# The prevalence, selected risk factors and burden of primary headaches in lecturers at a University of Technology (UoT) in KwaZulu-Natal during the COVID-19 pandemic

By

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I, Deidre Chetty, do 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 to my dad, mum, brother and sister. I would have never been able to accomplish my goals without your love and unyielding support. I am forever grateful to have such a phenomenal support structure. Thanks for everything — I love and appreciate you all dearly.

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# ABSTRACT

**Background:** Headaches are a common disabling condition that affect many people worldwide. Headaches have been under-studied in developing countries and there is a paucity of literature documenting headaches in lecturers. The COVID-19 pandemic has forced lecturers to adapt to online teaching, which may have resulted in headaches. It is envisaged that this research will be beneficial to chiropractors, other healthcare providers and lecturers.

**Aim of Study**: The aim of this study was to determine the prevalence, selected risk factors and burden of primary headaches in lecturers at a university of technology (UoT) in KwaZulu-Natal during the COVID-19 pandemic.

**Methodology**: A quantitative, descriptive cross-sectional design, where 685 lecturers employed at the Durban University of Technology, through self-selection, were selected to participate, using consecutive sampling. A minimum sample size of 247 was calculated, using a confidence level of 95% and confidence interval of 5%. Lecturers from all six faculties were invited to participate. The headache-attributed restriction, disability, social handicap and impaired participation (HARDSHIP) questionnaire was administered electronically via QUESTIONPRO®. Each participant was required to initial a consent form prior to answering the questionnaire. The diagnostic algorithm was utilised to diagnose headaches according to the diagnostic questions in the HARDSHIP questionnaire. All data were captured on an Excel spreadsheet and subsequently analysed using SPSS version 28.

**Results**: There was a total of 255 completed questionnaires. The mean age of respondents was 45.66 years old. Of the total sample ($n$=255), 51.8% were headache sufferers. Most respondents suffered from probable tension-type headache (41.9%; $n$=54), followed by migraine-type headache (27.9%, $n$=36). Social risk factors revealed a significant relationship between alcohol and headaches, and sleep deprivation and headaches. Medial risk factors revealed a significant relationship between a head injury and headache and sinusitis and headache. Although there was a relationship between psychological risk factors and headache, it was not significant. Many work-related risk factors were significantly related to headache. There was a greater number of headache sufferers who

tested positive for COVID-19. Many respondents experienced loneliness and their workload increased during the pandemic. Most of the respondents' headaches interfered with work, and they usually took medication to treat their headache.

**Conclusion**: Headaches are common in lecturing staff with, tension type headaches being most prevalent. There are many risk factors which are strongly associated with headaches and its impact caused an interference with work and negatively affected the suffers mental health. Family, social or leisure activities are also neglected when a headache occurred. This study adds to the current literature on headache prevalence in the lecturer population and increases awareness.

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CAR:            Chimeric antigen receptor

CNS:            Central nervous system

Co2:            Carbon dioxide

COVID-19:       Coronavirus disease 2019

CRS:            Cytokine release syndrome

CTH:            Cluster-type headache

CTTH:           Chronic tension type headache

ETTH:           Episodic tension type headache

GBD:            Global Burden of Diseases

ICHD-3:         International Classification of Headache Disorders 3rd Edition

IHS:            International Headache Society

MTH:            Migraine-type headache

MP:             Mobile phone

NSAIDs:         Non-steroidal anti-inflammatory drugs

TAC:            Trigeminal autonomic cephalgia

TNF:            Tumour necrosis factor

TTH:            Tension-type headache

UoT:            University of Technology

WHO:            World Health Organization

WFH:            Working from home

# DEFINITIONS

**Definition of a lecturer**

The Cambridge Advanced Learners Dictionary defined a lecturer as an individual who teaches at a college or university (Murungi and Gitonga, 2015). According to Maboe (2019: 137), a lecturer is someone who is trained to formally facilitate teaching and learning for the purpose of acquiring knowledge. For the purposes of this study, the first definition will be used.

**Definition of a headache**

Headaches are said to be the most common medical complaint known to man (Farooq and Williams, 2008). The International Headache Society (IHS) (2018) defined a headache as pain located in the head, above the orbitomeatal line and/or nuchal ridge.

# CHAPTER ONE INTRODUCTION

## 1.1 INTRODUCTION AND BACKGROUND

This chapter provides an overview of the background, research problem, aims and objectives. The significance of this study is then followed by a synopsis of what each chapter entails.

The IHS (2018) defined a headache as pain located in the head, above the orbitomeatal line and/or nuchal ridge. Headaches may also be defined as head pain which occurs in the head or neck area (Shuaibi *et al.*, 2021). It is said that headaches are one of the most common complaints in daily practice (Kurt and Kaplan, 2008), since they affect almost everyone at least once in their lifetime (Falavigna *et al.*, 2010).

Headache disorders are ranked in the top ten of the most disabling conditions according to the World Health Organisation (WHO) (Stovner *et al.*, 2007). It is estimated that almost half of the adult population have experienced a headache at least once within the last year (WHO, 2016). The global prevalence over periods of one month to a lifetime was found to be 58.4% (Abu-Arafeh *et al.*, 2010). The WHO ranks headache disorders in the top ten most disabling conditions for males and females and the top five for females only (Stovner *et al.*, 2007).

Headaches can be divided into primary and secondary headaches (Aurora, 2004; Ahmed, 2012). Secondary headaches are a result of a condition which causes inflammation or traction on pain-sensitive structures (Rizzoli and Mullally, 2017). Primary headaches (PHA) comprising of migraine, tension and cluster-type headaches (National Institute of Neurological Disorders and Stroke, 2016), are the most common and the most costly. These headache disorders are a diverse group of neurologic conditions which cause headaches but do not have an obvious cause (Robbins and Lipton, 2010). In adults, migraine type headaches (MTH) affect 12% of this population and are the most disabling, whereas tension-type headaches (TTH) affect 38% of the population (Robbins, 2021). Primary headaches make up approximately 90% of all headaches and are not life-threatening (Dell'Isola *et al.*, 2021). For the purposes of this study, only literature on primary headaches will be presented.

For adults under the age of 50 years, MTH is the leading cause of years lived with disability (Steiner *et al.*, 2018). A clinical picture of MTH includes four phases: prodrome, aura, headache phase and postdrome (Rizzoli and Mullally, 2017). More common than other headaches, TTHs is but not as severe as MTH and has a lifetime prevalence of up to 80% in the general population. Although TTH is not as severe as MTH, there is a significant

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socioeconomic impact as there is a degree of disability and high frequency (Stovner *et al.,* 2007). Of the trigeminal autonomic cephalgias (TACs), cluster-type headaches (CTH) are the most common but are rare in the group of primary headache disorders (Villar-Martinez, Puledda and Goadsby, 2020).

Risk factors, such as gender, family history, smoking, climate and body mass index, have been associated with primary headache disorders (Xie *et al.*, 2020). Psychosocial risk factors have been shown to greatly affect the impact of headaches in various ways (Malmberg-Ceder *et al.,* 2019). A population-based study in the Netherlands found that psychiatric conditions, sleep problems and a history of head or neck injury were risk factors for chronic headaches (Diener *et al.*, 2019). The risk factors that will be discussed in the literature include social, medical, psychological, work-related and the coronavirus disease 19 (COVID-19) related factors.

There are many studies which have focused on the physical factors accounting for headaches (Winter *et al.*, 2011; Ahmed, 2012; Lucas *et al.*, 2014; Mahmoud *et al.*, 2018 Raucci *et al.*, 2020; Xie *et al.*, 2020). However, research has shown that biological factors alone do not account for all aspects of headache and disability; it is unfortunate that psychological factors are only given importance when patients present with major psychopathology (Nicholson *et al.*, 2007). During the COVID-19 pandemic, high stress levels, depression and anxiety were reported among teachers, which negatively impacted their teaching (Al Lily *et al.*, 2020), all of which may lead to headaches.

The burden that headaches impose on individuals include disability, pain, reduced quality of life, impairment of participation in work related and social activities, and heavy financial costs (Yu *et al.*, 2012). The diagnosis rate of headaches is 40%, leaving 60% undiagnosed (Steiner *et al.*, 2011). Most primary headache clients can be treated effectively by primary healthcare services, thus making an improvement in the diagnosis and treatment rate which has the potential to significantly reduce the burden of headaches (Vosoughi *et al.*, 2019).

The COVID-19 disease is a pathogenic viral infection, which is highly transmittable and caused severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This virus caused a global pandemic that led to loss of human life worldwide (Shereen *et al.*, 2020). In South Africa, the first case was reported in March 2020 (Broadbent, Combrink and Smart, 2021). To curb the spread of the rapid transmission, a lockdown was implemented, which caused businesses and learning institutions to close. The impact of the COVID-19 pandemic forced South African schools and universities to adapt to online learning (Mpungose, 2020) during the acute phase of the pandemic. This transition to an online environment, working from home (WFH), and 'adapting to a new normal' may have resulted in anxiety, headaches and

other health concerns, which could have impacted the prevalence of PHA in university lecturers.

The higher education setting provides an occupational environment that requires teachers to perform and respond to different roles; these include, but are not limited to, teaching, mentoring, hosting internships, conducting research and organising seminars. All of these require a high level of personal, professional and scientific development (Souto *et al.,* 2018), adding a burden on the university lecturer. University lecturers experience pressure from heavy workloads and high levels of stress (Donnelly, 2014). There is a positive correlation between TTH and stress (Ashina, Bendtsen and Ashina, 2005).

The quality of higher education depends on various factors, such as student-staff ratio, funding from the government and private institutions, preparedness of learners, resource availability, student support services and the number of lecturers among others, all of which has been a challenge for South Africa (Tewari and Ilesanmi, 2020). The performance of students in South African universities is 74%, compared to 80% which is the desired national benchmark (RSA, 2013). Between 2009 and 2017, the average graduation rate was 16.43%, which was far below the target of 25% (Tewari and Ilesanmi, 2020). This places pressure on South African lecturers to make sure that students pass and graduate.

Ergonomically, WFH has many negative aspects which may have led to headaches in lecturers during the COVID-19 pandemic. This includes but is not limited to improper chair height, increased screen exposure, poor laptop/desk positioning and no footrest/armrest (Yeow, Ng and Lim, 2021). Compared to universities in developed countries, South African universities are still struggling with access to the internet (Van Deursen and Van Dijk, 2019). This may have been one of the major struggles that South African lecturers had to deal with during the transition to online teaching and learning, which may have led to or aggravated headaches.

## 1.2 RESEARCH PROBLEM

Headaches are considered treatable, but many headaches are under-recognised, under-diagnosed and often under-treated (Takeshima and Kikui, 2013). Despite the high prevalence and public health impact, headaches have only been partially documented, with most research focusing on migraine headaches (Dowson, 2015). There are limited studies done on headaches in university lecturers, yet they play such an integral part in the lives of students. University lecturers are required to perform various tasks, which puts them under a lot of pressure due to heavy workload and stress. The COVID-19 pandemic increased this pressure as lecturers were forced to adapt to online teaching. This transition brought about

poor ergonomic factors, amongst other things, such as inadequate workspaces, increased time spent on laptops/computers, poor seating and desk height which could contribute to headaches. These headaches may have led to absenteeism, decreased productivity and a reduced quality of life. A high prevalence and disease burden of migraine headaches has been associated with productivity losses and employer costs (Shimizu *et al.*, 2021). According to a previous study, among 2458 employees, 17% had migraine and had significantly missed more work days compared to non-headache sufferers or those with tension headaches (Shimizu e*t al.,* 2021).

The PHA prevalence in developing countries has been insufficiently investigated (Li *et al.*, 2020). From the literature presented, it is evident that there is a great need to conduct further studies on headaches, focusing on the prevalence, selected risk factors and burden of headaches, due to contradictory findings in the literature, and to assist health care providers (Kurt and Kaplan, 2008).

## 1.3 AIM OF THE STUDY

The aim of this study was to determine the prevalence, selected risk factors and burden of primary headaches in lecturers at an university of technology (UoT) in KwaZulu-Natal during the COVID-19 pandemic.

## 1.4 OBJECTIVES OF THE STUDY

1) To determine the prevalence and types of primary headaches suffered by lecturers at an university of technology.
2) To determine the socio-demographics, medical history, work-related and COVID-19 related risk factors for the primary headaches.
3) To determine the personal impact of the primary headaches in terms of work, family and social life.

## 1.5 SIGNIFICANCE OF THE STUDY

Headaches have been under-studied in developing countries and there is a paucity of literature documenting headaches in university lecturers. The COVID-19 pandemic has forced lecturers to adapt to online teaching which may have increased their susceptibility to headaches.

This research utilised the HARDSHIP questionnaire, which has not been utilised in a South African context, to determine the prevalence, risk factors and burden of primary headaches.

By conducting this research, information has been produced to assist chiropractors and other healthcare providers, who treat lecturers, understand the extent of the selected risk factors which lead to headaches in this population. Recommendations will be made to the institution to encourage employee assistance programmes to help staff manage and improve their quality of life (Al-Hashel *et al.*, 2021).

## 1.6 FLOW OF THE DISSERTATION

The following chapters are structured as follows:

Chapter Two provides a detailed review of the current literature on primary headaches. This literature focuses on the prevalence, pathogenesis and selected risk factors associated with these sub-types. This chapter also describes the impact of headaches in terms of work, family and social life.

Chapter Three details the methodology of the study.

Chapter Four presents a detailed report on the results obtained from the analysis of the data collected.

Chapter Five provides an analysis and discussion of the results, which is relative to the current literature.

Chapter Six concludes the study and provides recommendations for future studies. Limitations are also identified and noted.

## 1.7 CONCLUSION

Headaches are a common disabling condition that affect many people worldwide. Most individuals who present with a headache to a primary care provider for an evaluation have a primary headache disorder (Rizzoli and Mullally, 2017). Primary headaches are more common than secondary headaches but are not life-threatening. However, these headaches place a significant burden on the lives of individuals. For the purposes of this study, primary headache disorders have been discussed. Headaches have been under-studied in developing countries and there is a paucity of literature documenting headaches in lecturers.

