-arachnoid hemorrhage [1,2]	Sub-dural heamatoma [3,4]	Sub-arachnoid hemorrhage [6,7]
SLE [1]	Temporal arteritis [3,5]	Trigeminal neuralgia [6,7]
Giant cell arteritis [1,2]	TMJ syndrome [3]/ Myofascial pain syndrome [4]	Temporal arteritis [7]
Sinusitis [2]	Trigeminal neuralgia [3]	Herpes Zoster [7]

Table 7, illustrates some of the more common clinical conditions (as referenced) that must be excluded before the diagnosis of MTH, TTH or CTH. These conditions are more severe than primary headaches, although it can present with similar clinical signs and symptoms.

[1] (Chawla, 2009)
[2] (Blanda and Wright, 2009)
[3] (Blanda and Sargeant, 2009)
[4] (Singh, 2008)
[5] (Jensen, 2003)
[6] (Kumar and Dafer, 2009)
[7] (Sargeant and Blanda, 2009)

2.12 Treatment options:

The type of treatment required and the extent of treatment varies between headache types and across individuals as described below:

2.12.1 Migraine-type headache:

Blanda and Wright (2009) and Chawla (2009), point out that there are two types of drug treatments for MTH: abortive and prophylactic treatment. Abortive treatment they explain is aimed at stopping or preventing the progression of the headache, whereas prophylactic treatment decreases the frequency, improves the response to the treatment and decreases the amount of disability during a headache attack. Chawla (2009), continues by highlighting that there are many abortive medications and the medication chosen depends on the severity of the patient's headaches, the associated symptoms and the patient's response to the treatment. Simple analgesics (non-steroidal anti-inflammatory drugs (NSAIDs)) alone/combined with other medications provides relief for mild-moderate MTH. However, for more severe MTHs, dopamine antagonists are used. Similarly, as in the use of abortive medications, prophylactic medication must only be taken if co-existing diseases has been ruled out. But, the first line of medication are those such as beta blockers or tricyclic antidepressants. The second-line of medication are Methysergide and Flunarizine (Chawla, 2009).

Other treatments include that of surgical care and diet. Guyuron, Kriegler, Davis and Amini (2005), showed that deactivation of the MTH trigger sites through surgery can help with the symptoms associated with a MTH. Dirnberger and Becker (2004), showed that surgical resection of the Corrugator muscle helps with mild MTH. Dietary avoidance of common triggering factors such as alcohol, chocolate and cheese plays an important role in the treatment of MTH (Chawla, 2009). Resting in a quite dark room and cool compression to painful areas also assist in providing relief (Blanda and Wright, 2009).

2.12.2 Tension-type headache:

The treatment of TTH consists of three types of therapies, pharmacotherapy, psychophysiologic therapy and physical therapy (Singh, 2008). Pharmacotherapy consists of abortive therapy and prophylactic therapy. Prophylactic drugs are mainly used for chronic TTH, but can also be used for the episodic sub-type when needed (Singh, 2008). TTHs respond well to over-the-counter analgesics such as paracetamol and aspirin (Singh, 2008 and Blanda and Sargeant, 2009). If the treatment does not work, caffeine or prescription drugs can be added to the therapy. Barbiturates and opiate agonists should be avoided (Singh, 2008).

Physical therapy includes exercises (Ruoff and Urban, 2004 and Singh, 2008), application of hot/cold packs (Singh, 2008 and Blanda and Sargeant, 2009), manipulation (Singh, 2008), massage (Singh, 2008), positioning/posture correction (Singh, 2008 and Blanda and Sargeant, 2009), stretching (Ruoff and Urban, 2004 and Singh, 2008), transcutaneous electrical nerve stimulation (TENS) (Singh, 2008), traction (Singh, 2008) and ultrasound therapy (Singh, 2008 and Blanda and Sargeant, 2009). Psychophysiologic therapy includes counseling, reassurance, relaxation therapy and stress management programmes (Singh, 2008). A headache treatment program might include exercise, balanced diet and sufficient amount of sleep (Ruoff and Urban, 2004 and Singh, 2008). Other treatments that are slightly invasive include trigger point injections and nerve blocks (greater or lesser occipital nerve, auriculotemporal nerve and supraorbital nerve) (Singh, 2008).

Vernon and McDermaid (1998), investigated the most commonly used treatments for TTH by chiropractors in Canada. The results were (most common to least common) upper cervical manipulation, soft tissue therapy (STT), cervical muscle stretching exercises, trigger point therapy, mobilization of the upper cervical spine, massage, manipulation of the mid- cervical spine, shoulder muscle stretches and postural exercises. The conclusion was the best treatment for TTH by a chiropractor is manipulation of the upper cervical spine and STT, accompanied by stretching exercises for the patient at home.

2.12.3 Cluster-type headache:

As with MTH there are two types of medication therapies- abortive and prophylactic therapy. Due to the shortness of a CTH attack, abortive therapy must provide immediate relief (Kumar and Dafer, 2009). Oxygen is the abortive agent of choice and must be used early to abort the headache (Kumar and Dafer, 2009 and Sargeant and Blanda, 2009). Prophylactic therapy is more common and should start at the beginning of a headache cycle and continue till the patient is pain free for 2 weeks (Kumar and Dafer, 2009). Surgical care has also reported some success (up to 50%) and includes procedures such as invasive nerve blocks and ablative neurosurgical procedures. A less invasive alternative includes gamma-knife radiosurgery (Kumar and Dafer, 2009).

2.13 Impact of headaches on the general society:

The burden of headaches are under-rated, under-recognized and under-treated (Stovner *et al.,* 2007 and Jensen and Stovner, 2008). The frequency and morbidity of headaches makes it a significant health problem in society (da Costa *et al.,* 2000). It has been reported that individuals suffering from headache disorders miss working days more frequently than those without headache disorders (Molarius *et al.,* 2008).

Epidemiological studies done on MTHs have shown that due to its high prevalence, it impacts negatively on social as well as economic factors (IHS, 2004). According to the IHS (2004), MTHs are ranked as the nineteenth top disease among all disability-causing diseases worldwide. The reduced productivity caused by migraine headaches is estimated to be between 1.4-17.2 billion dollars a year in the USA (Bigal *et al.,* 2001). A Canadian study found that 77% of migraine sufferers reported activity limitation, 50% reported interruption to activities and 30% had to lie down during a headache attack (Bigal *et al.,* 2001). A similar study in the USA showed that 86.8% of migraine sufferers had a reduced capacity to work or general performance (Bigal *et al.,* 2001). TTHs, due to its high prevalence, have a greater effect on the population than MTHs (IHS, 2004 and Jensen and Stovner, 2008). Studies evaluating the impact of TTH on work productivity and quality of life, particularly on

students and the impact it has on their academic performance are limited (Bigal *et al.,* 2001 and Stovner *et al.,* 2007).

A study done by Bigal *et al*., (2001) has shown how MTHs and TTHs affect student study performance, the change in intensity and frequency of these headaches during examination times, the influence of intensity and associated symptoms on study performance and interference with activities of daily life, as follows:

Study performance: The study performance of the students as well as the number of days they study at home was greatly decreased in those students that suffered from MTH and less by those that suffered from TTH. The average interference time for students with MTHs and TTHs was 4.9 hours and 1.1 hours respectively. Fifty percent of MTH students and 53.2% of TTH students tried studying despite having a headache attack. Students suffering from MTHs missed more days than those with TTHs. Thus most of the students reported that suffering from headaches interferes with their overall student performance.

Change in intensity and frequency: The study also showed that 48.4% of students with MTHs described the intensity and frequency of the headaches to have increased during examination times, whilst 45.3% said it did not change and 6.3% said it was less than non-examination periods. In the TTH students, 26.6% said the headaches were more intense and frequent, during examination times 70.9% said there was no change and 2.5% said it improved.

Influence of intensity and associated symptoms on study performance: When pain intensity is compared to decrease in studying performance, MTH and TTH students reported a decrease (62.7% and 24.4% respectively). Even within the same pain index category (the pain being of the same intensity) the students suffering with MTHs reported a greater reduced performance than those students with TTHs. This would suggest that the associated symptoms with migraines also contributed to the decrease in performance.

Interference with activities of daily life: A significantly higher percentage of students that suffer from MTHs, as compared to students with TTHs, said it interfered with their activities of daily life. Fifty percent of MTH students had to lie down, 32.2% would have liked to, but could not because they were away from home, as compared to the 17.7% and 21.5% of TTH students (Bigal *et al.,* 2001).

2.14 Summary:

Primary headaches comprise of MTH, TTH and CTH (Aurora, 2004; IHS, 2004 and Curry and Green, 2007). With regards to a MTH, most researchers agree that a typical MTH has a pulsating/throbbing characteristic and is most commonly unilateral (Blanda and Wright, 2009 and Chawla, 2009). The headache is moderate to severe and can last from a few hours to up to 24 hours (Chawla, 2009). The headache causes the patient to rest or lie down (Chawla, 2009) as physical activity worsens the headache (Chawla, 2009). The headache can be associated with symptoms such as photophobia, phonophobia, nausea and vomiting (Curry and Green, 2007).

With regards to a TTH, it is often described as having a pressing or squeezing characteristic (Singh, 2008 and Blanda and Sargeant, 2009), which occurs from frontal to occipital regions of the head and travels bilaterally (Blanda and Sargeant, 2009). The headache is usually of mild intensity and is not aggravated by physical activity (Singh, 2008 and Blanda and Sargeant, 2009). The causes include that of stress, poor posture (Singh, 2008 and Blanda and Sargeant, 2009) and sleeping abnormalities (Singh, 2008). The headache can last between 30 minutes to up to 7 days and unlike a MTH, a TTH is usually not associated with nausea or vomiting (Singh, 2008 and Blanda and Sargeant, 2009).

A CTH is characterized by a severe unilateral pain (Goadsby, 2002 and Sargeant and Blanda, 2009) that is described as being excruciating, sharp and stabbing/boring and lancinating (Kumar and Dafer, 2009). A CTH frequently occurs around the eyes (orbitally) and associated with parasympathetic autonomic features in the face (Goadsby, 2002 and Sargeant and Blanda, 2009) such as lacrimation, rhinorrhea, eyelid edema, ptosis and miosis (Mendizabal *et al.,* 1998 and Sargeant and Blanda,

2009). CTH attacks are short in duration (Mendizabal *et al.,* 1998 and Sargeant and Blanda, 2009), normally lasting between 15 minutes to 3 hours and can occur as often as 8 times a day, but most often once a day (Mendizabal *et al.,* 1998).

Diagnostic evaluation is performed to rule out structural, metabolic or other causes of headaches that can mimic a headache type, co-morbid diseases that complicates the treatment and to rule out any contra-indications to drug therapy (Blanda and Wright, 2009 and Chawla, 2009). The type of treatment required and the extent of treatment varies between headache types and across individuals.

The burden of headaches are under-rated, under-recognized and under-treated (Stovner et al., 2007 and Jensen and Stovner, 2008). The frequency and morbidity of headaches makes it a significant health problem in society (da Costa *et al.,* 2000). It has been reported that individuals suffering from headache disorders miss working days more frequently than those without headache disorders (Molarius *et al.,* 2008).
A study done by Bigal *et al.,* (2001) has shown that MTH and TTH affect student study performance.

CHAPTER 3: METHODOLOGY

This chapter outlines the research methodology and provides a description of the study design, questionnaire development and participant sampling methodology. The chapter also outlines the procedure of questionnaire distribution, collection and data capturing methods, in keeping with institutional ethics policy and procedure.

3.1 Study Design:

The study was an epidemiological, cross sectional survey of primary headaches with descriptive and analytical components. A structured questionnaire was used to collect the appropriate data (Appendix E).

3.2 Ethical consideration:

The research was approved by the Faculty of Health Sciences Research and Ethics Committee (FHSEC 031/07)(Appendix G) indicating that the research protocol satisfied the ethical requirements set out by the Faculty of Health Sciences Research and Ethics Committee for such studies. Furthermore, this approval indicates that the research protocol is in line with the Declaration of Helsinki, 1975 (Johnson, 2005).

3.3 Advertising and Recruitment:

No advertising was necessary as all of the subjects were located on the same campus and were easily accessible. Allied health students were chosen as the preferred population group due to easy accessibility (students of the faculty) and a group that comprises a statistically valid and reliable population size.

3.4 Participant sampling:

This research was aimed at all of the Allied Health students at the Durban University of Technology (DUT). According to the Allied Health Professions Act 63 of 1982 (as amended) (Republic of South Africa, 1982) the following professions form part of the

Allied Health Professions Council of South Africa and present at DUT: Homeopathy, Chiropractic and Somatology. Based on current student numbers the population size was expected to be ±420 students and according to Esterhuizen (2009) the minimum response rate was expected to be approximately 70%.

Table 8: Current student numbers and population size estimation

	Homeopathy	Chiropractic	Somatology	Total
Students:	±70	±200	±150	±420
Minimum response rate (70%):	49	140	105	294

All students meeting the inclusion criteria (3.5.1) were invited to participate. A self – selection process (non-probability sampling) (Trochim, 2006) was adopted based on the participant's willingness to complete the questionnaire. A Subject Information Letter (Appendix B), included as a cover page of the questionnaire, and a questionnaire was administered by the researcher to each participant during practical lessons which maximised the response rate. Permission had previously been granted from the lecturer to allow for the distribution during the respective lesson and this allowed for sufficient time for completion as the practical sessions lasted approximately 2 hours during which time the questionnaires could be administered. The questionnaire was collected by the researcher at the end of the practical session.

3.5 Inclusion criteria:

Several factors were considered for inclusion into the study as follows:

3.5.1 Inclusion criteria (students):

Only students registered as full-time students in the Faculty of Health Science at DUT and categorized as Allied Health students were included in the study. According to the Allied Health Professions Act 63 of 1982 (as amended) (Republic of South Africa, 1982) the following professions are part of the Allied Health at DUT: Homeopathy, Chiropractic and Somatology.

