An Epidemiological Investigation into Primary Headaches in an Adolescent Population in Public High Schools in the Westville Ward of the Pinetown School District

By

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I, Melissa Maria Alessandra Crestani, do hereby declare that this dissertation is representative of my own work in both conception and execution (except where acknowledgements indicate to the contrary)

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DEDICATION

I dedicate this dissertation to:

My Dad and Mom, Pietro and Vani Crestani, without your sacrifices, financial and emotional support, patience and love I would never have had the opportunity to achieve my goals. Thank you. I love and appreciate you both dearly.

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ABSTRACT

AIM: The aim of the study is to determine the epidemiology of adolescents attending public high schools, in the Westville ward of the Pinetown School District, who present with a history of primary headaches.

SUBJECTS: Adolescents between 14 and 19 years of age currently attending a public high school in the Westville Ward of the Pinetown School District.

METHODOLOGY: Upon approval from the Department of Education (DoE) and principals of participating public high schools, an appropriate time-slot was identified in which the post-pilot questionnaire and letters of information and informed consent could be delivered to the scholars via the researcher. One class from Grade nine, Grade 10, Grade 11 and Grade 12, in each school, was randomly selected by a blind draw to participate in the study. A total of 460 completed informed consent and post-pilot questionnaires were collected and placed in separate sealed ballot boxes. All sealed ballot boxes were collected by the researcher. All post-pilot questionnaires were kept confidential and only seen by the researcher and supervisor. A code was allocated to each questionnaire before data was captured on a spreadsheet for data analysis by the chosen statistician.

RESULTS: In total 460 questionnaires were utilised for statistical analysis. The results showed a high prevalence of Migraine-type headache (MTH) (17.2%) and Tension-type headache (TTH) (27.6%). However, no scholars were diagnosed with a Cluster-type headache (CTH). The majority of scholars (63.8%) did not seek medical attention or advice for their headaches. A history of experiencing headaches (p=<001), participation in sport (p=0.008), difficulty sleeping (p=<0.001) and sleep bruxism (p=0.007) were the only significant risk factors noted as statistically significant in this study.

CONCLUSION: This study is consistent with previous studies on the high prevalence of primary headaches in an adolescent population. Primary headaches negatively affect the daily activities of adolescents; however, majority of adolescents do not seek medical attention or advice for their headaches.

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LIST OF SYMBOLS AND ABBREVIATIONS

%	Percentage
(H_o)	Null Hypothesis
CT	Computed Tomography
CTH	Cluster-type headache
DoE	Department of Education
DUT	Durban University of Technology
FRC	Faculty of Health Science Research Committee
HIS	International Headache Society
IREC	Institutional Research and Ethics Committee (IREC)
MRI	Magnetic Resonance Imaging
MTH	Migraine-type headache
N	Sample size
PET	Positron Emission Topography
PH	Paroxysmal hemicranias
SMT	Spinal manipulative therapy
SUNCT	Short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing
TACs	Trigeminal autonomic cephalalgias
TTH	Tension-type headaches
UNICEF	United Nations International Children's Emergency Fund
USSR	Union of Soviet Socialist Republics
WHO	World Health Organisation

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO THE STUDY

The International Headache Society (IHS) (2004) defines a headache as “a pain located above an imaginary line drawn from the outer or lateral part of the orbit of the eye to the center of the external auditory meatus of the ear”. In particular, a primary headache syndrome, which is the most common cause of childhood headaches (Straube *et al.,* 2013) is a headache that exists entirely independently of any other disease process (L’Europa, 2011).

Primary Headaches can be classified into four sub-groups, namely migraine-type headaches (MTH), tension-type-headaches (TTH), Trigeminal autonomic cephalalgias (TACs) and other primary headache disorders (IHS, 2004).

An expert consensus conducted by Straube *et al.* (2013) noted that 66% to 71% of scholars between 12 and 15 years of age experienced at least one headache every three months and 33% to 40% experienced at least one headache per week.

Although clinical assessment is considered the gold standard for diagnosis of headaches, they are noted as being more prone to selection bias and have proven to be extremely difficult in large population based studies (Gupta *et al.*, 2008).

1.2 AIMS AND OBJECTIVES

1.2.1 Aim

The aim of the study was to determine the epidemiology of adolescents attending public high schools in the Westville ward of the Pinetown School District who present with a history of primary headaches.

1.2.2 Objectives

1. To determine the prevalence of headaches in adolescents between 14-19 years of age.
2. To investigate the risk factors that are associated with primary headaches in an adolescent population.
3. To determine if adolescents presenting with a history of primary headaches have been treated by a health care provider.
4. To determine if adolescents seek chiropractic care for their headaches.
5. To determine the impact of primary headaches on the daily activities and productivity of adolescents.

1.3 HYPOTHESES

Null Hypothesis (H_O) 1: The prevalence of headaches is not significantly associated with risk factors such as smoking, alcohol, social drugs, caffeine, physical activity, sleeping disorders and stress.

Alternate Hypothesis (H_A) 1: The prevalence of headaches is significantly associated with risk factors such as smoking, alcohol, social drugs, caffeine, physical activity, sleeping disorders and stress.

Null Hypothesis ($H_{O)}$ 2: Daily activities and productivity of adolescents are not affected by primary headaches.

1.4 LIMITATIONS

Due to the research being based on a student population, the reliability of the results rests solely on the candour of scholars completing the questionnaire. Incomplete questionnaires were captured as missing data and not discarded from the research, therefore decreasing the accuracy of the diagnosis and, thus, the accuracy of the results.

1.5 RATIONALE

Headaches affect the paediatric, adolescent and adult populations on a global scale and the need for further research particularly with regards to the epidemiology of headaches is evidently becoming more important (Stovner *et al.,* 2007). Abu-Arafeh *et al.* (2010) estimated the global prevalence of headaches over periods of one month to a lifetime to be 58.4%.

According to the World Health Organisation (WHO), only a minority of people with headaches are diagnosed appropriately by a health care provider (Takeshima and Kikui, 2013). Abu-Arafeh *et al*. (2010) conducted a systematic review of headaches and migraines in children and adolescents using 38 population based studies from various countries around the world but not including South Africa. Thus, the number of adolescent patients presenting with headaches has not been well documented in South Africa.

The impact of headache disorders is a large problem for both the individual and society (Mennini, Gitto and Martelletti, 2008). Up to 75% of adolescents under the age of 15 reported clinically significant headaches that could have led to school absenteeism, less extra-curricular activities and poor academic performance which increased their risk of negative developmental outcomes (Breuner, Smith and Womack, 2004). With regards to society, the economic costs of headaches impose a serious burden on the National Health Care System (NHS) and the families of the adolescents with headaches (Mazzotta *et al*., 2005). However, research that focuses on childhood headaches is still lacking, therefore, the data available is limited (Mazzotta *et al*., 2005). This is particularly true in the South African context.

Stovner *et al*. (2007) based on a collaborative study between the WHO, World Headache Alliance, IHS and European Headache Federation concluded that the prevalence and burden of headaches in at least half the world's population is almost completely unknown due to a lack of existing studies from Union of Soviet Socialist Republics, Eastern Europe, Australia and Africa.

This study will, therefore, be of benefit to the adolescent population and the chiropractic profession because it will lay the foundation for future research on headaches affecting adolescents so that our understanding is well documented, rather than presumed, and is based on reliable scientific studies rather than deductions from adult studies, especially in a South African context. The findings of this study will contribute to health care providers with regards to improving the effectiveness of their treatments.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

Chapter two provides a detailed account of the current literature available with regards to the epidemiology of headaches in adolescents. According to Stovner *et al.* (2007), headaches are ranked as being one of the 10 most disabling conditions for both genders and in the top five for females. Although headaches are common during early childhood, they become more frequent during adolescence (Lewis, 2002). Headaches in adolescents are fast becoming a recognised health care problem (Fuh *et al.*, 2009).

2.2 DEFINITION OF A HEADACHE

The IHS (2004) classifies headaches as follows:

- Primary headache syndrome which refers to a headache that exists entirely independent of any other disease process
- Secondary headache that is caused by, or is secondary to, an underlying disease process or medical condition
- Cranial neuralgia

The IHS (2004) defines a headache as “a pain located above an imaginary line drawn from the outer or lateral part of the orbit of the eye to the center of the external auditory meatus of the ear”. According to Stedman’s Medical Dictionary (2006), a headache is defined as “Pain in various parts of the head, not confined to the area of distribution of any nerve”. For the purpose of this study we will be focusing on primary headache syndromes.

2.3 DEFINING AN ADOLESCENT

Texts are not cohesive in clearly defining the age at which adolescence begins and ends. The WHO (2008) defines an adolescent as any person between 10 and 19 years of age.

United Nations International Children's Emergency Fund (UNICEF) (2014) categorises and defines adolescence in three stages: early (10-13 years of age), middle (14-16 years of age) and late (17-19 years of age) adolescence.

2.4 CLASSIFICATION AND DEMOGRAPHICS OF PRIMARY HEADACHES

Primary headaches can be classified into four sub-groups namely migraine-type headaches, tension-type-headaches, trigeminal autonomic cephalalgias and other primary headache disorders (IHS, 2004). An accurate diagnosis and therefore reliable guidelines to differentiate headaches are essential for treatment purposes because this ensures higher quality patient care (Pacheva *et al*., 2012).

2.4.1 Migraine-Type Headache

A migraine-type headache (MTH) typically lasts between four to 72 hours (IHS, 2004). However, it has been noted that MTH in adolescents may present for a duration of less than two hours and rarely lasts for longer than 24 hours (Abu-Arafeh *et al*., 2010). A typical MTH in an adolescent is most often a severe bilateral headache that may be accompanied by nausea, vomiting, phonophobia and/or photophobia (IHS, 2004; Pacheva *et al*., 2012). A MTH may also cause vertigo (Pacheva *et al*., 2012) and in some adolescents the headache may be aggravated by routine physical activity (Akyol *et al*., 2007; Pacheva *et al*., 2012).

According to the IHS (2004), MTH is further classified as either a MTH presenting with an aura or a MTH presenting without an aura.

The warning signs associated with migraine attacks with an aura are known as a prodrome (Kelman, 2004). According to a database formulated by a study conducted by Winner *et al*. (2003) that incorporated eight migraine clinical trials on adolescents between 12 and 17 years of age, the majority of adolescents experienced a MTH without aura. The IHS (2004) describes an aura as a “recurrent disorder manifesting in attacks of reversible focal neurological symptoms

that usually develops gradually over five to 20 minutes with a duration of less than 60 minutes". A number of patients often complain more about the discomfort associated with the aura than with the actual MTH itself (Manzoni and Torelli, 2008). The aura may be experienced as visual disturbances such as seeing a spot of flickering light (scintillating scotoma) or visualising the flickering light as a zigzag line (teichopsia), decreased vision in half of one's visual field (hemianopsia) and/or blurred vision (Stedman, 2006; Donnet *et al*., 2012). Sensory disturbances are experienced as pins and needles (paraesthesia) moving from origin to one side of the body and/or numbness (IHS, 2014). Speech disturbances are the least common (Purdy, 2008), but may occur in conjunction with or isolated from visual and/or sensory disturbances (IHS, 2004).

Migraine-type headache commonly presents during childhood and adolescence (Curry and Green, 2007). According to a literature review conducted by Antonaci *et al*. (2014), 28% of adolescents suffer from recurrent MTH. An overall prevalence of MTH in females under 20 years of age was noted as 9.6% and 6.0% in males in a systematic review of population based studies (Abu-Arafeh *et al*., 2010). Russell and Olesen (1996) documented a lifetime migraine male to female ratio of 1:1.2. Migraines are statistically more common in young females than males (Rasmussen, 2001; Akyol *et al*., 2007; Fuh *et al*., 2009). Pre-pubescent adolescents show a higher prevalence of MTH headaches in males, however, it is noted that during later adolescence the scale tips and there is a higher prevalence of MTH in females than males (Lipton and Bigal, 2005; Abu-Arafeh *et al*., 2010; Özge *et al*., 2013). A 43 year systematic review and meta-analysis of community-based studies revealed an overall higher risk of migraine prevalence in high school and university female students (Woldeamanuel *et al*., 2014). Although endogenous sex hormones are an associated factor that may lead to the prevalence spike in females, the mechanism is still unclear (Sacco *et al*., 2012).

2.4.2 Tension-Type Headache

Tension-Type headache (TTH) is the most common primary headache in adolescents (Kroner-Herwig and Gassmann, 2012 and Tavasoli *et al*., 2013) although TTH commonly presents in the second and third decade of life (Rasmussen, 2001 and Stovner *et al*., 2007). Tension-type headaches are recurrent and may last anywhere between a few minutes to weeks (Chowdhury, 2012). Tension-type headaches are categorised into frequent and infrequent episodic tension-type headaches and chronic tension-type headaches (IHS, 2004). Tension-type headaches are most often described by patients as a feeling of a tight band sensation around the head or scalp

(Beers, 2003). Episodic tension-type headaches are of moderate intensity, self-limiting and usually respond to over the counter medication (IHS, 2004). Chronic tension-type headaches occur frequently, are not affected by daily activities such as running, are usually bilateral and non-pulsating (Silver, 2007). Tenderness upon manual palpation on the peri-cranial surface that is directly proportional to the frequency and severity is the most significant finding with regards to TTH sufferers (IHS, 2004). Tension-Type headache is not associated with nausea and vomiting, however, either photophobia or, more commonly, phonophobia may present in conjunction with TTH (IHS, 2004; Pacheva *et al*., 2012).

Expert opinion regarding gender demography of TTH is divided. According to Chowdhury (2012), TTH is not gender inclined. A study conducted by Fuh *et al.* (2009) on 2459 adolescents attending high school showed no significant difference between male and female students with regards to TTH. Rasmussen (2001) stated that there is a higher prevalence of TTH in females than in males, with a male to female ratio of 1:1.5.

2.4.3 Trigeminal Autonomic Cephalalgia

Trigeminal autonomic cephalalgias (TACs) are subcategorised as cluster-type headaches (CTH), paroxysmal hemicranias (PH) and short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing (SUNCT) (IHS, 2004; Lambru and Matharu, 2013). Although childhood and adolescent TACs are extremely rare, the headache characteristics and associated signs and symptoms present similarly to TACs in adults (Lambru and Matharu, 2013).

Cluster-Type headaches presents without warning (Dodick *et al*., 2000) as a harrowing, unilateral headache (Sargeant and Blanda, 2009; Lambru and Matharu, 2013) that occurs in association with one or more cranial autonomic features (Lambru and Matharu, 2013). All cranial autonomic features occur ipsilateral to the CTH and include conjunctival injection and/or lacrimation, nasal congestion, rhinorrhoea, eyelid oedema, forehead and facial sweating, miosis and/or ptosis (IHS, 2004). Nausea occurs in up to 40% of CTH sufferers (Dodick *et al*., 2000).

Episodic CTH occur during what is referred to as ‘Cluster Periods’ (IHS, 2004). A cluster period presents circannual (intervals of one year) and within a cluster period, the cluster-type headache will present every 24 hours for the duration of the cluster period (Lambru and Matharu, 2013). In a clinical study based in China, 61% of CTH patients reported having experienced a cluster period once a year, however, 11.5% of patients reported having

experienced two cluster periods per year (Xie *et al*., 2013). Chronic CTH are diagnosed in patients where the CTH is unrelenting or because the cluster periods remain in remission for less than one month (IHS, 2004).

Cluster-Type headaches are a relatively rare headache syndrome when compared to MTH, therefore, epidemiological studies regarding CTH are rare and minimal information can be extrapolated (Russell, 2004; Xie *et al*., 2013). Unlike MTH, CTH are more common in males than in females (Rozen *et al*., 2001; IHS, 2004); however, the extent varies between studies (Finkel, 2003). The reason for male predominance is currently unknown, but may be attributed to male sex hormones (Rozen *et al*., 2001). Onset of CTH is usually between 20 to 40 years of age (IHS, 2004). Cluster-Type headaches have, however, been noted to occur in people under 20 years of age (Rozen and Fishman, 2012). According to a retrospective chart review at the Jefferson Headache Centre, CTH onset under 20 years of age is more common in females than in males (Rozen *et al*., 2001).

2.5 INCIDENCE AND PREVALENCE OF PRIMARY HEADACHES

The global prevalence of recurrent headaches that encompasses all ages is 47% (Stovner *et al*., 2007). According to Stovner *et al*. (2007), children and adolescents worldwide have the overall highest prevalence of headaches. This may, however, be attributed to the minimal research available on headaches, especially TTH, in children and adolescents (Stovner *et al*., 2007). According to a systematic review of population-based studies on the prevalence of headaches by Abu-Arafeh *et al*. (2010), there is a 58.4% prevalence of headaches in children and adolescents under 20 years of age. The specific prevalence of MTH and TTH varies considerably across studies (Zwart *et al*., 2004). The prevalence range for MTH is noted to be between 1% to 17% and 0.9% to 72.3% in adolescents presenting with TTH (Zwart *et al*., 2004). This is attributed to the large differences on the utilisation of either the strict or modified version of the IHS criteria by various studies (Fendrich *et al*., 2007). Other contributing factors highlighted by Rasmussen (1999) and Stovner *et al*. (2007) include age, gender, cultural background and ethnicity. Karli *et al*. (2006) noted that the prevalence of MTH and TTH increased with age and was significantly higher in females (59.8%) than males (45.1%) in individuals between 13 to 17 years of age but not in 12 year olds. Similar findings have been noted in other studies and are reported in Table 2.1.

Table 2.1: Prevalence of primary-type headache syndromes in an adolescent population

Reference	Population	Sample Size	MTH (%)	TTH (%)	CTH (%)
Zwart *et al*., 2004	Norwegian adolescents	8 255			
	Male (13-18)		4.8	12.5	-
Karli *et al*., 2006	Turkish adolescents (12-17)	2 387	16.4	30.9	-
Fendrich *et al*., 2007	German adolescents	3 324			
	Male (12-15)		-	14.5	-
	Female (12-15)		-	16.9	-
Stovner *et al*., 2007	Worldwide prevalence of global population	-	-	38	-
Gupta *et al*., 2008	Indian adolescents	1 862			
	Male (12-19)		18.6 - 29.1	8.8 – 14.3	1.5 – 2.9
	Female (12-19)		31.1 – 36.5	7.9 – 16.7	0 – 2.4
Abu-Arafeh, 2010	Overall prevalence	-			
	Male (>20)		6.0	-	-
	Female (>20)		9.7	-	-
	In children and adolescents (>20)		7.7	-	-

2.6 FACTORS THAT PLAY A ROLE IN TRIGGERING PRIMARY HEADACHES

According to a cross sectional study on 1047 of 1260 scholars by Milde-Busch *et al*. (2012), the prevalence of perceived headache trigger factors is different to the prevalence of observed and identified primary headache triggers (Table 2.2).

Table 2.2: Self-perceived headache triggers

Trigger	Prevalence of perceived triggers (%)	Prevalence of observed triggers (%)
Alcohol consumption	7	55.5
Allergies	0.2	
Boredom	0.5	
Braces	0.2	
Climate changes	12	

Coffee consumption	0	13.6
Eye problems	2	
Genetics	1	
Lack of fresh air	4	
Lack of sleep	25	
Light sensitivity	1	
Long hours on electronic media	6	
Loud music/noise	4	
Medication	0.1	
Menstrual pain in girls	4	
Muscular pain	4	51.2
Physical activity	2	
Physical inactivity	0.3	35.6
Prevalent diseases	12	
Psychological problems	7	
Reading for extended periods	1	
Sexual activity	0.4	
Smoking or drug intake	1	
Specific movements	2	
Stress	48	22.5
Too few beverages	14	
Too much school work	19	
Travelling	0.1	
Unhealthy diet	3	
Wet/cold air	1	

Stress is considerably overestimated as the perceived cause of headaches among adolescents, with 48% of participants in the study identifying it as a major trigger; however, when matched against identified trigger points only 22.5% prevalence was noted (Milde-Busch *et al*., 2012). The role of perceived coffee consumption was underestimated as a prevalence, with 13.6% noted in identified trigger factors (Milde-Busch *et al*., 2012). The adolescent population place little importance on alcohol consumption when linking it to the cause of their headache (Milde-Busch *et al*., 2012). Only 7% of the scholars' perceived alcohol as a headache trigger, unlike the 55.5% prevalence that was noted as an observed trigger factors (Milde-Busch *et al*., 2012). Physical inactivity contributes to 35.6% as opposed to the 0.3% prevalence noted by the perception of adolescents (Milde-Busch *et al*., 2012). Other trigger factors associated with primary headaches include odour, food, hunger and wind (Karli *et al*., 2006) with odour and hunger being more common (Karli *et al*., 2005). Although lack of sleep was not noted as a

trigger for headaches by Milde-Busch *et al*. (2012), a study conducted in Rome on 1030 scholars between eight and 15 years of age, in four different schools, noted that the most common trigger (32.2%) for MTH and non-MTH was difficulty sleeping (Bruni *et al*., 2008). Gilman *et al*. (2007) and Moschiano *et al*. (2012) further support the association between sleeping difficulties and headaches. It was noted that a significant association exists between increased duration to falling asleep (difficulty falling asleep) and headache pain intensity and duration of headache (Gilman *et al*., 2007).

Gordon, Dooley and Wood (2004) highlighted smoking for scholars who did not score high on the depression scale. Drinking, dieting, depression and emerging sexual behaviour were shown to be associated risk factors for frequent headaches in scholars between 12 and 13 years of age.

The majority of headache triggers are the same for MTH and TTH (Karli *et al*., 2006). However, a study conducted by Karli *et al*. (2005) suggested that diet was a major trigger for MTH. A higher sensitivity to trigger factors associated with migraines was noted in female adolescents and younger adolescents (Karli *et al*., 2006).

Cluster-Type headache is not likely to be triggered by stress, food or allergies (Dodick *et al*., 2000). Alcohol and heavy smoking are identified as possible triggers to a first time CTH episode because a history of heavy smoking and drinking is noted in CTH patients (Dodick *et al*., 2000). During a CTH episode, nitroglycerine is considered a possible trigger because it can activate the trigeminal vascular system as well as histamines due to their vasodilation properties (Dodick *et al*., 2000).