The COVID-19 pandemic has forced lecturers to adapt to online teaching which may have resulted in headaches. This study aimed to determine the prevalence, selected risk factors and burden of primary headaches in lecturers at a university of technology (UoT) in KwaZulu-Natal during the COVID-19 pandemic. This research may be beneficial to chiropractors, other healthcare providers and lecturers.

The next chapter is the literature review which will present the various objectives in detail.

# CHAPTER TWO LITERATURE REVIEW

## 2.1 INTRODUCTION

This chapter provides a detailed account on the current and relatable literature on the epidemiology of headaches in lecturers. Information on the prevalence, risk factors and burden of headaches is highlighted in this chapter. Numerous search engines, such as Google Scholar, PubMed, the Durban University of Technology Library and the Institutional Repository, were used to gather information.

## 2.2 CLASSIFICATION OF HEADACHES

Headaches can be classified broadly as primary and secondary headaches (Aurora, 2004; Ahmed, 2012). According to the International Classification of Headache Disorders (ICHD-III), headaches are classified as the following:

- Primary headaches, which include tension, migraine and cluster.
- Secondary headaches, which include potentially life-threatening aetiologies, traumatic brain injury and vascular disorders.
- Cranial neuropathies, such as trigeminal neuralgia (IHS, 2018).

Primary headaches, which constitute most headaches (Ahmed, 2012), are composed of multiple entities that cause chronic and episodic head pain, in the absence of any underlying pathology or traumatic injury (Mier and Dhadwal, 2018). These headaches have no clear etiology on examination of patients, nor on structural imaging (Bahra, 2020) and are not life-threatening. According to the Mayo Clinic (2015), nerves, blood vessels and muscles of the head and neck all play a role in the development of primary headaches. Primary headaches are divided into tension-type headaches (TTH), migraine headaches (MTH) and trigeminal autonomic cephalgias (TACs) (Benoliel and Eliav, 2013).

Secondary headaches occur secondarily, caused by another disease or clinical condition (IHS, 2004). These headaches are not as common as primary headaches; however, they may be life-threatening (Ahmed, 2012).

For the purposes of this study, the focus will be on primary headaches.

## 2.3 TYPES OF PRIMARY HEADACHES

The TTH, MTH and CTH are discussed as follows.

### 2.3.1 Tension-Type Headache

Of the primary headaches, TTHs are the most common. It is said to be the most prevalent neurological disorder (Ashina *et al.*, 2021). According to the IHS (2018), the lifetime prevalence for TTH, in various studies ranges, is between 30% and 78% in the general population. These headaches were previously referred to as 'muscle contraction headaches' due to the role of stress and emotional and/or mental conflict which triggers pain, and then causes contractions of the muscles in the face, scalp, jaw and neck (Hassan and Asaad, 2020).

These headaches are further divided into infrequent episodic TTH (less than one headache a month); frequent episodic TTH (this includes two to fourteen headaches per month); and chronic TTH (which includes 15 headache days a month or more) (Derry *et al.*, 2015). Infrequent episodic TTH occurs in almost everyone and generally does not require medical attention, whereas frequent episodic TTH may be associated with disability, and one may need treatment, such as expensive drugs. Chronic TTH is the most serious and affects quality of life (IHS, 2018).

The etiology of TTHs is not well understood. Previously, it was considered to be primarily psychogenic but numerous studies since ICHD-1 suggest a neurobiological basis (IHS, 2018). Nutritional, muscular, environmental and genetic factors may play a role in the development of TTH (Shah and Hameed, 2021). In a randomised control trial, 100 patients with chronic TTH were compared with a control group of 100 people. The results showed that almost 70% of patients with chronic TTH had vitamin D deficiency, and a quarter people in the control had a vitamin D deficiency (Prakash *et al.*, 2017). Stress and posture are two significant factors in TTHs (Kratěnová *et al.*, 2007), but the pathophysiology is poorly understood. It is said that poor posture, like neck flexion for a prolonged period while watching a computer screen, leads to an increased amount of stress placed on the atlantoaxial joint. The shoulders will then try to compensate, leading to muscular imbalances and tightness in some areas causing TTHs (Shah and Hameed, 2021), which lecturers will be prone to due to the prolonged screen time. A population-based study of 11 199 twin pairs concluded that genetic factors were said to play a role in TTH and frequent episodic TTH, whereas infrequent episodic TTH is caused mainly by environmental factors (Russell, Saltyte-Benth, Levi, 2006).

According to Rudra, Chatterjee and Ray (2015), TTH is characterised by a pressing or tightening sensation which has a mild to moderate intensity. TTH usually occurs bilaterally and may last between thirty minutes and seven days (Blumenfeld, Schim and Brower 2010).

The risk factors for tension type headaches include emotional stress, anxiety, depression, panic disorders, and changes in sleep patterns, skipping meals and exposure to challenging environments, such as noise, heat and poor lighting (Black *et al.*, 2004). Factors that aggravate TTH include stress, anxiety, fatigue, lack of sleep, temperature and certain foods, whereas factors that relieve TTH include massage, rest, sleep, medication and good posture (Haque *et al.,* 2012).

A TTH can be differentiated from a MTH by the absence of photophobia, phonophobia, nausea and other neurological symptoms (Martami *et al.,* 2018).

### 2.3.2 Migraine-Type Headache

A MTH is the second most common headache (Ahmed, 2012). The word "migraine" is from the term "hemicranias", that means "half of the head" and many people experience pain in half of the head, however individuals may feel pain on both sides (Khan *et al.*, 2021). Each year across the world, more than one billion individuals are affected by MTH. These headaches are one of the most common neurologic disorders, with a high morbidity and prevalence (Amiri *et al.,* 2021).

According to Ruschel and Jesus (2022), migraines are separated into subtypes: migraine with aura, migraine without aura and chronic migraine. The IHS (2018) describes migraine with aura as being characterised primarily by the transient focal neurological symptoms, which usually precede, or sometimes accompany the headache. MMigraine without aura is classified as a clinical syndrome, which is characterised by a headache with specific features and symptoms. Many patients complain more about the discomfort associated with the aura, rather than the actual MTH (Manzoni and Torelli, 2008). A chronic migraine is a headache occurring 15 or more days a month, for more than three months. Categorising MTHs are different phases, including a premonitory phase, transient neurological symptoms, intense headache attack and a postdrome phase (Andreou and Edvinsson, 2019).

For the etiology of MTHs, it is important to note that there is a strong genetic component associated with these headaches (Ruschel and Jesus, 2022). This is complex and there is uncertainty about which genes and loci are implicated in the pathogenesis (de Vries *et al.*, 2016). According to Blumenfeld, Schim and Brower (2010), MTHs occur as a result of the activation of the trigeminal nerve fibres and inflammation of the meningeal blood vessels.

A MTH is characterised by a pulsating/throbbing sensation and is usually unilateral (Blanda and Wright, 2009 and Chawla, 2009). MTH causes the patient to rest as it is worsened by physical activity (Chawla, 2009). These headaches may be associated with syndromes, such as cyclic vomiting, abdominal migraine, somnambulism, benign paroxysmal torticollis, benign paroxysmal vertigo and confusional migraine, all of which have a different duration and presentation (Straube and Andreou, 2019). There are many risk factors for MTHs as shown in Table 2.1 (Bigal and Lipton, 2006; Lipton and Bigal, 2005; Amiri *et al.*, 2021).

**Table 2.1: Risk factors for migraine**

**Migraine risk factors**

| | | | |
|---|---|---|---|
| **Biological factors** | Hormonal imbalances | Estrogen dysregulation | Cortisol dysregulation |
| | | | Advancing age |
| | | Demographic factors | Female sex |
| | Metabolic factors | | Obesity |
| | | | Dyslipidemia |
| | | | Diabetes |
| | | | Hypertension |
| | Genetic and epigenetic factors | | *MTDH* gene |
| | | | *MEF2D* gene |
| | | | *PRDM16* gene |
| **Psychological factors** | Anxiety | | Phobia |
| | | | Panic |
| | | | Stress |
| **Miscellaneous** | Lower level of education | | Lower socioeconomic status |

*These conditions need to be furtherly assessed by future studies.

## 2.3.3 Trigeminal Autonomic Cephalalgias

Trigeminal autonomic cephalgias (TACs) are categorised as cluster-type headaches (CTH), paroxysmal hemicranias (PH) and short-lasting unilateral neuralgiform headache attacks with conjunctival injection and tearing (SUNCT) (Lambru and Matharu, 2013; IHS, 2018). For the purposes of this study, only cluster-type headaches will be discussed as CTH is the most common headache among TACs (Ahmed, 2012).

A CTH is the most prevalent headache among TACs (Ahmed, 2012), but these headaches are relatively rare and are considered as one of the most severe types of headaches (Kandel and Mandiga, 2022). These headaches occur in 0.1% of the general population (Kandel and Mandiga, 2022). The onset of CTH is usually between 20 to 40 years (IHS, 2004). CTH is divided into two forms: episodic and chronic. Episodic CTH indicates that

there is a remission period, whereas chronic CTH sufferers experience daily or near-daily headaches for more than one year without remission (Rudra, Chatterjee and Ray, 2015)

The exact aetiology of CTH is not known but studies have shown a genetic component, and multiple loci were associated (Harder *et al.*, 2021; O'Connor *et al.*, 2021). Although the mode of inheritance is not clear, it is known that first-degree family members are 18 times more likely to have CTHs (Kandel and Mandiga, 2022). An association between the trigeminovascular system, hypothalamus and the parasympathetic nerve fibers involved in the trigeminal autonomic reflex is known (Kandel and Mandiga, 2022). There is also a link between a pain attack and vasodilation.

These headaches are unilateral and short-lasting, with at least one autonomic symptom, such as nasal congestion, lacrimation, aural fullness or conjunctival injection (Drummond, 2006). Risk factors include family history, alcohol consumption, male gender, age greater than 30 and prior brain surgery or injury (Waung *et al.*, 2020).

## 2.4 PREVALENCE OF PRIMARY HEADACHES

Headache disorders are among the most prevalent conditions worldwide according to the Global Burden of Disease (GBD) (Stovner *et al*, 2022). According to Rizzoli and Mullally (2017), the lifelong prevalence of headache is 96% and there is a female dominance. Primary headache disorders have shown to have a lifetime prevalence of 91.3% (Steiner *et al.*, 2014). Approximately one half of the adult population worldwide is affected, at any time, by a headache disorder (Hainer and Mathesor, 2013). Among the adult population, prevalence studies revealed that TTHs affect 38%, whereas MTHs affect 12% (Robbins, 2021). A study on the general population, age group 18-65, in China, has shown that a one-year prevalence was 23.8% (Yu *et al.*, 2012).

The most common type of primary headaches are TTHs (Blanda and Wright, 2009; IHS, 2018), affecting 78% of the general population (Jensen, 2003). A Denmark population-based study has shown the lifetime prevalence of TTH to be 78%, with a majority of episodic infrequent TTH (Lyngberg *et al.*, 2005). TTHs are more common in females than males (Derry *et al.*, 2015 and Chowdhury, 2012). According to Bayraktutan *et al.* (2014), studies and clinical experience have shown that TTH is more common in females (1: 6; male: female ratio) and occurs more commonly in the third and fourth decades. In both males and females, the prevalence of TTHs peaks between the ages of 30 and 39 years and decreases with an increasing age (Lyngberg *et al.*, 2005)

The second most common headaches are MTHs (Ahmed, 2012). In 2019, the global prevalence of MTH was estimated to be 1.1 billion (Safiri *et al.*, 2022). Over the last three

decades, the global prevalence of MTH has increased substantially (Safiri *et al.*, 2022). A study in Turkey revealed about 20% of sufferers have an attack once or less per month; 38% had one to four attacks per month; and 42% experienced migraines more than four times per month (Özdemir *et al.* 2014). MTHs occur mainly between 25 and 55 years (Robbins and Lipton, 2010). Females are more likely to suffer from MTHs compared to males and the prevalence in the general population ranged from 2.6% to 32%, according to a Denmark study. However, the prevalence of these headaches varies as it is dependent on the technique used to diagnose them in the different studies (Ali, Ahmed and Omer, 2022). In 2019, the global prevalence rate in females and males were 17 902.5 and 10 337.6 respectively (Safiri *et al.*, 2022).

Among TACs, CTH is the most prevalent headache (Ahmed, 2012) and they occur more frequently as a continuance of a disorder that began during young adulthood (Fowler, Capobianco and Dodick, 2004). There is a male predominance (Bahra, May and Goadsby, 2002; Wei, Yuan Ong and Goadsby, 2018), and the mean onset is in the third decade. Since the prevalence is lower compared to migraines, it is difficult to assess the prevalence in the community (Wei, Yuan Ong and Goadsby, 2018).

Information on headache prevalence is sparse in Africa (Oshinaike *et al.,* 2014). In developing countries, the prevalence of headaches is not investigated sufficiently (Li *et al.*, 2020) which denotes a need for studies in developing countries, like South Africa. Due to the insufficient literature, management of headaches may be affected. A study conducted in rural South Tanzania revealed that the one-year prevalence of headache was 23.1% (Dent *et al.,* 2004*).* The one-year prevalence of migraine in Ethiopia was 3%, with the peak age in the fourth decade (Tekle Haimanot *et al.,* 1995). In Nigeria, the prevalence ratio of migraine was said to be 5.3% (Osuntokun *et al.,* 1992). According to Charleston (2021), in the United States, race-based disparities exist in headache medicine, but more research is needed. Due to the diversity of South Africa, this research will be beneficial as all race groups are included so it will build on the existing body of knowledge.