3.5.2 Inclusion criteria (questionnaire):

- The questionnaire had to be returned immediately after the lecture.
- Data from incomplete questionnaires were also included and missing data was recorded as such and utilized for statistical analysis.

3.5.3 Exclusion criteria (students):

- Students not wishing to participate in the study.
- Students that participated in the focus group discussion.

3.6 Procedure:

The research proposal and the questionnaire, approved by the Faculty Research Committee were forwarded to each relevant Head of Department in which the research was intended to be conducted. A covering letter (Appendix A) detailed the nature of the study and the process involved for administration of the research. Upon approval from each Head of Department, permission was obtained from relevant lecturers and an appropriate time-slot identified during which the questionnaire was administered by the researcher.

A Subject Information Letter (Appendix B) was provided to the student, detailing the nature of the study and the process involved. This ensured that the participant understood the context of the research study and what was expected of them. A questionnaire (Appendix E) was given to each participant who was willing to participate in the study to complete. The questionnaire was totally anonymous, as there were no details on the questionnaire that could associate the questionnaire with the student. The questionnaire was also collected by the researcher as soon as the questionnaire was completed to ensure confidentiality. Upon collection of the questionnaires, the results were captured onto a spreadsheet and checked to ascertain that the minimum response rate was achieved. The completed spreadsheet of data captured was forwarded to statistician for analysis. This information was then evaluated by the researcher and structured into the dissertation appropriately.

3.7 Questionnaire development:

The questionnaire initially developed was formulated using similar study questionnaires and questionnaires from headache research centers in other settings (Chicago Dizziness and Hearing, n.d.; Advanced Pain Management, n.d.; Boardman *et al*., 2000; UCSD Headache Center, n.d. and Williams and Nukada, 1994). It was then modified, based on further recommendations outlined in 3.7.1-3.7.6 into the final questionnaire.

3.7.1 Initial questionnaire:

The initial questionnaire consisted of three sections (Section A-C). Section A consisted of demographic characteristics, social history (such as smoking, alcohol consumption, caffeinated drinks consumption, exercise, sleeping habits and stress) and medical history. Section B included the headache history and headache characteristics (such as location, characteristics, duration and frequency of headaches). Section C consisted of a sequence of questions that would establish the effect of the headache on the productivity and activities of the student (Appendix C).

3.7.2 Focus group:

Possible participants were identified and invited to participate in the focus group meeting on the basis of one or more of the following criteria:

- Qualified practitioners- doctors of chiropractic or homeopathy with headache experience;
- Junior and senior students (to ensure that the questionnaire is understood by all students)
- At least one research supervisor
- The researcher

Ten possible participants were asked two weeks prior to the focus group meeting, for a time-slot that would be possible for them to attend the meeting. On receiving feedback, a common time was identified and the meeting was scheduled. Of the 10 possible participants, 8 confirmed that they could attend the meeting of which all attended on the day. The focus group therefore consisted of 8 participants, made up

of the researcher, the student supervisor, two qualified chiropractors and students from the relevant departments (junior and senior students) and was chaired by the researcher.

The focus group was conducted to allow for discussion on the content of the questionnaire developed. This enabled the participants to assess the questionnaire presented to them and clarify, modify, add or remove questions based on the group discussion and consensus (Salant and Dillman, 1994). The validity (face and content validity (Mouton, 1996; Dyer, 1997 and Bernard, 2000)) of the questionnaire is enhanced by members, other than the researcher, taking part in the focus group and contextualizing the questionnaire and its relevance in the research, thus supporting the research process (Salant and Dillman, 1994).

3.7.3 Outcome of focus group:

Following the focus group discussions, the questionnaire was amended accordingly in terms of uniformity, sectioning and grammar. A clear association between the contents of the questionnaire and the aims/objectives of the study was established so that all questions were relevant to the study's aims and objectives. The questionnaire therefore consisted of a 7 page hand - out comprising an overview of the study (including aims and objectives) and 6 sub - sections: demographics; social history; medical history; headache history; headache characteristics and the burden of headaches, arranged in a logical and coherent sequence.

The following includes the comments and changes that were recommended:

- There were two general comments made during the meeting as follows:
    - All the questions needed to be numbered, as this would be of great help when data capturing.
    - Secondly the questions must be uniform (in terms of nouns, verbs or adjectives used).

- Within section A the following suggestions were made:

    - Under the sub-heading “smoking”, it was asked how many cigarettes, cigars or pipes smoked per day. It was suggested that the number zero be included as opposed to starting at 1-5 per day and that “do you” be added after “have you”, so that it reads “Have you/do you ever smoked…”. Another comment was that social drug use be inserted after the questions related to alcohol use.
    - Under the sub-heading “caffeinated drinks”, only questions related to coffee, tea and coke were asked. It was suggested that “other” be added to this list.
    - Under the sub-heading “sleeping habits”, the question was “Do you sleep at regular intervals?”, this needed to be changed to “Do you have a routine sleeping pattern?”.
    - Under the sub-heading “stress”, the question stated “Do you consider yourself being under a significant amount of stress in the last 3 months?”- mental and physical stress needed to be added to the question, so that the student would then know what type of stress the researcher is referring to.
    - In the “medical history” section, hypertension had to be changed to high blood pressure (the junior students may still be new to medical terminology). The question relating to having had a CAT scan in the past, be changed to CAT scan of the head and/or neck.

- Within section B the following suggestions were made:

    - Under headache history, the question was “Since experiencing these headaches, have their patterns changed?”. One of the response options was, “do not last as long”. It was suggested that this be changed to “Not as long as previously”.
    - It was suggested that the follow-up question relating to “warning symptoms” be changed from “What type of warning do you

experience?" to "What type of warning symptom do you experience before your headache?".

- With regards to family members suffering from headaches it was suggested that the terms "mother's side or father's side" be changed to female or male relatives.
- Relating to medication that the student uses for their headache, it was suggested that a follow-up question be added on the effect that the medication had on the headache i.e. better, worse, no change or cannot recall.
- Under the sub-section on the headache characteristics it was suggested that the first question be changed from "Your pain right now" to "Do you have a headache at this moment" and that "0" be added to the pain rating scale so that those that do not have pain at the moment be included.
- It was suggested that long lists be arranged alphabetically so that the student could make the connection of which term belongs to specific headache; it was also suggested that the questions related to frequency be put before the questions on the duration of the headache and that the first response option for duration (0-1 hour) be replaced by 0-15 minutes, 15-30 minutes and 30 minutes-1 hour respectively.

- Within section C the following suggestions were made:

  - Questions related to frequency were moved to section B (with the other questions related to frequency).
  - There were two questions on what the student does when experiencing a headache - one when in a lecture and the second when at home. It was suggested that "other" be added to the list of possible answers.

3.7.4 Outcome departmental and ethical meeting/pilot study:

The main concern at the departmental meeting was that the questionnaire was too long. This could complicate the data capturing and the statistics would be long and some of it irrelevant to the study as specified by the objectives of the study.

The following suggestions were made at the departmental meeting:

- One of the objectives (to investigate the characteristics of each primary headache) was removed as this objective has been studied previously and the results well documented. The remaining three objectives was met based on section A and C. Section B was still part of the questionnaire, but only used for the purpose of diagnosing the type of primary headache. This shortened the questionnaire and the amount of statistics.

- To add a section at the beginning of the questionnaire for the researcher; so that the diagnosis could be recorded once it has been diagnosed.

- Within section A the following suggestions were made:

    - Shorten the number of questions on smoking i.e. instead of asking three different questions, combine them and ask “Have you ever smoked cigarettes/cigars/pipes?”.
    - In the sub-heading “caffeinated drinks”, change “coke” to “soft drinks” and list coke as an example.
    - In the sub-heading “sleeping habits”, it was suggested that the last question about how many times the student wakes up at night be deleted from the questionnaire, as this question was irrelevant.

- Within section B the following suggestions were made:

    - The question on whether the student suffers from more than one type of headache must be deleted, as most of the students would not know if it is the same type headache feeling more intense i.e. being more severe rather than another type of headache.

- In the sub-heading “headache characteristics” on pain, the last two questions should be deleted as it was confusing and the previous question provided adequate information to provide a diagnosis.

3.7.5 Final Questionnaire (Appendix E):

The final questionnaire consisted of three sections, Section A, B and C. Section A included the demographics, social history (smoking, alcohol consumption, social drugs, caffeinated drinks consumption, exercise, sleeping habits and stress) and medical history. Section B included the headache history and the headache characteristics. However, Section B was only used for diagnostic purposes according to the IHS criteria (Appendix F). Section C determined what effect the student’s headaches had on his/her life and how it influenced their productivity. Only sections A and C were used for statistical analysis.

3.8 Measurement frequency:

The questionnaire was administered to the student at the beginning of the study. No repeated tests or questionnaires were administered thereafter.

3.9 Statistical analysis:

SPSS version 15.0 was used to analyse the data. A p-value <0.05 was considered as statistically significant. Most of the analysis was descriptive, using frequency tables and bar charts for categorical variables. To determine the factors associated with headaches, cross-tabulations and chi-square tests were used for categorical risk factors, while t-tests will be used for quantitative risk factors.

3.10 Summary:

The study was an epidemiological, cross sectional survey of primary headaches with descriptive and analytical components. Allied Health students were chosen as the preferred population group and all students meeting inclusion criteria (3.5.1) were invited to participate. The questionnaire initially developed was formulated using similar study questionnaires and questionnaires from headache research centers in other settings and then modified at the focus group discussion and departmental and faculty research committee meetings. The questionnaire consisted of three sections, Section A, B and C. Section A included the demographics, social and medical history. Section B included the headache history and the headache characteristics. This section was only used for diagnostic purposes and to classify the headache according to the IHS criteria (Appendix F). Section C determined the effect of headaches on student life (particularly student productivity). Only sections A and C were used for statistical analysis. The data of the completed questionnaires were captured onto a spreadsheet and statistically analysed and structured into the dissertation accordingly.

CHAPTER 4: RESULTS

This chapter shows the results of the study and includes the prevalence of headaches, factors affecting the prevalence of the headaches and the association of the type of headache with activities of daily life and productivity of the student.

4.1 Sample size and response rate:

The total study population was ±420 (±200 chiropractic students, ±150 somatology students and ±70 homeopathy students), of which 314 questionnaires were collected by the researcher (response rate 74.8%). Of the 314 questionnaires that were collected, 311 were completed correctly and used for statistical analysis. The results indicated 83 male (26.7%) and 228 (73.3%) female respondents respectively. One hundred and eleven (35.7%) of the respondents were White, 65 (20.9%) Indian, 120 (38.6%) Black and 15 (4.8%) Coloured.

Thus, the response rate (after checking the questionnaires for completeness) was 74.0%, and above the minimum response rate of 70% (Esterhuizen, 2009) as targeted prior to the commencement of the study. Other questionnaire based studies showed lower response rates, especially those questionnaires that were distributed through the post [59% (Lindstrom, 2007), 43% (Caldwell, Coleman, Copp, Bell and Ghazi, 2007 and Copp, Caldwell, Atwal, Brett-Richards and Coleman, 2007) and 38% (Lindorff-Larsen, Rasmussen, Kondrup, Staun and Ladefoged, 2007)] as opposed to those that were self administered [55% (Tharaldsen, Olsen and Rundmo, 2007), 52% (Ross-Adjie, Leslie and Gillman, 2007), 75% (Riley, Stewart and Grace, 2007) and 55% (Chelenyane and Endacott, 2006)]. The remainder of the student population (±106) was either absent from the class when the questionnaires were distributed or chose not to participate in the study. The non participation rate was therefore ±25.2%.

4.2 Prevalence of headaches:

Of the total sample (N=311), 24.1% (n=75) did not experience headaches and the remaining 75.9% (n=236) were classified as having had either non-primary headache, MTH, TTH or CTH. Figure 1 shows the distribution of the types of headache in the sample. The most common type was MTH 31.2% (n=97) and TTH the second most common 30.2% (n=94), whilst CTHs were the least frequent 1.3% (n=4).

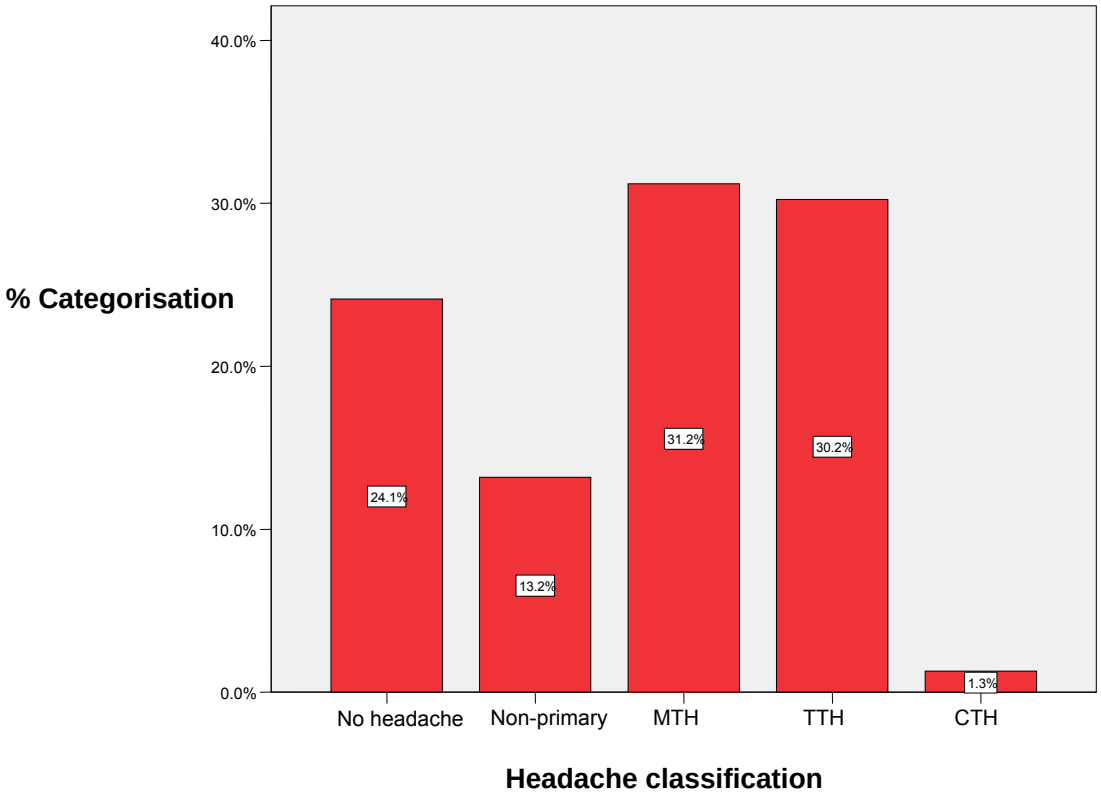


Figure 1: Prevalence of headache types of Allied Health students at Durban University of Technology

4.3 Factors affecting the prevalence of the headaches:

Table 9 shows an association between headache type and the department and the epidemiological characteristics that the student belonged to (p=0.004).