2.7 PATHOGENESIS

Cephalic pain including headaches is not well understood as no single structure is the key to a headache (Sanchez del Rio and Linera, 2004); however, rapid advances in neuro-imaging technology is beginning to allow researchers the ability to investigate the pathogenesis of these disorders (Sanchez del Rio and Linera, 2004; Lacovelli *et al*., 2012).

2.7.1 Migraine-Type Headache

The pathogenesis of MTH is still unclear despite advances in research (Aurora, 2004; Longoni and Ferrarese, 2006). Intracranial and extracranial pain sensitive structures of the head and

basic pain pathways are essential to the basic understanding of migraine pathogenesis (Benoit, 2009). Pain sensitive structures include the skin, eyes, muscles, gum, teeth, dura, arteries, sinuses, cervical roots, cranial nerves and the periosteum (Benoit, 2009; Olesen *et al*., 2009). Cervical roots C2 and C3 innervate the posterior scalp and posterior and inferior intracranial structures, whereas, the ophthalmic branch of the trigeminal nerve innervates the majority of the pain sensitive intracranial structures (Benoit, 2009). Whether MTH is due to a primary vascular or primary neural mechanism is yet to be established (Aurora, 2004). Research suggests that the migraine headache itself is caused by vasodilation of the cerebral arteries, whereas, the aura that may accompany a MTH is caused by vasoconstriction of the cerebral arteries (Aurora, 2004). The trigeminal nerve and associated vascular system is thought to play a role in the actual pain experience associated with MTH (Aurora, 2004) due to neurovascular inflammation that is most likely associated with the action of cytokines (Empl *et al*., 2003).

2.7.2 Tension-Type Headache

Understanding the pathogenesis of TTH remains in its infancy despite the high prevalence and burden it projects on society on a global scale (Chen, 2009). Literature suggests that peripheral mechanisms are in play when addressing the pathogenesis (Bendtsen, 2000; Ashina *et al*., 2005; Fumal and Schoenen, 2008; Chen, 2009). Peripheral mechanisms are currently the most probable cause for frequent and infrequent TTH, whereas central sensitisation is predominantly identified in chronic TTH (Fumal and Schoenen, 2008).

Pericranial muscle tenderness was the most prominent documented finding in people presenting with TTH (Bendtsen, 2000; Ashina *et al*., 2005; Chen, 2009) along with muscle hardening (Ashina *et al*., 2005). Suboccipital myofascial trigger points were noted in all TTH patients in a study conducted by Fernández-de-las-Peñas *et al*. (2006) on 40 adults above 18 years of age. Despite expectations to the contrary, results from a controlled study investigating pericranial and neck and shoulder tenderness in association with headaches in 1135 scholars who were 12 years of age, indicated that this was not a significantly associated factor (Anttila *et al*., 2002). Pericranial tenderness was noted in those with MTH (Anttila *et al*., 2002); this could allude to the fact that the muscle tenderness was secondary to the headache (Bendtsen, 2000).

According to Bendtsen (2000), prolonged nociceptive inputs from the pericranial muscles can cause central sensitisation at the level of the dorsal horn or trigeminal nucleus (i.e. increased excitability of neurones in the central nervous system). The cause for this sustained painful input to the central nervous system is still unknown (Ashina *et al*., 2002); however, once the central

sensitisation has been established, Brendtsen (2000) suggests that it may continue as an entity unto itself and any further input from the periphery has little or no contributing effects. It is hypothesised to be a contributing factor to infrequent and frequent TTH evolving into a chronic TTH (Fumal and Schoenen, 2008).

2.7.3 Cluster-Type Headache

Hypothesised mechanisms are required to address the trigeminal pain distribution of a CTH, the ipsilateral cranial autonomic feature and the circannual and circadian rhythm tendencies (Dodick *et al*., 2000; May, 2005). A consensus regarding the pathogenesis of CTH is yet to be agreed upon (Dodick *et al*., 2000; Edwards, 2012).

For many years, CTH has predominantly been considered a 'vascular' headache disorder (Dodick *et al*., 2000). The vascular hypothesis suggests vascular involvement because of the inflammation noted in the cavernous sinus during a CTH episode, which is the only peripheral anatomical location where a single pathology could involve the trigeminal nerve (May, 2005). The intense pulsating pain experienced during a CTH is caused by the release of neuropeptides that inherently cause the vasodilation of vessels noted in the cavernous sinus (Aurora, 2004). This is due to the distribution of pain predominantly over the opthalmic branch of the trigeminal nerve (pain behind the eye) and the neuropeptide changes noted. The vascular theory, however, is unable to account for the circadian rhythm (Aurora, 2004) which, according to Dodick *et al.* (2000), is a "signature" CTH characteristic.

May *et al*. (1998) noted that the hypothalamus is observably activated during a CTH attack in known areas that processes and responds to pain as well as in areas not typically known to process and respond to pain; however, it is active only during a CTH and in no other cases of head pain. With more neuroimaging studies and experience, different interpretations have emerged (Leone *et al*., 2013). Although the hypothalamus is activated during a CTH, hypothalamic stimulation does not cause a CTH attack (Leone *et al*., 2012). Areas of the brain associated with CTH attacks are almost identical to the areas of the brain considered to be part of the pain matrix (May, 2006). These areas are also considered to be largely associated with the part of the brain that can be modified by hypothalamic stimulation (May, 2006). These areas, and therefore the hypothalamus, is responsible for the control of the autonomic responses of the human body and are, therefore, involved in the cranial autonomic responses associated with a CTH by stimulation of the efferent arcs and thus, the sympathetic and parasympathetic functions (Aurora, 2004).

2.8 CLINICAL PRESENTATION AND DIAGNOSTIC CRITERIA OF PRIMARY HEADACHES

The IHS classification of headaches was used in this study to standardise the diagnosis of headaches. In order to diagnose a specific headache, the headache must present clinically with the findings listed in Tables 2.3 to Table 2.6 as per the IHS (2004).

Table 2.3: Clinical presentation of MTH without aura

MTH without aura	Notes to consider
1. At least five attacks, one of which fulfils criteria two to four	
2. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)	It has been noted that MTH in adolescents may present with a duration of less than two hours and rarely presents for longer than 24 hours (Abu-Arafeh *et al*., 2010; IHS, 2004). Duration of headache is accounted for even when a patient is asleep (IHS, 2004).
3. Headache has at least two of the following four characteristics: • unilateral location • pulsating quality • moderate or severe pain intensity • aggravation by or causing avoidance of routine physical activity (e.g. walking or climbing stairs)	Pacheva *et al*. (2012) noted that vertigo may be an accompanying symptom with MTH. Sleep can often resolve migraine type headaches in children (Grazzi and Usai, 2011).
4. During headache at least one of the following: • nausea and/or vomiting • photophobia and phonophobia	
5. Not better accounted for by another ICHD-3	

Table 2.4: Clinical presentation of MTH with aura

MTH with aura	Notes to consider
1. At least two attacks fulfilling criteria two and three	Majority of adolescents experienced a MTH without aura (Winner *et al*., 2003).
2. One or more of the following fully reversible aura symptoms: • visual • sensory • speech and/or language • motor • brainstem • retinal	Speech disturbances are the least common (Purdy, 2008), but may occur in conjunction with or isolated from visual and/or sensory disturbances (IHS, 2004).

3. At least two of the following four characteristics: • at least one aura symptom spreads gradually over five minutes and/or two or more symptoms occur in succession • each individual aura symptom lasts 5-60 minutes • at least one aura symptom is unilateral • the aura is accompanied or followed within 60 minutes by a headache	When, for example, three symptoms occur during an aura, the acceptable maximal duration is 3 x 60 minutes (IHS, 2004). Motor symptoms may last up to 72 hours (IHS, 2004).
4. Not better accounted for by another ICHD-3 diagnosis and transient ischaemic attack has been excluded.	

Table 2.5: Clinical presentation of TTH

TTH	Notes to consider
1. Lasting from 30 minutes to seven days	Chronic TTH is diagnosed when the headache lasts longer than 15 days per month on average for more than three months (180 days per year) and fulfils criteria two to four (IHS, 2004).
2. At least two of the following four characteristics: • bilateral location • pressing or tightening (non-pulsating) quality • mild or moderate intensity • not aggravated by routine physical activity such as walking or climbing stairs	
3. Both of the following: • no nausea or vomiting • no more than one of photophobia or phonophobia	Mild nausea may be experienced in chronic TTH instead of photophobia or phonophobia (IHS, 2004).
4. Not better accounted for by another ICHD-3	

Table 2.6: Clinical presentation of CTH

CTH	Notes to consider
1. At least five attacks fulfilling criteria two to four	
2. Severe or very severe unilateral orbital, supraorbital and/or temporal pain lasting 15–180 minutes (when untreated)	

3. Either or both of the following: 3.1 at least one of the following symptoms or signs, ipsilateral to the headache such as: • conjunctival injection and/or lacrimation • nasal congestion and/or rhinorrhoea • eyelid oedema • forehead and facial sweating • forehead and facial flushing • sensation of fullness in the ear • miosis and/or ptosis 3.2 A sense of restlessness or agitation	Nausea occurs in up to 40% of CTH sufferers (Dodick *et al*., 2000).
4. Attacks have a frequency between one every other day and eight per day for more than half of the time when the disorder is active	Chronic CTH are diagnosed in patients where the CTH is unrelenting or because the cluster periods remain in remission for less than one month (IHS, 2004).
5. Not better accounted for by another ICHD-3	

2.9 HEADACHE EVALUATION PROCEDURES

According to a retrospective study conducted by Lewis and Dorbad (2000), children and adolescents under 18 years of age presenting to a health care provider with a headache and no abnormalities (red flags) detected in the case history, physical examination and neurological examination require no further neuroimaging at all if any of the findings do not impact on treatment. Further investigation is rarely needed for people below 50 years of age (Kernick, 2011). Neuroimaging is primarily used to identify a space occupying lesion that is life-threatening and/or affects a child's or adolescent's daily living (Rho *et al*., 2011). Colombo *et al*. (2011) noted that the diagnosis of headaches in children between five and 18 years of age are delayed and underdiagnosed mainly due to unsatisfactory history taking and physical examination.

2.9.1 Red Flags

Red flags should be ruled out during evaluation of a primary headache because they are associated with secondary headaches and prompt further investigation with the use of neuroimaging techniques (Parisi *et al*., 2011) (Table 2.7, as adapted from Parisi *et al*. (2011).

Table 2.7: Red flags associated with secondary headaches

1. A severe headache that has never been experienced by the patient before. The headache presents for a few weeks.
2. The headache has changed extensively with regards to the character in a relatively short period of time
3. Headache associated with raised intracranial pressure
4. If the headache is associated with any change in personality, weakness, fever and/or seizures
5. A history of systemic diseases such as a malignancy with metastases

2.9.2 Migraine-Type Headache

A meticulous clinical evaluation that includes an in-depth case history is currently the gold standard for diagnosing a MTH if all other sinister causes are ruled out or clinical investigations reveal no results (Zwart *et al*., 2004; Scott, 2011 and Samaan *et al*., 2010). Disability, nausea and photophobia are the three most predictive characteristics associated with a MTH (Lipton *et al*., 2003). Guidelines have been developed by the IHS to provide health care providers a standard on which to base their diagnosis (IHS, 2004).

Self-administered questionnaires are a valid source of information for prevalence and epidemiological studies; however, clinical interviews are reported to be a better clinical tool for in practice diagnoses (Valentinis *et al*., 2009). Active screenings for MTH in adolescents presenting with headaches is advantageous when a validated tool is utilised (Lipton *et al*., 2004). The three question ID Migraine screen is an effective and validated tool that highlights patients who may be presenting with a migraine headache and improves the diagnosis of MTH in a clinical setting (Lipton *et al*., 2003). Thereafter, the health care provider must exclude all secondary causes of the headache to ensure a correct diagnosis (Lipton *et al*., 2004).

Neuroimaging studies should not be utilised to diagnose a MTH for reassurance if the headache meets the MTH IHS criteria (Loder *et al*., 2013). Currently there are no identifiable biological markers linked to a MTH (Samaan *et al*., 2010) and the use of functional neuroimaging techniques such as Magnetic Resonance Imaging (MRI), Computed Tomography (CT) or Positron emission topography (PET) are utilised for investigating the pathogenesis of a MTT rather than for diagnostic purposes (Sanchez de Rio and Linera, 2004).

2.9.3 Tension-Type Headache

Meticulous history taking and physical examination that includes an extensive neurological examination and attention to cranial, neck, facial and sinus tenderness on palpation are important for first-line diagnostic procedures for TTH (IHS, 2004; Anttilla, 2006). Further investigation with the use of neuroimaging techniques is only necessary if a neurological examination elicits abnormal findings and/or the health care provider has noted a red flag that could suggest a secondary cause of the headache (Parisi *et al*., 2011).

2.9.4 Cluster-Type Headache

Cluster-Type headaches have a distinct clinical presentation that can be highlighted and recognised with a meticulous history taking (Edwards, 2012). Neuroimaging, however, can be utilised for new onset cases in order to investigate a secondary cause for the headache, such as an abnormality in the pituitary gland (Edwards, 2012).

2.10 DIFFERENTIAL DIAGNOSIS/ES OF PRIMARY HEADACHES IN ADOLESCENTS

Table 2.8 presents the differential diagnosis/es of primary headaches.

Table 2.8: Differential diagnosis/es of primary headaches

Primary Headache	Differential diagnosis/es	Reason
MTH	TTH (Zebenholzer *et al*., 2000)	Overlapping of symptoms experienced with a TTH and a MTH.
	CTH (van Vliet *et al*., 2003)	Headaches that present between CTH episodes or concomitant symptoms such as nausea and photophobia may be the primary focus of the health care provider; therefore, a MTH misdiagnosis can be made.
	Brain tumour (Kernick, 2008)	If a new primary headache diagnosis cannot be made within eight weeks of presentation. If the headache is associated with a history of breast or lung cancer. If the headache is exacerbated by exertion and/or the valsalva maneuver. If the headache awakens a person from their sleep.
	Hemicrania continua (Lipton, 2011)	Unilateral head pain that is often associated with nausea and vomiting, photophobia and

		phonophobia present in patients with both MTH and hemicrania continua.
	Ocular surface disease (Friedman and Digre, 2013)	Location of pain around the orbit of the eye and presentation of photophobia coincide with features of MTH.
	Intracranial aneurysm (Garg *et al*., 2014)	A headache is the most common presenting sign in an adolescent experiencing an intracranial aneurysm.
TTH	MTH (Zebenholzer *et al*., 2000)	Overlapping of symptoms experienced with a TTH and a MTH.
	Brain tumour (Kernick, 2008)	If a new primary headache diagnosis cannot be made within eight weeks of presentation. If the headache is associated with a history of breast or lung cancer. If the headache is exacerbated by exertion and/or the valsalva maneuver. If the headache awakens a person from their sleep.
	Temporal cell arteritis (Bernstein *et al*., 2013)	Temporal cell arteritis is usually considered with new onset headaches, predominantly in persons over 50 years of age.
	Intracranial aneurysm (Garg *et al*., 2014)	A headache is the most common presenting sign in an adolescent experiencing an intracranial aneurysm.
CTH	Horner's Syndrome (Friedman and Digre, 2013)	Cluster headaches may be noted in conjunction with Horner's Syndrome.
	Carotid artery dissection (CAT) (Tsivgoulis *et al*., 2013 and Candeloro *et al*., 2013)	New onset Horner's Syndrome even if in conjunction with a CTH should always be considered a CAT until proven otherwise. New onset CTTH and/or pain variability in CHT should always prompt further investigation into CAT as CTH can mimic signs and symptoms of a CAT or the CTH is secondary to the CAT.

2.11 PRIMARY HEADACHES TREATMENT INTERVENTIONS

Limited knowledge, under diagnosing, inability to tailor treatment protocols to specific patients, limited resources of patient and/or health care provider, lack of patient compliance and lack of patient education with regards to primary headaches creates an unstable base for headache treatment interventions (Matchar *et al*., 2008).

A population based cross-sectional study conducted by Thomas *et al*. (2004) noted that 49% (n=1209) of the participants (n=2662) who reported experiencing headaches had at some stage sought advice or a medical consultation for their headache. However, a German based study noted only one third (31.1%) of adolescents had consulted a physician with regards to their headaches (Kröner-Herwig, Heinrich and Morris, 2007). The majority or participants noted a General Practictioner (GP) (27%) as their source for medical consultation, optometrist (21%) , pharmacist (8), hospital specialist and 1% had consulted a homeopath (Thomas *et al*., 2004).

Chee (2004), Dooley (2009) and Moreno (2013) suggest that non-pharmacological treatments such as keeping a headache diary, biofeedback and relaxation techniques, regular exercise, acupuncture and chiropractic treatment should remain the first-line of treatment when treating adolescents with primary headaches.

According to a long-term follow-up study over six years on 227 adolescents by Kienbacher *et al.* (2006), it was noted that 30% of the adolescents who reported to the headache centre for treatment, became free of headaches and 20-25% who initially experienced MTH now reported TTH or vice versa. The prognosis was noted as being adversely affected if the adolescent was initially diagnosed with a MTH (Kienbacher *et al*., 2006).

2.11.1 Soft Tissue Therapy and Manipulation

According to a review by Biondi (2005), chiropractic treatment, physiotherapy, massage therapy and/or osteopathic manipulation is often sought from headache sufferers especially people with MTH and TTH. Since the efficacy of these treatments are not well researched, it is suggested that these treatment options be used to supplement existing well researched and established techniques and treatment plans (Biondi*,* 2005). Physical manipulation and treatment which focuses on the cervical spine is beneficial in treating certain primary headache disorders because the headache may arise from or be influenced by cervical soft tissue structures or other osseous structures in the cervical spine (Biondi, 2005). Chiropractic spinal manipulative therapy (SMT) has proven to have a moderate level of efficiency in the treatment of MTH (Tuchin *et al.,* 2000). Although MTH, TTH and cervicogenic headaches are diagnosed as separate conditions, research has shown that they all may share a common underlying causative mechanism which includes cervical spine dysfunction (Bronfort *et al*., 2001). Bronfort *et al*. (2009), through a systematic review, revealed that SMT has comparable effectiveness with first line prophylactic treatments of MTH and TTH.

2.11.2 Acupuncture

The use of acupuncture in combination with first line treatments for primary headaches has been shown to increase the quality of life in an individual (Witt *et al*., 2008).

2.11.3 Relaxation Techniques

Although further studies are required, there is a strong indication that teaching adolescents who experience MTH and TTH relaxation techniques is beneficial in reducing the intensity and frequency of headaches (Fichtel and Larsson, 2004; Larsson *et al*., 2005). Progressive muscle contraction and relaxation and diaphragmatic breathing techniques are useful relaxation techniques that can be taught in a short period of time (Fichtel and Larsson, 2004). Biofeedback therapy is also considered a relaxation technique (Mayo Clinic, 2013). Although studies by Nestoriuc *et al*. (2008) and Blume *et al*. (2012) indicate that biofeedback therapy is an effective treatment for adolescents with chronic and episodic headaches such as MTH and TTH, further studies are still required. Mullally *et al*. (2009) dispute these findings and suggest that biofeedback techniques are not cost effective because they require many training sessions and provide little to no therapeutic benefit.

2.11.4 Headache Diary

The use of a headache diary is useful with regards to highlighting triggering factors and accurate assessment of drug use (Tassorelli *et al*., 2008). The study conducted by Tassorelli *et al*. (2008) also revealed that headache diaries increase the number of headache diagnoses for MTH and TTH when compared to diagnoses made from clinical interviews. However, headache diaries are not as useful in highlighting CTH (Tassorelli *et al*., 2008). Headache diaries provide accurate information pertaining to headaches in adolescents and younger children because time alters the way those patients remember their headache details, causing recall errors during a clinical interview (Van den Brink, Bandell-Hoekstra and Abu-Saad, 2001).

2.11.5 Oxygen Therapy

Inhalation of high flow 100% oxygen through a facial mask has been a standard form of abortive treatment since the 1950's for CTH (Halker *et al*., 2010). The treatment is most effective if administered during the initial onset of the headache pain or in some, during the peak of the

headache (Halker *et al*., 2010). However, particularly for children and adolescents, access to treatment is not always readily available (Lewis *et al*., 2005; Halker *et al*., 2010).

2.11.6 Pharmacological Treatment

There is currently no Food and Drug Administration (FDA) approved drugs for the treatment of primary headaches in adolescents (Whalen, 2005). The use of medication for headaches has been noted to increase with age in adolescents (Hansen *et al*., 2003). Health care providers prescribe pharmacological treatment based on adult approved drugs and estimated dosage amounts (Whalen, 2005). In a retrospective, observational cohort study conducted on 8373 adolescents between 13 and 17 years of age, it was noted that 46.1% of the participants had received an opioid prescription for the treatment of their headaches despite evidence against its use (DeVries *et al*., 2014). With regards to over the counter medication, adolescents are more likely to self-medicate (Du and Knopf, 2009).

2.11.6.1 Migraine-Type Headache and Tension-Type Headache

Paracetamol and ibuprofen have an excellent safety profile and therefore, remain the first line of treatment for MTH in adolescents even though evidence based research is still lacking (Dooley, 2009; Wöber-Bingöl, 2013). However, according to Mitka (2004), many adolescents over-use over the counter medication to treat their headaches, often without the acknowledgment of their parents. Zwart *et al*. (2003) conducted a study which revealed that the chronic intake of analgesics for headaches, especially MTH, significantly increases the individual's risk of experiencing chronic pain later in life when compared to those who did not overuse analgesics. Lewis (2002) and Terry (2009) state that pharmacological preventative MTH treatments for adults are not as safe or as effective for adolescents and although diagnosis may be based on the same criteria as adults, MTH in adolescents is often present for shorter durations and have a bilateral pain distribution.