There are socioeconomic disadvantages which are highly prevalent in those with headaches (Burch, Rizzoli and Loder, 2020). According to Mateen (2008), primary headaches are undertreated in many developing countries. The inconsistent literature on the prevalence of headaches is due to type of data collection, such as telephonic or face-to-face interviews (Kurt and Kaplan, 2008; Stovner *et al.*, 2007). Factors that may also affect the consistency of information include age, gender, cultural background, ethnicity, or a combination of these factors (Rasmussen, 1999 and Stovner *et al.*, 2007). Studies on the prevalence in different occupational groups is important to note due to the increased

prevalence and consequent decline in the ability to work (Li *et a*l., 2020). The literature on the prevalence in lecturers remain sparse.

## 2.5 RISK FACTORS FOR HEADACHES

There are several factors which influence our health — these are called determinants of health. This includes biology, genes, behaviour, diet and lifestyle factors, like smoking and exercise. There are also social determinants, which include our social and physical environment. The conditions that we live, work, play and learn in are our social determinants (Jswords, 2018).

### 2.5.1 Social History

According to Molarius *et al.* (2008), lifestyle factors which increase the prevalence of headaches include physical inactivity, occasional/current smokers, occasional heavy consumption of alcohol, missing breakfast and underweight or obese individuals.

Large population studies have shown strong evidence of an association between CTHs and cigarette smoking (Raucci *et al.*, 2020). According to Dueland (2015), 75% of MTH patients indicated alcohol as the most common cause for their attacks. Both excessive sleep and lack of sleep may trigger headaches (Raucci *et al.*, 2020).

### 2.5.2 Medical History

Headaches are the most common symptom after a head injury (Lucas *et al.*, 2014). According to the IHS (2013), headache attributed to a head injury (HAIH) is a headache that has no clinical characteristics and starts within seven days of injury. Individuals with a mild head injury have a higher headache severity and prevalence than those with a severe head injury (Theeler *et al.*, 2013; Solomon, 2009), but further investigation is needed.

The results for the studies examining headaches and reduced vision indicate a link between headaches and refractive errors (Gil-Gouveia and Martins, 2002; Gunes *et al.,* 2016). Headaches may be provoked by uncorrected vision and the need for glasses (Thorud, Aurjord and Falkenberg, 2021).

According to Lee *et al.* (2021), one of the most common causes of health-related productivity loss is headaches. The association of MTH with an increased risk of long-term cardiovascular and cerebrovascular events is mainly driven by an increased risk of stroke and myocardial infarction (MI) (Mahmoud *et al.*, 2018). In the early twentieth century, a correlation between headache and high blood pressure was first considered (Wang and Wang, 2021). A relationship between headache and an increased blood pressure were

repeatedly reported in literature (Adney *et al.,* 2021). Headache may be considered the most common symptom for arterial hypertension (Arnold, 2018).

### 2.5.3 Psychological

There is a significant association between headaches and anxiety/depression (Magnavita, 2015; Chu, 2018). Most of the research done on headaches has been on the role of biological factors in headache disability, but reliance on a purely biomedical model of headache does not account for all aspects involved in headache causation (Nicholson *et al.*, 2007). Psychosocial risk factors have been shown to greatly impact headaches occurrence and frequency (Malmberg-Ceder *et al.*, 2019). Stress is more common in headache populations, with depression and anxiety being associated with both migraine and other headaches. The relationship between depression/anxiety and headache is thought to be bidirectional (Malmberg-Ceder *et al.*, 2019). There is evidence showing that neural circuits responsible for cognitive-affective phenomena is highly interconnected with the circuitry responsible for headache pain and, therefore, psychological factors can influence headache pain via various central nervous system pathways (Nicholson *et al.*, 2007). Psychological risk factors, such as headache management, locus of control and self-efficacy, and negative affect/emotional states can alter the likelihood of a headache attack being triggered, the severity of pain, the impact on functioning treatment and prognosis. In addition, tension and stress is the leading trigger in TTH (Ashina, Bendtsen and Ashina, 2005).

Smith (2007) reported that there are high levels of stress with higher education systems. The teaching profession has always involved stress, due to excessive workloads, interpersonal communication problems, insufficient training and job insecurity (Ozamiz-Etxebarria, 2021). Higher education teachers are expected to perform and respond to different roles; these include, but are not limited to, teaching, mentoring, hosting internships, conducting research and organising seminars. All of these require a high level of personal, professional, and scientific development (Souto *et al.*, 2018). At universities, administrative duties have increased, together with increased demands placed on teaching and research responsibilities.

### 2.5.4 Work-Related

There are many work-related factors which have been attributed to headaches (Magnavita, 2022). The results from an Italian survey reported that headaches were one of the most common symptoms that office workers experienced. This was due to heat, drafts, lighting, odours and poor air quality in the working environment (Magnavita, 2014). Leadership styles

(Magnavita, 2022) and injustice in the workplace (Min *et al.*, 2014) may also play a role in headaches.

When South Africa experienced its first lockdown for COVID-19, lecturers were required to abruptly change their work environment and patterns and work from home. Many negative aspects of WFH have been described. Working remotely has led to an increased duration of screen exposure which may contribute to fatigue, headaches, and tiredness (Majumdar, Biswas and Sahu, 2020). WFH ergonomic problems that were raised included too much screen time, improper chair height, noise and distortion, poor lighting, poor laptop/desk positioning, no footrest/armrest and an increased key object distance (Yeow, Ng and Lim, 2021). Living alone and WFH without any face-face interactions may contribute to social isolation and depression as there is no opportunity to socialise with colleagues (Xiao *et al.*, 2021).

Excessive screen time is possibly a leading cause of headaches (Abou Hashish *et al.*, 2022) and these headaches are likely to be unilateral and occur towards the middle or end of the day (Mashige, 2014). According to Ranasinghe *et al.* (2016), the eyes and extraocular muscles endure constant shifting and accommodating for a prolonged period causing stress on the muscles and fatigue of the eyes which lead to headaches. The brightness of the screen light leads to migraine attack, and the migraine cascade threshold may reduce due to an increased screen exposure (Kowacs *et al.*, 2004). Working in the same position for prolonged hours, including computer work, is a risk factor for headaches (Houle *et al.*, 2021). Workers with headache disorders reported the use of computer monitors and occupational stress to be the most common risks (Vicente *et al.*, 2021).

According to Demir and Sumer (2019), headache duration and frequency of MTH is increased due to the use of smartphones. This is attributed to poor sleep quality and daytime sleepiness. A community-based cross-sectional study conducted in India concluded that headaches are associated with usage of a mobile phones (MP) — the prevalence of MP usage was reported to be 70% (Stalin *et al.*, 2016). In addition, headaches in MP users were increased in those who had longer calls and higher daily call frequency (Wang *et al.*, 2017).

The chronical postural strain from working in uncomfortable positions are a mechanical cause of TTH (Smith *et al.*, 2009). The severity of TTH increases because of the postural strain placing stress on the precranial muscles to their maximum tension (Monzani, Zurriaga and Espi Lopez, 2018).

### 2.5.5 COVID-19

According to Harapan *et al.* (2020), an outbreak of the coronavirus disease 2019 (COVID-19) occurred in 2019 in Wuhan City, China, caused by a novel SARS-CoV-2. Evidence shows a zoonotic origin of COVID-19 (Lau *et al.*, 2020) and Wu *et al* (2021), as a bat being the natural host, which may be questionable. Within the first 50 days, it was noted that there were over 70 000 infections and more than 1 800 individuals had died (Shereen *et al.*, 2020). According to Broadbent *et al.* (2021), the first case was reported on 5 March 2020 in South Africa. A National State of Disaster was declared on 15 March and, from March 27, a full lockdown of the country was in place. This included closing most economic activity and prohibiting movement for non-essential purposes (Broadbent, Combrink and Smart, 2021). During this time, schools and universities were closed, and teaching and learning had to be done online.

According to the ICHD, headaches are accepted as a symptom of a systemic viral infection (Table 2.2) (IHS, 2013), although the exact mechanism is not known. Headaches in infectious diseases coexist with fever but may also be present without fever. It is indicated that systemic infections do not have this effect simply through fever and exogenous/endogenous pyrogens, but the mechanisms include direct effects of microorganisms and activation of immunoinflammatory mediators (IHS, 2013).

Indirect mechanisms that cause headaches in SARS-CoV-2, but are not disease specific, include dehydration, metabolic disturbances, systemic inflammation and hypoxia (Bobker and Robbins, 2020). Although more studies are yet to be done discussing the link between headaches and COVID-19, proposed links are discussed as follows.

The central nervous system (CNS) may directly be invaded by SARS-CoV-2 via the olfactory bulb (Bobker and Robbins, 2020). Angiotensin-converting enzyme 2 (ACE2) are the receptors for cell entry in SARS-CoV-2 and these receptors are mainly expressed in neurons, but also in the glia in the CNS (Togha *et al.*, 2022), the potential for direct viral infection causing headaches (Bobker and Robbins, 2020). SARS-CoV-2 may also cause organ damage due to the downregulation of ACE2 expression on the cells (Togha *et al.*, 2022).

Headaches may be due to vascular attack and trigeminovascular activation from high expression of ACE2 in the capillary endothelium (Abboud *et al.*, 2020). Trigeminovascular system activation leads to the release of neurotransmitters that are pain-generating, which may cause headaches presenting similarly to MTHs (Noseda and Burstein, 2013; Planchuelo-Gomez *et al.*, 2020).

According to Bobker and Robbins (2020), headaches in SARS-CoV-2 may be linked to cytokine release syndrome (CRS), a supraphysiological response following immunotherapy and associated with neurotoxicity quite often. Neurotoxic symptoms that are seen with chimeric antigen receptor (CAR) T cells include headaches which were present in 42% of people in immunotherapy (Rubin *et al.*, 2019). The role of cytokines such as tumour necrosis factor (TNF-α) headache pathophysiology have been described (Wagner and Myers, 1996), including an increased level during migraine attacks (Perini *et al.*, 2005).

In South Africa, the use of face masks was recommended on 10 April 2020 (Rab, Javaid and Haleem, 2020). Stress and wearing masks were found to be the main triggers of headache (Uygun *et al.*, 2020). The pathogenesis may be due to mechanical compression, hypoxia, rebreathing of carbon dioxide (Co2), stress or an aggravation of a pre-existing headache (Gurnani and Kaur, 2021). Studies have focused on masks and headaches in healthcare workers (Rosner, 2020; Ramirez-Moreno *et al.*, 2020), but little or no research has been published on the effect of mask usage in lecturers. Once lecturers had returned to university, they had to adapt to lecturing with masks on, something that was new for everyone. Whether or not mask usage aggravated headaches in lecturers is worthy of attention.

An adverse event most frequently complained about after the COVID-19 vaccination included headaches (Castaldo *et al., 2022*). In both clinical trials and real-world data, headaches have been reported by almost half of the recipients of the vaccine (Zhu *et al.*, 2020).

**Table 2.2: ICHD3: headache attributed to systemic viral infection**

**Headache viral infection**

| | | |
|---|---|---|
| ***Description*** | Headache caused by and occurring in association with other symptoms and/or clinical signs of a systemic viral infection, in the absence of meningitis or encephalitis. | |
| ***Diagnostic criteria*** | A. Headache of any duration fulfilling criterion C | |
| | B. Both of the following: | 1. Systemic viral infection has been diagnosed.<br>2. No evidence of meningitic or encephalitic involvement. |
| | C. Evidence of causation demonstrated by at least two of the following: | 1. Headache has developed in temporal relation to the onset of the systemic viral infection.<br>2. Headache has significantly worsened in parallel with worsening of the systemic viral infection.<br>3. Headache has significantly improved or resolved in parallel with the improvement in or resolution of the systemic viral infection.<br>4. Headache has either or both of the following characteristics:<br>• (a) Diffuse pain.<br>• (b) Moderate or severe intensity. |
| | D. Not better accounted for by another ICHD-3 diagnosis. | |

From a clinical point of view, and from the literature presented, lecturers are exposed to risk factors that may pre-dispose them to developing headaches. Therefore, since there are limited studies done in South Africa documenting risk factors in lecturers, this study will be of great benefit, not only to chiropractors and other health related professionals, but for lecturers as awareness will be raised.

# 2.6 CLINICAL CHARACTERISTICS OF PRIMARY HEADACHES

Each headache has unique clinical characteristics, and by knowing the characteristics it makes it easier to identify the type of headache that one is experiencing, thus directing treatment.

## 2.6.1 Tension-Type Headache

The TTHs are characterised by a diffuse, mild to moderate pain that is described as feeling a tight band around the head (Mayo Clinic, 2021). The pain is described as dull, pressure-like or constricting, or some say that there is a sense of fullness in the head (Chowdhury, 2012). The pain is tightening in quality and bilateral in location. The duration of these headache episodes

varies between 30 minutes and seven days, with the average duration being 4–6 hours (Shah and Hameed, 2021). These headaches usually start during the day and increases slowly, which may be aggravated in the evening in some people (Chowdhury, 2012). A TTH does not worsen with physical activity and is not usually associated with nausea/vomiting but photophobia or phonophobia may be present, but both should not be present in a TTH (Chowdhury, 2012). Patients with TTHs may also present with neck and/or shoulder tightness and sleep disturbances (Shah and Hameed, 2021).

## 2.6.2 Migraine Type Headache

A MTH is characterised by severe paroxysmal unilateral pulsatile headaches (Li *et al*, 2020), which usually begins with warning signs (prodromes) and an aura. Migraine has two major types: with aura and without aura which is discussed as follows. Individuals may also experience a prodromal and/or postdromal phase, which includes symptoms such as fatigue, depression, craving certain food, yawning that is repetitive, hyperactivity or hypoactivity and neck stiffness/pain (IHS, 2018). Once the MTH develops, there is throbbing which intensifies with an increase in intracranial pressure. This is then associated with nausea, vomiting and abnormal sensitivity to noise, light and smell, which can also be accompanied with muscle tenderness and allodynia (Burstein *et al.*, 2015). The duration can be hours to days and the pain may be extremely severe (Mayo Clinic, 2021).