Table 9: Descriptive statistics of headache classification in Allied Health students at Durban University of Technology

		Diagnosis			
		Migraine %(n)	**Tension %(n)**	**Cluster %(n)**	***p*-value**
Department	**Chiropractic**	33.1(49)	36.5(54)	0.7(1)	0.004
	Homeopathy	25.0(13)	19.2(10)	3.8(2)	
	Somatology	31.5(35)	27.0(30)	0.9(1)	
Age		21.4±4.1[1]	20.7±2.7[1]	19.8±1.0[1]	0.462
Gender	**Male**	14.4(14)	16.9(27)	0(0)	<0.001
	Female	85.6(83)	36.4(67)	1.8(4)	
Ethnic Group	**White**	42.3(41)	36.9(37)	0(0)	0.040
	Black	29.9(29)	24.2(36)	1.7(2)	
	Indian	24.7(24)	36.9(14)	1.5(1)	
	Coloured	3.1(3)	20.0(7)	6.7(1)	

MTHs were almost equally likely in chiropractic and somatology students while chiropractic students were more likely to suffer from TTHs. There were very few CTHs (1.3%; n=4) and these tended to be most common in the homeopathic students (3.8%; n=2). Gender was also significantly related to the type of headache (p<0.001). Males were more likely to have no headache experiences, whilst females were twice as likely. Ethnic group was marginally significantly associated with type of headache (p=0.040).

Table 10 shows the association between smoking, recreational drugs as well as both alcoholic and non-alcoholic drinks.

Table 10: Risk factors for headaches in Allied Health students at Durban University of Technology

Risk factor			Headache		*p*-value
			No %(n)	Yes %(n)	
Smoking	**Smoking status**	**Current**	6.7(2)	93.3(28)	0.004
		Ex	7.4(2)	92.6(25)	
		Non smoker	28.0(71)	72.0(183)	
	Do you smoke	**Yes**	10.4(7)	89.6(60)	0.003
		No	27.9(68)	72.1(176)	
	How many per day smoked	**1-5**	13.0(6)	87.0(40)	0.679
		6-10	0(0)	100.0(9)	
		11-15	0(0)	100.0(4)	
		16-20	0(0)	100.0(2)	
		>20	0(0)	100.0(1)	
Alcohol	**Do you drink alcohol**	**Yes**	22.4(35)	77.6(121)	0.483
		No	25.8(40)	74.2(115)	
	Litres beer per week		1.2±1.1[1]	1.5±1.7[1]	0.501
	Litres wine per week		0.7±0.3[1]	1.2±1.3[1]	0.318
	Tots of spirits per week		2.4±1.7[1]	2.8±2.5[1]	0.436
Social Drugs	**Do you use social drugs?**	**Yes**	19.0(4)	81.0(17)	0.574
		No	24.5(71)	75.5(219)	
Caffeine	**Coffee**	**Yes**	18.6(43)	81.4(188)	<0.001
		No	40.0(32)	60.0(48)	
	Tea	**Yes**	24.1(58)	75.9(183)	0.970
		No	24.3(17)	75.7(53)	
	Soft drinks	**Yes**	22.7(53)	77.3(180)	0.329
		No	28.2(22)	71.8(56)	
	Other	**Yes**	22.3(25)	77.7(87)	0.579
		No	25.1(50)	74.9(149)	
	Cups coffee		1.6±1.2[1]	1.5±1.3[1]	0.569
	Cups tea		1.4±1.0[1]	1.6±1.2[1]	0.296
	Cups soft drinks		1.5±1.0[1]	1.5±1.1[1]	0.921
	Cups other		1.2±0.6[1]	1.2±0.7[1]	0.852

[1] mean±SD

Smokers and ex-smokers were significantly more likely to have headaches than non smokers (p=0.004 and 0.003 respectively). However, the number of cigarettes smoked per day was not associated with headaches (p= 0.679). Alcohol consumption was not associated with the prevalence of primary headaches, thus alcohol was shown to be a weak risk factor. The amount of alcohol consumed was not shown to affect the prevalence of primary headaches. Social drug use did not seem to influence the prevalence of primary headaches. Drinking coffee was shown to be a significant risk factor for headache (p<0.001), although the amount of coffee consumed did not have an impact. Drinking other caffeinated liquids such as soft drinks and caffeinated energy drinks was not associated with primary headaches, thus caffeine was also shown to be a weak risk factor.

Table 11 shows the association between headaches and risk factors such as exercise, stress and sleeping patterns.

Table 11: Risk factors for headaches in Allied Health students at Durban University of Technology

Risk factor			Headache		*p*-value
			No %(n)	Yes %(n)	
Exercise	**Do sport**	**Yes**	26.7(58)	73.3(159)	0.102
		No	18.1(17)	81.9(77)	
	Regular exercise	**Yes**	27.9(43)	72.1(111)	0.120
		No	20.4(32)	79.6(125)	
Sleeping pattern	**Hours sleep per day**		7.3±1.1[1]	7.1±1.3[1]	0.424
	Routine sleeping pattern	**Yes**	22.9(32)	77.1(108)	0.639
		No	25.1(43)	74.9(128)	
	Difficulty with sleeping pattern	**Yes**	16.0(17)	84.0(89)	0.017
		No	28.3(58)	71.7(147)	
Stress	**Grind teeth**	**Yes**	21.4(9)	78.6(33)	0.904
		No	24.4(50)	75.6(155)	
		Unknown	25.0(16)	75.0(48)	
	Under stress	**Yes**	17.6(28)	82.4(131)	0.006
		No	30.9(47)	69.1(105)	
	Treatment for stress	**Yes**	13.6(3)	86.4(19)	0.233
		No	24.9(72)	75.1(217)	

[1] mean±SD

Students that do not participate in sport and/or exercise had a slightly higher chance of suffering from primary headaches although not statistically significant. Maintaining a regular exercise program also lowers the chances of an individual suffering from primary headaches, although not statistically significant either. Having difficulty in maintaining a regular sleeping pattern was significantly associated with suffering from primary headaches (p=0.017). Being under stress or living a stressful life style was significantly associated with having primary headaches (p=0.006).

Table 12 shows the association between headaches and medical risk factors.

Table 12: Medical risk factors for headaches in Allied Health students at Durban University of Technology

Risk factor		Headache		*p*- value
		No %(n)	Yes %(n)	
Anaemia	**Yes**	15.8(6)	84.2(32)	0.200
	No	25.3(69)	74.7(204)	
High Blood Pressure	**Yes**	25.0(1)	75.0(3)	1.000
	No	24.1(74)	75.9(233)	
Thyroid disease	**Yes**	0(0)	100.0(5)	0.342
	No	24.5(75)	75.5(231)	
Depression	**Yes**	7.7(2)	92.3(24)	0.041
	No	25.6(73)	74.4(212)	
Seizures	**Yes**	0(0)	100.0(1)	1.000
	No	24.2(75)	75.8(235)	
Diabetes	**Yes**	0(0)	100.0(1)	1.000
	No	24.2(75)	75.8(235)	
Any head injuries (< 6months)?	**Yes**	0(0)	100.0(10)	0.070
	No	24.9(75)	75.1(226)	
If yes, did you receive any medical help?	**Yes**	0(0)	100.0(6)	-
	No	0(0)	100.0(4)	
Have you had a CAT scan of your head and neck and/or a brain MRI scan in the past?	**Yes**	11.1(3)	88.9(24)	0.098
	No	25.4(72)	74.6(212)	

Only depression was significantly associated with headaches (p=0.041). Participants who had head injuries were also more likely to have headaches, but this was not significant (p=0.070). Participants who were anaemic also displayed more of a chance of suffering from headaches than those participants who were not anaemic.

Based on the findings relating to possible risk factors for primary headaches, it would be most appropriate to reject Hypothesis 1 (accept the null hypothesis), which states that the prevalence of headaches is not increased by risk factors such as smoking, alcohol, social drugs, caffeine, physical activity, sleeping disorders and stress.

4.4 The association of the type of headache with activities of daily life and productivity of the student:

Table 13 shows the impact of headaches during lecture time as well as at home.

Table 13: Impact of headache on daily life of Allied Health students

			Diagnosis			
			Migraine %(n)	Tension %(n)	Cluster %(n)	*p*-value
In a lecture	**Put up with the headache and continue as normal**	**No**	53.4(31)	29.3(17)	1.7(1)	0.162
		Yes	37.1(66)	43.3(77)	1.7(3)	
	Take headache medicine and continue as normal	**No**	34.9(59)	44.4(75)	2.4(4)	0.014
		Yes	56.7(38)	28.4(19)	0(0)	
	Stop what you are doing and rest	**No**	41.4(92)	40.5(90)	1.4(3)	0.235
		Yes	35.7(5)	28.6(4)	7.1(1)	
	Other	**No**	41.4(96)	39.7(92)	1.7(4)	0.904
		Yes	25.0(1)	50.0(2)	0(0)	

Table 13: Impact of headache on daily life of Allied Health students (continued)

			Diagnosis			
			Migraine %(n)	Tension %(n)	Cluster %(n)	*p*-value
At home	**Put up with the headache and continue as normal**	**No**	42.2(79)	37.4(70)	2.1(4)	0.396
		Yes	36.7(18)	49.0(24)	0(0)	
	Take headache medicine and continue as normal	**No**	46.9(45)	37.5(36)	0(0)	0.207
		Yes	37.1(52)	41.4(58)	2.9(4)	
	Stop what you are doing and rest	**No**	37.2(54)	43.4(63)	1.4(2)	0.409
		Yes	47.3(43)	34.1(31)	2.2(2)	
	Other	**No**	40.5(90)	40.5(90)	1.8(4)	0.764
		Yes	50.0(7)	28.6(4)	0(0)	
Are your headaches ever so severe that you have to leave DUT and go home and rest?		**Yes**	56.4(22)	28.2(11)	2.6(1)	0.171
		No	38.1(75)	42.1(83)	1.5(3)	
If yes, how many times in the last 3 months has this occurred?		**Median**	1.5	1	1	0.404

There was a significant difference between the four headache types in terms of what a student does when in a lecture or at home. In general, Table 13 shows that most students managed the headache and continued as normal, other than in MTH where more respondents did not continue/attend lectures than those that did. MTH sufferers were significantly more likely to take headache medication than those with any other type of headache (p=0.014) and students suffering from MTH were also more likely to stop what they were doing and rest.

When at home, the percentage of students suffering from a TTH, MTH and CTH (in descending order) put up with the headache and continued as normal. Students suffering from TTH (followed by migraine and cluster headaches respectively) were more likely to take headache medication and continue as normal when at home. Students suffering from MTH were most likely to stop what they were doing and rest when at home. This was similarly followed by TTH and less so by CTH. Approximately 56% of students suffering from MTH (twice the amount of TTH) reported that their headaches were severe and had to return home to rest.

Table 14 shows the impact of headaches, particularly on lecture attendance, activities of daily life (eating, walking and sleeping) and family/social events. The table also shows the mean values of lectures and academic days missed by the students, the effect it had on their activities of daily life and the influence on family or social activities with respect to each of the types of headaches.

Table 14: Burden of headaches in Allied Health students at Durban University of Technology

	Diagnosis			
	Migraine	**Tension**	**Cluster**	***p*-value**
a. On how many occasions/days in the last 3 months have you missed lectures at DUT because of your headaches?	0	0	1	0.159
b. On how many occasions/days in the last 3 months have you gone to lectures at DUT despite having had a headache?	6	6	55	<0.001

Table 14: Burden of headaches in Allied Health students at Durban University of Technology (Continued)

	Diagnosis			
	Migraine	Tension	Cluster	*p*-value
c. On how many occasions/days in the last 3 months has your ability to do activities of daily life been reduced by half or more because of your headaches?	2	0	10	<0.001
d. On how many occasions/days in the last 3 months have you missed family, social or leisure activities because of your headaches?	0	0	5	0.002

Table 14 indicates that the more severe the headache was, the greater the affect it had on the student with respect to the categories used above.

Table 15 shows the effect of each headache type on the productivity of the student while experiencing a headache and its overall productivity over the past 3 months.