2.11.6.2 Cluster-Type Headache

The treatment and management of CTH in adolescents is not well documented and owing to CTH episodes remaining in remission for longer periods in adolescents and children, prolonged, long-term treatment plans are objectionable (Lewis *et al*., 2005). The use of subcutaneous sumatriptan and intranasal zolmitriptan as alternatives to 100% oxygen therapy are the most

widely used and researched pharmacological treatment options with promising results for CTH (Francis *et al*., 2010).

2.11.7 Surgery

Surgery directed towards the sensory trigeminal nerve is a last resort for patients who have exhausted all other treatment options for CTH (Halker *et al*., 2010).

2.12 THE BURDEN OF PRIMARY HEADACHES

The impact of headache disorders is a large problem for both the individual and society (Mennini *et al*., 2008; Nodari *et al*., 2002). Up to 75% of adolescents below 15 years of age reported clinically significant headaches that could have led to school absenteeism, less extra-curricular activities and poor academic performance which increased their risk of negative developmental outcomes (Breuner *et al*., 2004). This is supported by a study conducted on 3963 adolescents which highlighted that headaches had a negative impact on all curricular and extra-curricular activities in the adolescent participants (Fuh *et al*., 2009). Using data obtained from the National Longitudinal Study of Adolescent Health, Rees and Sabia (2011) found that the negative effects of MTH can be partly attributed to excusable absenteeism and decreased ability to concentrate on class work as well as homework. The study suggests that addressing these issues could reduce the estimated effect on a scholar's high school grade point average by approximately 50% (Rees and Sabia, 2011). Gordon, Dooley and Wood (2004) noted that the adolescents that participated in their study who experienced frequent headaches had an increased frequency of reporting anxiety, emotional disorders and poor self-esteem and physical self-image when compared to the adolescents who did not experience frequent headaches.

With regard to society, the economic costs of headaches impose a serious burden on the National Health Care system and on the families of adolescents with headaches (Mazzotta *et al*., 2005). However, research that focuses on childhood headaches is still lacking and therefore, the data available is limited (Mazzotta *et al*., 2005). This is particularly true in the South African context.

According to a collaborative study between the WHO, World Headache Alliance, IHS and European Headache Federation, the prevalence and burden of headaches in at least half the

world's population is almost completely unknown due to a lack of existing studies from USSR, Eastern Europe, Australia and Africa (Stovner *et al*., 2007).

Headaches in adolescents affect their quality of life and a study conducted by Talarska (2005) on 135 adolescents who were predominantly between 14 and 16 years of age, showed that adolescents with tension-type headaches generally viewed life in a more pessimistic and depressive way as compared to adolescents who did not suffer from these headaches.

Africa has a rapidly growing young population and it is estimated that by 2040 Africa will overtake China and India to supply the largest productive age-group to the labour force (Woldeamanuel *et al*., 2014). In 2010, MTH was ranked as the 13th leading cause of disability in Africa (Vos *et al*., 2010). If one takes into consideration the high prevalence of adolescents with primary headaches (IHS, 2004) who will become the labour force, it highlights the ripple effect primary headaches will cause on society due to an increase in absenteeism and decrease in productivity (Woldeamanuel *et al*., 2014). Bigal *et al*. (2001) estimated a loss of 1.4-17.2 billion dollars a year in the United States of America due to decreased productivity caused by MTH. A validated, self-administered questionnaire with 29727 qualifying participants above 12 years of age revealed that more than 50% of people with MTH reported severe impairment of activities and a 53% decrease in productivity during work or school during a MTH attack (Lipton *et al*., 2001).

2.13 SUMMARY

Although headaches are common during early childhood, they become more frequent during adolescence (Lewis, 2002) and it is fast becoming a recognised health care problem (Fuh *et al*., 2009). Varying results have been drawn from different studies with regards to the prevalence of headaches, associated risk factors and headache triggers in an adolescent population.

Limited knowledge, under diagnosing, inability to tailor treatment protocols to specific patients, limited resources of patient and/or health care provider, lack of patient compliance and lack of patient education with regards to primary headaches creates an unstable base for headache treatment interventions (Matchar *et al*., 2008).

CHAPTER 3
METHODOLOGY

3.1 RESEARCH STUDY DESIGN

This research used a quantitative descriptive design utilising a survey to obtain information from adolescents who attend six public high schools in the Westville ward of the Pinetown School District. Ethical clearance for the study was granted by the Institutional Research and Ethics Committee (IREC) Durban University of Technology (DUT) (Appendix A).

3.2 ADVERTISING

No advertising was necessary as all participants were full time scholars of the six public high schools located in the Westville ward of the Pinetown School District.

3.3 SAMPLE SIZE

Based on 2013 statistics from the Department of Education (DoE) (Ngcobo, 2013), a total of 5502 scholars were enrolled in the six public high schools located in the Westville ward of the Pinetown School District (Table 3.1).

Although, Pitlochary Senior Primary was listed as a public high school within the Westville ward of the Pinetown School District, it was excluded from the study because they currently only had one Grade 8 and Grade 9 class and the principal did not consider the school as a high school.

Westville Girls High School was not able to participate in the study. Therefore, Kloof High School, a public high school on the border of the ward, was approached to participate in the study.

The sample size was calculated on the assumption that the expected prevalence of headaches in this population group was similar to that found in previous literature of 58.4% (Abu-Arafeh *et al*., 2010). To ensure that our sample was a precise estimate of this prevalence, we specified a precision level of 5% around the population value. Assuming a design effect of 1.5 and based on five schools with an 80% response rate, a sample size of no less than 360 was required (Singh, 2014).

One class from Grade 9, Grade 10, Grade 11 and Grade 12 in each school were randomly selected by a blind draw. Grade 8 classes were excluded from the study as the majority of the students in that grade would fall below the age of the target population (Table 3.1).

All the students within the selected classes were invited to participate in the study in order to ensure that the minimum required scholars for each school was met and exceeded.

Table 3.1: 2013 Student Numbers and Population Size Estimation and Obtained

High Schools	Number of students	Population size Estimation (%)	Proportional Sample size	Population size obtained
1. Gelofte Hoer Skool	674	13.6	49	98
2. Pinetown Boys High School	842	16.9	61	69
3. Pinetown Girls High School	1143	23.0	83	99
4. Westville Boys High School	1299	26.1	94	97
5. Kloof High School	1016	20.4	74	97
Total	4974	100	360	460

3.4 INCLUSION AND EXCLUSION CRITERIA

3.4.1 Inclusion Criteria

- Adolescent population between 14 and 19 years of age who were full-time scholars attending public high schools in the Westville ward of the Pinetown School District.
- Completion of a letter of information and informed consent (Appendix B).

3.4.2 Exclusion Criteria

- If a student was absent from school during the allocated time for completion of the questionnaire.

3.5 RESEARCH PROCEDURE

When the IREC of DUT approved the research proposal and questionnaire (Appendix A), permission was sought from the DoE (Appendix C) and the principals of the participating public high schools by means of a letter of information and informed consent (Appendix D). Upon approval from the principals of the participating public high schools, an appropriate time-slot was identified in which the final questionnaire (Appendix E) and letters of information and informed consent (Appendix B) could be delivered to the scholars within the participating classes via the researcher.

Upon completion of the informed consent form (Appendix B) and the final questionnaire (Appendix E) by the scholar, the completed informed consent form (Appendix B) and final questionnaire (Appendix E) were each placed in separate sealed ballot boxes by the scholar in order to conceal the identity of each participating scholar. All sealed ballot boxes were collected by the researcher on the same day as delivery. The researcher was available and present for the duration of the time that scholars were completing the questionnaire in order to guide and answers any questions.

All final questionnaires (Appendix E) were kept confidential and only seen by the researcher and supervisor. A code was allocated to each questionnaire before data was captured on a spreadsheet for data analysis by the chosen statistician.

3.6 QUESTIONAIRE DEVELOPMENT

3.6.1 Initial Questionnaire Development

The pre-pilot questionnaire (Appendix F) was based on the questionnaire that was developed and used by Prangley (2010) in his dissertation at DUT (permission was granted, Appendix G).

The pre-pilot questionnaire (Appendix F) consisted of three sections: Section A, B and C. The questions in Section A addressed demographics, social history and medical history. Section B focused on headache history and characteristics, namely: location, severity of pain, trigger factors, aggravating factors, relieving factors, associated signs and symptoms, frequency and duration. Section C revolved around a set of questions designed to establish the effects of the headache on the scholar's productivity and activities.

3.6.2 Expert Group

The pre-pilot questionnaire was answered and discussed by an expert group at a specially convened meeting. Expert groups are defined as “a group of interacting individuals having some common interest or characteristics, brought together by a moderator, who uses the group and its interaction as a way to gain information about a specific or focused issue” (Marczak and Sewell, n.d.). All flaws or inconsistencies noted in the questionnaire were corrected. Nine possible participants were asked two and a half weeks prior to the meeting to establish an acceptable time to have the meeting. Of the nine possible participants, seven confirmed that they would be able to participate in the expert group meeting but only six attended on the day. The expert group consisted of one stakeholder from the target population with the same age as the intended respondents to check for understanding and clarity, one Chiropractor, the research supervisor, two Chiropractic students and a Homeopathic student currently completing their Master’s Degree in their relative fields. All members of the expert group were given a letter of information and informed consent (Appendix H), code of conduct and confidentiality statement (Appendix I) to complete before discussion. The expert group meeting was video recorded and transcribed. The record was kept confidential.

3.6.3 Outcome of Expert Group Discussion

The pilot questionnaire (Appendix J) was developed according to the recommendations and alterations made during the expert group discussion.

The expert group made various suggestions and recommendations, as noted below.

- Insertion of a title page was recommended
- A general comment to implement throughout the questionnaire was to list options within a question alphabetically in order to ensure that there is no favouritism. For example in Section A, question 5-a, instead of listing ‘Anxiety, Stress, Depression or None’, rather list options as ‘Anxiety, Depression, Stress and then None’.

Within Section A the following recommendations were noted:

- Under the sub-heading ‘Social History’, a recommendation was made to change the order of the questions so that invasive questions are revealed later in the questioning and easier questions can ease the participant into the questionnaire. For example,

question two ‘smoking’ was moved to question six and instead social history questioning began with ‘exercise’.

- The fourth option ‘Caffeinated drinks’ in question four was altered to read as ‘energy drinks’ to ensure that a larger population will be able to understand the option.
- It was recommended that question 7-b, ‘Do you have a regular sleeping pattern’, be removed from the questionnaire because question 7-c addressed the question by default.
- The example ‘insomnia’ in question 7-c was changed to the more colloquial term ‘difficulty falling asleep’ in order to give participants a better understanding of the question being asked.
- With regards to question 8-a, in order to make the question more specific, it was recommended to change the option ‘Yes or No’ to a numerical scale from zero to ten. The question was also moved to question 8-b.
- Question 8-b was moved to question 8-a and the ‘Yes or No’ option was changed to the options ‘Anxiety, Depression, and Stress’. Therefore, the question was more precise.
- Under the sub-heading ‘Medical History’, questions 9-k and 9-l were moved higher up in the questioning order and reflect as questions 9-h and 9-i.
- Question 9-h ‘Have you had a head injury in the last 6 months?’ was changed to ‘Have you had a head or neck injury in the past?’. Therefore, the question was not limited and includes neck injury because these can also play an important role in headaches, etc.
- ‘Medical help’ was altered to ‘treatment’ in question 9-I to ensure that scholars could understand the question better.
- The wrongly numbered question 9-j, ‘Have you had a CAT scan or MRI of your head, neck and/or brain?’ was altered to question 9-m and a follow-up question asking ‘If yes, what was the reason?’ was introduced to the questionnaire so that the maximum amount of information could be utilised from that question.
- Question 10 was added to medical history and it focused more specifically on Chiropractic treatment and was aimed to see if scholars were aware of what a Chiropractor was and what Chiropractors did.
- Question 11 was also inserted into the questioning under ‘Medical History’ and focused on pregnancy.

Within section B, the following changes were noted:

- More questions were added to question 10 to gather more information. In addition to 'Have you experienced any headaches in the last 3 months?' The following two questions were added to the questionnaire: 'Have you ever been diagnosed with a headache in the past?' 'If yes what headache were you diagnosed with? *e.g. migraine*'
- Question 11-c was made clearer by changing it from 'if yes, my headaches are…' to 'If yes, have the following characteristics changed over time?' The structure of question 11-c options was also altered into a block type questioning and reduced the questions from ten separate options to a list of five.
- Examples were included in question 11-l, therefore, directing scholars into the correct direction when answering the question.
- Question 11-j was altered from 'Have you ever seen a doctor for your headache/s?' to 'Have you ever sought treatment for your headaches?' and more traditional examples were included in the follow-up question to ensure scholars are aware that they could include traditional healers a well as pharmacists in their answer.
- The label indicating the position of the head in each diagram in question 12 was added to ensure there was no confusion when shading in areas of pain.
- A more detailed numerical scale was recommended for questions 13a and 13b so that interpretation of the answer by the researcher could be more precise.
- 'ache' and 'poking' was added to the list of headache description options in question 14 because those are descriptions are often heard from patients.
- 'reading' and the 'sun' was included as options in question 15. It was also suggested that the same set of options be used for question 16.
- The descriptive example of how question 18 needed to be answered 'I have nausea (tick) during my headache (tick) or do not have nausea (no further ticks)' was removed because it was perceived as too confusing and replaced with an arbitrary example in the table provided so that scholars could see how the question could be answered.
- The answer options in question 20 was changed from very specific options to options that allowed the scholars to answer for themselves with regards to how many hours or minutes or days their headache may last.

Within section C, the following changes were noted:

- A specific question for studying was added to question 20. 'How many days in the last 3 months have you not been able to study or do homework because of your headache?' as this was important to include due to it being an important aspect of a scholars life.
- The options in question 20-i were changed from a list of percentages that may be confusing to scholars to a scale that could later be interpreted by the researcher for data collection.

3.6.5 Outcome of Pilot Study

Comments and changes arising from the pilot questionnaire (Appendix J) appear below.

- It was advised that student name was changed to student/witness name and surname on the informed consent because (Appendix B) participants in the pilot study were inclined to only put their first name when signing consent.

Within Section A the following recommendations were noted:

- Advised to include the option none to question 5a. Students were unsure whether to leave blank or fill in 'none'.

Within Section B, the following changes were noted:

- Advised to include an example in question 22 because students thought they just had to tick if their headache occurred for only a few minutes or hours or days, therefore, not indicating a specific time frame.

No changes were made to Section C.

3.6.6 Final Questionnaire

The final questionnaire (Appendix E) consisted of three sections i.e. Section A, B and C with each having sub-headings. The questions in Section A addressed demographics, social history (exercise, sleeping habits, caffeinated drinks, stress, smoking, alcohol consumption and social drugs) and medical history. Section B focused on headache history, characteristics (location, severity of pain, trigger factors, aggravating factors, relieving factors, associated signs and symptoms, frequency and duration), pregnancy and inquired information regarding scholars'

knowledge of Chiropractic. Section C revolved around a set of questions designed to establish the effects of the headache on the scholar's productivity and activities. Section A, B and C were used for data capturing and statistical analysis and Section B was also used to diagnose the headache by adhering to the criteria and guidelines as mentioned by the IHS (Appendix K).

3.7 ETHICAL CONSIDERATIONS

The research was conducted on minors therefore permission was sought from the DoE (Appendix C) and principals of the participating schools (Appendix D). In terms of section 39(4) of the Child Care Act 74 of 1983 (South African Medical Research Council, 2004), scholars in the age group 14 to 19 years of age do not require permission from a legal guardian or parent to participate in the study and could therefore sign their own informed consent (Appendix B).

Time allocated to students to complete questionnaires did not interfere with the scholars allocated academic hours. All questionnaires were completed during a time-slot that was agreed upon by the principals and teachers of the participating scholars.

Participation in the study was voluntary and no remuneration was awarded.

The scholar's name was not used on the data sheets. A code was allocated to each questionnaire during data capturing. The research data will be kept safe at the DUT Chiropractic Department for approximately five years, after which all data will be disposed of by means of shredding.

3.8 MEASUREMENT FREQUENCY

All questionnaires were administered to and collected from the scholars on the same day of administration and no further tests or questionnaires were administered thereafter.

3.9 STATISTICAL ANALYSIS

The data was captured on a MS Excel spreadsheet and imported into IBM SPSS version 20 for analysis. Missing data was captured as missing. The specific objectives were analysed (Singh 2014). The prevalence of headaches in total, per grade, gender and other demographics was reported as a percentage and 95% confidence interval. The proportion of those with headaches

who reported being treated by a health care provider was reported with a 95% confidence interval. The burden of headaches was reported in percentages in those who experience headaches and displayed in tables and bar charts. The hypothesis was tested at the 0.05 level of significance. The association between each risk factor individually and the outcome of the headache was assessed using bivariate tests such as the chi square test and independent samples t test. For the risk factors that are significantly associated with headaches, a logistic regression model was constructed to assess the adjusted effect of each whilst controlling for confounding effects. The proportion of those with headaches reporting to a Chiropractor or other health care provider was reported with its 95% confidence interval.

CHAPTER FOUR

RESULTS

This chapter presents the results of the information from the questionnaires utilised in this study.

4.1 SAMPLE SIZE AND RESPONSE RATE

The total sample size needed for the study was 360. In total, 460 questionnaires were dispatched and 460 were returned which gave a response rate greater than 100%. All 460 questionnaires were analysed.

The male to female ratio was approximately 1:1. Of the 460 scholars who participated in the study, 246 (53.5%) were male and 214 (46.5%) were female (Table 4.1).

Table 4.1: Respondents described by age and gender

AGE (years)		Gender		TOTAL
		Male	Female	
14	Count	49	29	
	% within age group	62.8%	37.2%	
	% within gender	19.9%	13.6%	
	% of total	10.7%	6.3%	17.0%
15	Count	58	49	
	% within age group	54.2%	45.8%	
	% within gender	23.6%	22.9%	
	% of total	12.6%	10.7%	23.3%
16	Count	48	64	
	% within age group	42.9%	57.1%	
	% within gender	19.5%	29.9%	
	% of total	10.4%	13.9%	24.3%
	Count	50	43	
	% within age	53.8%	46.2%	

17	group			
	% within gender	20.3%	20.1%	
	% of total	10.9%	9.3%	20.2%
	Count	39	28	
	% within age group	58.2	41.8	
18				
	% within gender	15.9	13.1	
	% of total	8.5	6.1	14.6
	Count	2	1	
	% within age group	66.7%	33.3%	
19				
	% within gender	0.8%	0.5%	
	% of total	0.4%	0.2%	0.6%

A total of 78 (17.0%) scholars were 14 years of age, 107 (23.3%) were 15 years of age, 112 (24.3%) were 16 years of age, 93 (20.2%) were 17 years of age, 67 (14.6%) were 18 years of age and 3 (0.6%) were 19 years of age (Figure 4.1).

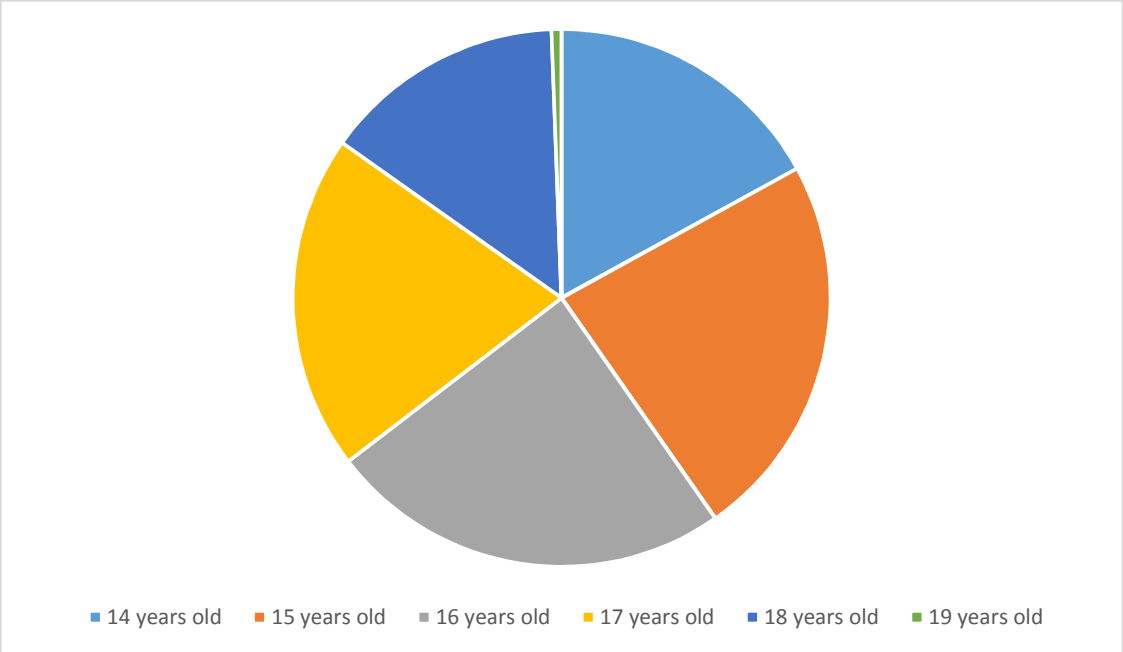


Figure 4.1: Pie chart representing the respective ages of the participating scholars (%)

4.2 PREVALENCE OF HEADACHES

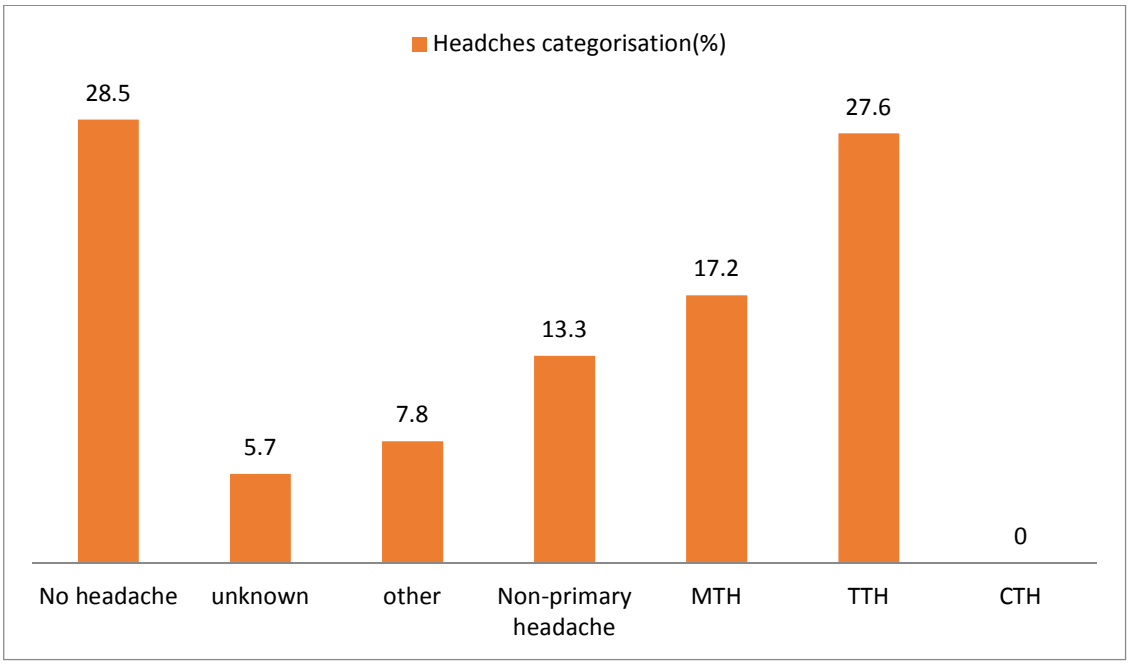


Figure 4.2: Bar graph representing headache categorization (%)

Of the total study population (N=460), scholars currently in public high schools in the Westville ward of the Pinetown school district, 69.6% (n=320) of scholars indicated that they had experienced a headache within the last three months and 28.5% (n=131) did not experience headaches. Due to missing data, 5.7% (n=26) were classified as unknown and 7.8% (n=36) as 'other' because the characteristics of the presenting headache did not lean towards a diagnosis without further investigation. The remaining 58% (n=267) were categorised as either a non-primary headache, MTH, TTH or CTH. TTH was the most common headache with 27.6% (n=127) of scholars being diagnosed with a TTH by the researcher, according to information provided in the questionnaire and cross referenced with the IHS classification. MTH encompasses 17.2% (n=79) of the population and 13.3% (n=61) of the population was diagnosed with a non-primary headache (Figure 4.2).