According to the IHS (2018), the following characteristics of the sub-types of migraines are described:

**Migraine without aura**

Recurrent headaches that have attacks which last 4–72 hours and these headaches have a unilateral location, moderate to severe intensity and pulsating quality, aggravated by physical activity. These headaches are associated with nausea and/or phonophobia and photophobia.

**Migraine with aura**

The attacks are recurrent and lasts for minutes. There are unilateral, fully reversible, sensory, visual or other central nervous system symptoms which gradually develop. This is then followed by headache and migraine associated symptoms**.**

## 2.6.3 Cluster Headache

Cluster-type headaches present as a harrowing, unilateral headache (Sargeant and Blanda, 2009; Lambru and Matharu, 2013). These headaches are a form of sporadic, short-lived and agonising head pain associated with automatic dysfunction (Rudra, Chatterjee and Ray, 2015). Cluster-type headaches usually involve the first division of the trigeminal

nerve, the temple and over the peri and retro-orbital regions (Bahra, May and Goadsby, 2002). These headaches may be accompanied by symptoms such as ipsilateral conjunctival injection, sweating of the facial or forehead area, lacrimation, restlessness or agitation, rhinorrhoea, nasal congestion, miosis, ptosis and/or eyelid oedema (IHS, 2018).

## 2.7 DIAGNOSIS

The HARDSHIP questionnaire utilised in this study has proven cross-cultural validity and incorporates demographic enquiry, diagnostic based questions and burden related questions. This instruments' modular design makes it flexible to adaptation and cultural sensitivities (Steiner *et al.*, 2014).

Strengths:

- The evolution of this instrument has come from a broad base of expert opinions.
- It has undergone testing in many settings and cultures.
- The successful use in many studies have built a collection of studies that had similar methodology in various regions.

Limitations:

- In all cultures and languages, the diagnostic questions are insensitive to TTH.

The diagnostic algorithm (Appendix 8) was utilised to diagnose headaches according to the diagnostic questions in the HARDSHIP questionnaire.

## 2.8 MANAGEMENT OF PRIMARY HEADACHES

Most headache disorders do not require input from a specialist as they can be treated effectively with a correct diagnosis, with no further investigations (Ahmed, 2012). A diagnosis, empathy and effective treatment may be very rewarding for the clinician as it can make a significant difference to the patient (Sinclair *et al.*, 2015). Educating the patient on lifestyle factors is a vital part in any headache management plan (Raucci *et al.*, 2020).

Physical therapy should always be considered in patients with TTHs. The most used non-pharmacological treatment is physical therapy, including active treatment strategies, such as relaxation, posture improvement, exercise regimen, in addition to ultrasound and electrical stimulation (Jensen and Roth, 2005). Cryotherapy, heat, massage, transcutaneous electrical nerve stimulation and changes to ergonomics are effective for acute TTH, but not episodic TTH (Fumal and Schoenen, 2008). Acupuncture, homeopathy, herbal medication, Indian head massage and cognitive behaviour therapy may help MTHs (Ahmed, 2012). If those affected with MTH are managed with acute and preventative

strategies, then the disability and loss of function caused by this disease will be reduced (Jenkins, 2020).

Manual therapy is said to be more effective compared to care from a general practitioner in both short- and long-term reduction of symptoms for chronic TTH (Castien *et al*, 2011). Spinal manipulation is not effective in treating episodic TTH (Bove and Nilsson, 1998). However, manual therapy, such as spinal manipulation, myofascial manipulation or craniosacral techniques, is effective in treating chronic MTH (Espí-López, Bermell-Salvador and Cortés-Amador, 2017).

Psychological treatments used to treat headaches include relaxation training, EMG biofeedback and cognitive behavioural therapy (Chowdhury, 2012). Relaxation training and biofeedback have widely been accepted for treating headaches (Lee *et al.*, 2019), and have been used for more than four decades (Penzien, Rains and Andrasik, 2002). Muscle tension and autonomic arousal, which may result from headaches, are consciously reduced during relaxation training (Chowdhury, 2012). EMG biofeedback helps the patient recognise and control tension in the muscle, which is done by providing continuous feedback about activity in the muscle (Holroyd *et al.*, 2005). During biofeedback, the patient is helped to gain control over pericranial muscle tension (Chowdhury, 2012). Cognitive behavioural training involves learning to identify thoughts and beliefs which cause stress and aggravate headaches (Chowdhury, 2012). Both cognitive behaviour therapy and biofeedback training have shown to reduce stress (Crystal and Grosberg, 2009).

Medications may be helpful to treat headaches, but it is important to note that prolonged usage and overuse of medication to treat headaches may lead to another headache called medication-overuse headache. The majority of patients should have both pharmacological and non-pharmacological interventions for the headache treatment (Shah and Pandey, 2017). Many patients with TTH can take simple analgesia (Sinclair *et al.*, 2015). Ahmed (2012) indicates the use of over-the-counter analgesics, such as paracetamol and ibuprofen, for infrequent episodic TTH. Those with CTTH may use preventative treatments, such as amitriptyline or topiramate (Clarke *et al.*, 2009). For mild to moderate migraines, non-steroidal anti-inflammatory (NSAIDs) and acetaminophen are first line treatment, whereas triptans are used for moderate to severe migraines (Mayans and Walling, 2018). The most recommended treatments for CTHs are oxygen therapy and triptans (Kandel and Mandiga, 2022).

## 2.9 BURDEN OF HEADACHES

According to Jensen and Stovner (2008), headaches cause disability and loss of quality of life, which is known to be on the same level with other chronic disorders. Headaches are a major problem because they can limit daily activities, decrease quality of life and productivity (Rasmussen, 1999; Bigal *et al.*, 2001; Curry and Green, 2007; Stovner, Hagen and Jensen, 2007; Jensen and Stovner, 2008; Kurt and Kaplan, 2008). According to the Global Burden of Diseases (GBD), headaches are major causes of disability worldwide (GBD, 2016). Both personal life and work life may be affected equally in those who are headache sufferers (Bussone *et al.* 2004).

The MTH has been described as a burdensome disease and was said to have an impact on family relationships, work activities and on an individual's economic situation (Leonardi and Raggi, 2019). According to GBD (2019), in 2016, the second largest contributor to the disability-adjusted life-years globally was MTH.

The burden of TTH is greater than MTH with regard to the aspect of absenteeism from work (Oshinaike *et al.*, 2014). There is a paucity of literature in terms of the impact of headache disorders and the loss of productivity at the workplace (Shimizu *et al.,* 2021). Studies have revealed significant effects on partners of migraine sufferers, with 24% missing family days or social activities and 12% who avoid family days and social activities due to proband's migraine. Migraine sufferers have also reported the influence the headache has on good parenting. Some individuals had stated that they have avoided having children because of the headache (Hamelsky, Lipton and Stewart, 2005; Lipton *et al.,* 2003). CTHs have a negative impact on personal life, society and self-perceived health (Petersen *et al.,* 2022).

In South Africa, higher education is a force in national socioeconomic development against a backdrop of skill shortage, oppression, ignorance and perpetual dependence (Maharasoa and Hay, 2001). Compared to universities in developed countries, South African universities are still struggling with access to the internet and computers due to the intensity of factors, which has led to a digital divide (Van Deursen and Van Dijk, 2019), making it difficult for lecturers to teach online. A major problem that affects the quality of graduates in South Africa is a huge number of underprepared students entering higher institutions (Tewari and Ilesanmi, 2020). Since performance is dependent on the number of teachers, their quality, their devotion and duty and their effectiveness (Ahmad, 2016), they are given a major responsibility to produce good quality graduates and, therefore, have many tasks, increased workloads and stress.

Over the past two years (2020–2022), there have been significant changes in the lives of university lecturers due to the COVID-19 pandemic. South African universities have been

forced to transit to online learning due to the COVID-19 pandemic (Mpungose, 2020), which has added an extra burden on lecturers as they have had to adapt to online teaching. This added work stress may negatively affect university lecturers' health, leading to anxiety, headaches and other health concerns, which may influence the prevalence of primary headaches. Lecturers were forced to adapt to the "new normal" within a short space of time and reported having increased workloads, psychosomatic problems and exhaustion (Prado-Gascó *et al.*, 2020). The lockdown and social distancing policies implemented to control the spread of the virus have led to dramatic mental health impacts, bringing about greater social isolation and increased anxiety (Smith and Lim, 2020).

The burden of headaches may be reduced significantly by creating awareness, hospital visits, recognising precipitating factors and treatment (Oshinaike *et al.,* 2014). According to Statistics South Africa (2022), the unemployment rate was reported as 35.3%, the highest since 2008. Treating headaches is costly and due to the unemployment rate, many people will not be able to afford proper treatment, worsening the burden of headaches.

## 2.10 CONCLUSION

To date, there has been no literature published that documents the prevalence, risk factors and burden of headaches in university lecturers in South Africa.

From the literature presented, it is evident that headaches affect many people worldwide. For the purposes of this study, the focus was on primary headaches, which have the following subtypes: TTHs, MTHs and TACs. Cluster-type headaches are the most common of the TACs, as discussed previously.

The prevalence of headaches differs in populations and different countries. It is important to identify the prevalence in lecturers as there are limited studies, yet they play an integral role in the lives of students.

There are many risk factors for primary headaches, but only a few have been discussed. The factors discussed seemed to be the most relevant to the lecturer population. The COVID-19 pandemic changed the lives of lecturers as they were forced to transition to online teaching. Identifying the impact these headaches have in the lives of lecturers will assist in better management programmes and additional support.

Although headaches are extremely common, there is still information lacking, so these headaches remain underestimated, underrecognised and undertreated (WHO, 2016). There is a great need for more research on headaches, especially in developing countries.

The following chapter will outline the research methodology.

# CHAPTER THREE METHODOLOGY

## 3.1 INTRODUCTION

Research methodology is a way to solve a research problem systematically (Patel and Patel, 2019). This is important as a systematic approach with diligent planning is required for the conduct of research (Garg, 2016). This chapter provides an outline of the research methodology, including a description of the study design, study population, questionnaire development, data collection and data analysis.

## 3.2 STUDY DESIGN

This study utilised a quantitative approach with a descriptive cross-sectional design. This design was the most suitable for this study as it provided data for describing the status of phenomena at a fixed point in time (Ihudiebube-Splendor and Chikeme, 2020). Quantitative research is a research strategy which emphasises the quantification of the collection and analysis of data (Bryman 2012); hence, a quantitative approach with a descriptive cross-sectional design was appropriate for this study. Descriptive studies explain the concepts and their relationships, which is beneficial as it leads to further investigation for new research (Burns and Grove, 2009).

Surveys include the collection of information from a sample of people through their responses to questions (Check and Schutt, 2011). The benefits of surveys include having a big population and, therefore, greater statistical power, the ability to gather large amounts of information and having the availability of validated models (Jones, Baxter and Khanduja, 2013).

The quantitative paradigm for this study was based on positivism. Through a quantitative approach, this generally focuses on identifying explanatory associations or causal relationships, where findings from large samples are favoured (Park, Konge and Artino, 2020).

## 3.3 STUDY POPULATION AND SETTING

The study population was lecturers (part-time, full-time and those on fixed term contracts), who were employed by the Durban University of Technology (DUT) during the time of this study. These lecturers were of different genders, age groups and ethnicities. The university has seven campuses across the two cities of Durban and Pietermaritzburg, which include: Steve Biko, Ritson, ML Sultan, Brickfield, City, Riverside and Indumiso campuses. There

are six faculties which comprise of Applied Sciences, Management Sciences, Engineering and The Built Environment, Accounting and Informatics, Arts and Design and Health Sciences, with approximately 33 000 students and a total of 685 lecturing staff.

## 3.4 PARTICIPANT RECRUITMENT

All lecturers lecturing at DUT were recruited for this study. In total, there are 685 lecturers employed at the seven campuses. Once approval from the Institutional Research Ethics Committee and Gatekeeper's permission was received, the focus and pilot studies had been conducted, and the questionnaire had been amended accordingly, an e-mail was sent out to all lecturing staff. The e-mail had a link which included a letter of information, informed consent and the questionnaire and was sent via the DUT server. No individuals were forced to participate in this study and no remuneration was offered.

## 3.5 PERMISSION

Permission to conduct this research was sought from the DUT Institutional Research Ethics Committee (Appendix 2) and the gatekeeper's permission from the DUT Director of Research (Appendix 1)

## 3.6 SAMPLING

According to Brink *et al*. (2012), a sample is a subsection of a research population which makes up a research sample.

### 3.6.1 Sample Size

There were 685 lecturers employed at DUT when this study was conducted. To reach a suitable sample size for generalisability, a sample size calculation had been performed by a statistician using PASS Software. In an e-mail communication on 14 June 2022, the statistician, Dr Tonya Esterhuizen indicated that, using a 95% confidence interval, a power of 80 and an error margin of 5%, the study required a response rate of 247.

### 3.6.2 Sample Characteristics

**Inclusion criteria**
- Registered lecturers (full-time, part-time and contract) employed at DUT.
- Informed consent that was initialled (Appendix 5).

**Exclusion criteria**
1. Tutors and mentors.
2. Individuals who participated in the pilot study of the research.

### 3.6.3 Sample Strategy

The whole population was invited to participate in the study, and through self-selection, elected to participate, using consecutive sampling. This sampling strategy was chosen for the study as it included recruiting everyone in the accessible population who met the eligibility criteria over a certain period (Polit and Beck, 2012). This was achieved by providing a link to the questionnaire in an e-mail that was sent to lecturing staff. Following the initial e-mail requesting participation, three follow up e-mails were sent, with a three-week interval between each reminder e-mail. The data collection process took three months to complete.

## 3.7 DATA COLLECTION

Data can be collected by means of questionnaires, interviews, observations, or scales (Polit and Beck, 2012). For the purposes of this study, a questionnaire was used.