Table 15: Effect of headaches on productivity of Allied Health students at Durban University of Technology

		Diagnosis			
		Migraine %(n)	Tension %(n)	Cluster %(n)	*p*-value
When I experience a headache my productivity is decreased by	**0%**	57.1(4)	28.6(2)	0(0)	<0.001
	1-10%	19.2(5)	30.8(8)	0(0)	
	11-20%	26.2(11)	45.2(19)	0(0)	
	21-30%	30.6(15)	53.1(26)	0(0)	
	31-40%	58.3(21)	36.1(13)	2.8(1)	
	41-50%	46.7(14)	36.7(11)	3.3(1)	
	51-60%	52.6(10)	42.1(8)	0(0)	
	61-70%	66.7(8)	33.3(4)	0(0)	
	71-80%	50.0(3)	16.7(1)	16.7(1)	
	81-90%	66.7(4)	33.3(2)	0(0)	
	91-100%	66.7(2)	0(0)	33.3(1)	

Table 15: Effect of headaches on productivity of Allied Health students at Durban University of Technology (Continued)

		Diagnosis			
		Migraine %(n)	**Tension %(n)**	**Cluster %(n)**	***p*-value**
On average in the last 3 months my headaches decreased my overall productivity by	**0%**	35.0(7)	25.0(5)	0(0)	<0.001
	1-10%	28.3(15)	41.5(22)	1.9(1)	
	11-20%	41.7(20)	39.6(19)	0(0)	
	21-30%	40.5(17)	52.4(22)	0(0)	
	31-40%	47.6(10)	38.1(8)	4.8(1)	
	41-50%	43.8(7)	43.8(7)	0(0)	
	51-60%	42.1(8)	47.4(9)	5.3(1)	
	61-70%	71.4(5)	14.3(1)	14.3(1)	
	71-80%	100.0(5)	0(0)	0(0)	
	81-90%	33.3(1)	33.3(1)	0(0)	
	91-100%	100.0(2)	0(0)	0(0)	

Students suffering from MTH, TTH and CTH reported an average decreased productivity ranging from 11-60%, 11-50% and 71-100% respectively. As seen in the second part of Table 15, MTH decreased the overall productivity of the student by 1-40%, TTH 1-30% and CTH 51-70%. Thus TTH had the lowest productivity loss and CTH the highest.

Based on the findings relating to productivity and daily life activities, it would be appropriate to reject Hypothesis 2 (accept the null hypothesis), which states that the productivity and activities of daily life is not affected by primary headaches.

4.5 Summary and conclusion:

Headaches are very prevalent amongst the student population. There were several factors associated with having headaches, but the results can only show an association and not determine whether the risk factors were causally related, due to the cross-sectional nature of the study. Nevertheless, in keeping with the primary aim of the study, the research undertaken provides useful information of the prevalence of headaches in a student population, and show that CTHs, although rare in occurrence, tended to have the most impact on daily life and productivity of the student as an individual. MTHs and TTHs tended to have a greater effect on the student population, mainly due to their high incidence.

CHAPTER 5: DISCUSSION

This chapter discusses the results of this study and how it compares to other studies of similar interest. It also includes the sample size of the study, the prevalence of primary headaches in the students, demographic factors related to headaches, factors that influence the prevalence of these headaches and the association of these headaches with activities of daily life and productivity.

5.1 Sample size and gender distribution:

The study population (N=420), included 311 correctly completed questionnaires (response rate 74.0 %), made up of 83 male (26.7%) and 228 (73.3%) female respondents respectively. Other studies that were done on specific population groups had similar sample sizes. For example, in a study done by Deleu *et al.,* (2001) on medical students (N=423), 403 (95.3%) completed the questionnaire, made up of 151 males (37.5%) and 252 females (62.5%). Curry and Green (2007), did a study on an undergraduate student population (N=104), (no response rate or gender breakdown was given) and da Costa *et al.,* (2001), on medical students (N=607) of which 408 (67.2%) responded to the questionnaire, 245 males (60%) and 163 females (40%). Thus, this study has attained a sufficient response rate for it to be statistically accepted. No parallels could be drawn with respect to the gender distribution.

5.2 Demographic factors related to headaches:

This study showed gender to be significantly related to the type of headache. Males were more likely to have no headache experiences, whilst females were more prone to headaches. Of those students that did suffer from headaches, 79.7% were female and 20.3% were male. This is comparable with other studies on university students. For example, da Costa *et al.,* (2000) reported headaches being more prevalent in females than males (45.5% and 24.6% respectively) and Bigal *et al.,* (2001) observed similar findings (66.9% and 16.2% respectively).

This study also showed the female-male ratios for MTHs and TTHs to be approximately 6:1 and 3:1 respectively. The ratio for CTHs could not be calculated as no males in the study suffered from CTHs. All studies reported that MTHs are more prevalent among females (Rasmussen, 2001), with a female to male ratio of 2-3:1 (Rasmussen, 2001; Zwart *et al.,* 2004 and Jensen and Stovner, 2008). TTH are also more prevalent amongst females with an approximate female-male ratio of 2:1 (females:males) (Rasmussen, 2001) and 5:4 (Lyngberg *et al.,* 2005 and Jensen and Stovner, 2008); thus unlike in MTH, females are only slightly more prevalent in TTHs. Whilst MTH and TTH occur more commonly in females (Rasmussen, 2001; Zwart *et al.,* 2004; Lyngberg *et al.,* 2005 and Jensen and Stovner, 2008), CTH are more common in males (IHS, 2004 and Sargeant and Blanda, 2009) with a ratio of 3-4:1 (IHS,2004).

Ethnicity was marginally significantly associated with type of headache (p=0.04). The incidence of MTHs was more predominant in Whites (42.3%). With respect to TTHs, there was an equal prevalence in White and Indian students (36.9% respectively) CTHs were not included in this analysis due to the low prevalence. A study done by Steiner *et al.,* (2003) in England showed similar results with MTH being more common in Caucasian females (19%) and males (7.7%) than in non-Caucasian females (9.3%) and males (5.1%). According to Schwartz *et al*., (1998), TTH are also more common among the White population in both females (46.8%) and males (40.1%) as opposed to Black females (30.9%) and males (22.8%) (Schwartz *et al.,* 1998).

5.3 Prevalence of headaches:

In this study the most common type of headache was MTH (31.2%), followed by TTH (30.2%); whilst CTHs were the least frequent (1.3%). A study carried out by Kurt and Kaplan (2008), amongst Turkish university students showed TTHs to be more prevalent than MTHs (22.6% and 17.9% respectively). A study by Bigal *et al.,* (2001) on Brazilian university students showed similar, but somewhat higher prevalence rates between TTHs and MTHs (32.9% and 25% respectively). A study by da Costa

et al., (2000) on Brazilian university students, showed similar results for TTH and MTH (39.5% and 39.6% respectively).

The results obtained by da Costa et al., (2000) are similar to this study i.e. the prevalence of MTHs and TTHs were almost equal. Other studies also showed variable results and very wide percentage ranges. For example, Kurt and Kaplan (2008) showed ranges of 12.2%-40.2% for MTHs and 4.7%-32.1% for TTHs, supporting the statement that data from prevalence studies are variable. In addition, the low prevalence of CTH's in this study (1.3%) supports the finding by Finkel, (2003) and the conclusion that CTHs are rare and difficult to define in a specific population group.

5.4 Factors affecting the prevalence of the headaches:

A cross section study by Payne *et al.,* (1991); Aamodt *et al.,* (2006); Wiendels *et al.,* (2006) and Molarius *et al.,* (2008), showed an increased prevalence of primary headaches among smokers compared to non smokers. Rasmussen (1993), found no association between smoking and headaches. In this study, smokers and ex-smokers were significantly more likely to have headaches than non smokers. However, the number of cigarettes smoked per day was not associated with headaches. This study supports the findings of Rasmussen, (1993) and Molarius *et al.,* (2008) who also found no association between alcohol consumption and headache prevalence.

Drinking coffee was shown to be a significant risk factor for headaches in this study, although the amount of coffee consumed did not have an impact. Drinking other caffeinated liquids was not associated with primary headaches, thus caffeine was shown to be a weak risk factor. A study carried out by Wiendels *et al.,* (2006), also found similar results when caffeine consumption was investigated as a risk factor. Shapiro, (2007) found that a large intake of caffeine resulted in an increased risk of daily headaches and then stopping this large intake resulted in a withdrawal syndrome with headaches as a symptom.

This study showed an association between sport and headache prevalence. Students that did not participate in sport and/or exercise were shown to have a slightly higher incidence of primary headaches whereas those maintaining a regular exercise program were shown to have a lower incidence of primary headaches, although not statistically significant. These results showed similar findings to Molarius *et al.,* (2008), in that headaches were more prevalent in those who were physically inactive than those who were physically active. These findings were consistent with a much earlier study by Rasmussen, 1993 who also observed similar findings and found an increased prevalence of TTH in men with a sedentary life style.

Having difficulty in maintaining a regular sleeping pattern was significantly associated with primary headaches (p=0.017). Of those students that reported they had a difficulty with maintaining a regular sleeping pattern, 84% were headaches sufferers. Similarly, a study by Deleu et al., (2001) on medical students (N=403) in Oman, found sleep deprivation to be one of the most important risk factors. It also had the highest frequency of all the other factors they tested such as sunlight exposure, menstruation, mental and emotional stress. Kurt and Kaplan (2008) found sleeplessness to be one of the most common factors among MTH and TTH sufferers (44.5% and 43.7% respectively). Other studies on university students also found sleeplessness to be a common factor in primary headaches (Ogunyemi, 1984; Amayo, Jowi and Njeru, 1996; Sanvito, Monzillo, Peres, Martinelli, Fera, Gouveia, Murachovsky, Salomao and Leme, 1996 and Kececi and Dener, 2002).

Being under stress or living a stressful life style was significantly associated with primary headaches (p=0.006). Of those students that reported that they were under stress, 82.4% also suffered from headaches. This is similar to results obtained by Curry and Green (2007), which found stress or tension to be the most common factor. A study by Kececi and Dener (2002), in Turkey (N=1 320) found that 64.6% of respondents reported emotional stress influenced their headache prevalence. In a study carried out by Amayo *et al*., (1996) on medical students (N=711), 21% of respondents reported that the stress of studying was a factor that influenced their headache occurrence. Similarly, a study by Deleu *et al*., (2001) on medical students (N=403) in Oman, found emotional and mental stress to be a common factor related

to headache frequency and other studies on university students also found stress to be a common factor in primary headaches (Ogunyemi, 1984 and Sanvito *et al.,* 1996).

In this study, depression was shown to be the only medical risk factor significantly associated with headache (p= 0.041). Bigal *et al.,* (2001) found that students suffering with MTH were more depressed and nervous than those with TTH. Lipton, Bigal, Kolodner, Stewart, Liberman and Steiner, (2003) found that suffering from depression and MTH added to the reduced quality of life. In a study by Tietjen et al., (2007) (N=223), 37.2% of the participants suffered from CTH and also had depression as a co-morbid effect. Zwart *et al.,* (2003) conducted a large cross-sectional population based study (N=64 560) in Norway, on depression and anxiety and how it affected the frequency of headaches on individuals 20 years and older. Both headache groups (MTHs and other headache types) were significantly associated with depression (p<0.0001). Depression was more pronounced among individuals with MTHs, than other headaches types. Those individuals that did not suffer from headaches had the lowest depression rate. Also, the depression rate doubled/tripled in those individuals that suffered from headaches more than 14 times a month, compared to those that only had it less than seven times a month.

5.5 The association of the type of headache with activities of daily life and productivity of the student:

Cluster-type headaches showed a significant impact on lifestyle than the other headache types, particularly on lecture attendance (p=<0.001), activities of daily life (eating, walking and sleeping) (p= 0.002) and family/social events (p=<0.001). MTH also had a greater effect than TTH. From this we can conclude, the more severe the headache is, the greater the effect it has on the student with respect to the categories above. Bigal *et al.,* (2001) found that the study performance of students as well as the number of days they studied at home was greatly decreased in those students that suffered from MTH and to a lesser extent by those that suffered from TTH. Students suffering from MTH missed more days than those with TTH. Thus most of the students reported that suffering from headaches interfered with their overall performance (Bigal *et al.,* 2001). This would confirm the results obtained in this study

as MTH were evidently more severe than TTH (IHS, 2004) and had a greater effect on the student performance.

When experiencing the headache attack, students suffering from MTH, TTH and CTH reported an average decreased productivity ranging from 11-60%, 11-50% and 71-100% respectively. MTH decreased the overall productivity of the student by 1-40%, TTH 1-30% and CTH 51-70%. Whilst this demonstrates a very large range, TTHs were noted to have the lowest productivity loss and CTHs the highest. Also, a greater percentage of students that suffered from MTH, as compared to students with TTH, said it interfered with their activities of daily life (Bigal *et al.,* 2001). This supports the findings in this study as TTHs were categorised as mild-moderate, MTHs moderate-severe and CTHs (although very low prevalence) severe as per the IHS classification (IHS, 2004). This was similar to the findings of other studies, on students as well as on the general population, in which MTHs and TTHs caused a decrease in productivity and quality of life (Rasmussen, 1999; Bigal *et al.,* 2001; Curry and Green, 2007; Jensen and Stovner, 2008 and Kurt and Kaplan, 2008).

5.6 Summary:

This study was of similar size when compared to other studies on student groups (Deleu *et al.,* 2001; da Costa *et al.,* 2001 and Curry and Green, 2007). The demographic and risk factors that were shown to have an influence on this population were similar to other studies (Bigal *et al.,* 2001; Deleu et al., 2001; Kececi and Dener 2002; Steiner *et al.,* 2003; Zwart *et al.,* 2003; Aamodt *et al.,* 2006; Wiendels *et al.,* 2006 and Molarius *et al.,* 2008), although the numbers/percentages differed. As with other studies (Bigal *et al.,* 2001; Jensen and Stovner, 2008 and Kurt and Kaplan, 2008), headaches showed a significant effect on student productivity as well as their activities of daily life, although the extent to which it affected the individual depended largely on the headache type and its severity.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

The study supports previous findings documented on the prevalence of headaches in student populations in showing that primary headaches are common and occur frequently in university students (Amayo *et al.,* 1996; da Costa *et al.,* 2000; Bigal *et al.,* 2001; Deleu *et al.,* 2001; Kaynak Key *et al.,* 2004; Curry and Green, 2007 and Kurt and Kaplan, 2008). More specifically, the study observed a high prevalence in MTHs (31.2%) and TTH (30.2%). A very low prevalence of CTH was noted (1.3%), as similarly documented in previous studies (Finkel, 2003 and Haimanot, 2003). Smoking, sleeping disorders, stress and depression were the only risk factors that were statistically significant. A further finding was that the burden of primary headaches appears to be underestimated and is shown to have a great effect on student productivity and attendance at university, and an overall negative effect on the quality of life of the student.