Table 4.2: Prevalence of primary headache with regards to age in the last three months

Age (years)	Diagnosis			*p*-value
	MTH %(n)	TTH %(n)	CTH %(n)	
14	10.7(8)	23.0(29)	-	0.012*
15	22.7(17)	31.7(40)	-	
16	17.3(13)	20.6(26)	-	
17	28.0(21)	13.5(17)	-	
18	20.0(15)	10.3(13)	-	
19	1.3(1)	0.8(11)	-	
TOTAL %(n)	100(75)	100(126)	-	

*Significant *p*-value

Overall more adolescents were diagnosed with TTH than MTH. The age group with the highest prevalence was 15 years old with 31.7% (n=40), followed by 14 year olds with 23.0% (n=29) and 16 year olds with a prevalence of 20.6% (n=26). A *p*-value of 0.012 indicates that age is a significant correlation (Table 4.2).

Of the total study population (N=460), 56.6% (n=255) of scholars indicated that they had previously experienced headaches. This indicates that more than half of the scholars participating in the study had experienced headaches in their lifetime. Scholars were asked to indicate what headache they had previously experienced or been diagnosed with; the most common previously experienced headache was indicated as MTH, with 50.6% (n=129) of the 56.6% (n=255) scholars reporting a MTH. Other headaches indicated by scholars included: TTH 2.4% (n=6), 'normal headache' 9% (n=23), 'minor headache' 3.9% (n=10), sinus headache 1.6% (n=4), non-primary-headache 1.2% (n=3) and dehydration headache 0.8% (2).

4.3 FACTORS AFFECTING THE PREVALANCE OF HEADACHES

Table 4.3: Cross tabulation to demonstrate the prevalence of headaches in the past three months in relation to having previously experienced headaches

			Headaches experienced in the past		Total	*p*-value
			Yes	No		
Headaches experienced in the last three months	Yes	Count	199	121	320	<0.001*
		% of total	44.1%	26.8%	71.0%	
	No	Count	55	76	131	
		% of total	12.2%	16.9%	29.0%	
Total		Count	254	197	451	
		% of total	56.3%	43.7%	100.0%	

*Significant *p*-value

The *p*-value (*p*=<0.001) indicates that there is a significant relationship between the variables. Headaches experienced in the past increased the risk of scholars having experienced headaches in the three months prior to the study (Table 4.3).

Table 4.4: Prevalence of primary headaches with regards to gender in the last three months

Gender	Diagnosis			*p*-value
	MTTH %(n)	TTH %(n)	CTH %(n)	
Male	44.0(33)	54.8(69)	-	0.251
Female	56.0(42)	45.2(57)	-	
TOTAL %(n)	100(75)	100(126)	-	

A *p*-value of 0.251 indicates that within the total study population, gender does not play a significant role when determining the prevalence of primary headaches within an adolescent population (Table 4.4).

Table 4.5 shows the association between primary headache factors relating to the adolescents social history. This includes exercise, sleeping habits, caffeinated drinks, stress, smoking, alcohol consumption and social drugs.

Table 4.5: Associated risk factors for headaches in an adolescent population

Risk Factor			Headache		*p*-value
			Yes %(n)	No %(n)	
Exercise	Play sport	Yes	54.3(245)	18.8(85)	0.008*
		No	16.6(75)	10.2(46)	
	Regular exercise program	Yes	70.9(195)	29.1(80)	0.979
		No	71.0(125)	29.0(51)	
Sleeping Habits	Difficulty sleeping	Yes	82.7(134)	17.3(28)	<0.001*
		No	64.8(184)	35.2(100)	
	Grind teeth	Yes	89.8(44)	10.2(5)	0.007*
		No	67.7(191)	32.3(91)	
		Unknown	72.2(83)	27.8(32)	
	Wake up position				
	Stomach	Yes	73.2(104)	26.8(38)	0.723
		No	65.2(212)	2.2(7)	
	Back	Yes	66.3(59)	33.7(30)	0.678
		No	79.1(257)	2.2(7)	
	Left	Yes	77.6(90)	22.4(26)	0.454
		No	69.5(226)	2.5(8)	
	Right	Yes	69.5(89)	30.5(39)	0.264
		No	71.1(231)	1.5(5)	
Caffeinated Drinks	Coffee	Yes	73.2(221)	26.8(81)	0.727
		No	30.2(98)	0.6(2)	
	Tea	Yes	71.3(216)	28.7(87)	1.000
		No	31.7(103)	0.9(3)	
	Soft drink	Yes	70.2(255)	29.8(108)	0.213
		No	20.0(65)	0.0(0)	

	Energy drink	Yes	75.1(127)	24.9(42)	0.744
		No	58.8(191)	1.5(5)	
Smoking	Smoking status	Yes	74.4(29)	25.6(10)	0.225
		No	70.6(274)	29.4(114)	
		Ex-smoker	78.9(15)	21.1(4)	
	If yes, how many	1-5	71.4(20)	28.6(8)	
		6-10	100(8)	0.0	
		11-15	100(1)	0.0	
		16-20	0.0	0.0	
		More than 20	0.0	0.0	
Alcohol consumption		Yes	75.4(89)	24.6(29)	0.225
		No	69.5(228)	30.5(100)	
Social Drugs		Yes	69.4(25)	30.6(11)	0.839
		No	71.0(292)	29.0(119)	

*significant *p*-value

Participation in sport, difficulty sleeping and whether or not one grinds teeth while sleeping (sleep bruxism) are significant risk factors for developing headaches. With regards to sport, the six predominant sports are as follows: soccer, rugby, hockey, cricket, netball and swimming. It was noted that the six predominant sports are outdoor sports, with squash, the first indoor sport, listed at number 14. More than half of the scholars, 61.5% (n=330), indicated that they partook in sport. Of those, 54.3% (n=245) had experienced a headache in the last three months.

Participants who had difficulty sleeping or who grind their teeth during sleep (sleep bruxism) also had an increased risk of experiencing headaches.

Table 4.6: Associated medical risk factors for headaches in an adolescent population

Risk Factor		**Headache**		***p*-value**
		Yes %(n)	No %(n)	
Anemia	Yes	79.3(23)	20.7(6)	0.503
	No	90.2(293)	2.5(8)	
Anxiety	Yes	86.7(13)	13.3(2)	1.000
	No	93.2(303)	2.8(9)	

Depression	Yes	75.8(25)	24.2(8)	0.350
	No	89.5(291)	2.5(8)	
Diabetes	Yes	83.3(5)	16.7(1)	1.000
	No	95.7(311)	2.8(9)	
High Blood Pressure	Yes	78.6(11)	21.4(3)	0.752
	No	94.2(306)	2.9(9)	
Low Blood Pressure	Yes	88.2(15)	11.8(2)	0.650
	No	92.6(301)	2.8(9)	
Seizures	Yes	100.0(3)	0.0(0)	1.000
	No	96.3(313)	2.8(9)	
Stress	Yes	88.0(22)	12.0(3)	0.646
	No	90.5(294)	2.8(9)	
Thyroid Disease	Yes	100(3)	0.0(0)	1.000
	No	96.3(313)	2.8(9)	
Head injuries in the past?	Yes	77.3(99)	22.7(2)	0.067
	No	68.7(219)	31.3(100)	
If yes, did you receive treatment?	Yes	76.1(67)	23.9(2)	
	No	78.3(36)	21.7(10)	
Have you had a CAT scan or MRI of your head, neck and brain?	Yes	73.8(31)	26.2(11)	0.681
	No	70.8(281)	29.2(116)	
Family history of headaches	Yes	97.8(221)	2.2(5)	0.846
	No	97.4(75)	2.6(2)	

No significant medical risk factors were noted in Table 4.6. However, a general observation noted that scholars who had a history of head injury had an increased risk of experiencing headaches (77.3%) as compared to those who did not (68.7%).

4.4 TREATMENT OF HEADACHES

The following pie chart (Figure 4.3) depicts the percentage of students who seek and who do not seek professional treatment for their headaches. Approximately two-thirds, 63.8% (n=196), of participating scholars did not seek medical consultations for their headaches and 36.2% (n=111) did seek professional treatment for their headaches (p=0.254).

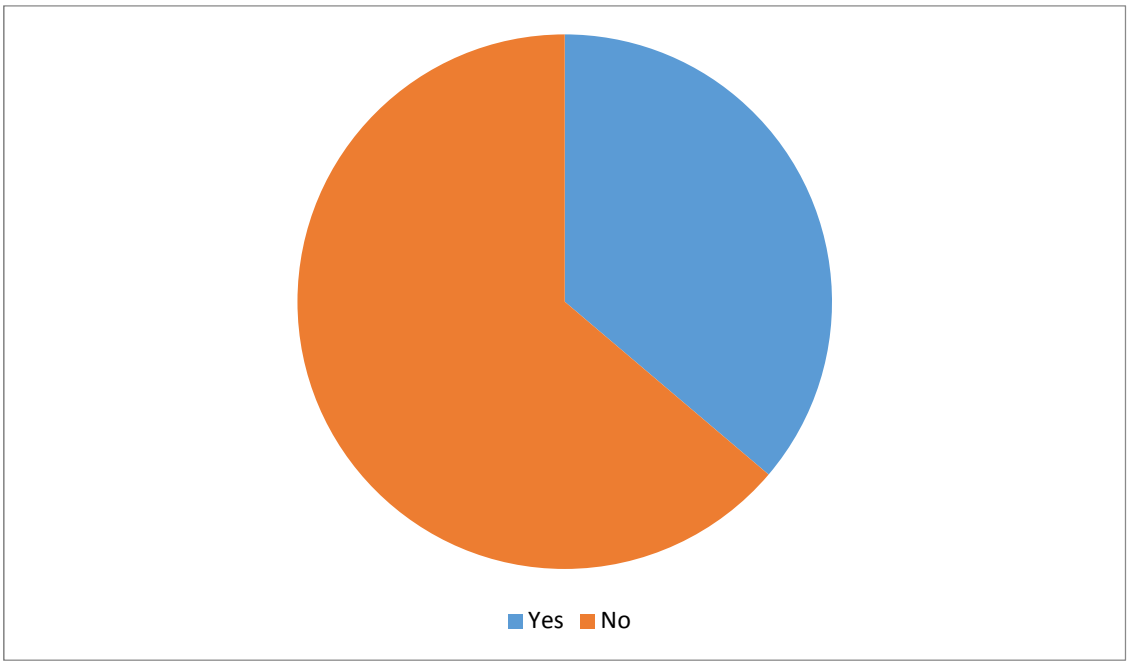


Figure 4.3: Pie chart representing scholars who seek and who do not seek treatment for their headaches (%)

Of the 36.2% (n=111) of participating scholars who had sought treatment from a medical professional, 94.6% (n=105) listed the professionals that they had consulted (Figure 4.4). Multiple responses were permitted and some scholars had been to more than one medical professional, hence n=130.

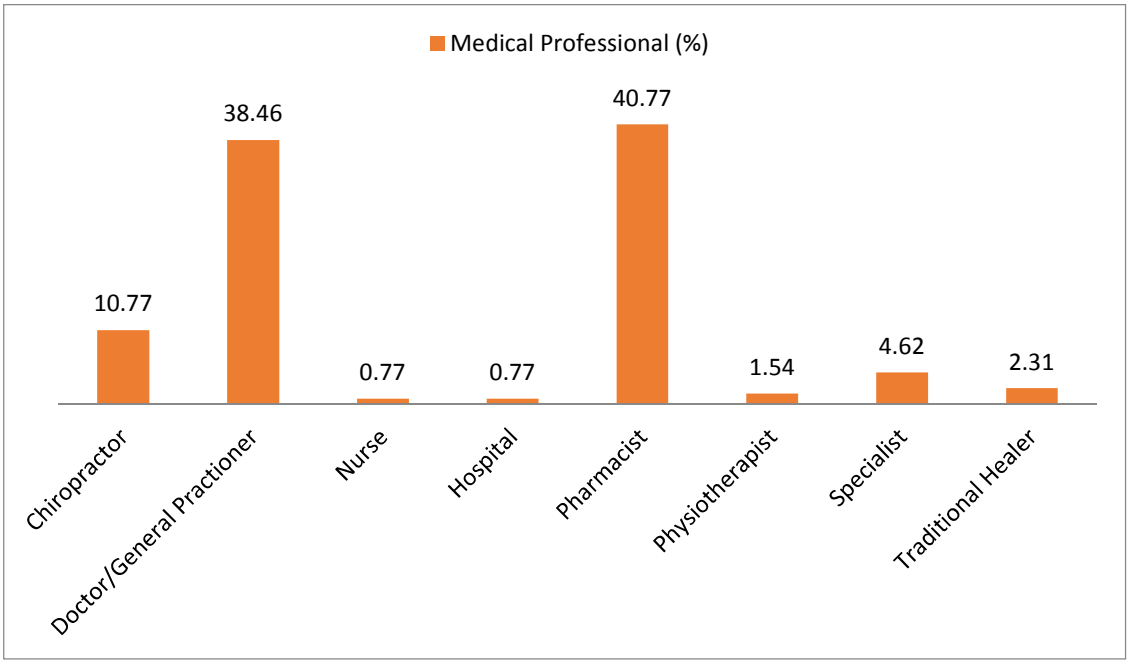


Figure 4.4: Bar graph representing the medical professionals that scholars seek medical attention from for their headaches (%)

A pharmacist was noted as the most common medical professional to seek help from for headaches 40.77% (n=53), and second was a consultation with a Doctor/General Practitioner 38.46% (n=50). Chiropractors were the third most often visited professional with 10.77% (n=14) of scholars seeking treatment from them. Seeking help at a hospital was ranked as the least common option, with only 0.77% (n=1) of the respondents listing it as an option.

Other medical professions listed by scholars included: Specialists 4.62% (n=6), Traditional healer 2.31% (n=3); Physiotherapist 1.54% (n=2) and a Nurse 0.77% (n=1).

Figure 5 represents noted diagnoses. Approximately one quarter of the scholars were diagnosed with a specific type of headache by the respective medical professional.

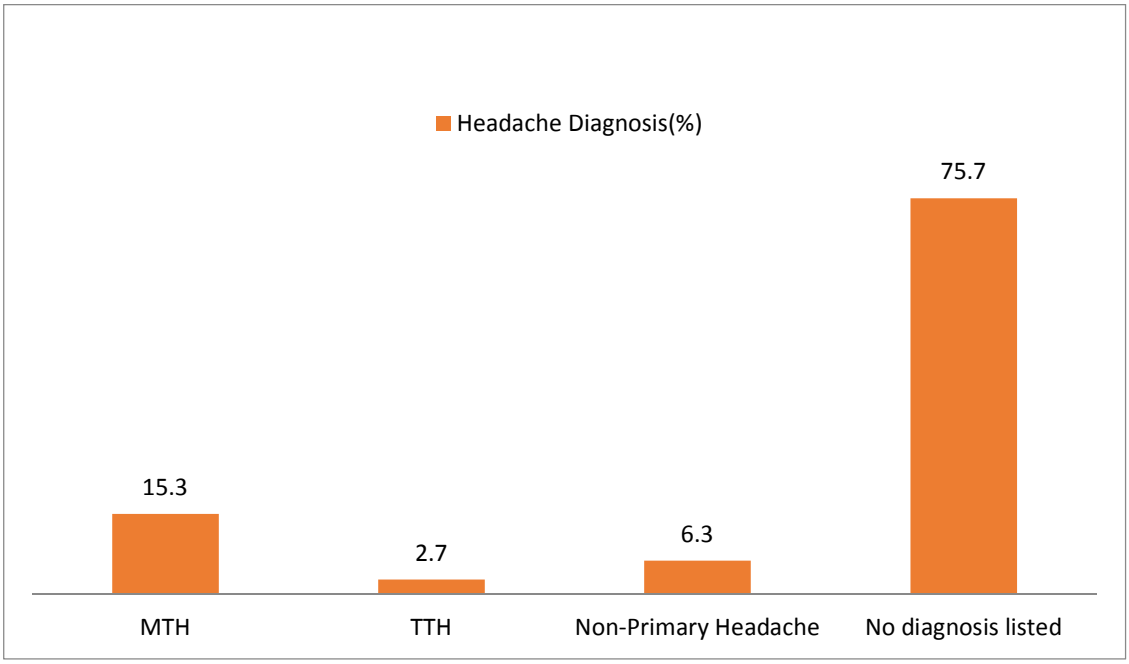
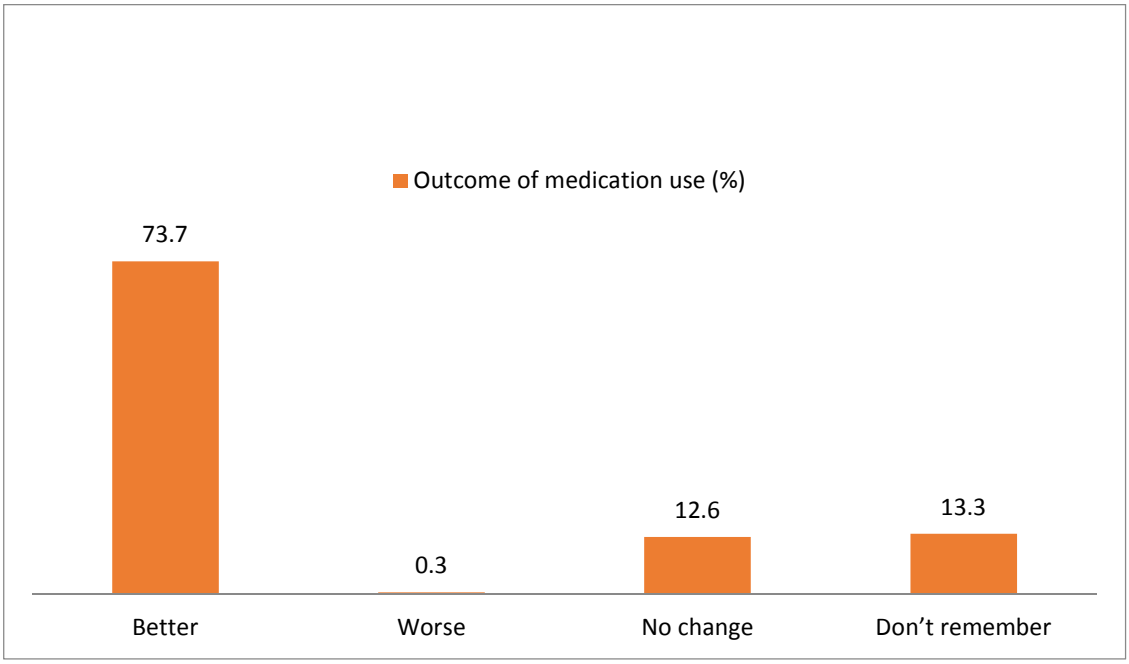


Figure 4.5: Bar graph representing headache diagnosis by the respective medical professionals (%)

Of the 36.2% (n=111) of scholars who sought treatment from a medical professional, 15.3% (n=17) were diagnosed with a MTH, 2.7% (n=3) were diagnosed with a TTH and 6.3% (n=7) were diagnosed with non-primary headaches. The majority of scholars 75.7% (n=84) did not indicate a diagnosis (Figure 4.5).

The use of medication for headaches was noted by 79.7% (n=255) of the 69% (n=320) of scholars who experienced a headache in their lifetime. The following bar graph (Figure represents the outcome of medication use on the effect of headaches.



p-value = 0.464

Figure 4.6: Bar graph representing the outcome of medication use for headaches in an adolescent population (%)

The headaches were predominantly improved with the use of medication, 73.7% (n=188), with only 0.3% (n=1) noting that medication made their headache worse, 12.6% (n=32) revealing that medication had no effect on their headache and 13.3% (n=34) could not recall the effect of medication on their headache (Figure 4.6).