### 3.7.1 Measurement Tool

The measurement tool utilised for this study was the HARDSHIP questionnaire. This questionnaire is a modular instrument with proven cross-cultural validity, which consists of questions related to demographics, diagnostic questions based on ICHD-3 beta criteria and headache burden related questions (Steiner *et al.*, 2014). The questionnaire was available on the internet for use, but permission was granted by Professor Steiner via e-mail (Appendix 3).

### 3.7.2 Administration of the Tool

The questionnaire was administered electronically by a link and was in English since DUT is an English medium university, therefore all lecturers are proficient in this language. The online survey management system QUESTIONPRO® was used. Online survey tools are useful for academic research as it is easy to design a questionnaire and collect data by sending e-mails to the research participants. All data were secured by TRUSTe and NORTRON for security purposes (Nagalakhmi and Trivedi, 2010).

### 3.7.3 The Hardship Questionnaire

The initial version, with adaptations that have been used in eighteen countries, has not yet been used in a South African context. The evolution of this instrument came from a broad base of expert opinions and has undergone testing in many settings and cultures. This instruments' modular design makes it flexible to adaptation and cultural sensitivities (Steiner *et al.*, 2014).

The HARDSHIP questionnaire, after permission was obtained (Appendix 3), was modified to suit the requirements of this study.

The questionnaire consisted of three sections:

- Section A was related to demographic characteristics, social history, medical history, work related characteristics and COVID 19.
- Section B included headache diagnostic related questions.
- Section C consisted of questions that helped establish the impact headaches had on the lecturers' personal life in terms of work, family and social life.

### 3.7.4 Classification of Headaches

The diagnostic algorithm for headaches according to the diagnostic questions in the HARDSHIP questionnaire was used to classify the headaches (Appendix 8). However, this algorithm did not include cluster-type headaches so diagnostic questions for cluster-type headaches were added to the questionnaire.

## 3.8 VALIDATION OF THE QUESTIONNAIRE

To validate the questionnaire, a focus group and pilot study was done.

### 3.8.1 Focus/Expert Group

A focus group ensured that the participants were able to understand and answer the questionnaire without ambiguity. The purpose of this was to validate the questionnaire. The definition of validity is the extent to which a concept is measured accurately in a quantitative study (Heale and Twycross, 2015) and comprises of four types: content validity, construct validity, criterion validity and face validity. The focus group achieved face validity. Face validity is there to confirm that the content of the test is suitable to the aims (Middleton, 2019). The focus group consisted of five participants and each person received a letter of information (Appendix 4) and informed consent (Appendix 5). Although there were six criteria, five participants were deemed fit as most of the participants met more than one criteria.

**Inclusion criteria:**
The focus group consisted of:

1. The researcher, supervisor and collaborator.
2. A person with experience in survey research.
3. A person familiar with statistical analysis of survey data.
4. At least one person who was a headache sufferer.

5. At least one person who was a lecturer at the Durban University of Technology.
6. At least one person who was medically trained to diagnose headaches.

**Exclusion criteria**

Participants who were unwilling to sign the letter of information and informed consent.

## 3.8.2 Outcome of the Focus Group

The focus group participants engaged in some robust discussion regarding each question, which resulted in some changes to the questionnaire. A selection of questions were excluded, whilst others were narrowed down to make them more specific and understandable. The number of questions was reduced due to the questionnaire taking longer than the expected time. Instructions for each section was changed to 'Choose an appropriate option' instead of 'Place an x where necessary' since the questionnaire was administered online.

For Section A, the following changes were made:

- Under the sub-section "Demographics":
    - The first question changed to "What is your age?" and "What is your sex?" moved to the second question.
    - "What is your marital status?" was added as the last question.
- Under the sub-section "Social History":
    - Two questions were added regarding exercise: "Do you exercise?" and "If yes, how many hours per week do you exercise for?".
- Under the sub-section "Medical History":
    - "In general, how would you describe your general health?" was added.
    - Under the list of medical conditions, two additional boxes were added – sinusitis and hayfever.
- Under the sub-section "Work Related":
    - "You may choose more than one option" was added under the question "Describe the manner in which you have lectured over the last year".
    - "Now that things are slowly getting back to normal, how are you coping?" was added.

**For Section B the following changes were made:**

- Under the sub-section "Screening":
    - "On how many days in the last 3 months did you have a headache?" was reworded to **"**During the last 30 days, on how many of these days did you have a headache?".

- "Have your headaches worsened since COVID-19?" was changed to "Have your headaches worsened during the pandemic?".
- A question about family was added: "Does anyone in your immediate family suffer from similar headaches?".
- The sub-section "Daily headache questions" was removed and the questions that were under that section was moved to screening.
- The following question was added "Please think about your headaches. Do you think they are all of one type or are they of more than one type?".
- The following instruction was added before Diagnostic questions: "If you answered one, the next questions are to diagnose the headache. If you answered more than one, please focus upon the headache type that on the whole bothers you the most".

- Under the sub-section "Diagnostic Questions": "How long would it last if you did not take medication?" was split into two questions to make it easier to understand and answer – one requests the number of hours and the other requests the number of days. For the question "How bad is this type of headache?", an additional option was added (severe).

**For Section C the following changes were made:**

- Under the sub-section "Impact Questions":
    - A question was added "Do you think your headaches have had a negative effect on your mental health?".

### 3.8.3 Pilot study

A pilot study aids in identifying potential barriers to the methodology of a study, so they can be addressed to ensure the success of the larger scale study (Jairath, Hogerney and Parsons 2000). This consisted of four participants. The participants were required to have the same characteristics as those in the main study.

Inclusion criteria

1. Lecturers employed at the Durban University of Technology.
2. Have completed and signed the letter of information and informed consent.

Exclusion criteria

1. Prospective participants that were unwilling to sign the letter of information and informed consent.
2. Persons who attended the focus group.

### 3.8.4 Outcome of the Pilot Study

The following questions were changed/phrased differently after the questionnaire was answered online. An option of <1 hour was added for many questions.

**Section A**

- Under the sub-section "Psychological":
    - "Are you usually highly stressed?" was changed to "How would you describe your stress levels?" with options.
- Under the sub-section "Work Related":
    - More options were provided instead of <2years or >2years.
    - "Did you experience any difficulty working from home?" was changed to "Did you experience any difficulty with the transition to working from home during COVID-19"?

**Section B**

- Under the sub-section "Screening":
    - "Have you ever had a headache?" was changed to "Are you a headache sufferer?".
- Under the sub-section "Diagnostic Questions":
    - "Is your last answer with or without medication?" was changed to "With regards to your last answer, is this when you have taken medication?".
    - -The word "cyclical" was changed to "cycles" and "occurs in a routine pattern" was added.

## 3.9 DATA ANALYSIS

Data analysis involves classifying, collecting, controlling and summarising the information, followed by describing them in significant terms (Brink *et al.*, 2012).

### 3.9.1 Statistical Analysis

The responses from the survey were automatically coded in QUESTIONPRO® and, on completion of the survey, the data were imported into IBM SPSS version 28. Descriptive statistics provide information such as the average age or the number of males or females (Greasley, 2008). Descriptive analysis included counts and frequencies for categorical data and means and standard deviations for interval data. Inferential statistics was used to determine patterns and relationships in the data. Univariate analysis using the chi-square goodness-of-fit-test was used on categorical variables to test if any of the response options were selected significantly more/less compared to others. Pearson's chi-square test or Fisher's

Exact test were used to determine whether a significant relationship existed between risk factors and headache. Binomial tests were applied to questions with only two response options to test whether a significant proportion of respondents selected one of two possible options.

## 3.10 DATA COLLECTION PROCEDURE

Once the study received full ethical approval from the DUT's Institutional Research Ethics Committee (IREC), the questionnaire was sent out to all employed lecturers at DUT via the DUT server. The e-mail included the letter of information and a link to the questionnaire. This questionnaire should have taken between 10-15 minutes to complete. The researchers contact details was provided in the case of respondents experiencing difficulties in completing the questionnaire. Following the initial e-mail requesting participation, two to three follow up e-mails were sent, with a one week interval between each reminder e-mail.

## 3.11 ETHICAL CONSIDERATIONS

To conduct this study, ethical approval from IREC (Appendix 2) was obtained. In addition, Gatekeeper's permission was received prior to the start of the study to access the employees of the institution (Appendix 1). Respondents were required to provide informed consent, after having read the letter of information (Appendix 4), to participate in the study. This is in line with the principle of autonomy which refers to an individual being able to make individual choices with no manipulation of external forces (Christman, 2003).

There are three essential principles of ethics which guide researchers during the research process. This includes beneficence, respect for persons and justice. The principles are based on human rights which need to be secure; the right to autonomy, secrecy and own discretion, confidentiality, fair treatment and to be protected from harm and discomfort (Brink *et a*l., 2012).

**Beneficence**
A compiled report was provided to DUT, where pooled data were referred to, ensuring anonymity of the respondents, to allow the institution to address issues that the study may have revealed. Respondents were not forced to participate in this study and were able to withdraw at any point without fear or harm. In addition, the study provided information regarding headaches in lecturers which will be of use to the medical fraternity, fulfilling the principle of beneficence.

**Respect for persons**

No personal information was on the survey, such as the names of participants, identification details or contact details. All respondents' information was coded to ensure confidentiality and anonymity. Prior to participation, all information about the study was disclosed to respondents in the letter of information and their initials were required on the informed consent form prior to answering the questionnaire. Participation in this study was voluntary with no remuneration.

**Justice**

The study data obtained will be kept for five years in the Department of Chiropractic and thereafter shredded if printed, and if stored digitally, the flash drive will be formatted. There was a fair and equal chance for all potential respondents to participate. There was no exclusion based on ethnicity or gender, which is in keeping with justice, which is the fair, appropriate and equitable treatment of individuals (Varkey, 2021).

## 3.12 CONCLUSION

The study used a quantitative, descriptive cross-sectional design, where 685 lecturers employed at DUT were invited to participate. This included full-time, part-time and contract staff, of which a minimum response rate of 247 was needed. The HARDSHIP questionnaire was administered electronically via QUESTIONPRO®. Respondents had a choice whether or not to participate in this study, and no remuneration was offered. The responses were automatically coded in QUESTIONPRO® and the data was then imported into IBM SPSS version 28.

The next chapter will present the results obtained from the HARDSHIP questionnaire. This will include the prevalence, selected risk factors and burden of headaches in lecturers.

# CHAPTER FOUR RESULTS

## 4.1 INTRODUCTION

This chapter presents the results of the analysis done on the data collected on lecturers via the HARDSHIP questionnaire. This information is presented in the form of graphs and tabulations.

## 4.2 SAMPLE SIZE AND RESPONSE RATE

For this study, a sample size of 247 was required. Since there were 685 registered lecturers at DUT, 685 questionnaires were sent out electronically. Of the 685 questionnaires sent, 332 questionnaires were submitted, however 60 were excluded because they did not answer any questions. A further 17 answered part of the questionnaire but 12 were excluded because they did not fill in the screening question at the start of Section B. The total number of questionnaires retained for the analysis was 255. Since there were 255 respondents who answered the questionnaire fully, a response rate greater than 100% was achieved.

## 4.3 DEMOGRAPHICS

The statistics gathered on age, sex, race and marital status are presented as follows:

### 4.3.1 Age

The mean age of respondents was 45.66 years, with a standard deviation of 9.727, and a range from 24 to 76 years (Table 4.1).

**Table 4.1: Age of respondents**

| Age in years | |
|---|---|
| Mean age | 45.66 |
| Std. deviation | 9.727 |
| Minimum age | 24 |
| Maximum age | 76 |

### 4.3.2 Gender

From the 255 respondents, there were 110 males (43.1%) and 145 females (56.9%). More females have answered the questionnaire (Table 4.2).

**Table 4.2: Gender of respondents**

| Gender | Frequency *n*=255 | Percentage |
|---|---|---|
| Male | 110 | 43.1% |
| Female | 145 | 56.9% |
| Total | 255 | 100% |

### 4.3.3 Race

Black African (*n*=99, 38.8%) comprised the most respondents, with Indian lecturers being the second most common (*n*=92, 36.1%), followed by White respondents (*n*=48, 18.8%), Coloured lecturers (*n*=14, 5.5%), and those who identified as Other (*n*=2, 0.8%) (Table 4.3).

**Table 4.3: Race of respondents**

| Race | Frequency *n* = 255 | Percentage |
|---|---|---|
| Black | 99 | 38.8% |
| White | 48 | 18.8% |
| Indian | 92 | 36.1% |
| Coloured | 14 | 5.5% |
| Other | 2 | 0.8% |
| Total | 255 | 100% |

### 4.3.4 Marital Status

Most of the respondents were married (*n*=168, 65.9%), followed by single respondents (*n*=64, 25.1%), divorcees (*n*=18, 7.1%), widowed respondents (*n*=3, 1.2%) and Other (*n*=2, 0.8%) (Table 4.4).

**Table 4.4: Marital status of respondents**

| Marital status | Frequency *n* = 255 | Percentage |
|---|---|---|
| Single | 64 | 25.1% |
| Married | 168 | 65.9% |
| Divorced | 18 | 7.1% |
| Widow | 3 | 1.2% |
| Other | 2 | 0.8% |
| Total | 255 | 100% |

## 4.4 PREVALENCE OF HEADACHES

Of the total sample (*n*=255), 51.8% (*n*=132) were headache sufferers, whereas the remaining 48.2% (*n*=123) did not experience headaches (Table 4.5).

**Table 4.5: Headache sufferers**

| Headache sufferer | Frequency *n* = 255 | Percentage |
|---|---|---|
| Yes | 132 | 51.8% |
| No | 123 | 48.2% |
| Total | 255 | 100% |

Of the 132 headache sufferers, 97.7% (*n*=129) of respondents had a headache during the last 12 months, and 2.3% (*n*=3) did not answer the question (Table 4.6). The three respondents who did not answer this question did not answer any of the remaining questions. They were retained to address objective 2 – risk factors for headaches but had no input for anything else.