Future research studies should be aimed at a greater sample size and a greater diversity of ethnic groups if possible. It should also be directed towards similar studies on students, and further explore the impact of headaches on student attendance, performance, overall productivity and quality of life, as there are only a few studies in this area. Whilst there are several studies documenting the prevalence and clinical features of headaches, few studies have focused on the impact of the headache on students. Nevertheless, the findings of this study, when compared with similar studies previously conducted in other settings, provides a useful addition to current literature and more importantly new information within the South African context.

REFERENCE LIST:

Aamodt, A.H., Stovner, L.J., Hagen, K., Brathen, G. and Zwart, J. 2006. Headache prevalence related to smoking and alcohol use. *European Journal of Neurology*, 13(11):1233-1238.

Advanced Pain Management Headache Questionnaire [online]. n.d. Available at: http://www.advpain.com/patientForms/HEADACHEquestionnaire.pdf [Accessed 31 May 2009].

Amayo, E.O., Jowi, J.O. and Njeru, E.K. 1996. Migraine headaches in a group of medical students at the Kenyatta National Hospital, Nairobi. *East African Medical Journal*, 73(9):594-597.

Aurora, S.K. 2004. Pathophysiology of Migraine and Cluster Headaches. *Seminars in Pain Medicine*, 2(2): 62-71.

Bendtsen, L. 2000. Central sensitization in tension-type headache- possible pathophysiological mechanisms. *Cephalalgia*, 20(5): 486-508.

Bernard, H.R. 2000. *Social Research Methods: Qualitative and Quantitative Approaches*. California: Sage Publications Inc.

Bigal, M.E., Bigal, J.M., Betti, M., Bordini, C.A. and Speciali, J.G. 2001. Evaluation of the impact of migraine and episodic tension-type headache on the quality of life and performance of a university student population. *Headache: The journal of Head and Face Pain*, 41(7): 710-719.

Blanda, M. and Sargeant, L.K. 2009. *Headache, Tension* [online]. Available at: http://emedicine.medscape.com/article/792384 [Accessed 3 March 2010].

Blanda, M. and Wright, J.T. 2009. Headache, *Migraine* [online]. Available at: http://emedicine.medscape.com/article/792267 [Accessed 5 March 2010].

Boardman, H., Millson, D. and Croft, P. 2000. *Headache and General Health Survey* [online]. Available at: http://www.keele.ac.uk/research/pchs/pcmrc/dissemination/tools/Headache.pdf [Accessed 31 May 2009].

Bourinet, E., Soong, T.Q., Sutton, K., Slaymaker, S., Mathews, E., Monteil, A., Zamponi, G.W., Nargeot, J. and Snutch, T.P. 1999. Splicing of α1A subunit gene generates phenotypic variants of P- and Q-type calcium channels. *Nature Neuroscience*, 2(5): 407-415.

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

Chawla, J. 2009. *Migraine Headache* [online]. Available at: http://emedicine.medscape.com/article/1142556 [Accessed 3 March 2010].

Chelenyane, M. and Endacott, R. 2006. Self-reported infection control practices and perceptions of HIV/AIDS risk amongst emergency department nurses in Botswana. *Accident and Emergency Nursing*, 14(3): 148-154.

Chicago Dizziness and Hearing [online]. n.d. Available at: http://www.dizziness-and-balance.com/practice/resources/Headache%20Questionnaire.pdf [Accessed 31 May 2009].

Copp, G., Caldwell, K., Atwal, A., Brett-Richards, M. and Coleman, K. 2007. Preparation for cancer care: Perceptions of newly qualified health care professionals. *European Journal of Oncology Nursing*, 11(2): 159-167.

Curry, K. and Green, R. 2007. Prevalence and management of headache in a university undergraduate population. *Journal of the American Academy of Nurse Practioners*, 19(7): 378-382.

da Costa, M.Z.G., Soares, C.B., Heinisch, L.M. and Heinisch, R.G. 2000. Frequency of headache in the medical students of Santa Catarina's Federal University. *Headache: The Journal of Head and Face Pain*, 40(7): 710-719.

Deleu, D., Khan, M.A., Humaidan, H., Al Mantheri, Z. and Al Hashami, S. 2001. Prevalence and Clinical Characteristics of Headache in Medical Students in Oman. *Headache*, 41(8): 798-804.

Dirnberger, F. and Becker, K. 2004. Surgical Treatment of Migraine Headaches by Corrugator Muscle Resection. *Plastic and Reconstructive Surgery*, 114(3); 652-657.

Dyer, C. 1997. *Beginning Research in Psychology: A practical guide to research methods and statistics*. Blackwell Publishers Ltd. Oxford.

Esterhuizen, T. 2009. Interviewed by J. Prangley. UKZN, Durban, 16 July.

Finkel, A.G. 2003. Epidemiology of Cluster Headache. *Current Pain and Headache Reports*, 7(2): 144-149.

Fumal, A. and Schoenen, J. 2008. Tension-type headache: Current research and clinical management. *The Lancet Neurology*, 7(1): 70-83.

Goadsby, P.J. 2002. Pathophysiology of cluster headache: a trigeminal autonomic cephalgia. *The Lancet Neurology*, 1(4): 251-257.

Guyuron, B., Kriegler, J.S., Davis, J. and Amini, S.B. 2005. Comprehensive Surgical Treatment of Migraine Headaches. *Plastic and Reconstructive Surgery*, 115(1): 1-9.

Haimanot, R.T. 2003. Burden of headache in Africa. *Journal of Headache Pain*, 4(1): 47-54.

Holle, D., Obermann, M. and Katsarava, Z. 2009. The electrophysiology of cluster headache. *Current Pain and Headache Reports*, 13:155-159.

International Headache Society. 2004. Part One- The primary headaches. *Cephalalgia*, 24(1): 24-48.

Jensen, R. 2003. Diagnosis, Epidemiology, and Impact of Tension-type Headache. *Current Headache Reports*, 7(6): 455-459.

Jensen, R. and Stovner, L.J. 2008. Epidemiology and co morbidity of headache. *The Lancet Neurology*, 7(4): 354-361.

Johnson, C. 2005. On the subject of human subjects. *Journal of Manipulative Physiological Therapeutics*, 28:79-80.

Kaynak Key, F.N., Donmez, S. and Tuzun, U. 2004. Epidemiological and clinical characteristic with psychosocial aspects of tension-type headache in Turkish college students. *Cephalalgia*, 24(8): 669-674.

Kececi, H. and Dener, S. 2002. Epidemiological and Clinical Characteristics of Migraine in Sivas, Turkey. *Headache*, 42(4): 275-280.

Kumar, R. and Dafer, R.M. 2009. *Cluster Headache* [online]. Available at: http://emedicine.medscape.com/article/1142459 [Accessed 3 March 2010].

Kurt, S. and Kaplan, Y. 2008. Epidemiology and clinical characteristics of headaches in university students. *Clinical Neurology and Neurosurgery*, 110(1): 46-50.

Lindorff-Larsen, K., Rasmussen, H.H., Kondrup, J., Staun, M. and Ladefoged, K. 2007. Management and perception of hospital under nutrition – A positive change among Danish doctors and nurses. *Clinical Nutrition*, 26(3):371-378.

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

Lipton, R.B., Bigal, M.E., Kolodner, K., Stewart, W.F., Liberman, J.N. and Steiner, T.J. 2003. The family impact of migraine: population-based studies in the USA and UK. *Cephalalgia*, 23(6): 429-440.

Lyngberg, A.C., Rasmussen, B.K., Jorgensen, T. and Jensen, R. 2005. Has the prevalence of migraine and tension-type headache changed over a 12-year period? A Danish population survey. *European Journal of Epidemiology*, 20(3): 243–249.

Mendizabal, J.E., Umana, E. and Zweifler, R.M. 1998. Cluster headache: Horton's cephalalgia revisited. *Southern Medical Journal*, 91(7): 606-617.

Molarius, A., Tegelberg, A. and Ohrvik, J. 2008. Socio-Economic Factors, Lifestyle and Headache Disorders- A Population-Based Study in Sweden. *Headache journal*, 48(10): 1426-1437.

Mouton, J. 1996. Understanding Social Research. Pretoria: Van Schaik Publishers.

Ogunyemi, A.O. 1984. Prevalence of Headaches among Nigerian University Students, *Headache: The journal of Head and Face Pain*, 24(3): 127-130.

Payne, T.J., Sterson, B., Stevens, V.M., Johnson, C.A., Penzien, D.B. and Van Dorsten, B. 1991. The Impact of Cigarette Smoking on Headache Activity in Headache Patients. *Headache*, 31(5): 329-332.

Rasmussen, B.K. 1993. Migraine and tension-type headache in a general population: precipitating factors, female hormones, sleep pattern and relation to lifestyle. *Pain*, 53(1): 65-72.

Rasmussen, B.K. 1999. Epidemiology and socio-economic impact of headache. *Cephalalgia*, 19(25): 20-23.

Rasmussen, B.K. 2001. Epidemiology of headache. *Cephalalgia*, 21(7): 774–777.

Republic of South Africa. 1982. Allied Health Professions Act 63 of 1982. Pretoria: Government Printer.

Riley, D.L., Stewart, D.E. and Grace, S.L. 2007. Continuity of cardiac care: Cardiac rehabilitation participation and other correlates. *International Journal of Cardiology*, 119(3): 326-333.

Ross-Adjie, G.M., Leslie, G. and Gillman, L. 2007. Occupational stress in the ED: What matters to nurses?. *Australasian Emergency Nursing Journal*, 10(3): 117-123.

Ruoff, G. and Urban, G. 2004. Treatment of primary headache: episodic tension-type headache. *National headache foundation*, 1: 1-30.

Salant, P. and Dillman, D.A. 1994. *How to conduct your own survey*. New York: Wiley.

Sanvito, W.L., Monzillo, P.H., Peres, M.F., Martinelli, M.O., Fera, M.P., Gouveia, D.A., Murachovsky, J., Salomao, W.R. and Leme, R.J. 1996. The epidemiology of migraine in medical students. *Headache*, 36(5): 316–319.

Sargeant, K. and Blanda, M. 2009. *Headache, Cluster* [online]. Available at: http://emedicine.medscape.com/article/792150 [Accessed 5 March 2010].

Scher, A.I., Midgette, L.A. and Lipton, R.B. 2008. Risk Factors for Headache Chronification. *Headache journal*, 48(1): 16-25.

Schwartz, B.S., Stewart, W.F., Simon, D. and Lipton, R.B. 1998. Epidemiology of tension-type headache. *Journal of the American Medical Association*, 279(5): 381–383.

Shapiro, R.E. 2007. Caffeine and headaches. *Neurological Science*, 28(2): 179-183.

Singh, M.K. 2008. *Muscle Contraction Tension Headache* [online]. Available at: http://emedicine.medscape.com/article/1142908 [Accessed 5 March 2010].

Stedman's Medical Dictionary. 27th edition. 1999. United States of America: Lippincott, Williams and Wilkins.

Steiner, T.J., Scher, A.L., Stewart, W.F., Kolodner, K., Liberman, J. and Lipton, R.B. 2003. The prevalence and disability burden of adult migraine in England and their relationships to age, gender and ethnicity. *Cephalalgia*, 23(7): 519–527.

Stovner, L., Hagen, K. and Jensen, R. 2007. The global burden of headache: a documentation of headache prevalence and disability worldwide. *Cephalalgia*, 27(3): 193–210.

Tharaldsen, J.E., Olsen, E. and Rundmo, T. 2007. A longitudinal study of safety climate on the Norwegian continental shelf. *Safety Science*, 46(3):427-439.

Tietjen, G.E., Herial, N.A., Hardgrove, J., Utley, C. and White, L. 2007. Migraine Comorbidity Constellations. *Headache*, 47(6): 857-865.

Trochim, W.M.K. 2006. *Researc Methods Knowledge Base* [online]. Available at: http://www.socialresearchmethods.net/kb/sampnon.php [Accessed 21 July 2009].

UCSD Headache Center Headache Questionnaire [online]. n.d. Available at: http://health.toodoc.com/doc/9662/ [Accessed 31 May 2009].

Ulrich, V., Russel, M.B., Jensen, R. and Olesen, J. 1996. A comparison of tension-type headache in migraineurs and in non-migraineurs: a population-based study. *Pain*, 67(2): 501-506.

Vernon, H. and McDermaid, C. 1998. Chiropractic management of episodic tention-type headache: A survey of clinical specialists. *Journal of Canadian Chiropractic Association*, 42(4): 209-215.

Wiendels, N.J., Knuistingh Neven, A., Rosendaal, F.R., Spinhoven, P., Zitman, F.G. and Assendelft, W.J.J. 2006. Chronic frequent headache in the general population: prevalence and associated factors. *Cephalalgia*, 26(12): 1434-1442.

Williams, S.J. and Nukada, H. 1994. Sport and exercise headache: Prevalence among university students. *British Journal of Sports Medicine*, 28(2): no page numbers.

Zwart, J.A., Dyb, G., Hagen, K., Odegard, K.J., Dahl, A.A., Bovim, G. and Stovner, L.J. 2003. Depression and anxiety disorders associated with headache frequency. The Nord-Trondelag Health Study. *European Journal of Neurology*, 10(2): 147-152.

Zwart, J.A., Dyb, G. and Holmen, T.L. 2004. The prevalence of migraine and tension-type headaches among adolescents in Norway: The Nord-Trondelag Health Study. *Cephalagia*, 24(5): 373–379.

APPENDICES:

Appendix A: Letter of Information and Consent to the relevant HOD's

To whom it may concern:

I am a chiropractic master's student who is doing my research on primary headaches in Allied Health students at DUT. Listed below is all the relevant information about my research and what it will include.