4.5 SCHOLAR'S CHIROPRACTIC KNOWLEDGE

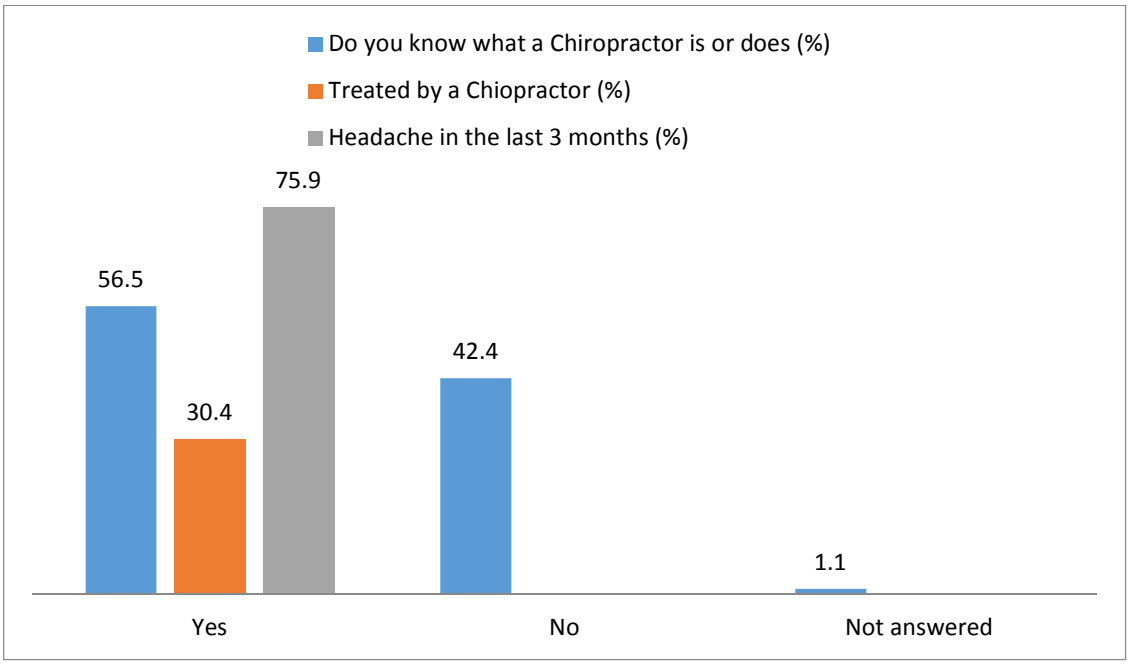


Figure 4.7: Bar Graph representing if scholars knew what a chiropractor was or did, if they have been treated by a Chiropractor, and how many of those scholars had experienced a headache in the last three months (%)

As can be seen from Figure 4.7, the majority of scholars, 56.5% (n=260) knew what a chiropractor was and what chiropractors did, whereas, 42.4% (n=195) of scholars answered that they did not know and 1.1% (n=5) was reflected as missing data. However, of the 56.5% (n=260) of scholars who knew what a chiropractor was and what a chiropractor did, only 30.4% (n=79) had been treated by a chiropractor. It was also noted that 75.9% (n=60) of the 30.4% (n=79) of scholars had experienced a headache in the last three months.

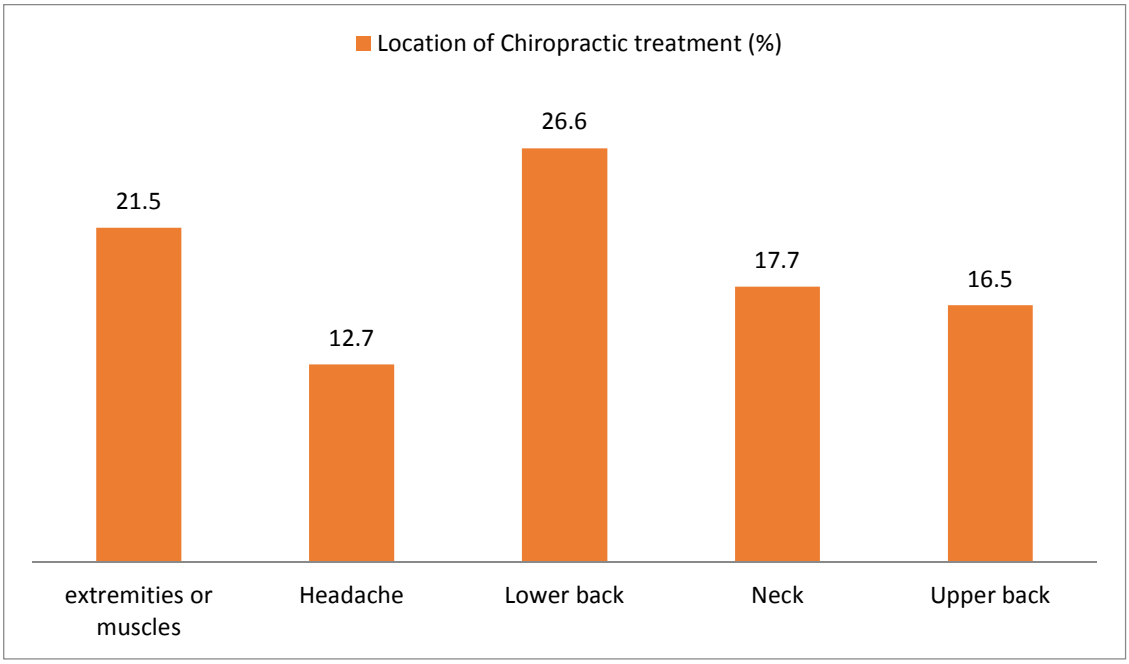


Figure 4.8: Bar graph representing reasons why scholars consulted a chiropractor (%)

As can be seen from Figure 4.8, the majority of scholars, 26.6% (n=21), consulted a chiropractor for low back complaints, 21.5% (n=17) for extremities or muscle complaints, 17.7% (n=14) for neck complaints, 16.5% (n=13) for upper back complaints. Although 75.9% (n=60) of the 30.4% (n=79) of scholars had experienced a headache, only 12.7% (n=10) of the participating scholars consulted a chiropractor for their headaches.

4.6 THE BURDEN OF HEADACHES

Table 4.7: Median, mean, standard deviations and Eta values for the number of days that daily life has been interrupted as a result of headaches in an adolescent population

	Median	Mean	Standard deviation	Eta value
How many days have you missed school in the last 3 months because of your headache?	0.00	0.82	1.97	0.234
In the last 3 months, how many days have you attended school even though you had a headache?	5.00	7.34	11.87	0.407
How many days have you missed family, social, sports or leisure				

activities in the last 3 months?	0.00	0.98	2.53	0.273
How many days in the last 3 months has your headache decreased your ability to do activities of daily life?	1.00	2.38	4.59	0.323
How many days in the last 3 months have you not been able to study or do homework because of your headache?	2.00	3.57	5.48	0.331

It is noted that the standard deviations in Table 4.7 are large. This is due to the large ranges that were observed. The small Eta values indicate there is no significant relationship between MTT and TTH with regard to the number of days interrupted by a scholar's headache. General observations from the data are as follows: on average one day of school was missed due to a scholar's headache; however, it was also noted that scholars attended school even though they had a headache on average of seven days. On average a scholar experienced a decreased ability to continue daily activities on three days and an average of four days was noted as headaches having had an adverse effect on a scholar's ability to study or complete homework. Headaches affected fewer leisure activities and social activities (one day on average).

Overall, it was noted that the majority of scholars who missed school due to a headache had experienced a MTT, 33.8% (n=24) as compared to TTH, 22.7% (n=27). A higher percentage of scholars who experience MTT attended school even though they had a headache, 88.2% (n=67), compared to those with TTH, 84.2% (n=96). A higher percentage of scholars with MTH experienced a decreased ability to perform activities of daily life 72.5% (n=50), and decreased ability to study or complete homework 80% (n=56) in comparison to those with TTH, 53.1% (n=60) and 72.2% (n=83) respectively. However, a larger percentage of scholars with TTH noted having to miss family, social, sports or leisure activities due to a headache, 38.3% (n=44), in comparison to those with MTH, 32.4% (n=22).

Table 4.8: Cross tabulation to indicate the action taken at school when a scholar experiences a headache

Action Taken at School		**Diagnosis**			***p*-value**
		MTH %(n)	TTH %(n)	CTH %(n)	
Continue as normal	Yes	18.0(37)	32.0(66)	-	0.567
	No	20.4(42)	29.6(61)	-	

Stop and rest	Yes	13.1(27)	18.9(39)	-	0.646
	No	25.2(52)	42.7(88)	-	
Take medication and continue as normal	Yes	5.3(11)	10.2(21)	-	0.695
	No	33.0(68)	51.5(106)	-	
Other	Yes	1.5(3)	2.4(5)	-	0.315
	No	36.9(76)	59.2(122)	-	

Overall, the majority of scholars, 50% (n=103), indicated that they continued as normal when experiencing a headache at school (Table 4.8).

Table 4.9: Cross tabulation to indicate the action taken at home when a scholar experiences a headache

Action Taken at Home		**Diagnosis**			***p*-value**
		MTH %(n)	TTH %(n)	CTH %(n)	
Continue as normal	Yes	2.9(6)	8.7(18)	-	0.184
	No	35.4(73)	52.9(109)	-	
Stop and rest	Yes	17.0(35)	25.7(53)	-	0.773
	No	21.4(44)	35.9(74)	-	
Take medication and continue as normal	Yes	14.6(30)	26.7(55)	-	0.470
	No	23.8(49)	35.0(72)	-	
Other	Yes	3.9(8)	3.9(8)	-	0.244
	No	34.5(71)	57.8(119)	-	

Overall, the majority of scholars, 42.7% (n=88), indicated that they would stop and rest if they experienced a headache at home, whereas, taking medication and continuing as normal was marginally the second most popular option, 41.3% (n=85) (Table 4.9).

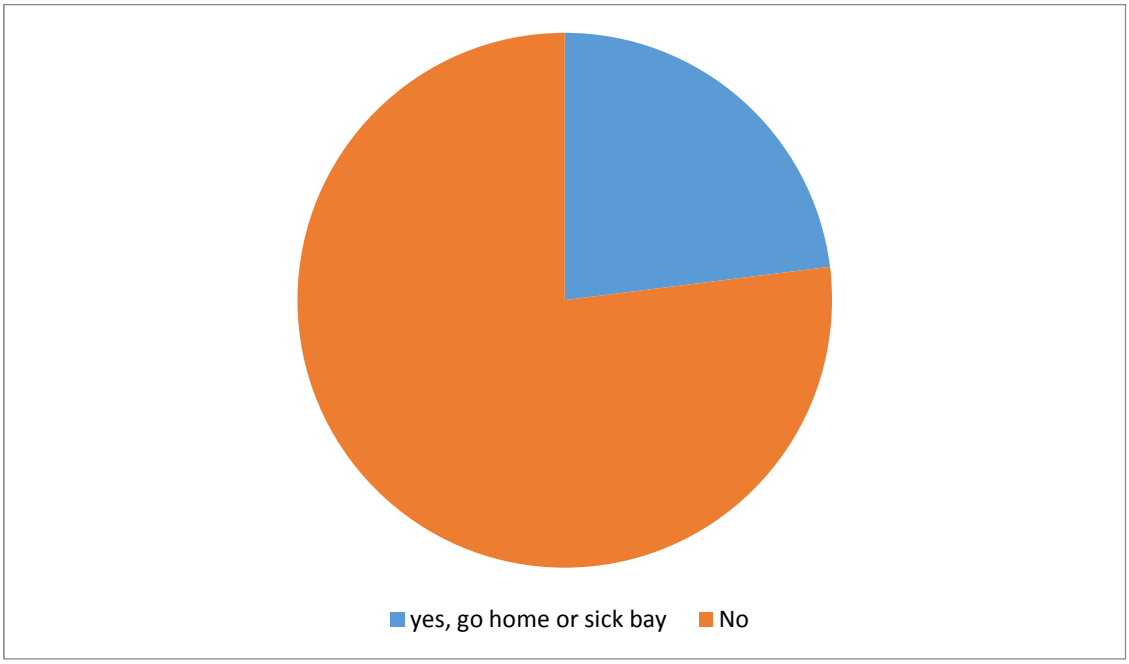


Figure 4.9: Pie chart representing whether scholars go home or to the sick bay when they have a headache (%)

Approximately a quarter of the learners, 23.0% (n=69) indicated that they had to go home from school early or go to the sick bay because of a headache over the last three months (Figure 4.9).

Table 4.10: Overall productivity decrease due to headaches in the last three months

Overall decrease in productivity (%)	**Diagnosis**			***p*-value**
	MTH %(n)	TTH %(n)	CTH %(n)	
0	12.5(9)	13.7(10)	-	0.315
10	9.7(7)	8.5(10)	-	
20	11.1(8)	23.9(28)	-	
30	15.3(11)	17.9(21)	-	
40	13.9(10)	12.8(15)	-	
45	1.4(1)	0.0(0)	-	
50	18.1(13)	8.5(10)	-	
60	8.3(6)	7.7(9)	-	
70	5.6(4)	2.6(3)	-	
80	1.4(1)	1.7(2)	-	

90	1.4(1)	1.7(2)	-
100	1.4(1)	0.9(1)	-

The average decrease in productivity is closer to a minimum decrease. This indicates that on average scholars experience a 30% decrease in productivity during a headache. Although the *p*-value is insignificant, a general observation can be made; the majority of scholars who experience MTH, 18.1% (n=13), experience a 50% decrease in productivity during a headache. Whereas, the majority of scholars who experience a TTH, 23.9% (n=28), have a 20% overall decrease in productivity during a headache (Table 4.10).

CHAPTER 5

DISCUSSION

This chapter discusses the results presented in Chapter 4 and compares them to similar studies. This includes sample size and response rate, prevalence of headaches, factors affecting the prevalence of headaches, treatment of headaches, scholar's chiropractic knowledge and the burden of headaches.

5.1 SAMPLE SIZE AND RESPONSE RATE

The total sample size needed for the study was 360 scholars (Singh 2014). In total, 460 questionnaires were dispatched and 460 were returned which gave a response rate greater than 100%. Any missing data was noted as missing and no questionnaires were discarded. The male to female ratio was approximately 1:1. Of the 460 scholars who participated in the questionnaire 246 (53.5%) were male and 214 (46.5%) were female.

Other studies that were conducted on similar population groups had larger population sizes. A study conducted by Zwart *et al*. (2004) showed a response rate of 88% out of 10 202 scholars between 13 and 18 years of age, with a final sample size of 8 255 scholars. In the study, 69.4% of the study population were male and 84.2% were female (Zwart *et al*., 2004). Karli *et al.* (2006) conducted their study on 2 387 Turkish scholars between 12 and 17 years of age (no specificity regarding gender was given). Gupta *et al*. (2008) included 1 862 scholars of which 61.4% were male and 38.6% were female.

Although the sample size was not in coherence with other studies, this study attained a sufficient response rate for it to be statistically accepted when compared to the target area and number of public high schools in the Westville ward of the Pinetown school district.

Gender distribution was, however, on par with the study conducted by Gupta *et al*. (2008); however, no distinct parallels can be drawn with regards to sample size and response rate.

5.2 PREVALENCE OF HEADACHES

As can be seen from Figure 4.2, of the total sample (N=460) of scholars in the study population currently in public high schools in the Westville ward of the Pinetown school district, 28.5% (n=131) did not experience headaches, 5.7% (n=26) were classified as unknown due to missing data and 7.8% (n=36) as 'other' due to the characteristics of the presenting headache leaning towards a diagnosis that warrants further investigation. The remaining 58% (n=267) were categorized as either a non-primary headache, MTH, TTH or CTH. Kroner-Herwig and Gassmann, (2012) and Tavasoli *et al.* (2013) stated that TTH was the most common primary headache to present in adolescents. This is congruent with the findings of this study where TTH was the most commonly diagnosed headache with 27.6% (n=127) of scholars being diagnosed with a TTH by the researcher, according to information provided in the questionnaire and cross referenced with the IHS classification. MTH encompasses 17.2% (n=79) of the population which ranked as the second most common headache which is considerably less that the overall 28% prevalence noted in a literature review conducted by Antonaci *et al*. (2014). However, it is consistent when highlighting that MTH is not as common as TTH and it is not an uncommon diagnosis in adolescents (Curry and Green, 2007). No scholars were diagnosed with a CTH. This is considered a likely result because CTH are relatively rare (Russell, 2004; Xie *et al*., 2013) and affect only one out of 500 individuals (Russell, 2004).

Scholars were asked to indicate what headache they had previously experienced or if they had been diagnosed with a headache. Of the total sample (n=460), 56.6% (n=255) of scholars indicated that they had previously experienced headaches. This indicates that more than half of the scholars participating in the study had experienced headaches in their lifetime. This mirrors similar findings to that of a study conducted by Stovner *et al*. (2007) which found that the global prevalence of recurrent headaches that encompasses all ages is 47%. According to a systematic review of population-based studies on the prevalence of headaches by Abu-Arafeh *et al*. (2010), there is a 58.4% prevalence of headaches in children and adolescents under 20 years of age. This is marginally higher than the results of this study; however, the prevalence of MTH and TTH specifically varies considerably across studies (Zwart *et al*., 2004).

The most common previously experienced headache was indicated as MTH, with 50.6% (n=129) of the 56.6% (n=255) scholars reporting a MTH. It must be noted that this diagnosis was not given by the researcher but based on a diagnosis provided by the participating scholar. Lipton, Stewart and Liberman (2002) investigated the self-awareness and recognition of MTH by

interviewing 30 758 individuals via random digit dialling in the United States of America. The study noted that of the 4 967 individuals who self-reported MTH, only 33% were correct when diagnosed according to the IHS Classification.

Overall, more adolescents were diagnosed with TTH than MTH. The age group with the highest prevalence was scholars who were 15 years of age with 31.7% (n=40), followed by scholars who were 14 years of age with 23.0% (n=29) and lastly scholars who were 16 years of age with a prevalence of 20.6% (n=26) (Table 4.3). A *p*-value of 0.012 indicates that age is a significant correlation. Karli *et al*. (2006) noted that the prevalence of MTH and TTH increased with age. Endogenous sex hormones during puberty are an associated factor that may lead to the prevalence spike in older females presenting with MTH, but the mechanism is still unclear (Sacco *et al*., 2012).

5.3 FACTORS AFFECTING THE PREVALANCE OF HEADACHES

A *p*-value of 0.000 when cross-tabulating the prevalence of headaches in the past three months in relation to having previously experienced headaches (Table 4.2) indicates that there is a significant relationship between the variables. Forty-four percent of scholars who had previously experienced a headache had also experienced a headache in the last three months prior to completing the questionnaire. Headaches experienced in the past increased the risk of scholars having experienced headaches in the three months prior to this study. This finding is supported by the population based cross-sectional study conducted by Thomas *et al*. (2004) where 2 662 participants noted experiencing headaches in their lifetime and 2 125 of those participants noted that they had also experienced a headache within the three months prior to the study.

This study concludes that gender did not, statistically, play a significant role when determining the prevalence of primary headaches within an adolescent population (Table 4.4). The male to female ratio of participants in the study was 1:1 and the male to female ratio of the prevalence of primary headaches in the last three months was also 1:1. This is not consistent with other studies. Karli *et al*. (2006) noted that the prevalence of MTH and TTH was significantly higher in females (59.8%) than males (45.1%) between 13 and 17 years of age but not in adolescents who were 12 years of age. Gupta *et al*. (2008) and Abu-Arafeh *et al*., (2010) also support these findings with the prevalence of MTH and TTH being more prevalent in the female adolescent population than in males (Table 2.1). However, the majority of scholars in the study were diagnosed with TTH (27.6%; n=127) and, according to Chowdhury (2012), TTH is not gender

inclined. A study conducted by Fuh *et al.* (2009) on 2 459 adolescents attending high school corroborates Chowdhury's (2012) observation because the study showed no significant difference between male and female students with regards to TTH. Rasmussen (2001) stated that there is a higher prevalence of TTH in females than in males, with a male to female ratio of 1:1.5. Differences in the study and the other studies include population size and country of study. Other contributing factors highlighted by Rasmussen (1999) and Stovner *et al*. (2007) include cultural background and ethnicity. Therefore, further investigation as to why there is no correlation between the studies is required.

With regards to this study, the six predominant sports are as follows: soccer, rugby, hockey, cricket, netball and swimming. A total of 61.5% (n=283) of the scholars participating in the study indicated that they partook in sport. Of those, 54.3 % (n=245) had experienced a headache in the last three months. It was noted that the six predominant sports were outdoor sports, with squash, the first indoor sport, listed at number 14. Participation in sport was statistically significant and noted that playing sport, particularly an outdoor sport, is an associated risk factor for headaches. On the contrary, a study conducted by Milde-Busch *et al*. (2012) noted that physical inactivity contributed to 36.5% of the headaches experienced by adolescents participating in the study and physical activity was not noted as an associated risk factor. Studies linking headaches to sports injuries exist, but further investigation into sports as an associated risk factor is required.

According to the study (Table 4.5) scholars who have difficulty sleeping have a higher risk of experiencing headaches (p=<0.001). It is evident that there is a relationship between sleeping difficulties and headaches (Bruni *et al*., 2008, Moschiano *et al*., 2012). Information pertaining to sleep and its association to headaches is limited. Freedom and Evans (2013) suggested that migraines and sleeping disorders are co-morbid disorders. According to a study conducted in Rome on 1 030 scholars between eight and 15 years of age, in four different schools, the most common trigger (32.2%), for MTH and non-MTH was difficulty sleeping (Bruni *et al*., 2008). An earlier study by Deborah *et al*., (2007) further supports the association between sleeping difficulties and headaches. It was noted that a significant association exists between increased duration to falling asleep (difficulty falling asleep) and headache pain intensity and duration of the headache (Deborah *et al*., 2007). The study also noted that sleep patterns did not differ between adolescents with TTH and MTH (Deborah *et al*., 2007).