**Table 4.6: Respondents who had a headache during the last 12 months**

| Headache during the last 12 months | Frequency *n* = 132 | Percentage |
|---|---|---|
| Yes | 129 | 97.7% |
| Unanswered | 3 | 2.3% |
| Total | 132 | 100% |

The following questions were calculated using *n*=129 headache sufferers.

## 4.5 SCREENING

This section involved screening to check if a headache disorder was present or not.

Of the 129 headache sufferers, a significant 89.1% ($n$=115) indicated that they sustained headaches between 1–14 days during the last 30 days. There were 10.9% ($n$=14) of lecturers who indicated that they had a headache on more than 15 days in the last 30 days. A large number ($n$=92, 71.3%) reported their headache had worsened during the pandemic, and 103 lecturers (79.8%) indicated that wearing a mask aggravated their headaches. From the 129 respondents, 72.1% ($n$=93) reported that nobody in their family suffered from similar headaches. Most of the lecturers reported taking medication to treat their headaches, and a majority of them, 89.1% ($n$=115), indicated that they took medication on less than nine days in the last 30 days. There were 83 (64.3%) lecturers who complained of their headaches being one type, whereas 46 (35.7%) lecturers complained of their headaches being more than one type (Table 4.7).

Lecturers who chose more than one type of headache were asked to focus on the one that bothered them the most in order to answer the diagnostic questions.
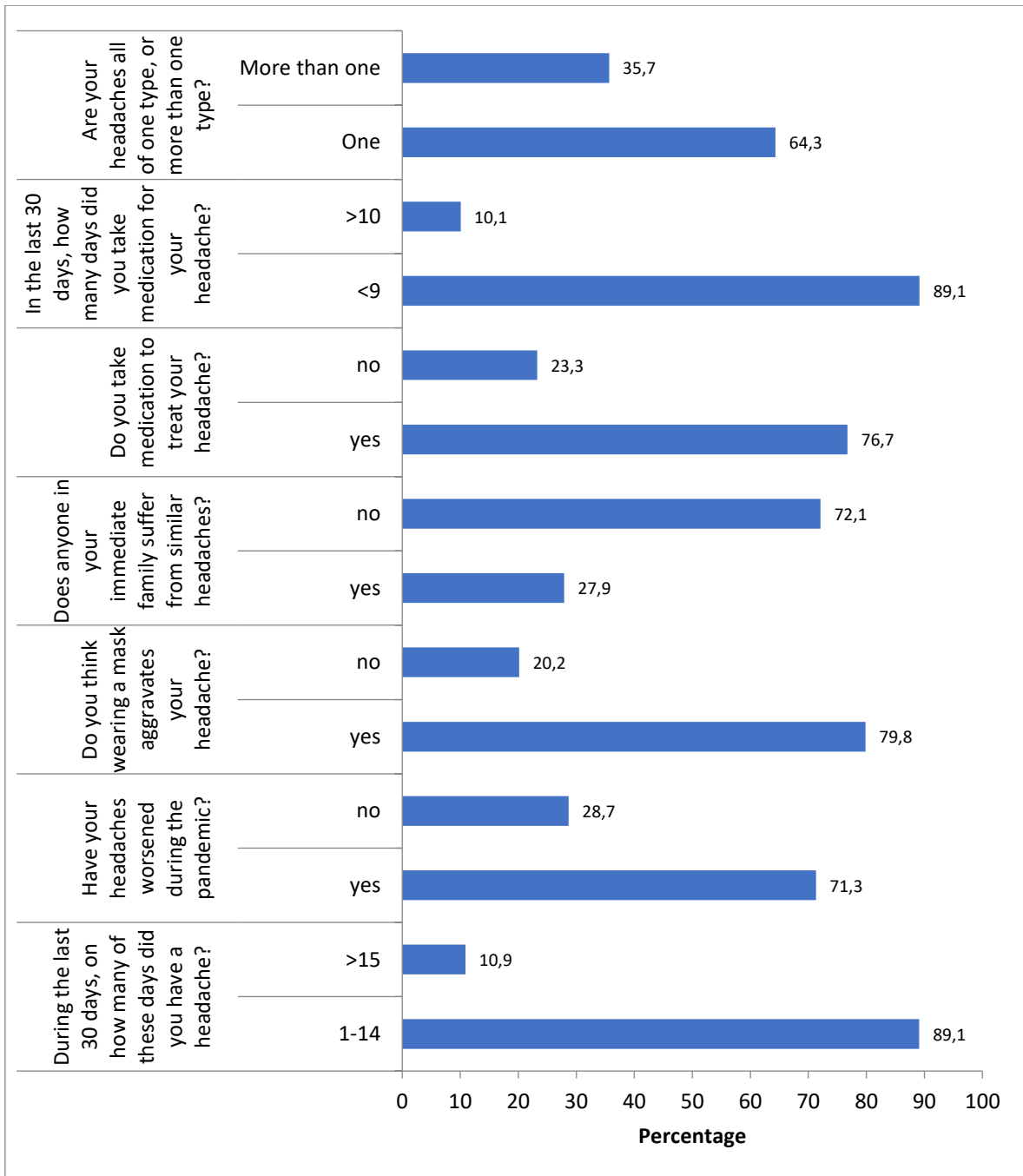
*Figure 4.1: Screening questions and results*

## 4.6 DIAGNOSTIC QUESTIONS

A number of questions were asked in order to diagnose the headaches, and the results are shown in Figure 4.2.

A significant 78.3% (*n*=101) said that their headache usually lasted for hours. Only 13 (10.1%) lecturers indicated that their headache lasted for minutes, and this was the same as those who indicated that their headache lasted for days. There were two (1.6%) respondents who reported that their headache never goes away.

A follow up question determining whether the previous answer was when the respondents had/had not taken medication showed that the question about duration of headache was answered keeping in mind that most (65.9%, $n$=85) of them had taken medication.

There were 63 (48.8%) lecturers who reported that their headache lasted for more than 24 hours when they did not take medication. This was followed by 20 respondents whose headaches lasted between 2–4 hours, with the least number ($n$=6, 4.7%) of respondents indicating that their headache lasted between 12–24 hours.

From the results presented, it is clear that when the respondents had taken medication then most of them reported their headache duration to be hours. However, when they did not take medication, most of them reported that their headache lasted for more than a day.
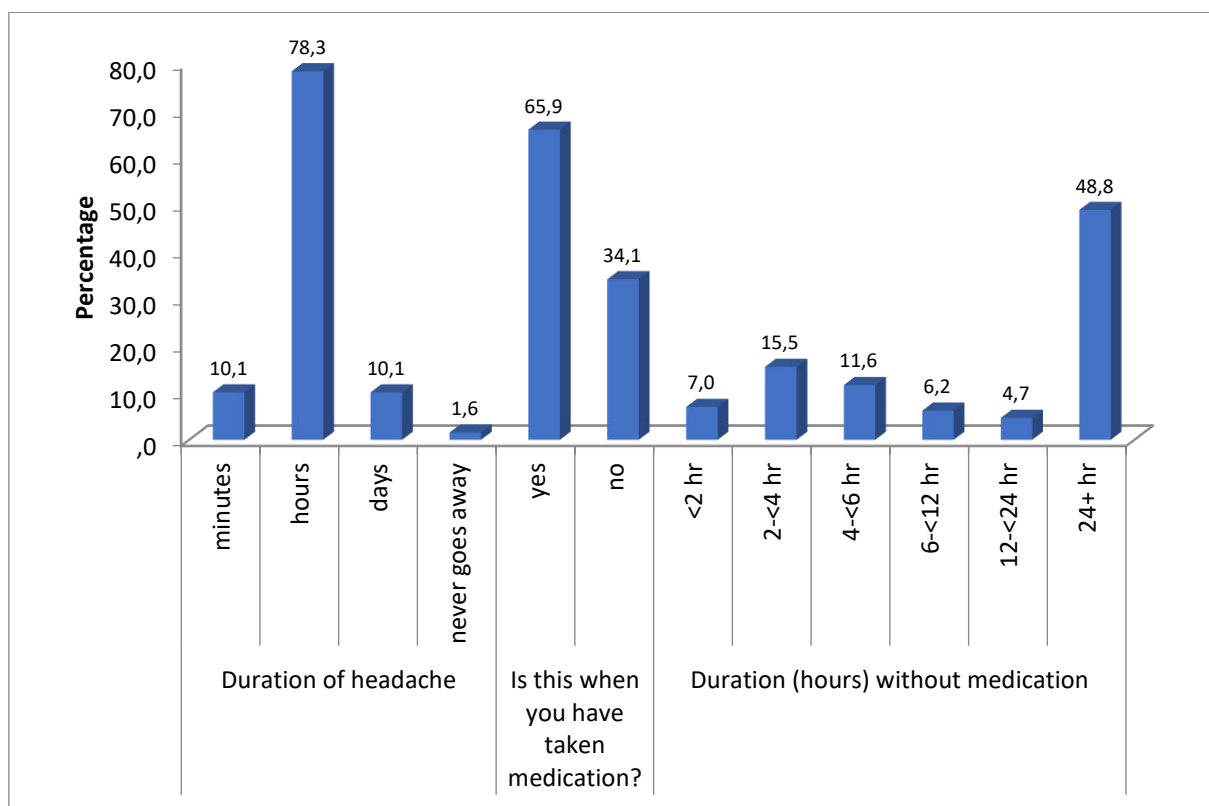


*Figure 4.2: The relationship between the duration of headache and medication*

A significant majority (69%, $n$=89) indicated that their headaches were moderate, followed by 33 (25.6%), who indicated they were severe; six (4.7%) reported their headaches to be mild and only 1 (0.8%) reported them to be extremely severe.
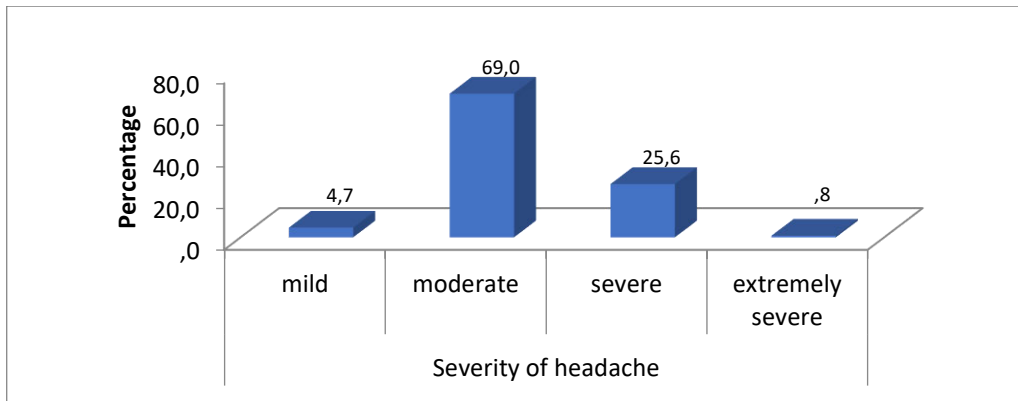
*Figure 4.3: Severity of headache*

Since the questionnaire used did not include cluster related questions, the next three questions were added to diagnose CTH. Figures 4.4 – 4.6 show the results for the specific cluster related headache questions asked.

Just under three quarters of respondents ($n$=94, 72.9%) did not experience the cluster headache symptoms listed previously. The rest of them (27.1%, $n$=35) did experience the cluster related symptoms, which included their eye turning red on one side, watering on one side, a running and congested nose on one side.
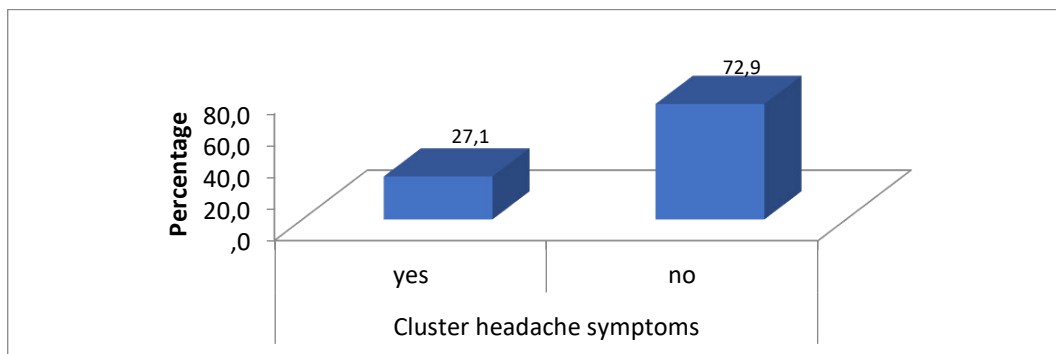


*Figure 4.4: Cluster-type headache question*

Of the 129 headache sufferers, 99 (76.7%) respondents did not experience their headaches in cycles. The remaining respondents (23.3%, $n$=30) did experience cyclical headaches.
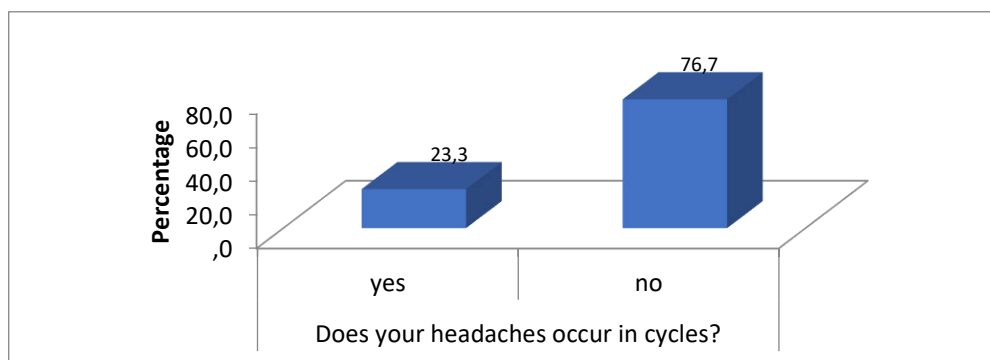