Principle Investigator/s:

Johan Prangley Contact number (031-373 2205)

Co-Investigator/s:

Mr. J.D. Pillay Contact number (031-3732398)

Title of the Research Study:

The primary headaches in Allied Health students at the Durban University of Technology.

Brief Introduction and Purpose of the Study:

Several studies have confirmed a high prevalence of headaches in adults.

The aim of this research is therefore, to determine the prevalence of primary headaches and the factors that influence the prevalence in Allied Health students at the Durban University of Technology (DUT).

Outline of the Procedures:

All students meeting the inclusion criteria (detailed below) will be invited to participate in this study. A questionnaire will be given to each student/participant for completion. Participation is purely voluntary and a student may choose not to take part in the study if he/she so wishes. The questionnaire will be administered and collected by the researcher (Ballot Box Method) so as to maintain confidentiality at all times. The researcher will thereafter document the information for statistical analysis and further results.

Inclusion criteria (students):

- Only students who are registered full time students with the Health Science Faculty at DUT and are categorised as Allied Health students will be included into the study. According to the Allied Health Professions Act 63 of 1982 the following professions are part of the allied health at DUT: Homeopathy, Chiropractic and Somatology.

Exclusion criteria (students):

- As this is a prevalence study, there are no exclusion criteria. However, those students not wishing to participate in the study will be excluded.
- Students that participated in the focus group discussion.

Risks or Discomforts to the Subject:

None.

Benefits:

Your full co-operation will assist the relevant professions in expanding its knowledge of this condition and thus making future treatment of patients suffering from primary headaches more effective.

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

- Students/participants that completed the questionnaire and were thereafter identified as not to have met all of the inclusion criteria.
- Students/participants that completed the questionnaire and were involved in the focus group for this study/questionnaire.

Remuneration:

Students taking part in the study will not be offered any other form of remuneration for taking part in the study.

Costs of the Study:

None.

Confidentiality:

All the information is confidential and the results of the study will be made available in the Durban University of Technology library in the form of a dissertation.

Research-related Injury:

None.

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

Please do not hesitate to ask questions with regards to any aspect of this study. Should you wish you may contact my research supervisor, **Mr J.D. Pillay 031- 373 2398** or alternatively you could contact me, the principal investigator, **Johan Prangley 031-373 2205**

I, ... HOD of …… hereby give the necessary consent for this study.

Signature: _____

Date: _____

Appendix B: Letter of Information and Consent to students

Title of the Research Study:

The primary headaches in Allied Health students at the Durban University of Technology.

Principle Investigator/s:

Johan Prangley Contact number (031-373 2205)

Co-Investigator/s:

Mr. J.D. Pillay Contact number (031-3732398)

Brief Introduction and Purpose of the Study:

Several studies have confirmed a high prevalence of headaches in adults.

The aim of this research is therefore, to determine the prevalence of primary headaches and the factors that influence the prevalence in Allied Health students at the Durban University of Technology (DUT).

Outline of the Procedures:

All students meeting the inclusion criteria (detailed below) will be invited to participate in this study. A questionnaire will be given to each student/participant for completion. Participation is purely voluntary and a student may choose not to take part in the study if he/she so wishes. The questionnaire will be administered and collected by the researcher (Ballot Box Method) so as to maintain confidentiality at all times. The researcher will thereafter document the information for statistical analysis and further results.

Inclusion criteria (students):

- Only students who are registered full time students with the Health Science Faculty at DUT and are categorised as Allied Health students will be included into the study. According to the Allied Health Professions Act 63 of 1982 the following professions are part of the allied health at DUT: Homeopathy, Chiropractic and Somatology.

Exclusion criteria (students):

- As this is a prevalence study, there are no exclusion criteria. However, those students not wishing to participate in the study will be excluded.
- Students that participated in the focus group discussion.

Risks or Discomforts to the Subject:

None.

Benefits:

Your full co-operation will assist the relevant professions in expanding its knowledge of this condition and thus making future treatment of patients suffering from primary headaches more effective.

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

- Students/participants that completed the questionnaire and were thereafter identified as not to have met all of the inclusion criteria.
- Students/participants that completed the questionnaire and were involved in the focus group for this study/questionnaire.

Remuneration:

Students taking part in the study will not be offered any other form of remuneration for taking part in the study.

Costs of the Study:

None.

Confidentiality:

All the information is confidential and the results of the study will be made available in the Durban University of Technology library in the form of a dissertation.

Research-related Injury:

None.

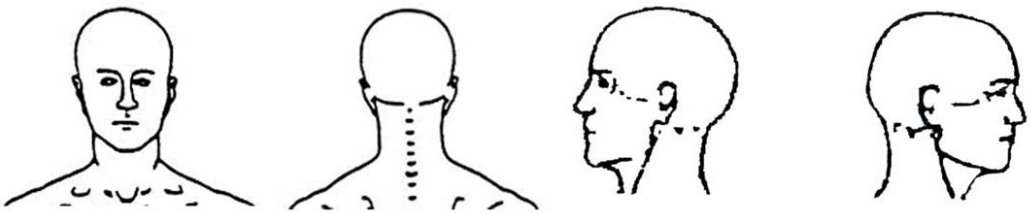
Persons to Contact in the Event of Any Problems or Queries:

Please do not hesitate to ask questions with regards to any aspect of this study. Should you wish you may contact my research supervisor, **Mr J.D. Pillay 031- 373 2398** or alternatively you could contact me, the principal investigator, **Johan Prangley 031-373 2205**

Appendix C: Pre-focus group questionnaire

SECTION A:										
Demographics:										
	Date of Birth									
	What is your age?								years old	
	Gender:	Male				Female				
	Race	White	Black	Indian	Coloured	Other				
	Marital Status:	Single	Married	Divorced/Separated		Other				
Social history										
Smoking:	What is your smoking status?	Current-smoker		Ex-smoker		Non-smoker				
	Have you ever smoked cigarettes?	Yes				No				
	If yes, how many per day?	1-5	6-10	11-15	16-20	>20				
	Have you ever smoked cigars?	Yes				No				
	If yes, how many per day?	1-5	6-10	11-15	16-20	>20				
	Have you ever smoked pipes?	Yes				No				
	If yes, how many per day?	1-5	6-10	11-15	16-20	>20				
Alcohol consumption:	Do you drink alcohol?	Yes				No				
	If yes, how much of the following do you drink?	Litres of beer per week?				L/ week				
		Litres of wine per week?				L/ week				
		Tots of spirits per week?				L/ week				
Caffeinated drinks:	Do you drink?	Coffee	Yes			No				
		Tea	Yes			No				
		Coke	Yes			No				
	If yes, how many cups/glasses (250ml) per day?	Coffee	No. of Cups							
		Tea	No. of Cups							
		Coke	No. of Cups							
Exercise:	What sport do you do?	1								
		2								
		3								
		4								
		5								
		6								
	Do you adhere to a regular exercise program?	Yes				No				
	If yes, how many days per week do you train?	days/week								
Sleeping habits:	How many hours do you sleep per day?	hours/day								
	Do you sleep at regular intervals?	Yes				No				
	Are you currently having difficulties with your sleeping habits (“always sleepy”, insomnia, early morning awakening, etc.)?	Yes				No				
	Do you grind your teeth at night?	Yes			No	Unknown				
	How many times per night do you wake up?	times/night								
Stress:	Do you consider yourself being under a significant amount of stress in the last 3 months?	Yes				No				
	Are you currently receiving formal treatment (counseling and/or medication) for anxiety, stress or depression?	Yes				No				
Medical history :										
Please tick the appropriate boxes if you have a history of the following:	Aneamia	Yes				No				
	Hypertension	Yes				No				
	Thyroid disease	Yes				No				
	Depression	Yes				No				
	Seizures	Yes				No				
	Diabetes	Yes				No				
	Significant head injury (< 6months)	Yes				No				
	Any other significant medical or psychiatric conditions for which you are under medical care. Please state condition:	1								
		2								
		3								
		4								
What medications are you currently taking?	(Please include over-the-counter medications, herbs and birth control pills)	1								
		2								
		3								
		4								
		5								

		6	
Have you had a CAT scan and/or a brain MRI scan in the past?		Yes	No

SECTION B:						
Headache history :	Have you experienced a headache in the last 3 months?		Yes		No	
	If yes, please answer the rest of the questionnaire.					
	If no, you may hand in your questionnaire.					
Headache history :	At what age did you start to experience headaches?		years of age			
	Since experiencing these headaches, have their patterns changed		Yes		No	
	If yes, my headaches are:	More frequent	Yes		No	
		Less frequent	Yes		No	
		More severe	Yes		No	
		Less severe	Yes		No	
		More continuous	Yes		No	
		Less continuous	Yes		No	
		More predictable	Yes		No	
		Less predictable	Yes		No	
		Last longer	Yes		No	
		Do not last as long	Yes		No	
	Do you suffer from more than one type of headache		Yes		No	
	If yes, how many?		1	2	3	4
	Is your headache ever localized to one side		Never	Occasionally	Most of the time	Always
	Is your headache ever localized to both sides?		Never	Occasionally	Most of the time	Always
	Does your headache typically occur at a certain time of the day?		Yes		No	
	If yes, please state the time of day					
	Do you have warning symptoms which alert you that you are going to experience a headache attack?		Yes		No	
	If yes, what type of warning do you experience?		1			
			2			
			3			
			4			
			5			
			6			
	Do you have other family members who suffer from headaches?		Yes		No	
	If yes:		1	Immediate family		
			2	Mother's side of the family		
			3	Father's side of the family		
	Have you consulted a doctor in the past for your headaches?		Yes		No	
	If yes, please state the diagnosis (if known):					
Headache history :	What medication have you used in the past for your headaches?	1				
		2				
		3				
		4				
		5				
		6				
	Have you used oral contraceptives or estrogen replacement therapy in the past?		Yes		No	
	If yes, what effect did it have on your headache?		Better	Worse	No change	Cannot recall
	Have you ever been pregnant		Yes		No	
	If yes, what effect did it have on your headache		Better	Worse	No change	Cannot recall
Headache Characteristics:						
Location:						

		(Shade in the area on the diagram of where your headache is felt)

***Pain**:*	Your pain right now?	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)									
	Your typical headache?	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)									
	Your pain at its best?	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)									
	Your pain at its worst?	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)									

***Character**:*	Description	Never	Occasionally	Frequently	Always	When severe
	Shooting					
	Stabbing					
	Sharp					
	Throbbing					
	Pulsating					
	Pounding					
	Squeezing					
	Pressure					
	Tightness					
	Other (List) 1					
	Other (List) 2					
	Other (List) 3					

Triggering factors:	Which of the following seem to trigger/bring about your headache?										
	Fatigue/Exertion		Lack of sleep		Bending over		Alcohol	
	Smells/Perfumes/ Odours		Change in weather/Seasons		Menstrual cycle		Caffeine containing drinks	
	Oversleeping		Chewing/Clenching teeth		Time of day		Exercise	
	Stress/Tension		Sinus Problems		Medications			
	Skipping meals		Hunger					
	Certain foods:	1		Other	1			
		2			2			
		3			3			
		4			4			

Aggravating factors:	Is your headache aggravated / made worse by any of the following?										
	Weather Changes		Sneezing/Coughing		Walking		Loud noises	
	Lying down		Reaching overhead		Lack of sleep		Sharp light	
	Sitting		Stress/Tension		Sexual activity		Bending over	
	Standing							
	Other	1						
		2						
		3						
		4						

Relieving factors:	Is your headache relieved/ made better by any of the following?										
	Vomiting		Eating		Massage		Standing	
	Cold/Ice application		Moving around/Walking		Compression		Exercise	
	Relaxation		Lying down		Heat		Stretching	
	Medication		Sitting		Sleep			
	Other:	1						
		2						
		3						
		4						

Associated signs and symptoms:	Please tick (X) which one of the following you experience and their relationship to your headache.				
		Have symptom	Before my headache	During my headache	When headache is severe
	Vomiting				
	Sensitivity to light				
	Sensitivity to sound				
	Sensitivity to smell				
	Weakness				
	Tiredness				
	Dizziness				
	Balance Problems				
	Sweating				
	Anxiety				
	Visual changes				
	Neck/Back stiffness				
	Neck/Back pain				
	Jaw pain				
	Numbness of face/head/neck				
	Nausea				
	Other:				
	Other:				
Duration:	How long does a typical headache attack last?				
	0-1hour		48-72hrs/2-3days		
	1-6hrs		greater than 72hrs/3days		
	6-12hrs		constant		
	12-24hrs		too variable		
	24-48hrs		unknown		
Frequency	I get my headache about every:				
	Day		Month		
	Week		Three-months		
	How many times per day/week/month does your headache occur? (eg. 3 times/week)				
					times/day
					times/ week
					times/month

Section C:								
The burden of headaches:								
	How many severe headaches do you have per	day?						
		week?						
		month?						
	How many mild/moderate headaches do you have per:	day?						
		week?						
		month?						
	On how many occasions/days in the last 3 months have you missed lectures at DUT because of your headaches?	days.						
	On how many occasions/days in the last 3 months have you gone to lectures at DUT despite having had a moderate/severe headache?	days.						
	On how many occasions/days in the last 3 months has your ability to do activities of daily life been reduced by half or more because of your headaches?	days.						
	On how many occasions/days in the last 3 months have you missed family, social or leisure activities because of your headaches?	days.						
	If you are currently in a lecture and you experience a headache what do you usually do?	Put up with the headache and continue as normal						
		Take a headache/pain killer medicine and continue as normal.						
		Stop what you are doing and rest.						
	When you have a headache at home what do you usually do?	Put up with the headache and continue as normal.						
		Take a headache/pain killer medicine and continue as normal.						
		Stop what you are doing and rest.						
	Are your headaches ever so severe that you have to leave DUT and go home and rest?	Yes		No				
	If yes, how many times in the last 3 months has this occurred?	times/3months						
	When I experience a headache my productivity is decreased by:	0%		1-10%		11-20%		
		21-30%		31-40%		41-50%		
		51-60%		61-70%		71-80%		
		81-90%		91-100%				
	On average in the last 3 months my headaches decrease my overall productivity by	0%		1-10%		11-20%		
		21-30%		31-40%		41-50%		
		51-60%		61-70%		71-80%		
		81-90%		91-100%				