Grinding ones teeth while sleeping and headaches was noted as statistically significant in the study (p=0.007); 89.8% (n=44) of scholars who noted that they grind their while sleeping (sleep bruxism) also experienced headaches (Table 4.5). A systematic review by De Luca Canto *et al*. (2014) concluded that further investigation is required to assess the association of bruxism and headaches in children and adolescents because not enough scientific data exists in order to refute or support the association.

The consumption of alcohol was not significant in this study (p=0.225). This could be due to the fact that the adolescent population place little importance on alcohol consumption when linking it to the cause of their headache (Milde-Busch *et al*., 2012). This, however, is contrary to the findings observed by Milde-Busch *et al*. (2012) where only 7% of the scholars' perceived alcohol as a headache trigger, unlike the 55.5% prevalence that noted alcohol consumption as an observed trigger factor (Milde-Busch *et al*., 2012).

There were no significantly associated medical risk factors in the study (Table 4.6). The literature does not support this finding. A longitudinal cohort study conducted by Waldie (2001) concluded that a significant association between TTH and stress, particularly stress with regards to bodily changes, does exist in adolescents. Although stress is considerably overestimated as the cause of headaches among adolescents, 48% of participants in the study by Milde-Busch *et al*. (2012) of 1 027 scholars' self-identified it as a major trigger, while an observable prevalence of 22.5% was noted in the study.

The significance of associations between headaches and various risk factors such as stress, alcohol consumption and exercise in different populations can be influenced by different socio-cultural backgrounds (Moschiano *et al*., 2013).

5.4 TREATMENT OF HEADACHES

Approximately two-thirds, 63.8% (n=196), of participating scholars did not seek medical consultations for their headaches and 36.2% (n=111) did seek professional treatment for their headaches (Figure 4.3). The literature varies considerably with different populations. A population based, cross-sectional study in the United Kingdom conducted by Thomas *et al*. (2004) noted that approximately half (48%) of the study population who reported experiencing headaches had at some stage sought advice or a medical consultation for their headache. However, a German based study noted only one third (31.1%) of adolescents had consulted a physician with regards to their headaches (Kröner-Herwig, Heinrich and Morris, 2007).

Of the 36.2% (n=111) of participating scholars in this study who had sought treatment from a medical professional, 94.6% (n=105) listed the professionals that they had consulted (Figure 4). A Pharmacist was noted as the most common medical professional to seek help from for headaches 40.77% (n=53) with a Doctor/General Practitioner being second with 38.46% (n=50). Chiropractors were the third most often visited professionals with 10.77% (n=14) of scholars seeking chiropractors for treatment of their headaches. Seeking help at a hospital was ranked as the least common option, with only 0.77% (n=1) of the respondents listing it as an option. Other medical professions listed by scholars included: Specialists 4.62% (n=6); Traditional healer 2.31% (n=3); Physiotherapist 1.54% (n=2) and a Nurse 0.77% (n=1). Multiple responses were permitted, hence the n=130. The majority of participants in the study conducted by Thomas *et al*. (2004) in the United Kingdom noted a General Practitioner (GP) (27%) as their first point of contact for a medical consultation and a consultation with a pharmacist was ranked third (8%). These differences in the studies require further investigation as socio-cultural variances could play a role in the discrepancies. An Optometrist was the second most visited medical professional (21%), hospital specialist (7%) was the fourth most visited and only 1% had consulted a Homeopathic doctor (Thomas *et al*., 2004). Unlike this study, a Chiropractor did not feature as a possible point of help for a headache by the study population.

The use of medication for headaches was noted by 79.7% (n=255) of the 69% (n=320) of scholars who experienced a headache in their lifetime. Although there is currently no Food and Drug Administration (FDA) approved drugs for the treatment of primary headaches in adolescents, many health care providers prescribe pharmacological treatment based on approved drugs for adults and estimate dosage amounts (Whalen, 2005). In a retrospective, observational cohort study conducted on 8 373 adolescents between 13 and 17 years of age, it was noted that 46.1% of the participants had received an opioid prescription for the treatment of their headaches despite evidence against its use (DeVries *et al*., 2014). With regards to over the counter medication, adolescents are more likely to self-medicate and headaches was the most frequent mentioned indications in a study conducted on German children and adolescents (Du and Knopf, 2009).

Although the findings were not statistically significant, p=0.464, it was noted that headaches were predominantly better with the use of medication, 73.7% (n=188), with only 0.3% (n=1) noting that medication made their headache worse, 12.6% (n=32) revealed that medication had no effect on their headache and 13.3% (n=34) could not recall the effect of medication on their

headache. These findings could not be directly compared to other studies as no other studies reported on treatment of headaches.

5.5 SCHOLAR'S CHIROPRACTIC KNOWLEDGE

The majority of scholars, 56.5% (n=260), knew what a Chiropractor was and what a chiropractor did, 42.4% (n=195) of scholars answered did not know and 1.1% (n=5) was reflected as missing data. However, of the 56.5% (n=260) of scholars who knew what a chiropractor was and what a chiropractor did, only 30.4% (n=79) had been treated by a Chiropractor. It was also noted that 75.9% (n=60) of the n=79 scholars had experienced a headache in the last three months. This data, illustrates the gap in chiropractic knowledge in the adolescent population and the potential to tap into a population that could benefit from the Chiropractic profession, especially in a South African context. By increasing scholar's awareness regarding Chiropractic ability to treat headaches it will greatly benefit the Chiropractic profession.

The majority of scholars who consulted a Chiropractor, 26.6% (n=21), did so for low back complaints, 21.5% (n=17) for arm or leg joints or muscular complaints, 17.7% (n=14) for neck complaints and 16.5% (n=13) for upper back complaints. Although 75.9% (n=60) of the n=79 scholars had experienced a headache, only 12.7% (n=10) of participating scholars consulted a chiropractor for their headaches. According to a nationwide survey directed at Danish Chiropractic practices, 75% (n=184) of the adolescent population reported to a chiropractor due to musculoskeletal complaints and 11% (n=27) reported to a chiropractor due to headaches (Hestbaek, Jørgensen and Hartvigsen, 2009), which is consistent with the findings in this study.

5.6 THE BURDEN OF HEADACHES

Stovner *et al*. (2007) highlighted that the burden of headache varies across the world due to variables that include but may not be limited to socio-economic backgrounds, life style and various disease spectrums that exist in different populations.

The small Eta values indicate there are no significant relationships between MTT and TTH with regards to the number of days interrupted by a scholar's headache in this study. General observations from the data showed that on average, one day of school was missed due to a scholar's headache; however, it was also noted that scholars attended school even though they had a headache on average of seven days. A scholar experienced a decreased ability to continue daily activities on three days on average and an average of four days was noted as

headaches having had an adverse effect on a scholar's ability to study or complete homework. Headaches affected fewer leisure activities and social activities (one day on average). From this we can deduce that the quality of life and activity of an adolescent who experiences primary headaches is negatively impacted and this is supported in other studies (Breuner *et al*., 2004; Fuh *et al*., 2009; Lipton *et al*., 2001; Nodari *et al*., 2002; Mennini *et al*., 2008 and Talarska, 2005).

Overall it was noted that the majority of scholars who missed school due to a headache had experienced a MTH, 33.8% (n=24) as compared to TTH, 22.7% (n=27). A higher percentage of scholars who experienced MTT attended school even though they had a headache, 88.2% (n=67) compared to those with TTH, 84.2% (n=96). A higher percentage of scholars with MTH experienced a decreased ability to perform activities of daily living 72.5% (n=50) and a decreased ability to study or complete homework 80% (n=56) when compared to those with TTH, 53.1% (n=60) and 72.2% (n=83) respectively. However, a larger percentage of scholars with TTH noted having to miss family, social, sports or leisure activities due to a headache, 38.3% (n=44) in comparison to those with MTH, 32.4% (n=22).

The results of the study conducted by Breuner *et al*. (2004) are consistent with the results of this study because it noted a higher percentage of school absenteeism (one to two days) in adolescents who experienced MTH, 72.1% (n=106) when compared to those with TTH 27.2% (n=40). A study conducted by Bigal *et al.* (2001) also corroborated these findings when the number of school days missed and the decreased ability to study was more prevalent in scholars experiencing MTH than those with TTH. It was noted that scholars with MTH missed 3.94 days of school due to their headache and 62.7% of scholars with MTT experienced a decreased ability to study versus zero missed days of school and 24.4% of scholars with TTH experiencing a decreased ability to study (Bigal *et al*., 2001).

Although the *p*-value in this study is insignificant a general observation can be made; the majority of scholars who experience MTH, 18.1% (n=13), experience a 50% decrease in productivity during a headache, and the majority of scholars who experience a TTH, 23.9% (n=28), have a 20% overall decrease in productivity during a headache. These findings are mirrored by other studies on scholars where the more severe the headache is, the greater impact it has on the productivity and therefore life style of the participating scholars (Bigal *et al*., 2001; Powers *et al*., 2003).

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

With regards to the aims and objectives of this study, the results showed that there is a high prevalence of MTH (17.2%) and TTH (27.6%). However, no scholars were diagnosed with CTH which is considered a likely result because CTH is relatively rare (Russell, 2004; Xie *et al.*, 2013) and affects only one out of 500 individuals (Russell, 2004). A history of experiencing headaches, participation in sport, difficulty sleeping and sleep bruxism were the only risk factors noted as statistically significant in this study. The majority of scholars, 63.8% (n=196), did not seek medical attention or advice for their headaches and although 75.9% (n=60) of the scholars who had been treated by a Chiropractor had experienced a headache, only 12.7% (n=10) of those scholars were treated for a headache. A scholar experiences a decreased ability to continue daily activities on three days on average, and an average of four days was noted as headaches having had an adverse effect on a scholar's ability to study or complete homework.

This study adds to the current literature on headaches in adolescents and illustrates the gap in chiropractic knowledge in the adolescent population and the potential to tap into a population that could benefit from the Chiropractic profession, especially in a South African context. This study will also be of importance to The DoE as it highlights the prevalence, risk factors for and impact of headaches experienced by adolescents.

In terms of the associated hypotheses that were set at the onset of the study:

Null Hypothesis (H_O) 1 which stated the prevalence of headaches is not significantly associated with risk factors such as smoking, alcohol, social drugs, caffeine and stress was accepted.

Alternate Hypothesis (H_A) 1 which stated the prevalence of headaches is significantly associated with risk factors such as physical activity, sleeping disorders and sleep bruxism is accepted.

Null Hypothesis (H_O) 2 which stated that daily activities and productivity of adolescents is not affected by primary headaches is accepted.

6.2 RECOMMENDATION

Future research should be aimed at a larger population size in South Africa and investigate further into the burden of specific headaches on adolescents.

Future research should explore cultural and socio-economic factors with regards to headaches in adolescents.

Although the Chiropractic Durban University of Technology curriculum does include headaches, adaptations can be made by including the recognition, treatment and management of adolescent headaches specifically.

The questionnaire was lengthy in order to obtain greater insight to allow an educated diagnosis of a headache. However, a shorter questionnaire might have yielded a better response.

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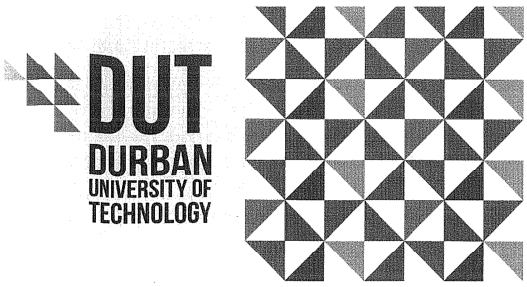
APPENDICES

Appendix A : Ethical Clearance Certificate



Institutional Research Ethics Committee
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27 August 2014

IREC Reference Number: **REC 40/14**

Ms M M A Crestani
16 Bertha Frame Gardens
New Germany
3610

Dear Ms Crestani

An Epidemiological Investigation into Primary Headaches in an Adolescent Population in Public High Schools in the Westville Ward of the Pinetown School District

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the questionnaire has been APPROVED; you may now proceed with data collection on the proposed project.

Yours Sincerely

[redacted]

Prof J. K. Adam
Chairperson: IREC

Appendix B : Letter of information and informed consent for students

Letter of information and informed consent for students

A research study is a special way to find out information about a particular subject. I am trying to find out more about headaches that teenagers experience. Your help in my study is the most important part.

WHAT IS INVOLVED IN THE STUDY?

If you want to be in the study, you will need to sign this form and complete the questionnaire that will ask you questions about your headache.

WHAT ARE THE RISKS OF THE STUDY?

There are NO risks involved if you decide to fill in the questionnaire. The questionnaire includes sensitive questions relating to alcohol consumption, cigarette smoking, drug usage and pregnancy but you are allowed to withdraw from the study if you wish not to complete the questionnaire.

ARE THERE BENEFITS TO TAKING PART IN THE STUDY?

Many teenagers experience headaches but there is not a lot of information on the headaches that teenagers experience, especially here in South Africa. With your help this study can add to the information so that medical professionals can treat headaches in teenagers more effectively.

WHAT OTHER OPTIONS ARE THERE?

You do not have to complete the questionnaire if you do not wish to, and therefore can withdraw from (stop participating in) the study at any given point in time.

WHAT ABOUT CONFIDENTIALITY?

Every reasonable effort will be made to keep your questionnaire private. All the questionnaires filled in by you and your classmates will be placed in a closed box as soon as you have completed the questionnaire. Your name will not be written on the questionnaire. Only I, the researcher and my supervisor will read the questionnaire once completed. Your Principal, teacher or parents will not have access to the questionnaire.

WHAT ARE THE COSTS?

It is free to take part in the study and fill in the questionnaire.

WILL YOU GET PAID TO BE IN THIS STUDY?

You will not be paid to fill in the questionnaire but your help will be greatly appreciated.

WHAT ARE YOUR RIGHTS AS A RESEARCH SUBJECT?

Being in this study is voluntary. You don't have to be in this study if you don't want to or you can stop being in the study at any time. Your decision will not result in any punishment or penalty.

AGREEMENT TO BE IN THE STUDY

Your signature below means that you have read the above information about the study and have had a chance to ask questions to help you understand what you will do in this study. Your signature also means that you have been told that you can change your mind later if you want to. By signing this consent form you are not giving up any of your legal rights.

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

Supervisor: Dr. D. Varatharajullu	Tel: 031 3732533
Principle investigator: Melissa Crestani	Cell: 072 432 0421
Institutional Research Ethics administrator	Tel: 031 373 2900
Complaints can be reported to the DVC: TIP Prof. F. Otieno	Tel: 031 373 2382 or email: dvctip@dut.ac.za

✂----------✂

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Melissa Crestani, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____.
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____
Name and surname of student	Student Signature	Date
_____	_____	_____
Name and surname of witness	Witness Signature	Date
_____	_____	_____
Full name of researcher	Researcher Signature	Date

Appendix C : Approval from the Department of Education

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enquiries: Nomangisi Ngubane Tel: 033 392 1004 Ref.:2/4/8/244

Ms MMA Crestani
16 Bertha Frame Gardens
NEW GERMANY
3610

Dear Ms Crestani

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **"AN EPIDEMIOLOGICAL INVESTIGATION INTO PRIMARY HEADACHES IN AN ADOLESCENT POPULATON IN PUBLIC HIGH SCHOOLS IN THE WESTVILLE WARD OF THE PINETOWN SCHOOL DISTRICT",** in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 01 September 2014 to 31 December 2014.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Connie Kehologile at the contact numbers below.
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report / dissertation / thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education (Pinetown District).

[redacted]

Nkosinathi S.P. Sishi, PhD
Head of Department: Education
Date: 29 August 2014

KWAZULU-NATAL DEPARTMENT OF EDUCATION

POSTAL: Private Bag X 9137, Pietermaritzburg, 3200, KwaZulu-Natal, Republic of South Africa ...dedicated to service and performance
PHYSICAL: 247 Burger Street, Anton Lembede House, Pietermaritzburg, 3201. Tel. 033 392 1004 **beyond the call of duty**
EMAIL ADDRESS: kehologile.connie@kzndoe.gov.za / Nomangisi.Ngubane@kzndoe.gov.za
CALL CENTRE: 0860 596 363; Fax: 033 392 1203 WEBSITE: WWW.kzneducation.gov.za

Appendix D : Permission letter to Principals/Body of Governs of participating schools

Dear Principal/ Body of Governs

Welcome to my research study

Title of the Research Study:

An Epidemiological investigation into the prevalence of Primary Headaches in an Adolescent Population in Public High Schools in the Westville Ward of the Pinetown School District

Principal Investigator/researcher: Melissa Crestani, B.Tech: Chiropractic

Co-Investigator/supervisor: Dr. D. Varatharajullu, M.Tech: Chiropractic

Brief Introduction and Purpose of the Study: The number of adolescents experiencing headaches has not been well documented in South Africa. Foreign studies have shown that headaches in adolescents can affect their quality of life which in return can negatively affect their school work, extra-curricular activity and increase their school absenteeism. Therefore the aim of this study is to investigate the prevalence of primary headaches and the factors that influence primary headaches in adolescents attending public high schools in the Westville ward of the Pinetown School District by means of a questionnaire.

Outline of the Procedures: All willing participants who have completed the informed consent are encouraged to complete the questionnaire which will be hand delivered to their school. Participation in the study will not interrupt participant's lesson times at school and will take approximately 10-15 minutes to

complete and hand in. The researcher will be present while questionnaire is being completed so that any questions or queries can be addressed.

Risks or Discomforts to the Participant: There are no foreseeable risks or adverse consequences to the participant if they chose to partake in completing the questionnaire. The questionnaire includes sensitive questions relating to alcohol consumption, cigarette smoking, drug usage and pregnancy but participants are able to withdraw from the study if they wish not to complete the questionnaire.

Benefits: This study will aim to add to the existing body of knowledge in relation to headaches in adolescents in a South African context. This will aid in developing a more scientific based treatment for adolescents with headaches which is valuable for both health care professionals and patients.

Reason/s why the Participant May Be Withdrawn from the Study: The participant is free to withdraw for the study at any time. However once the questionnaire is completed and placed into a sealed box it may not be reopened as this will infringe on the confidentiality of the study.

Remuneration: Participation in the study is voluntary and no remuneration will be awarded to the participants.

Costs of the Study: There in no cost associated with participating in the study

Confidentiality: All answers are confidential and will not be linked to the participants. The informed consent and questionnaires will be kept in separate sealed boxes as to ensure that no questionnaire can be linked to a participant. The questionnaire will be analysed by a statistician and all information will only be used for research purposes.

Research-related Injury: Participants are only required to fill in a questionnaire and therefore there is no risk of injury.

I kindly ask for permission to proceed with the study in your school. Permission has been granted form the Department of Education and can be provided to you if requested. Before the study can take place permission will be sort from parent or legal guardian of every student participant.

Your assistance is vital to the research and is greatly appreciated.

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

Supervisor: Dr. D. Varatharajullu Tel: 031 3732533

Principle investigator: Melissa Crestani Cell: 072 432 0421
Institutional Research Ethics administrator Tel: 031 373 2900

Complaints can be reported to the DVC: TIP Prof. F. Otieno Tel: 031 373 2382 or

email: dvctip@dut.ac.za

Appendix E : Final Questionnaire

Dear Student

Thank you for participating in my research.

Please note:

All information will be kept private. Therefore, your principal, teachers or parents will not have access to any of the information you provide.

You do not have to complete the questionnaire if you feel uncomfortable with doing so at any stage, and therefore can withdraw from (stop participating in) the study at any given point in time.

Please feel free to ask any questions you may have regarding the questionnaire or study.

Thank you

Melissa Crestani

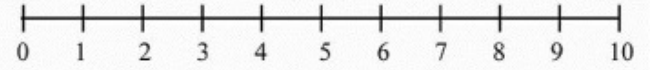
For use by researcher only

Diagnosis: No Headache ☐ Non-Primary Headache ☐ Migraine ☐ Tension ☐ Cluster ☐

Other:_____

SECTION A					
Demographics: *(Student: Please fill in or tick where relevant)*					
1.					
a. Date of birth:					
b. Age:					
c. Gender:	Female			Male	
d. Race:	Black	Coloured	Indian	White	Other :_____
e. Who do you live with?	Both parents	One parent		Relative	Other:_____
f. Where do you live?	In an industrial area	Near an industrial area		In a residential area	other:_____

Social History:		
2. Exercise		
a. Do you play sport? If yes, please list what sports you play?	1)_____ 2)_____ 3)_____ 4)_____ 5)_____ 6)_____	
b. Do you have a regular exercise programme E.g. gym, running?	Yes	No

c. If yes, how many days per week do you exercise?	_____days per week			
3. Sleeping Habits				
a. How many hours do you sleep a day on average?	_____hours per day			
b. Do you currently have difficulty sleeping e.g. difficulty falling asleep, waking up during the night?	Yes		No	
c. Do you grind your teeth while you sleeping?	Yes	No	Unknown	
d. What position do you normally wake up in?	On stomach	On back	Lying on left	Lying on right
4. Caffeinated Drinks				
a. Do you drink the following? *(you may tick more than 1 box)*	1)Coffee		2)Tea	
	3)Soft Drinks e.g. coke		4)Energy drinks e.g. Red Bull, Monster	
b. If yes for the above, how many cup/glasses (250ml) per day?	1)Coffee: ____no. of cups		2)Tea: ____ no. of cups	
	3) Soft drinks: ____no. of cups		4) Energy drinks: ____no of cups	
5. Stress				
a. Are you currently receiving treatment, counselling or are on medication for anxiety, stress or depression?	1) Anxiety	2)Depression	3) Stress	4)None
b. Do you consider yourself as being under a lot of stress (mental or physical) in the last 3 months?	 *(0=least amount of stress and 10=most amount of*			

(please rate your answer on the scale provided)	*stress)*

6. Smoking

a. Do you smoke cigarettes/pipes/ cigars?	Yes		No		Ex-smoker
b. If yes, how many per day	1-5	6-10	11-15	16-20	more than 20

7. Alcohol Consumption

a. Do you drink alcohol?	Yes	No
b. If yes, how much of the following do you drink per week?	1) Litres of beer per week?_____	
	2) Litres of wine per week?_____	
	3) Litres of cider per week?_____	
	4) Tots of spirits per week?_____	

8. Social Drugs

a. Do you use social drugs? e.g. marijuana /dagga	Yes	No

Medical History:

9.Please tick the appropriate boxes if you have a history of or have been diagnosed with any of the following:

(you may tick more than 1 box)

a. Anemia	b. Depression	c. Diabetes	d. High blood pressure	e. Low blood pressure	f. Seizures	g. Thyroid disease
h. Do you have any other significant medical condition/s which you are being treated for?						