*Figure 4.5: Cluster-type headache question*

Most of the respondents (58.1%, $n$=75) did not experience pain in, behind, or around the eye.
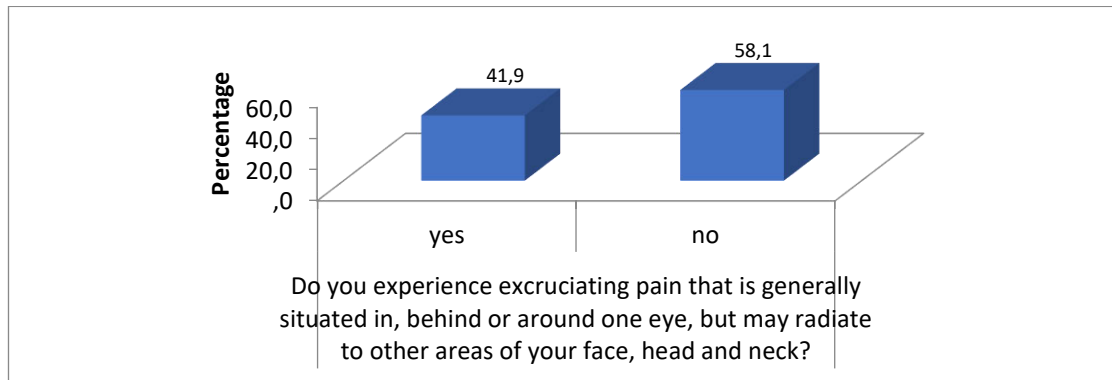


*Figure 4.6: Cluster-type headache question*

A little over half of the respondents ($n$=72, 55.8%) described their headache as being throbbing or pulsating, whilst 44.2% ($n$=57) described their headache as being pressing, squeezing or tightening.
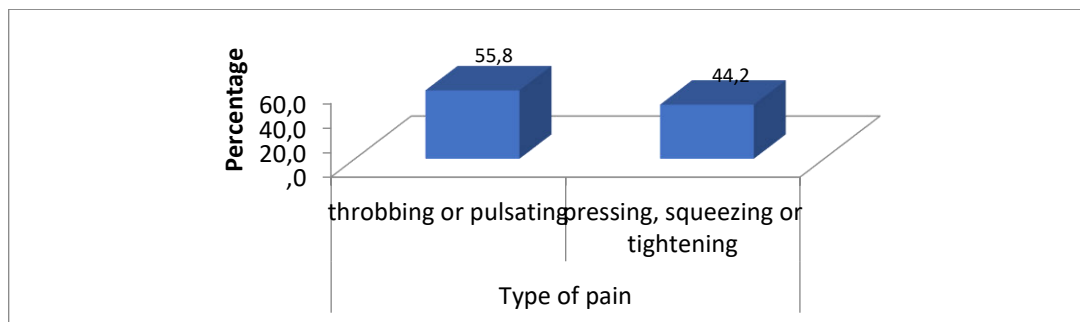


*Figure 4.7: Type of pain*

Of the 129 respondents, 51.9% ($n$=67) had unilateral headaches and 48.1% ($n$=62) had bilateral headaches. More than half of the respondents, 59.7% ($n$=77) said that exercise did not make their headaches worse.

A significant majority of 68.2% ($n$=88) usually did not feel nauseated and 93.8% ($n$=121) did not vomit during their headache episodes.

A total of 66 respondents (51.2%, $n$=66) reported that light bothers them, and 53.5% ($n$=69) reported that noise bothers them.
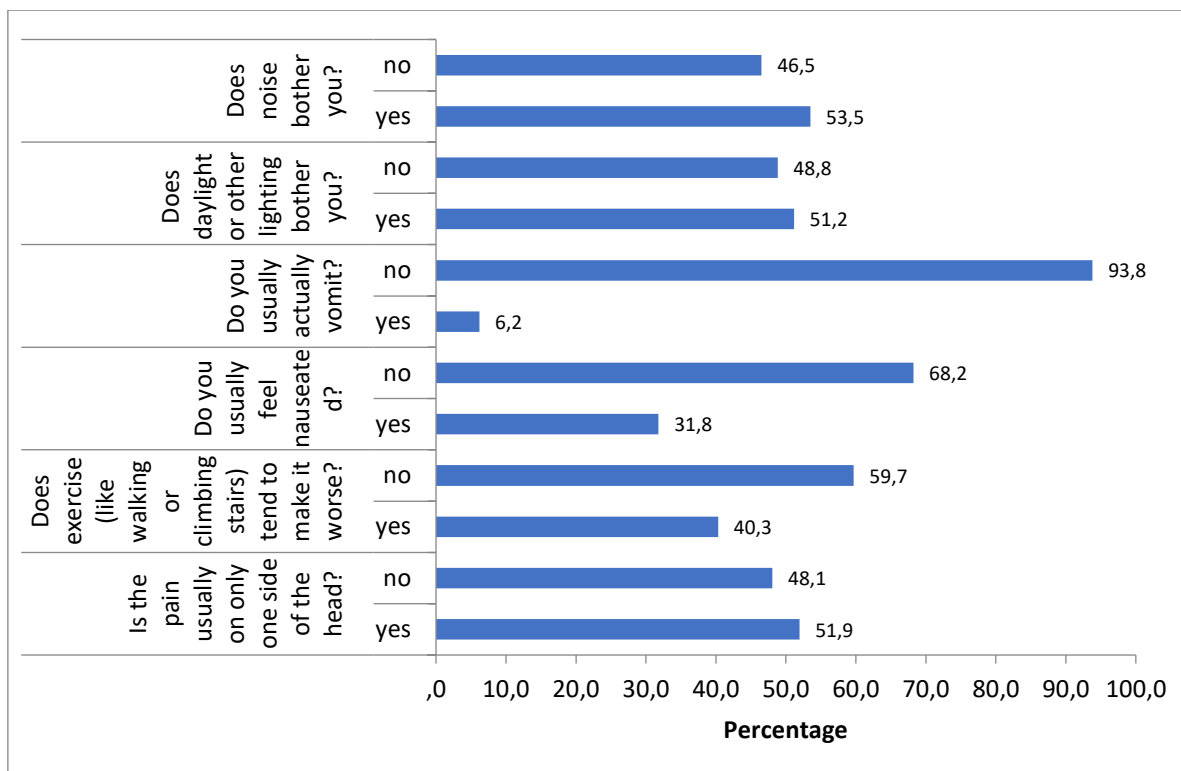
*Figure 4.8: Type of pain*

**Diagnosis according to the HARDSHIP questionnaire algorithm**

Of the 129 respondents experiencing headaches, there were more probable tension type headaches (TTH) (41.9%, $n$=54), followed by migraine type headaches (MTH) (27.9%, $n$=36) (Table 4.7).

**Table 4.7: Diagnosis of headaches**

| Headache during the last 12 months | Frequency $n$ = 132 | Percentage |
|---|---|---|
| Yes | 129 | 97.7% |
| Unanswered | 3 | 2.3% |
| Total | 132 | 100% |

# 4.7 IMPACT ON LIFE

These questions pertain to the same respondents ($n$=129) as those included in the prior analysis.

A significant majority (80.6%, $n$=104) said that their headache interfered with work, and most of the respondents (76.0%, $n$=98) avoided telling people that they had headaches.

A vast majority also reported that their headaches have never caused a long-term relationship/partnership to break down; this accounted for 91.5%, *n*=118.

Many of the respondents (73.6%, *n*=95) indicated that their headache has a negative effect on their mental health.
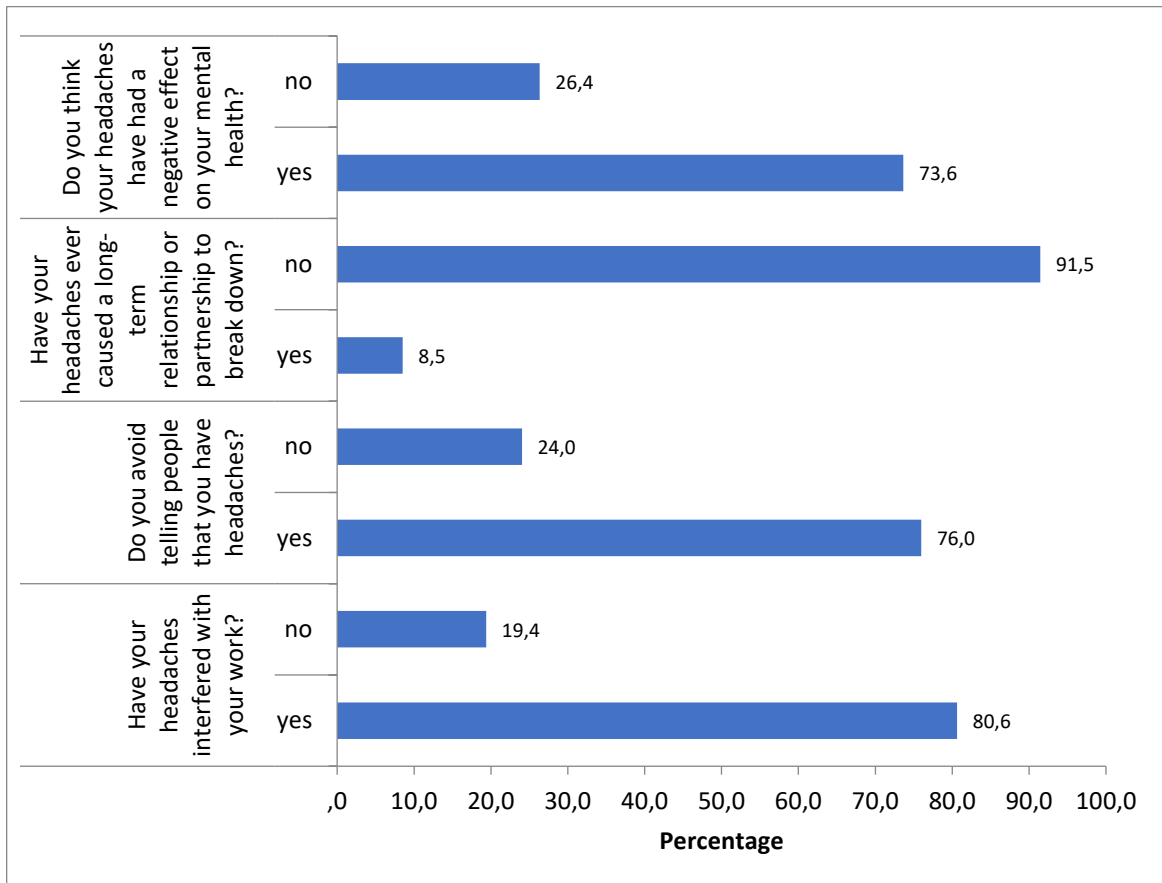


***Figure 4.9: The impact of headaches***

The majority of the respondents (55.8%, *n*=72) did not miss work due to their headache, whereas a majority (57.4%, *n*=74) of respondents missed family/leisure activities between 1–14 days in the last three months.
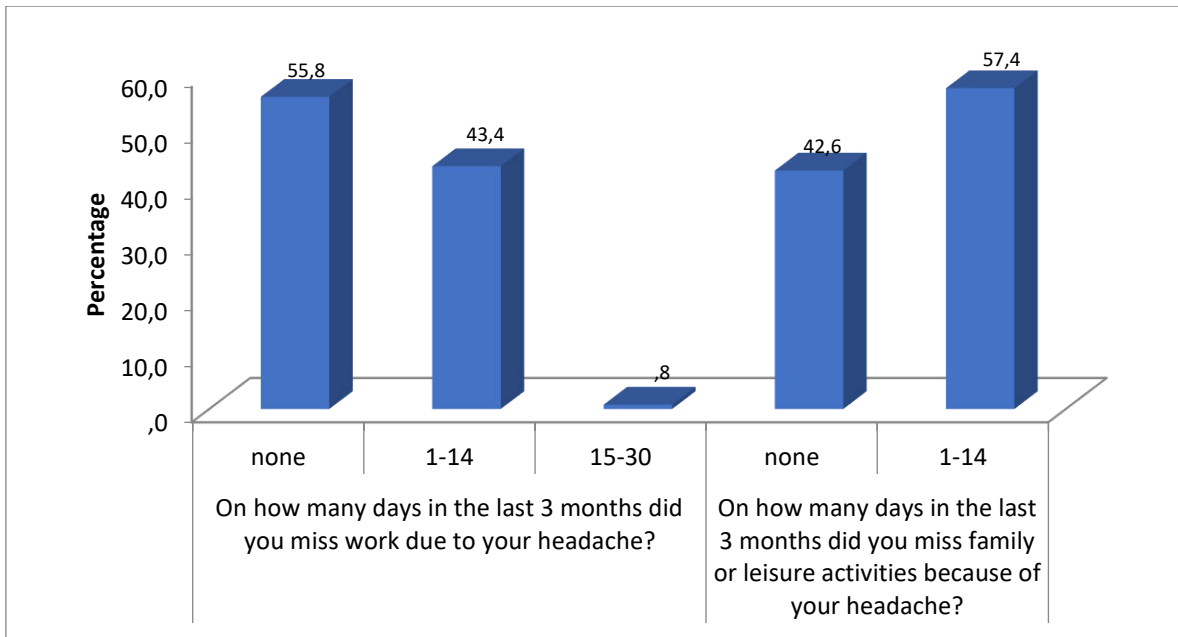
*Figure 4.10: Missed workdays/family activities due to headaches*

Of 129 respondents, most of the respondents (54.3%, *n*=70) said that their family and friends partly understand and accept their headaches. This was followed by those who answered no (26.4%, *n*=34) and (19.4%, *n*=25) felt that their headaches are fully understood and accepted by family and friends.
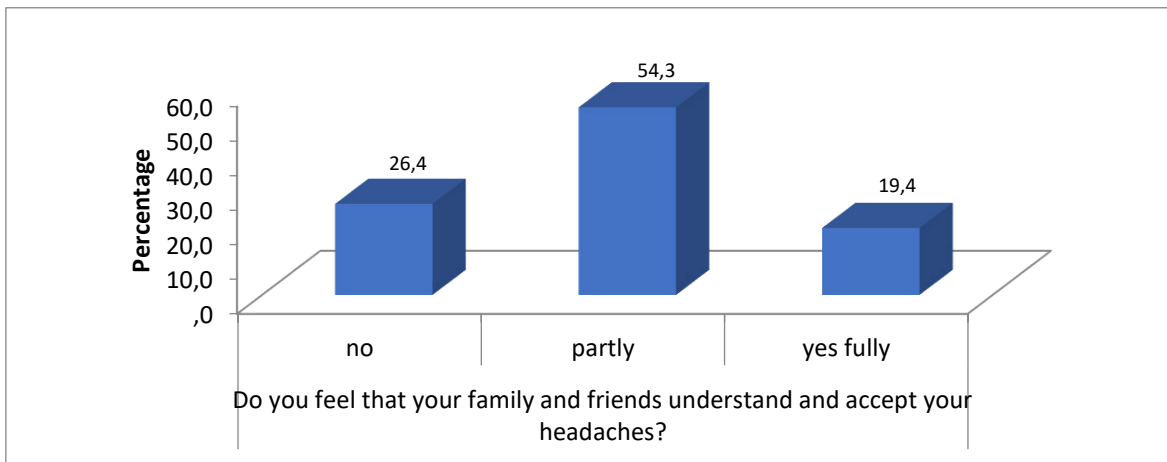


*Figure 4.11: Missed workdays/family activities due to headaches*

A significant majority (81.4%, *n*=105) said that they take medication when they have a headache at work. The other respondents had stated that they would go home when they had a headache (6.2%, *n*=8).