Appendix D: Pre-departmental and ethics meeting questionnaire

SECTION A:						
(Researcher only)	Diagnosis:	No Headache	Non-Primary Headache	Migraine	Tension	Cluster

Demographics: *(Student: Please fill in or tick where relevant)*											
	1a. Date of Birth:										
	b. What is your age?									years old	
	c. Gender:	Male				Female					
	d. Race:	White	Black	Indian		Coloured	Other:_____				
	e. Marital Status:	Single	Married	Divorced/Separated			Other:_____				
Social history											
Smoking:	2a. What is your smoking status?	Current-smoker			Ex-smoker		Non-smoker				
	b. Have you ever/do you smoke cigarettes?	Yes					No				
	c. If yes, how many per day?	0	1-5	6-10	11-15		16-20	>20			
	d. Have you ever/do you smoke cigars?	Yes					No				
	e. If yes, how many per day?	0	1-5	6-10	11-15		16-20	>20			
	f. Have you ever/do you smoke pipes?	Yes					No				
	g. If yes, how many per day?	0	1-5	6-10	11-15		16-20	>20			
Alcohol consumption:	3a. Do you drink alcohol?	Yes					No				
	b. If yes, how much of the following do you drink?	1. Litres of beer per week?					L/ week				
		2. Litres of wine per week?					L/ week				
		3. Tots of spirits per week?					Tots/ week				
Social Drugs:	4a. Do you use any social drugs?	Yes					No				
Caffeinated drinks:	5a. Do you drink?	1. Coffee	Yes				No				
		2. Tea	Yes				No				
		3. Soft Drinks (Coke)	Yes				No				
		4. Energy drinks (eg. Red Bull)	Yes				No				
		5. Other:_____	Yes				No				
	5b. If yes, how many cups/glasses (250ml) per day?	1. Coffee	No. of Cups								
		2. Tea	No. of Cups								
		3. Soft Drinks (Coke)	No. of Cups								
		4. Energy Drinks (eg. Red Bull)	No. of Cups								
		5. Other:_____	No. of Cups								
Exercise:	6a. What sport do you do?	1.									
		2.									
		3.									
		4.									
		5.									
		6.									
	6b.Do you adhere to a regular exercise program?	Yes					No				
	6c.If yes, how many days per week do you train?	days/week									
Sleeping habits:	7a. How many hours do you sleep per day?	hours/day									
	7b. Do you have a routine sleeping pattern?	Yes					No				
	7c. Are you currently having difficulties with your sleeping habits (“always sleepy”, insomnia, early morning awakening, etc.)?	Yes					No				
	7d. Do you grind your teeth at night?	Yes			No		Unknown				
	7e. How many times per night do you wake up?	times/night									
Stress:	8a. Do you consider yourself being under a significant amount of stress (mental and/or physical) in the last 3 months?	Yes					No				
	8b. Are you currently receiving formal treatment (counseling and/or medication) for anxiety, stress or depression?	Yes					No				

Medical history :				
Please tick the appropriate boxes if you have a history of the following:	9a. Aneamia		Yes	No
	9b. High Blood Pressure		Yes	No
	9c. Thyroid disease		Yes	No
	9d. Depression		Yes	No
	9e.Seizures		Yes	No
	9f. Diabetes		Yes	No
	9g. Any head injuries (< 6months)?		Yes	No
	9h. If yes, did you receive any medical help?		Yes	No
	9i. Any other significant medical or psychiatric conditions for which you are under medical care. Please state condition:	1.		
		2.		
		3.		
		4.		
9j. What medications are you currently taking?	(Please include over-the-counter medications, herbs and birth control pills)	1.		
		2.		
		3.		
		4.		
		5.		
		6.		
9k. Have you had a CAT scan of your head and neck and/or a brain MRI scan in the past?			Yes	No

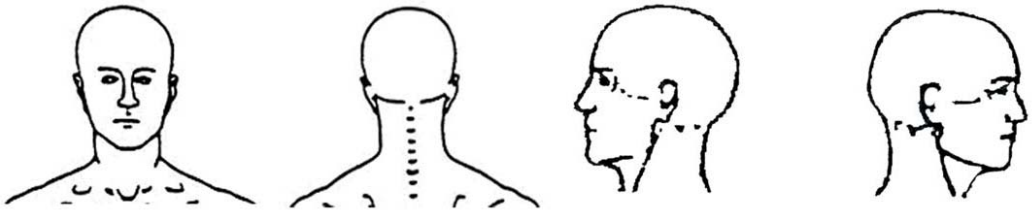
SECTION B:						
Headache history :	10a. Have you experienced a headache in the last 3 months?		Yes	No		
	If yes, please answer the rest of the questionnaire.					
	If no, you may hand in your questionnaire.					
Headache history :	11a. At what age did you start to experience headaches?		years of age			
	11b. Since experiencing these headaches, have their patterns changed?		Yes	No		
	11c. If yes, my headaches are:	1. More frequent	Yes	No		
		2. Less frequent	Yes	No		
		3. More severe	Yes	No		
		4. Less severe	Yes	No		
		5. More continuous	Yes	No		
		6. Less continuous	Yes	No		
		7. More predictable	Yes	No		
		8. Less predictable	Yes	No		
		9. Last longer	Yes	No		
		10.Shorter than previously	Yes	No		
	11d. Do you suffer from more than one type of headache (Do your headaches feel different in character)?		Yes	No		
	11e. If yes, how many?		1	2	3	4
	11f. Is your headache ever localized to one side?		Never	Occasionally	Most of the time	Always
	11g.Is your headache ever localized to both sides?		Never	Occasionally	Most of the time	Always
	11h.Does your headache typically occur at a certain time of the day?		Yes	No		
	11i. If yes, please state the time of day.					
	11j. Do you have warning symptoms which alert you that you are going to experience a headache attack?		Yes	No		
	11k. If yes, what type of warning symptoms do you experience before your headache?	1.				
		2.				
		3.				
		4.				
		5.				
		6.				
	11l. Do you have other family members who suffer from headaches?		Yes	No		
	11m. If yes:	1.	Male relatives?	Yes	No	
		2.	Female relatives?	Yes	No	
	11n. Have you consulted a doctor in the past for your		Yes	No		

	headaches?		
	11o. If yes, please state the diagnosis (if known):	1.	
		2.	
		3.	

Headache history :	11p. What medication have you used in the past for your headaches?	1.			
		2.			
		3.			
		4.			
		5.			
		6.			
	11q. What effect did it have on your headache?	Better	Worse	No change	Cannot recall
	11r. Have you used oral contraceptives or estrogen replacement therapy in the past?	Yes		No	
	11s. If yes, what effect did it have on your headache?	Better	Worse	No change	Cannot recall
	11t. Have you ever been pregnant?	Yes		No	
	11u. If yes, what effect did it have on your headache?	Better	Worse	No change	Cannot recall

Headache Characteristics:

Location: 12.



(Shade in the area on the diagram of where your headache is felt)

Pain:	13a. Do you have a headache at this moment?	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)										
	b. Your typical headache?	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)										
	c. Your pain at its best (least severe)?	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)										
	d. Your pain at its worst (most severe)?	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)										

Character of pain:	***(Please tick where applicable)***					
	Description	Never	Occasionally	Frequently	Always	Only when severe
	14a. Pulsating					
	b. Pounding					
	c. Pressure					
	d. Sharp					
	e. Shooting					
	f. Squeezing					
	g. Stabbing					
	h. Throbbing					
	i. Tightness					
	j. Other (List) 1.					
	2.					
	3.					

Triggering factors:	***(Please tick next to the factor that mostly applies to you and/ or fill in where applicable)***							
	Which of the following seem to trigger/bring about your headache?							
	15a. Fatigue/Exertion		b. Lack of sleep		c. Bending over		d. Alcohol	
	e. Smells (Pleasant and/or unpleasant)		f. Change in weather/Seasons		g. Menstrual cycle		h. Caffeine containing drinks	
	i. Oversleeping		j. Chewing/Clenching teeth		k. Time of day		l. Exercise	
	m. Stress/Tension		n. Sinus Problems		o. Medications			
	p. Skipping meals		q. Hunger					
	r. Certain foods:	1.			s. Other:	1.		
		2.				2.		
		3.				3.		
		4.				4.		

Aggravating factors:	***(Please tick next to the factor that mostly applies to you and/or fill in where applicable)***							
	Is your headache aggravated/made worse by any of the following?							
	16a. Weather Changes		b. Sneezing/Coughing		c. Walking		d. Loud noises	
	e. Lying down		f. Reaching overhead		g. Lack of sleep		h. Sharp light	
	i. Sitting		j. Stress/Tension		k. Sexual activity		l. Bending over	
	m. Standing							
	n. Other	1.						
		2.						
		3.						
		4.						
Relieving factors:	Is your headache relieved/made better by any of the following?							
	17a. Vomiting		b. Eating		c. Massage		d. Standing	
	e. Cold/Ice application		f. Moving around/Walking		g. Compression		h. Exercise	
	i. Relaxation		j. Lying down		k. Heat		l. Stretching	
	m. Medication		n. Sitting		o. Sleep			
	p. Other:	1.						
		2.						
		3.						
		4.						

Associated signs and symptoms:	***(Please tick the following symptoms you experience and their relationship to your headache.)***			
		Have symptom	Before my headache	During my headache	When headache is severe
	18a. Anxiety				
	b. Balance Problems				
	c. Dizziness				
	d. Jaw pain				
	e. Nausea				
	f. Neck/Back pain				
	g. Neck/Back stiffness				
	h. Numbness of face/head/neck				
	i. Sensitivity to light				
	j. Sensitivity to smell				
	k. Sensitivity to sound				
	l. Sweating				
	m. Tiredness				
	n. Visual changes				
	o. Vomiting				
	p. Weakness				
	q. Other:				
	r. Other:				
Frequency:	19a. How many times per day/week/month does your headache occur? (eg. 3 times/week)				
					times/day
					times/week
					times/month
	b. How many mild/moderate headaches do you have per				
	Day?				/day
	Week?				/week
	Month?				/month
	Year?				/year

	c. How many severe headaches do you have per			
	Day?	/day		
	Week?	/week		
	Month?	/month		
	Year?	/year		
Duration:	20. How long does your usual headache last (without medication)?			
	1. 0-15min		7. 24-48hrs	
	2. 15-30min		8. 48-72hrs/2-3days	
	3. 30min-1hour		9. greater than 72hrs/3days	
	4. 1-6hrs		10. constant	
	5. 6-12hrs		11. too variable	
	6. 12-24hrs		12. unknown	

Section C:								
The burden of headaches:	***(Where applicable please fill in or tick the relevant boxes)***							
	21a. On how many occasions/days in the last 3 months have you missed lectures at DUT because of your headaches?	days.						
	b. On how many occasions/days in the last 3 months have you gone to lectures at DUT despite having had a headache?	days.						
	c. On how many occasions/days in the last 3 months has your ability to do activities of daily life been reduced by half or more because of your headaches?	days.						
	d. On how many occasions/days in the last 3 months have you missed family, social or leisure activities because of your headaches?	days.						
	e. If you are currently in a lecture and you experience a headache what do you usually do?	1. Put up with the headache and continue as normal						
		2. Take a headache/pain killer medicine and continue as normal.						
		3. Stop what you are doing and rest.						
		4. Other:_____						
	f. When you have a headache at home what do you usually do?	1. Put up with the headache and continue as normal						
		2. Take a headache/pain killer medicine and continue as normal.						
		3. Stop what you are doing and rest.						
		4. Other:_____						
	g. Are your headaches ever so severe that you have to leave DUT and go home and rest?	Yes		No				
	h. If yes, how many times in the last 3 months has this occurred?	times/3months						
	i. When I experience a headache my productivity is decreased by:	1. 0%		2. 1-10%		3. 11-20%		
		4. 21-30%		5. 31-40%		6. 41-50%		
		7. 51-60%		8. 61-70%		9. 71-80%		
		10. 81-90%		11. 91-100%				
	j. On average in the last 3 months my headaches decreased my overall productivity by:	1. 0%		2. 1-10%		3. 11-20%		
		4. 21-30%		5. 31-40%		6. 41-50%		
		7. 51-60%		8. 61-70%		9. 71-80%		
		10. 81-90%		11. 91-100%				

Appendix E: Final questionnaire

SECTION A:												
(Researcher only)	Diagnosis:	No Headache		Non-Primary Headache		Migraine		Tension		Cluster		
Demographics:	*(**Student**: Please fill in or tick where relevant)*											
	1a. Date of Birth:											
	b. What is your age?									years old		
	c. Gender:	Male				Female						
	d. Race:	White	Black	Indian		Coloured		Other:_____				
	e. Marital Status:	Single	Married	Divorced/Separated				Other:_____				
Social history												
***Smoking**:*	2a. What is your smoking status?	Current-smoker				Ex-smoker		Non-smoker				
	b. Have you ever/do you smoke cigarettes, cigars or pipes?	Yes				No						
	c. If yes, how many per day?	0	1-5	6-10		11-15		16-20		>20		
***Alcohol consumption**:*	3a. Do you drink alcohol?	Yes				No						
	b. If yes, how much of the following do you drink?	1. Litres of beer per week?				L/week						
		2. Litres of wine per week?				L/week						
		3. Tots of spirits per week?				Tots/week						
Social Drugs:	4a. Do you use any social drugs?	Yes				No						
Caffeinated drinks:	5a. Do you drink?	1. Coffee	Yes			No						
		2. Tea	Yes			No						
		3. Soft Drinks (Coke)	Yes			No						
		4. Other caffeinated drinks	Yes			No						
	5b. If yes, how many cups/glasses (250ml) per day?	1. Coffee	No. of Cups									
		2. Tea	No. of Cups									
		3. Soft Drinks (Coke)	No. of Cups									
		4. Other caffeinated drinks	No. of Cups									
***Exercise**:*	6a. What sport do you do?	1.										
		2.										
		3.										
		4.										
		5.										
		6.										
	6b.Do you adhere to a regular exercise program?	Yes				No						
	6c.If yes, how many days per week do you train?	days/week										
Sleeping habits:	7a. How many hours do you sleep per day?	hours/day										
	7b. Do you have a routine sleeping pattern?	Yes				No						
	7c. Are you currently having difficulties with your sleeping habits (“always sleepy”, insomnia, early morning awakening, etc.)?	Yes				No						
	7d. Do you grind your teeth at night?	Yes				No		Unknown				
***Stress**:*	8a. Do you consider yourself being under a significant amount of stress (mental and/or physical) in the last 3 months?	Yes				No						
	8b. Are you currently receiving formal treatment (counseling and/or medication) for anxiety, stress or depression?	Yes				No						