Please list condition/s : 1)_____

2)_____

3)_____

4)_____

i. Are you currently taking any medication/s? Yes □ No □

If yes, please list medication/s: *(please include and over-the-counter medication, herbs or birth control pills/injection, acne treatments)*

1)_____

2)_____

3)_____

4)_____

5)_____

j. Have you had a head or neck injury in the past?	Yes	No	
k. If yes, did you receive any treatment for the injury?	Yes	No	
l. If yes, who did you get treatment from?	_____		
m. Have you had a CAT scan or MRI of you head, neck and/or brain?	Yes	No	
n. If yes, what was the reason?	_____		
10.			
a. Do you know what a chiropractor is or does?	Yes	No	
b. If yes, have you ever been treated by a Chiropractor?	Yes	No	
c. If yes, what did your Chiropractor treat *? More than one block*	headache	neck	<u>Upper</u> back

can be ticked if necessary	Lower back	Arm or leg joints or muscles	Other: 1._____ _2._____ __

11.			
a. Are you currently pregnant?	Yes	No	n/a
b. Have you ever been pregnant?	Yes	No	n/a

SECTION B		
Headache History:		
12.		
a. Have you ever been diagnosed with a headache in the past?	Yes	No
b. If yes what headache were you diagnosed with? *e.g. migraine*	_____	
c. Have you experienced any headaches in the last 3 months?	Yes	No
If yes, please answer the rest of the questionnaire. *If no, you may hand in your questionnaire.*		

13.			
a. At what age did you start experiencing headaches for the first time?	_____ years old.		
b. Since experiencing these headaches, have their patterns changed in an	Yes	No	
c. If yes, have the following characteristics changed over time?	1)Less frequent	More frequent	N/A
	2)Less severe	More severe	N/A

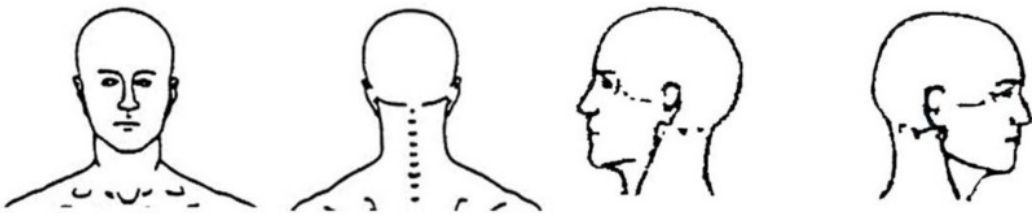
(please tick the appropriate box and answer 1-5)	3)Less continuous	More continuous	N/A	
	4)Less predictable	More Predictable	N/A	
	5)Lasts longer	Last for shorter tim	N/A	
d. Is your headache ever felt over one side of your head or	never	sometimes	most of the time	always
e. Is your headache ever felt over both sides of your head?	never	sometimes	Most of the time	always
f. Does your headache normally occur at a specific time of	Yes		No	
g. If yes, please state at what time?	_____			
h. Do you have warning symptoms that alert you that you a going to experience a headache soon?	Yes		No	
i. If yes, please list the symptoms. *e.g. seeing spots, sensitive to light, dizziness*	1)_____ 2)_____ 3)_____			
j. Have you ever sort treatment for your headaches?	Yes		No	
k. If yes, who did you see? *e.g. GP, Chiropractor, Sangoma, Pharmacist, Inyanga*	1)_____ 2)_____ 3)_____			
l. Please state what you were diagnosed with (if known)?	1)_____ 2)_____ 3)_____			
m. What medication have you used in the past for your headache? *E.g. Panado, Grandpa, Myprodol*	1)_____ 2)_____ 3)_____			

	4)_____ 5)_____				
n. What effect did the medication have on your headache?	Better	Worse	No change	Don't remember	
p. If you have used birth control, what effect did they have on your headache?	Better	Worse	No change	Don't remember	N/A
r. If you have been/are pregnant, what effect has it had on your headache?	Better	Worse	No change	Don't remember	N/A
s. Do you have family members who suffer with headaches	Yes		No		
t. If yes, are they : *(you may tick both if applicable)*	1)male relative/s		2)female relative/s		

Headache Characteristics *within the last 3 months*

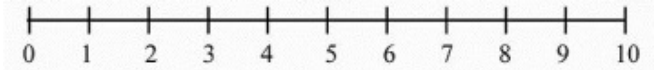
14. Location

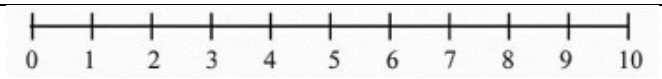
Front Back Right Left



a.Please shade in the area on the diagram above of where you most often feel your headache. (Prangley ,20

15. Pain

a. Do you have a headache right now? If yes please rate your pain on the scale provided.	 (0= least amount of pain and 10= worst pain possible)

b. How painful is your typical headache? Pl your pain on the scale provided.	 (0= least amount of pain and 10= worst pain possible)

16. Character of pain *in the last 3 months*

Please tick the appropriate box which best describes how your headache/s feel?

(please answer question a-j)

Description	Never	Sometimes	Often	Always	Only if severe
a. Aching					
b. Poking					
c. Pounding					
d. Pressure					
e. Pulsating					
f. Sharp					
g. Shooting					
h. Squeezing					
i. Stabbing					
j. Throbbing					
k. Tightness					
j. Other: 1)_____ 2)_____ 3)_____					

17. Headache Triggers *in the last 3 months*		
Which of the following, if any, seem to trigger/bring about your headache? *(Please tick the box/s that most apply to you (you may tick more than 1 box)*		
a. Alcohol □ b. Bending over □ c. Bright light □ d. Certain foods(if yes, please list): 1) _____ 2)_____ 3) _____ e. Certain smells □ f. Certain time of day □ g. Change in weather/ seasons □ h. Chewing/ clenching teeth□ i. Caffeinated drinks □ *e.g. coffee, tea, Red Bull*	j. Exercise □ k. Fatigue/exertion □ l. Hunger □ m. Lack of sleep □ n. Loud noises □ o. Lying down□ p. Medication □ q. Menstrual cycle(periods) □ r. Over sleeping □ s. Reaching overhead □ t. Reading □	u. Sexual activity □ v. Sinus problems □ w. Sneezing/Coughing x. Skipping meals □ y. Standing □ z. Stress/tension □ aa. Sun □ ab. Walking □ ac. Other (if yes please list) 1)_____ 2)_____ 3)_____
18. Aggravating Factors *in the last 3 months*		
Are your headache/s aggravated/made worse by any of the following? Please tick the box/s that most apply to you *(you may tick more than 1 box).*		
a. Alcohol □ b. Bending over □	j. Exercise □ k. Fatigue/exertion □	u. Sexual activity □ v. Sinus problems □

c. Bright light □ d. Certain foods(if yes, please list): 1) _____ 2)_____ 3) _____ e. Certain smells □ f. Certain time of day □ g. Change in weather/ seasons □ h. Chewing/ clenching teeth□ i. Caffeinated drinks □ *e.g. coffee, tea, Red Bull*	l. Hunger □ m. Lack of sleep □ n. Loud noises □ o. Lying down□ p. Medication □ q. Menstrual cycle(periods) □ r. Over sleeping □ s. Reaching overhead □ t. Reading □	w. Sneezing/Coughing x. Skipping meals □ y. Standing □ z. Stress/tension □ aa. Sun □ ab. Walking □ ac. Other (if yes please list) 1)_____ 2)_____ 3)_____

19. Relieving Factors *in the last 3 months*		
Are your headache/s relieved/made to feel better by any of the following? Please tick the box/s that most apply to you *(you may tick more than 1 box).*		
a. Applying Ice/something cold □ b. Compression □ c. Eating □ d. Exercise □ e. Heat □	h. Medication i. Moving around/walking □ j. Sleep k. Relaxing □ l. Sitting	n. Stretching o. Vomiting □ p. Other (if yes, please list) 1)_____ 2)_____ 3)_____

f. Lying down □ g. Massage □	m. Standing □	

20. Associated Signs and Symptoms *in the last 3 Months*

Please tick the symptoms you have experienced with your headache.

If you ticked the corresponding yes box please tick the relationship that symptom has to your headache

Sign or Symptom	Yes?	Before Headache	During Headache	When headache is severe
EXAMPLE : brown eyes	☑			✓
a. Anxiety	□			
b. Balance problems	□			
c. Dizziness	□			
d. Jaw pain	□			
e. Nausea	□			
f. Neck/ back pain	□			
g. Neck/back stiffness	□			
h. Numbness of face/he	□			
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:_____	□			

21.Frequency

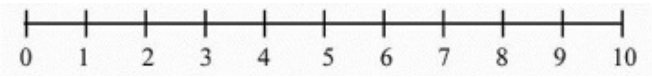
a. How many times per day/week/month does your headache occur? (e.g. 3 times/week)	_____ times/day or _____ times/week or _____ times/month
b. How many mild/moderate headaches do you experience on average ?	_____ times/day or _____ times/week or _____ times/month
c. How many severe headaches do you experience on average?	_____ times/day or _____ times/week or _____ times/month

22.Duration

a. How long does your headache usually last if you do	1)_____minutes	2)_____hours	3)_____days
treat your headache? *(Please fill in how many minutes*	4) You have medication	5) It's always	6) unknown

hours or days if that is the option you chose. E.g. 2 ho		different	

SECTION C		
The Burden of Headaches		
23.		
a. How many days have you missed school in the last 3 month because of your headache?	_____ days	
b. In the last 3 months, how many days have you attended school even though you had a headache?	_____ days	
c. How many days have you missed family, social, sports or leisure acti in the last 3 months?	_____days	
d. How many days in the last 3 months has your headache decreased your ability to do activities of daily life? *e.g. chores, bathing, cooking*	_____days	
e. How many days in the last 3 months have you not been able to study do homework because of your headache?	_____ days	
f. What do you do if you experienced a headache while you are in class *(please tick the appropriate box)*	1) Continue as normal	
	2)Take medication and continue as norm	
	3) Stop what you are doing and try rest	
	4) other: if yes, please _____	
g. Do you ever go home from school early or to the sick bay because of headache?	Yes	No

h. If yes, how many times in the last 3 months?	_____times in last 3 months
i. What do you do when you have a headache at home?	1) Continue as normal
	2)Take medication and continue as norm
	3) Stop what you are doing and try rest
	4) other: if yes, please _____
j. On average, in the last 3 months,how much did your headache decrease your overall productivity? *e.g decreased concentration, drop in test marks*	 (0= no decrease and 10= 100% decrease)

Thank you for taking the time to complete the questionnaire. Your help is greatly appreciated. ☺

Appendix F : Pre-pilot Questionnaire

SECTION A		
Demographics: *(Student: Please fill in or tick where relevant)*		
1.	a. Date of birth:	
	b. Age:	
	c. Gender:	Male ☐ Female ☐
	d. Race:	White ☐ Black ☐ Indian ☐ Coloured ☐ Other :_____

Social History:		
2.Smoking	a. Do you smoke cigarettes/pipes/ cigars?	Yes ☐ No ☐ Ex-smoker ☐
	b. If yes, how many per day	1-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ more than 20 ☐
3.Alcohol consumption	a. Do you drink alcohol?	Yes ☐ No ☐
	b. If yes, how much of the following do you drink per week?	1) Litres of beer per week? _____ 2) Litres of wine per week? _____ 3) Litres of cider per week? _____ 4) Tots of spirits per week? _____
4.Caffeinated drinks	a. Do you drink the following? *(you may tick more than 1 box)*	1)Coffee ☐ 3)Soft Drinks e.g. coke ☐ 2)Tea ☐ 4)Caffeinated drinks e.g. Red Bull, Monster ☐

	b. If yes for the above, how many cup/glasses (250ml) per day?	1)Coffee: ____no. of cups 3) Soft drinks: ____no. of cups 2)Tea: ____ no. of cups 4) Caffeinated drinks: ____no of cups
5.Social drugs	a. Do you use social drugs? e.g. marijuana /dagga	Yes □ No □
6.Exercise	a. Do you play sport? If yes, please list what sports you play?	1)_____ 4)_____ 2)_____ 5)_____ 3)_____ 6)_____
	b. Do you have a regular exercise programme E.g. gym, running?	Yes □ No □
	c. If yes, how many days per week do you exercise?	_____days per week
7.Sleeping habits	a. How many hours do you sleep a day on average?	_____hours per day
	b. Do you have a regular sleeping pattern?	Yes □ No □
	c. Do you currently have difficulty sleeping e.g. insomnia, waking up in the middle of the night?	Yes □ No □
	d. Do you grind your teeth while you sleeping?	Yes □ No □ Unknown □

8.Stress	a. Do you consider yourself as being under a lot of stress (mental or physical) in the last 3 months?	Yes ☐ No ☐
	b. Are you currently receiving treatment, counselling or are on medication for anxiety, stress or depression?	Yes ☐ No ☐

Medical History:	
9.Please tick the appropriate boxes if you have a history of or have been diagnosed with any the following: *(you may tick more than 1 box)*	a. Anemia ☐ e. Seizures ☐ b. High blood pressure ☐ f. Depression ☐ c. Low blood pressure ☐ g. Diabetes ☐ d. Thyroid disease ☐
	h. Have you had a head injury in the last 6months? Yes ☐ No ☐
	i. If yes, did you receive any medical help? Yes ☐ No ☐
	j. If yes, who did you get treatment from? _____
	k. Do you have any other significant medical condition/s which are under medical care? Please list condition/s : 1)_____

	2)_____ 3)_____ 4)_____
	l. Are you currently taking any medication/s? Yes □ No □ If yes, please list medication/s: *(please include and over-the-counter medication, herbs or* birth control pills 1)_____ 2)_____ 3)_____ 4)_____ 5)_____
	j. Have you had a CAT scan or MRI of you head, neck and/or brain? Yes □ No □

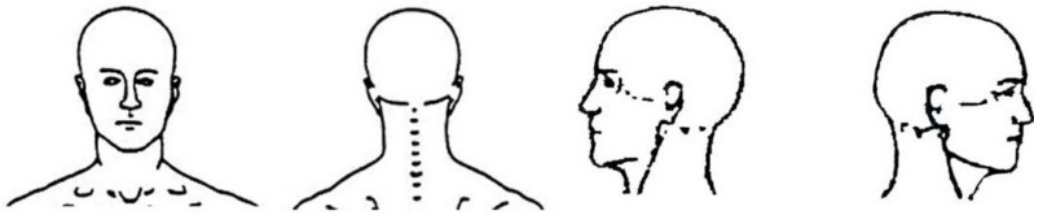
SECTION B		
Headache History		
10.	Have you experienced any headaches in the last 3 months	Yes □ No □
	If yes, please answer the rest of the questionnaire. If no, you may hand in your questionnaire.	

11.	a. At what age did you start to	_____ years old.

	experience headaches for the first time?	
	b. since experiencing these headaches, have their patterns changed in any way?	Yes ☐ No ☐
	c. If yes, my headaches are…. *(please tick the appropriate box and answer 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)of longer duration Yes ☐ No ☐ 10) shorter than previously Yes ☐ No ☐
	d. Is your headache ever felt ove one side of your head only?	never ☐ sometimes ☐ most of the time ☐ always ☐
	e. Is your headache ever felt ove both sides of your head?	never ☐ sometimes ☐ most of the time ☐ always ☐
	f. Does your headache normally	Yes ☐ No ☐

	occur at a specific time of day?	
	g. If yes, please state at what tim	_____
	h. Do you have warning symptor that alert you that you are going experience a headache soon?	Yes □ No □
	i. If yes, please list the symptoms	1)_____ 2)_____ 3)_____ 4)_____ 5)_____
	j. Have you ever seen a doctor for your headaches?	Yes □ No □
	k. If yes, who did you see? e.g. GP, Chiropractor, Sangoma	1)_____ 2)_____ 3)_____
	l. Please state what the doctor diagnosed you with (if known)?	1)_____ 2)_____ 3)_____
	m. What medication have you used in the past for your headache? E.g. Panado, Grandp Myprodol	1)_____ 2)_____ 3)_____ 4)_____

		5)_____ 6)_____
	n. What effect did the medicatior have on you headache?	Better □ Worse □ No change □ don't remember □
	o. Have you ever used birth control pills?	Yes □ No □
	p. If yes, what effect did they hav on your headache?	Better □ Worse □ No change □ don't remember □
	q. Have you ever been pregnant	Yes □ No □
	r. If yes, what effect did it have on your headache?	Better □ Worse □ No change □ don't remember □
	s. Do you have family members who suffer with headaches?	Yes □ No □
	t. If yes, are they :	1)male relative/s Yes □ No □ 2)female relative/s Yes □ No □

Headache Characteristics	
12. Location	

	Please shade in the area on the diagram above of where you most often feel your hea	
13. Pain	a. Do you have a headache right now? If yes, please rate your pain on the scale provided.	(1= least amount of pain and 10= worst pain poss
	b. How painful is your typical headache? Please rate your pain on the scale provided.	(1= least amount of pain and 10= worst pain poss

14. Character of the pain

Please tick the appropriate box which best describes how your headache/s feel?

(please answer question a-j)

Description	Never	Sometimes	Often	Always	Only if severe
a. Pulsating					
b. pounding					
c. pressure					
d. sharp					
e. shooting					
f. squeezing					
g. stabbing					
h. throbbing					
i. tightness					
j. Other: 1)_____ 2)_____					

	3)_____					
15. Trigger Factors	Which of the following, if any, seem to trigger/bring about your headache? Please tick the box/s that most apply to you *(you may tick more than 1 box).*					
	a. Fatigue/exertion □ b. Lack of sleep □ c. Bending over □ d. Alcohol □ e. Certain smells □ f. Change in weather/seasons □ g. Menstrual cycle(periods) □ h. Certain time of day □ i. Drinks containing caffeine □ j. Over sleeping □ k. Chewing/clenching teeth □ l. Exercise □		m. Stress/tension □ n. Sinus problems □ o. Medications □ p. Skipping meals □ q. Hunger □ r. Certain foods (if yes please list) 1)_____ 2)_____ 3)_____ s. Other (if yes, please list) 1)_____ 2)_____		
16. Aggravating Factors	Are your headache/s aggravated/made worse by any of the following? Please tick the box/s that most apply to you *(you may tick more than 1 box).*					
	a. Weather changes □ b. Sneezing/Coughing □		j. Stress/Tension □ k. Sexual activity □			

	c. Walking □	l. Bending over □
	d. Loud noises □	M. Standing □
	e. Lying down □	n. Other (if yes please list)
	f. Reaching overhead □	1)_____
	g. Lack of sleep □	2)_____
	h. bright light □	3)_____
	i. sitting □	

17. Relieving factors	Are your headache/s relieved/made to feel better by any of the following? Please tick the box/s that most apply to you *(you may tick more than 1 box).*	
	a. Vomiting □	k. Heat □
	b. Eating □	l. Stretching
	c. Massage □	m. Medication
	d. Standing □	n. Sitting
	e. Applying Ice/something cold □	o. Sleep
	f. Moving around/walking □	p. Other (if yes, please list)
	g. Compression □	1)_____
	h. Exercise □	2)_____
	i. Relaxing □	3)_____

	j. Lying down □				
18. Associated signs and symptoms	Please tick the symptoms you have experienced with your headache. If you ticked the corresponding yes box please tick the relationship that symptom has to your headache *E.g. I have Anxiety(tick) during my headache(tick) or I do not have nausea (no further*				
	Sign or Symptom	Yes?	Before Headache	During Headache	When headache Is severe
	a. Anxiety	□			
	b. Balance problems	□			
	c. Dizziness	□			
	d. Jaw pain	□			
	e. Nausea	□			
	f. Neck/ back pain	□			
	g. Neck/back stiffness	□			
	h. Numbness of face/hea	□			
	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:_____	□			

19. Frequency	a. How many times per day/week/month does your headache occur?(e.g. 3 times/weel	_____ times/day or → _____ times/week or → _____ times/month
	b. How many mild/moderate headaches do you experience on average ?	____ per day □ /week □/ month □/year□ *(e.g. if you have 4 mild headaches a month, fill in 4 line provided and tick the box next to month)*
	c. How many severe headaches do you experience on average?	____ per day □ /week □/ month □/year□ *(e.g. If you have 1 severe headache a year, fill in 1 he line provided and tick the box next to year)*

20. Duration	a. How long does your headache usually last if you do not take medication for the head Please tick the box that most apply to you.	
	1) 0-15 min □	7) 24-48 hours □
	2) 15-30 min □	8) 2-3 days □
	3) 30min-1hour □	9) more than 3 days □

	4) 1-6 hours □ 5) 6-12 hours □ 6) 12-24 hours □	10) You have to take medication □ 11) It's always different □ 12) unknown □

	SECTION C	
The Burden of Headaches		
20.	a. How many days have you missed school in the last 3 month because of your headache?	_____ days.
	b. How many days have you attend school even though you had a headache in the last 3 months?	_____ days.
	c. How many days have you missed family, social, sports or leisure activities in the last 3 months?	_____days.
	d. How many days in the last 3 months has your headache decreas your ability to do activities of daily life? E.g. chores, bathing, cooking	_____days.
	e. What do you do if you experience a headache while you are in class?	1) Continue as normal □ 2)Take medication and continue as normal □

	(please tick the appropriate box)	3) Stop what you are doing and try rest □ 4) other: □ if yes, please comment: _____
	f. Do you ever go home from schoo early because of your headache?	Yes □ No □
	g. If yes, how many times in the las 3 months?	_____times per month
	h. What do you do when you have a headache at home?	1) Continue as normal □ 2)Take medication and continue as normal □ 3) Stop what you are doing and try rest □ 4) other: □ if yes, please comment: _____
	i. How much does your productivity decrease when you have a headac	1) 0% □ 5) 31-40% □ 9) 71-80% □ 2) 1-10% □ 6) 41-50% □ 10) 81-90% □ 3) 11-20% □ 7) 51-60% □ 11) 91-100% □ 4) 21-30% □ 8) 61-70% □
	j. On average, in the last 3 months, how much did your headache decrease your overall productivity?	1) 0% □ 5) 31-40% □ 9) 71-80% □ 2) 1-10% □ 6) 41-50% □ 10) 81-90% □ 3) 11-20% □ 7) 51-60% □ 11) 91-100% □ 4) 21-30% □ 8) 61-70% □

Thank you for taking the time to complete the questionnaire. Your help is greatly appreciated. ☺

Appendix G : Permission Letter from Dr J. Prangley

From: Melissa Crestani , melcrestani@hotmail.com

To: Dr Johan Prangley , jprangley@gmail.com

Date: 20 Oct 2013, 11:49 AM

Subject: DUT Chiropractic Research

To Dr J. Prangley

My name is Melissa Crestani and I am currently a 6th year Chiropractic student at the Durban University of Technology. My current research topic has been approved by the Chiropractic Departmental Research Committee and is titled: “The Primary Headaches in the Adolescent Population in the Pinetown School District.”

I am in the process of completing my PG4a document and hereby request your permission to use the questionnaire you formulated for your research for the purposes of my research. If your permission is granted, there will be slight alterations to your questionnaire where necessary and to better suite an adolescent population.

Kind regards

Melissa Crestani

Reply Forward

From: Dr Johan Prangley , jprangley@gmail.com

To: Melissa Crestani , melcrestani@hotmail.com

Date: 20 October 2013, 11:53:15 AM

Subject: DUT Chiropractic Research

Hey Melissa, it's fine. Good luck with your research.

Johan

Appendix H : Letter of Information and Informed Consent for members of the Expert Group

Letter of Information and Informed Consent to expert group

Dear Participant

I welcome you to my research study

Title of the Research Study:

An Epidemiological Investigation into Primary Headaches in an Adolescent Population in Public High Schools in the Westville Ward of the Pinetown School District

Principal Investigator/researcher: Melissa Crestani, B.Tech: Chiropractic

Co-Investigator/supervisor: Dr. D. Varatharajullu, M.Tech: Chiropractic

Brief Introduction and Purpose of the Study: The number of adolescents experiencing headaches has not been well documented in South Africa. Foreign studies have shown that headaches in adolescents can affect their quality of life which in turn can negatively affect their school work, extra-curricular activities and increase their school absenteeism. Therefore the aim of this study is to investigate the prevalence of primary headaches and the factors that influence primary headaches in adolescents attending public high schools in the Westville ward of the Pinetown School District by means of a questionnaire.

Study objectives:

1. To determine the prevalence of headaches in adolescents between the ages of 12-19 years
2. To determine if adolescents presenting with primary headaches are treated by a health care provider

3. To determine if headaches affect the daily activities of adolescent patients presenting with primary headaches
4. To determine if there is a relative correlation between the prevalence of headaches in adolescent patients and those who seek treatment.
5. To assess the risk factors that is associated with headaches in a specific population

Outline of the Procedures: Please read and complete the informed consent letter and the code of conduct and confidentiality statement prior to commencement of the expert group meeting. Each member of the expert group will receive a copy of the questionnaire before the discussion begins. During the expert group meeting, each question will be discussed in a sequential order. As a member of the expert group please feel free to make your opinion or suggestions known to the researcher as every comment made can contribute to the validity of the questionnaire. The expert group meeting will be recorded in order for the researcher to reflect on the comments made during the expert group meeting.

Risks or Discomforts to the Participant: There are no foreseeable risks, discomforts or adverse consequences to the expert group participants.

Benefits: The expert group is valuable in ensuring validity of the questionnaire.

Reason/s why the Participant May Be Withdrawn from the Study: You may withdraw from the study at any time.

Remuneration: Participation in the study is voluntary and no remuneration will be awarded to the participants in the expert group.

Costs of the Study: There are no costs associated with participating in the study

Confidentiality: All information discussed during the expert group meeting will be kept confidential and used for research purposes only.

Research-related Injury: Not applicable to this study as it is a questionnaire based study.

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

Supervisor: Dr. D. Varatharajullu Tel: 031 3732533

Principle investigator: Melissa Crestani Cell: 072 432 0421

Institutional Research Ethics administrator Tel: 031 373 2900

Complaints can be reported to the DVC: TIP Prof. F. Otieno Tel: 031 373 2382 or

email: dvctip@dut.ac.za

CONSENT

Statement of Agreement to Participate in the Research Study:

I……., ID number……., have read this document in its entirety and understand its contents. Where I have had any questions or queries, these have been explained to me by…… to my satisfaction. Furthermore, I fully understand that I may withdraw from this study at any stage without any adverse consequences and my future health care will not be compromised. I, therefore voluntarily agree to participate in this study.

_____	_____	_____	_____
Full name of the participant	**Date**	**Time**	**Signature**

I, Melissa Crestani, hereby confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full name of the Researcher	**Date**	**Signature**

_____	_____	_____
Full name of the Witness	**Date**	**Signature**

_____	_____	_____
Full name of the Legal Guardian	**Date**	**Signature**
(If applicable)		

Appendix I : Code of Conduct and Confidentiality Statement

Code of Conduct and Confidentiality Statement

This form needs to be completed by every member of the expert group prior to the commencement of the expert group meeting.

As a member of this committee I agree to abide by the following conditions:

1. All information contained in the research documents and any information discussed during the expert group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. None of the information shall be communicated to any other individual or organisation outside of this specific expert group as to the decisions of this expert group.
3. The information gathered from this expert group by the researcher will be made public in terms of a dissertation and journal publication. The researcher will ensure that any participants in the expert group and research remain anonymous and confidential.
4. The expert group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will be stored securely under password protection.
5. All data generated from this expert group (including the recording) will be kept for 15 years in a secure location at Durban University of Technology and thereafter will be destroyed.

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

_____	_____
Full name of the participant	**Signature**
_____	_____
Full name of the Witness	**Signature**
_____	_____
Full name of the Researcher	**Signature**
_____	_____
Full name of Supervisor	**Signature**

Appendix J : Pilot Questionnaire

Dear Student

Thank you for participating in my research.

Please note:

All information will be kept private. Therefore, your principal, teachers or parents will not have access to any of the information you provide.

You do not have to complete the questionnaire if you feel uncomfortable with doing so at any stage, and therefore can withdraw from (stop participating in) the study at any given point in time.

Please feel free to ask any questions you may have regarding the questionnaire or study.

Thank you

Melissa Crestani

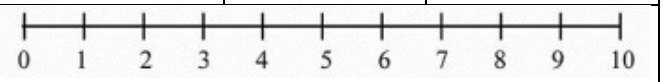
For use by researcher only

Diagnosis: No Headache ☐ Non-Primary Headache ☐ Migraine ☐ Tension ☐ Cluster ☐

Other:_____

SECTION A					
Demographics: *(Student: Please fill in or tick where relevant)*					
1.					
a. Date of birth:					
b. Age:					
c. Gender:	Female			Male	
d. Race:	Black	Coloured	Indian	White	Other :_____
e. Who do you live with?	Both parents	One parent	Relative	Other:_____	
f. Where do you live?	In an industrial area	Near an industrial area	In a residential area	other:_____	

Social History:		
2. Exercise		
a. Do you play sport? If yes, please list what sports you play?	1)_____ 4)_____ 2)_____ 5)_____ 3)_____ 6)_____	
b. Do you have a regular exercise programm E.g. gym,	Yes	No

running?			
c. If yes, how many days per week do you exercise?	_____days per week		
3. Sleeping Habits			
a. How many hours do you sleep a day on average?	_____hours per day		
b. Do you currently have difficulty sleeping e.g. difficulty falling asleep, waking up during the night?	Yes		No
c. Do you grind your teeth while you sleeping?	Yes	No	Unknown
d. What position do you normally wake up in?	On stomach	On back	Lying on left / Lying on right
4. Caffeinated Drinks			
a. Do you drink the following? *(you may tick more than 1 box)*	1)Coffee	2)Tea	
	3)Soft Drinks e.g. coke	4)Energy drinks e.g. Red Bull, Monster	
b. If yes for the above, how many cup/glasses (250ml) per day?	1)Coffee: ____no. of cups	2)Tea: ____ no. of cups	
	3) Soft drinks: ____no. of cups	4) Energy drinks: ____no of cups	
5. Stress			
a. Are you currently receiving treatment, counselling or are on medication for anxiety, stress or depression?	1) Anxiety	2) Depression	3) Stress
b. Do you consider yourself as being under a lot of stress (mental or physical) in the last 3			

months? *(please rate your answer on the scale provided)*	*(0=least amount of stress and 10=most amount of stress)*

6. Smoking					
a. Do you smoke cigarettes/pipes/ cigars?	Yes		No		Ex-smoker
b. If yes, how many per day	1-5	6-10	11-15	16-20	more than 20

7. Alcohol Consumption		
a. Do you drink alcohol?	Yes	No
b. If yes, how much of the following do you drink per week?	1) Litres of beer per week?_____	
	2) Litres of wine per week?_____	
	3) Litres of cider per week?_____	
	4) Tots of spirits per week?_____	

8. Social Drugs		
a. Do you use social drugs? e.g. marijuana /dagga	Yes	No

Medical History:

9.Please tick the appropriate boxes if you have a history of or have been diagnosed with any of the following:

(you may tick more than 1 box)

a. Anemia	b. Depression	c. Diabetes	d. High blood pressure	e. Low blood pressure	f. Seizures	g. Thyroid disease

h. Do you have any other significant medical condition/s which you are being treated for? Please list condition/s : 1)_____ 2)_____ 3)_____ 4)_____		
i. Are you currently taking any medication/s? Yes □ No □ If yes, please list medication/s: *(please include and over-the-counter medication, herbs or birth control pills/injection, acne treatments)* 1)_____ 2)_____ 3)_____ 4)_____ 5)_____		
j. Have you had a head or neck injury in the past?	Yes	No
k. If yes, did you receive any treatment for the injury?	Yes	No
l. If yes, who did you get treatment from?	_____	
m. Have you had a CAT scan or MRI of you head, neck and/or brain?	Yes	No
n. If yes, what was the reason?	_____	
10.		
o. Do you know what a chiropractor is or does?	Yes	No
p. If yes, have you ever been treated by a Chiropractor?	Yes	No

q. If yes, what did your Chiropractor treat *? More than one block can be ticked if necessary*	headache	neck	Upper back
	Lower back	Arm or leg joints or muscles	Other: 1._____ _2._____ __

11.	
a. Are you currently pregnant?	Yes □ No □ n/a □
b. Have you ever been pregnant?	Yes □ No □ n/a □

SECTION B		
Headache History:		
12.		
a. Have you ever been diagnosed with a headache in the past?	Yes	No
b. If yes what headache were you diagnosed with? *e.g. migraine*	_____	
c. Have you experienced any headaches in the last 3 months?	Yes	No
If yes, please answer the rest of the questionnaire. *If no, you may hand in your questionnaire.*		

13.			
a. At what age did you start experiencing headaches for the first time?	_____ years old.		
b. Since experiencing these headaches, have their patterns changed in an	Yes	No	
c. If yes, have the following characteristics changed	1)Less frequent	More frequent	N/A

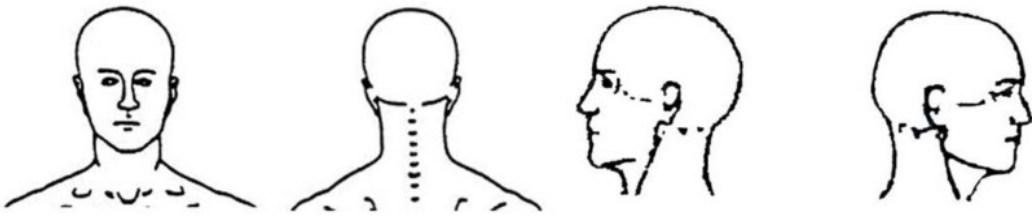
over time? *(please tick the appropriate box and answer 1-5)*	2)Less severe	More severe	N/A	
	3)Less continuous	More continuous	N/A	
	4)Less predictable	More Predictable	N/A	
	5)Lasts longer	Last for shorter time	N/A	
d. Is your headache ever felt over one side of your head or	never	sometimes	most of the time	always
e. Is your headache ever felt over both sides of your head?	never	sometimes	Most of the time	always
f. Does your headache normally occur at a specific time of	Yes		No	
g. If yes, please state at what time?	_____			
h. Do you have warning symptoms that alert you that you a going to experience a headache soon?	Yes		No	
i. If yes, please list the symptoms. *e.g. seeing spots, sensitive to light, dizziness*	1)_____ 2)_____ 3)_____			
j. Have you ever sort treatment for your headaches?	Yes		No	
k. If yes, who did you see? *e.g. GP, Chiropractor, Sangoma, Pharmacist, Inyanga*	1)_____ 2)_____ 3)_____			
l. Please state what you were diagnosed with (if known)?	1)_____ 2)_____ 3)_____			
m. What medication have you used in the past for your headache? *E.g. Panado, Grandpa, Myprodol*	1)_____ 2)_____			

	3)_____ 4)_____ 5)_____				
n. What effect did the medication have on your headache?	Better	Worse	No change	Don't remember	
p. If you have used birth control, what effect did they have on your headache?	Better	Worse	No change	Don't remember	N/A
r. If you have been/are pregnant, what effect has it had on your headache?	Better	Worse	No change	Don't remember	N/A
s. Do you have family members who suffer with headaches	Yes		No		
t. If yes, are they : *(you may tick both if applicable)*	1)male relative/s		2)female relative/s		

Headache Characteristics *within the last 3 months*

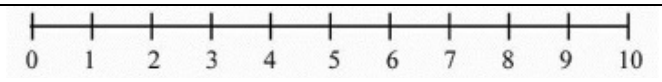
14. Location

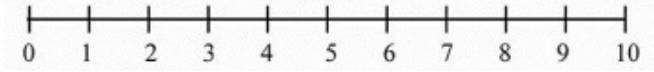
Front Back Right Left



a.Please shade in the area on the diagram above of where you most often feel your headache. (Prangley ,20

15. Pain

a. Do you have a headache right now? If yes	

please rate your pain on the scale provided.	(0= least amount of pain and 10= worst pain possible)
b. How painful is your typical headache? Pl your pain on the scale provided.	 (0= least amount of pain and 10= worst pain possible)

16. Character of pain *in the last 3 months*

Please tick the appropriate box which best describes how your headache/s feel?

(please answer question a-j)

Description	Never	Sometimes	Often	Always	Only if severe
a. Aching					
b. Poking					
c. Pounding					
d. Pressure					
e. Pulsating					
f. Sharp					
g. Shooting					
h. Squeezing					
i. Stabbing					
j. Throbbing					
k. Tightness					
j. Other: 1)_____ 2)_____					

3)_____					

17. Headache Triggers *in the last 3 months*

Which of the following, if any, seem to trigger/bring about your headache?

(Please tick the box/s that most apply to you (you may tick more than 1 box)

a. Alcohol □ b. Bending over □ c. Bright light □ d. Certain foods(if yes, please list): 1) _____ 2)_____ 3) _____ e. Certain smells □ f. Certain time of day □ g. Change in weather/ seasons □ h. Chewing/ clenching teeth□ i. Caffeinated drinks □ *e.g. coffee, tea, Red Bull*	j. Exercise □ k. Fatigue/exertion □ l. Hunger □ m. Lack of sleep □ n. Loud noises □ o. Lying down□ p. Medication □ q. Menstrual cycle(periods) □ r. Over sleeping □ s. Reaching overhead □ t. Reading □	u. Sexual activity □ v. Sinus problems □ w. Sneezing/Coughing x. Skipping meals □ y. Standing □ z. Stress/tension □ aa. Sun □ ab. Walking □ ac. Other (if yes please list) 1)_____ 2)_____ 3)_____

18. Aggravating Factors *in the last 3 months*

Are your headache/s aggravated/made worse by any of the following?

Please tick the box/s that most apply to you *(you may tick more than 1 box).*

a. Alcohol □ b. Bending over □ c. Bright light □ d. Certain foods(if yes, please list): 1) _____ 2)_____ 3) _____ e. Certain smells □ f. Certain time of day □ g. Change in weather/ seasons □ h. Chewing/ clenching teeth□ i. Caffeinated drinks □ *e.g. coffee, tea, Red Bull*	j. Exercise □ k. Fatigue/exertion □ l. Hunger □ m. Lack of sleep □ n. Loud noises □ o. Lying down□ p. Medication □ q. Menstrual cycle(periods) □ r. Over sleeping □ s. Reaching overhead □ t. Reading □	u. Sexual activity □ v. Sinus problems □ w. Sneezing/Coughing x. Skipping meals □ y. Standing □ z. Stress/tension □ aa. Sun □ ab. Walking □ ac. Other (if yes please list) 1)_____ 2)_____ 3)_____

19. Relieving Factors *in the last 3 months*		
Are your headache/s relieved/made to feel better by any of the following? Please tick the box/s that most apply to you *(you may tick more than 1 box).*		
a. Applying Ice/something cold □ b. Compression □ c. Eating □	h. Medication i. Moving around/walking □ j. Sleep	n. Stretching o. Vomiting □ p. Other (if yes, please list) 1)_____

d. Exercise □ e. Heat □ f. Lying down □ g. Massage □	k. Relaxing □ l. Sitting m. Standing □	2)_____ 3)_____

20. Associated Signs and Symtoms *in the last 3 Months*

Please tick the symptoms you have experienced with your headache.

If you ticked the corresponding yes box please tick the relationship that symptom has to your headache

Sign or Symptom	Yes?	Before Headache	During Headache	When headache is severe
EXAMPLE : brown eyes	☑			✓
a. Anxiety	□			
b. Balance problems	□			
c. Dizziness	□			
d. Jaw pain	□			
e. Nausea	□			
f. Neck/ back pain	□			
g. Neck/back stiffness	□			
h. Numbness of face/he	□			
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:_____	□			

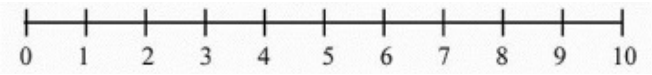
21.Frequency

a. How many times per day/week/month does your headache occur? (e.g. 3 times/week)	_____ times/day or _____ times/week or _____ times/month
b. How many mild/moderateheadaches do you experience on average ?	_____ times/day or _____ times/week or _____ times/month
c. How many severe headaches do you experience on average?	_____ times/day or _____ times/week or _____ times/month

22.Duration

a. How long does your headache usually last if you do treat your headache?	1)_____minutes	2)_____hours	3)_____days
	4) You have medication	5) It's always different	6) unknown

SECTION C	
The Burden of Headaches	
23.	
a. How many days have you missed school in the last 3 month because of your headache?	_____ days
b. In the last 3 months, how many days have you attended school even though you had a headache?	_____ days
c. How many days have you missed family, social, sports or leisure acti in the last 3 months?	_____days
d. How many days in the last 3 months has your headache decreased your ability to do activities of daily life? *e.g. chores, bathing, cooking*	_____days
e. How many days in the last 3 months have you not been able to study do homework because of your headache?	_____ days
f. What do you do if you experienced a headache while you are in class *(please tick the appropriate box)*	1) Continue as normal
	2)Take medication and continue as norm
	3) Stop what you are doing and try rest
	4) other: if yes, please _____

g. Do you ever go home from school early or to the sick bay because of headache?	Yes	No
h. If yes, how many times in the last 3 months?	_____times in last 3 months	
i. What do you do when you have a headache at home?	1) Continue as normal	
	2)Take medication and continue as norm	
	3) Stop what you are doing and try rest	
	4) other: if yes, please _____	
j. On average, in the last 3 months,how much did your headache decrease your overall productivity? *e.g decreased concentration, drop in test marks*	 (0= no decrease and 10= 100% decrease)	

Thank you for taking the time to complete the questionnaire. Your help is greatly appreciated. ☺

Appendix K : International Headache Society Guidelines for Diagnosis of Primary Headaches (IHS 2004)

Migraine Headache

A. At least 5 attacks fulfilling criteria B-D

B. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated) and occurring on <15 days/month

C. Headache has at least two of the following characteristics:

   1. unilateral location
   2. pulsating quality
   3. moderate or severe pain intensity
   4. aggravation by or causing avoidance of routine physical activity (eg, walking or climbing stairs)

D. During headache at least two of the following:

   1. Nausea
   2. Vomiting
   3. Photophobia
   4. Phonophobia
   5. osmophobia

E. Not attributed to another disorder

Tension Headache

A. Headache lasting from 30 minutes to 7 days

B. At least three of the following pain characteristics:

   1. bilateral location
   2. pressing/tightening (non-pulsating) quality
   3. mild or moderate intensity
   4. not aggravated by routine physical activity such as walking or climbing stairs

C. No nausea (anorexia may occur), vomiting, photophobia or phonophobia

D. Not attributed to other disorder

Cluster Headache

A. At least 20 attacks fulfilling criteria B-E

B. Attacks of unilateral orbital, supraorbital or temporal stabbing or pulsating pain lasting from 2 seconds to 10 minutes

C. Pain is accompanied by one of:

   1. conjunctival injection and/or lacrimation
   2. nasal congestion and/or rhinorrhoea
   3. eyelid oedema

D. Attacks occur with a frequency of ≥1 per day for more than half of the time

E. No refractory period follows attacks triggered from trigger areas

F. Not attributed to another disorder