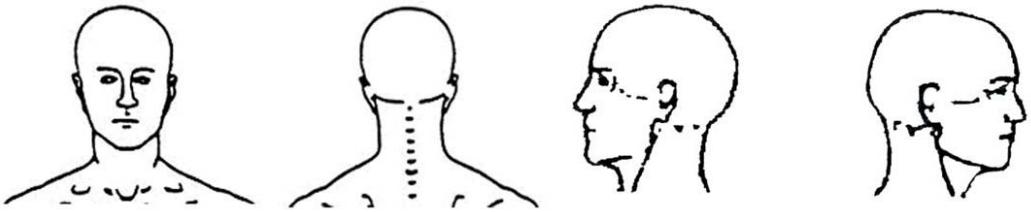
Medical history :				
Please tick the appropriate boxes if you have a history of the following:	9a. Aneamia		Yes	No
	9b. High Blood Pressure		Yes	No
	9c. Thyroid disease		Yes	No
	9d. Depression		Yes	No
	9e.Seizures		Yes	No
	9f. Diabetes		Yes	No
	9g. Any head injuries (< 6months)?		Yes	No
	9h. If yes, did you receive any medical help?		Yes	No
	9i. Any other significant medical or psychiatric conditions for which you are under medical care. Please state condition:	1.		
		2.		
		3.		
		4.		
	9j. What medications are you currently taking? (Please include over-the-counter medications, herbs and birth control pills)	1.		
		2.		
		3.		
		4.		
		5.		
		6.		
	9k. Have you had a CAT scan of your head and neck and/or a brain MRI scan in the past?		Yes	No

SECTION B:						
Headache history :	10a. Have you experienced a headache in the last 3 months?		Yes		No	
	***If yes**, please answer the rest of the questionnaire.*					
	***If no**, you may hand in your questionnaire.*					
Headache history :	11a. At what age did you start to experience headaches?		years of age			
	11b. Since experiencing these headaches, have their patterns changed?		Yes		No	
	11c. If yes, my headaches are: *(Please answer no.1-10)*	1. More frequent	Yes		No	
		2. Less frequent	Yes		No	
		3. More severe	Yes		No	
		4. Less severe	Yes		No	
		5. More continuous	Yes		No	
		6. Less continuous	Yes		No	
		7. More predictable	Yes		No	
		8. Less predictable	Yes		No	
		9. Last longer	Yes		No	
		10.Shorter than previously	Yes		No	
	11d. Is your headache ever localized to one side?		Never	Occasionally	Most of the time	Always
	11e.Is your headache ever localized to both sides?		Never	Occasionally	Most of the time	Always
	11f.Does your headache typically occur at a certain time of the day?		Yes		No	
	11g. If yes, please state the time of day.					
	11h. Do you have warning symptoms which alert you that you are going to experience a headache attack?		Yes		No	
	11i. If yes, what type of warning symptoms do you experience before your headache?	1.				
		2.				
		3.				
		4.				
		5.				
		6.				
	11j. Do you have other family members who suffer from headaches?		Yes		No	
	11k. If yes:	1.	Male relatives?	Yes	No	
		2.	Female relatives?	Yes	No	
	11l. Have you consulted a doctor in the past for your headaches?		Yes		No	
	11m. If yes, please state the diagnosis (if known):	1.				
		2.				
		3.				

Headache history :	11n. What medication have you used in the past for your headaches?	1.			
		2.			
		3.			
		4.			
		5.			
		6.			
	11o. What effect did it have on your headache?	Better	Worse	No change	Cannot recall
	11p. Have you used oral contraceptives or estrogen replacement therapy in the past?	Yes		No	
	11q. If yes, what effect did it have on your headache?	Better	Worse	No change	Cannot recall
	11r. Have you ever been pregnant?	Yes		No	
	11s. If yes, what effect did it have on your headache?	Better	Worse	No change	Cannot recall

Headache Characteristics:

Location: 12.



(Shade in the area on the diagram of where your headache is felt)

Pain:	13a. Do you have a headache at this moment?	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)										
	b. Your typical headache?	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
		Please rate your pain according to the scale: (0= no pain and 10= worst pain possible)										

Character of pain:	***(Please tick where applicable)***					
	Description	Never	Occasionally	Frequently	Always	Only when severe
	14a. Pulsating					
	b. Pounding					
	c. Pressure					
	d. Sharp					
	e. Shooting					
	f. Squeezing					
	g. Stabbing					
	h. Throbbing					
	i. Tightness					
	j. Other (List) 1.					
	2.					
	3.					

Triggering factors:	***(Please tick next to the factor that mostly applies to you and/or fill in where applicable)***										
	Which of the following seem to trigger/bring about your headache?										
	15a. Fatigue/Exertion		b. Lack of sleep		c. Bending over		d. Alcohol	
	e. Smells (Pleasant and/or unpleasant)		f. Change in weather/Seasons		g. Menstrual cycle		h. Caffeine containing drinks	
	i. Oversleeping		j. Chewing/Clenching teeth		k. Time of day		l. Exercise	
	m. Stress/Tension		n. Sinus Problems		o. Medications			
	p. Skipping meals		q. Hunger					
	r. Certain foods:	1.		s. Other:	1.			
		2.			2.			
		3.			3.			
		4.			4.			

Aggravating factors:	***(Please tick next to the factor that mostly applies to you and/or fill in where applicable)***						
	Is your headache aggravated / made worse by any of the following?						
	16a. Weather Changes		b. Sneezing/Coughing		c. Walking		d. Loud noises
	e. Lying down		f. Reaching overhead		g. Lack of sleep		h. Sharp light
	i. Sitting		j. Stress/Tension		k. Sexual activity		l. Bending over
	m. Standing						
	n. Other	1.					
		2.					
		3.					
		4.					
Relieving factors:	Is your headache relieved/ made better by any of the following?						
	17a. Vomiting		b. Eating		c. Massage		d. Standing
	e. Cold/Ice application		f. Moving around/Walking		g. Compression		h. Exercise
	i. Relaxation		j. Lying down		k. Heat		l. Stretching
	m. Medication		n. Sitting		o. Sleep		
	p. Other:	1.					
		2.					
		3.					
		4.					

Associated signs and symptoms:	***(Please tick the following symptoms you experience and their relationship to your headache.)***				
		Have symptom	Before my headache	During my headache	When headache is severe
	18a. Anxiety				
	b. Balance Problems				
	c. Dizziness				
	d. Jaw pain				
	e. Nausea				
	f. Neck/Back pain				
	g. Neck/Back stiffness				
	h. Numbness of face/head/neck				
	i. Sensitivity to light				
	j. Sensitivity to smell				
	k. Sensitivity to sound				
	l. Sweating				
	m. Tiredness				
	n. Visual changes				
	o. Vomiting				
	p. Weakness				
	q. Other:				
	r. Other:				

Frequency:	19a. How many times per day/week/month does your headache occur? (eg. 3 times/week)	
		times/day
		times/week
		times/month
	b. How many mild/moderate headaches do you have per	
	Day?	/day
	Week?	/week
	Month?	/month
	Year?	/year
	c. How many severe headaches do you have per	
	Day?	/day
	Week?	/week
	Month?	/month
	Year?	/year

Duration:	20. How long does your usual headache last (without medication)?			
	1. 0-15min		7. 24-48hrs	
	2. 15-30min		8. 48-72hrs/2-3days	
	3. 30min-1hour		9. greater than 72hrs/3days	
	4. 1-6hrs		10. constant	
	5. 6-12hrs		11. too variable	
	6. 12-24hrs		12. unknown	

Section C:								
The burden of headaches:	***(Where applicable please fill in or tick the relevant boxes)***							
	21a. On how many occasions/days in the last 3 months have you missed lectures at DUT because of your headaches?						days.	
	b. On how many occasions/days in the last 3 months have you gone to lectures at DUT despite having had a headache?						days.	
	c. On how many occasions/days in the last 3 months has your ability to do activities of daily life been reduced by half or more because of your headaches?						days.	
	d. On how many occasions/days in the last 3 months have you missed family, social or leisure activities because of your headaches?						days.	
	e. If you are currently in a lecture and you experience a headache what do you usually do?	1. Put up with the headache and continue as normal						
		2. Take a headache/pain killer medicine and continue as normal.						
		3. Stop what you are doing and rest.						
		4. Other:_____						
	f. When you have a headache at home what do you usually do?	1. Put up with the headache and continue as normal						
		2. Take a headache/pain killer medicine and continue as normal.						
		3. Stop what you are doing and rest.						
		4. Other:_____						
	g. Are your headaches ever so severe that you have to leave DUT and go home and rest?	Yes				No		
	h. If yes, how many times in the last 3 months has this occurred?						times/3months	
	i. When I experience a headache my productivity is decreased by:	1. 0%		2. 1-10%		3. 11-20%		
		4. 21-30%		5. 31-40%		6. 41-50%		
		7. 51-60%		8. 61-70%		9. 71-80%		
		10. 81-90%		11. 91-100%				
	j. On average in the last 3 months my headaches decreased my overall productivity by:	1. 0%		2. 1-10%		3. 11-20%		
		4. 21-30%		5. 31-40%		6. 41-50%		
		7. 51-60%		8. 61-70%		9. 71-80%		
		10. 81-90%		11. 91-100%				

Appendix F: International Headache Society diagnostic criteria for primary headaches: (IHS, 2004)

Migraine:

1. Duration of headache attack: 4-72 hours (when untreated or unsuccessfully treated).

2. The headache must have at least two of the following characteristics:

    - unilateral location
    - pulsating quality
    - moderate to severe pain intensity
    - aggravated by or causing to avoid physical activity (eg: walking, running or climbing stairs)

3. During an headache attack at least one of the following:

    - nausea and/or vomiting
    - photophobia and phonophobia

4. Must not be caused by an underlying pathology.

Tension-type headache:

1. Duration of headache attack: 30 minutes -7 days (when untreated or unsuccessfully treated).

2. The headache must have at least two of the following characteristics:

    - bilateral location

- pressing/tightening (non-pulsating) quality
- mild or moderate intensity
- not aggravated by physical activity such as walking, running or climbing stairs

3. Both of the following:
    - no nausea or vomiting (anorexia may occur)
    - either photophobia or phonophobia (not both)
4. Must not be caused by an underlying pathology.

<u>Cluster headache:</u>

1. Severe or very severe headache attack that causes unilateral orbital, supraorbital and/or temporal pain that lasts 15-180 minutes (when untreated or unsuccessfully treated).
2. The headache attack must be accompanied by at least one of the following:
    - ipsilateral conjunctival injection and/or lacrimation
    - ipsilateral nasal congestion and/or rhinorrhoea
    - ipsilateral eyelid oedema
    - ipsilateral forehead and facial sweating
    - ipsilateral miosis and/or ptosis
    - a sense of restlessness or agitation
3. The headache attacks have a frequency from one every other day to 8 per day.

4. Must not be caused by an underlying pathology.

Appendix G: Ethics Clearance Certificate

DURBAN UNIVERSITY of TECHNOLOGY

Faculty of Health Sciences

ETHICS CLEARANCE CERTIFICATE

Student Name	Johan Prangley	Student No	20511784
Ethics Reference		Date of FRC Approval	
Qualification	M. Tech: Chiropractic		
Research Title:	**The primary headaches in allied health students at the Durban University of Technology.**		

In terms of the ethical considerations for the conduct of research in the Faculty of Health Sciences, Durban University of Technology, this proposal meets with Institutional requirements and confirms the following ethical obligations:

1. The researcher has read and understood the research ethics policy and procedures as endorsed by the Durban University of Technology, has sufficiently answered all questions pertaining to ethics in the DUT 186 and agrees to comply with them.
2. The researcher will report any serious adverse events pertaining to the research to the Faculty of Health Sciences Research Ethics Committee.
3. The researcher will submit any major additions or changes to the research proposal after approval has been granted to the Faculty of Health Sciences Research Committee for consideration.
4. The researcher, with the supervisor and co-researchers will take full responsibility in ensuring that the protocol is adhered to.
5. *The following section must be completed if the research involves human participants:*

	YES	NO	N/A
❖ Provision has been made to obtain informed consent of the participants	X		
❖ Potential psychological and physical risks have been considered and minimised	X		
❖ Provision has been made to avoid undue intrusion with regard to participants and community	X		
❖ Rights of participants will be safe-guarded in relation to: - Measures for the protection of anonymity and the maintenance of Confidentiality.	X		
- Access to research information and findings.	X		
- Termination of involvement without compromise	X		
- Misleading promises regarding benefits of the research	X		

_____	_____
SIGNATURE OF STUDENT/RESEARCHER	DATE
_____	_____
SIGNATURE OF SUPERVISOR/S	DATE
_____	_____
SIGNATURE OF HEAD OF DEPARTMENT	DATE
_____	_____
SIGNATURE: CHAIRPERSON OF RESEARCH ETHICS COMMITTEE	DATE