When asked what the respondents do when they have a headache at home, the majority (39.5%, *n*=55) said they would take medication, followed by sleeping (34.1%, *n*=44), and others said they would lie down (23.3%, *n*=30).

It can be concluded that the vast majority take medication when at work or at home.
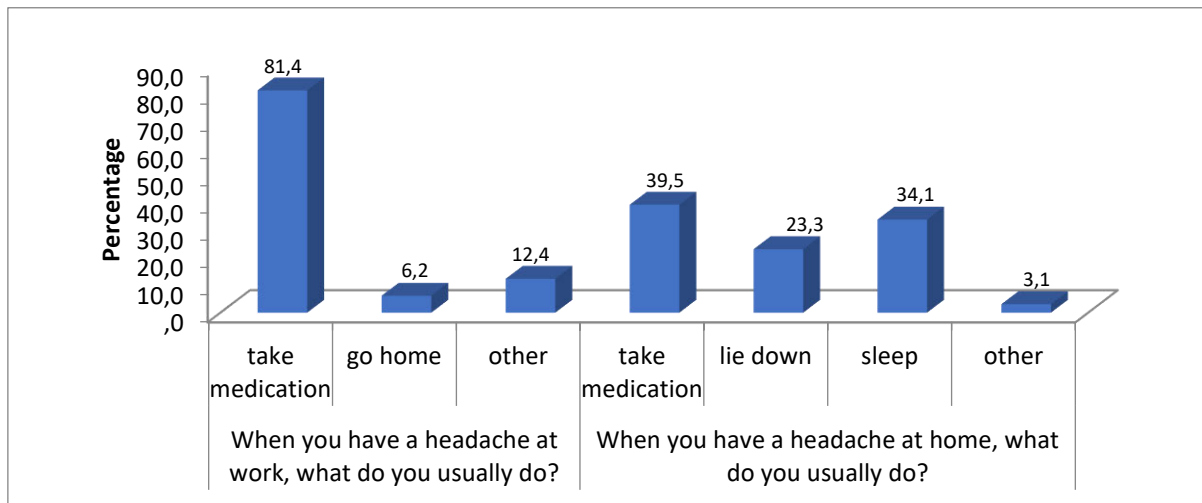


*Figure 4.12: Relieving a headache at home VS at work*

## 4.8 SELECTED RISK FACTORS

The selected risk factors include the results from the social, medical, psychological, work-related and COVID-19 related risk factors. The total sample (*n*=255) answered the questions on risk factors.

### 4.8.1 Social History Results

There was no significant relationship between smoking and headaches, but there was a greater amount of headache sufferers who smoked daily, compared to smoking weekly or occasionally. There was a significant relationship between how much alcohol they drank and the headaches; having 7–9 units of alcohol a week was significantly related to suffering from headaches.

Compared to those who did not have headaches, a significant number of those who had headaches only had on average 1–4 hours of sleep a night.

Not doing exercise was related to having headaches, and those who exercised for the least number of hours (1–4) had shown a greater percentage of headache sufferers (Table 4.8).

**Table 4.8: Social risk factors**

| Item | Response categories | Responses as Frequency (%) | | $X^2$ | df | p-value |
|------|---------------------|-------------------|-------------------|-------|-----|---------|
| | | Headache YES | Headache NO | | | |
| Do you smoke? | Yes (*n*=40) | 24 (60.0) | 16 (40.0) | 1.289 | 1 | .256 |
| | No (*n*=215) | 108 (50.2) | 107 (49.8) | | | |
| How often do you smoke? | Daily (*n*=30) | 17 (56.7) | 13 (43.3) | .661# | | .856 |
| | Weekly (*n*=7) | 5 (71.4) | 2 (28.6) | | | |
| | Occasionally (*n*=3) | 2 (66.7) | 1 (33.3) | | | |
| Do you drink alcohol? | Yes (*n*=95) | 47 (49.5) | 48 (50.5) | .318 | 1 | .573 |
| | No (*n*=160) | 85 (53.1) | 75 (46.9) | | | |
| How many units do you drink per week? | 1 – 3 (*n*=63) | 36 (57.1) | 27 (42.9) | 14.763# | | .001* |
| | 4 – 6 (*n*=24) | 6 (25.0) | 18 (75.0) | | | |
| | 7 – 9 (*n*=5) | 5 (100) | 0 (0) | | | |
| | 10+ (*n*=3) | 0 (0) | 3 (100) | | | |
| Do you usually eat three meals a day? | Yes (*n*=152) | 78 (51.3) | 74 (48.7) | .030 | 1 | .862 |
| | No (*n*=103) | 54 (52.4) | 49 (47.6) | | | |
| On average, how many hours of sleep do you get per night? | 1 – 4 (*n*=37) | 25 (67.6) | 12 (32.4) | 5.213# | | .050* |
| | 5 – 9 (*n*=217) | 107 (49.3) | 110 (50.7) | | | |
| | 10+ (*n*=1) | 0 (0) | 1 (100) | | | |
| Do you exercise? | Yes (*n*=139) | 57 (41.0) | 82 (59.0) | 14.162 | 1 | <.001* |
| | No (*n*=116) | 75 (64.7) | 41 (35.3) | | | |
| For how many hours per week do you exercise? | 1 – 4 (*n*=106) | 46 (43.4) | 60 (56.6) | 1.238# | | .568 |
| | 5 – 9 (*n*=25) | 9 (36.0) | 16 (64.0) | | | |
| | 10+ (*n*=8) | 2 (25.0) | 6 (75.0) | | | |

**Table 4.9: Medical risk factors**

| Item | Response categories | Responses as Frequency (%) | | X² | df | p-value |
|---|---|---|---|---|---|---|
| | | Headache YES | Headache NO | | | |
| Have you had a head injury in the last 3 months? | Yes (*n*=11) | 6 (54.5) | 5 (45.5) | .036 | 1 | .850 |
| | No (*n*=244) | 126 (51.6) | 118 (48.4) | | | |
| Do you wear glasses? | Yes (*n*=166) | 100 (60.2) | 66 (39.8) | 13.686 | 1 | .000 |
| | No (*n*=89) | 32 (36.0) | 57 (64.0) | | | |
| How would you describe your health? | Excellent (*n*=27) | 5 (18.5) | 22 (81.5) | 27.241 | 1 | .000 |
| | Very good (*n*=62) | 24 (38.7) | 38 (61.3) | | | |
| | Good (*n*=149) | 96 (64.4) | 53 (35.6) | | | |
| | Fair (*n*=16) | 7 (43.8) | 9 (56.3) | | | |
| | Poor (*n*=1) | 0 (0) | 1 (100) | | | |
| High blood pressure | 0 (*n*=195) | 101 (51.8) | 94 (48.2) | .000 | 1 | .986 |
| | Yes (*n*=60) | 31 (51.7) | 29 (48.3) | | | |
| Low blood pressure | 0 (*n*=242) | 123 (50.8) | 119 (49.2) | 1.674 | 1 | .196 |
| | Yes (*n*=13) | 9 (69.2) | 4 (30.8) | | | |
| Diabetes | 0 (*n*=230) | 123 (53.5) | 107 (46.5) | 2.759 | 1 | .097 |
| | Yes (*n*=25) | 9 (36.0) | 16 (64.0) | | | |
| Cerebral stroke | 0 (*n*=255) | 132 (51.8) | 123 (48.2) | | | |
| Anaemia | 0 (*n*=235) | 119 (50.6) | 116 (49.4) | 1.523 | 1 | .217 |
| | Yes (*n*=20) | 13 (65.0) | 7 (35.0) | | | |
| Thyroid Disease | 0 (*n*=251) | 131 (52.2) | 120 (47.8) | 1.166 | 1 | .280 |
| | Yes (*n*=4) | 1 (25.0) | 3 (75.0) | | | |
| Cancer | 0 (*n*=253) | 130 (51.4) | 123 (48.6) | 1.878 | 1 | .171 |
| | Yes (*n*=2) | 2 (100) | 0 (0) | | | |
| Seizures | 0 (*n*=253) | 132 (52.2) | 121 (47.8) | 2.163 | 1 | .141 |
| | Yes (*n*=2) | 0 (0) | 2 (100) | | | |
| Sinusitis | 0 (*n*=225) | 110 (48.9) | 115 (51.1) | 6.335 | 1 | .012 |
| | Yes (*n*=30) | 22 (73.3) | 8 (26.7) | | | |
| Hayfever | 0 (*n*=237) | 120 (50.6) | 117 (49.4) | 1.722 | 1 | .189 |
| | Yes (*n*=18) | 12 (66.7) | 6 (33.3) | | | |

## 4.8.2 Medical History Results

Of those who had a head injury in the last three months, 54.5% (*n*=6) complained of headaches.

Wearing glasses was significantly associated with headaches, as 60.2% (*n*=100) who wore glasses were headache sufferers.

There was a significant association with general health and headaches; most of the respondents indicated their general health as "good" and 64.4% (*n*=96) of this sample were headache sufferers.

### 4.8.2.1 Chronic illnesses

- High blood pressure – of the 60 respondents who reported high blood pressure, 31 (51.5%) respondents reported headaches as well.
- Low blood pressure – 13 respondents reported having low blood pressure, of which nine (69.2%) respondents reported headaches as well.
- There seemed to be an association between both high blood pressure and headaches, and low blood pressure and headaches.
- Anemia – of the 20 respondents who reported anemia, 13 (65.0%) reported headaches.
- Sinusitis was strongly associated with headaches, as 73.3% (*n*=22) who reported sinusitis reported headaches.
- Hayfever - of the 18 respondents who reported hayfever, 12 (66.7%) reported headaches.

## 4.8.3 Psychological Results

Of the total sample (*n*=255), the majority of the respondents reported their stress levels as moderate, followed by high stress levels.

Of the 162 respondents who reported their stress levels as moderate, 93 (57.4%) had headaches.

Of the 45 respondents who reported high stress levels, 28 (62.2%) had headaches.

There was a link between depression and headaches: 33 (12.9%) respondents were diagnosed with depression and of the 33 respondents, 18 (54.5%) were headache sufferers.

There was a link between anxiety and headaches, 39 (15.3%) respondents were diagnosed with anxiety and of the 39 respondents, 23 (59.0%) were headache sufferers.

**Table 4.10: Psychological risk factors**

| Item | Response categories | Responses as Frequency (%) | | $X^2$ | df | p-value |
|---|---|---|---|---|---|---|
| | | Headache YES | Headache NO | | | |
| How would you rate your stress levels? | High (*n*=45) | 28 (62.2) | 17 (37.8) | 23.200 # | | .000 |
| | Moderate (*n*=162) | 93 (57.4) | 69 (42.6) | | | |
| | Mild (*n*=39) | 11 (28.2) | 28 (71.8) | | | |
| | None (*n*=9) | 0 (0) | 9 (100) | | | |
| Have you been diagnosed with depression? | Yes (*n*=33) | 18 (54.5) | 15 (45.5) | .117 | 1 | .732 |
| | No (*n*=222) | 114 (51.4) | 108 (48.6) | | | |
| Have you been diagnosed with anxiety? | Yes (*n*=39) | 23 (59.0) | 16 (41.0) | .958 | 1 | .328 |
| | No (*n*=216) | 109 (50.5) | 107 (49.5) | | | |

**Table 4.11: Work-related risk factors**

| Item | Response categories | Responses as Frequency (%) | | X² | df | p-value |
|---|---|---|---|---|---|---|
| | | **Headache YES** | **Headache NO** | | | |
| How long have you been a lecturer? | 0-3 years (*n*=29) | 14 (48.3) | 15 (51.7) | 1.207 # | | .764 |
| | 4-8 years (*n*=74) | 42 (56.8) | 32 (43.2) | | | |
| | 9-13 years (*n*=54) | 26 (48.1) | 28 (51.9) | | | |
| | + 14 years (*n*=98) | 50 (51.0) | 48 (49.0) | | | |
| Nature of the lecturing appointment | Full-time (*n*=227) | 118 (52.0) | 109 (48.0) | .766# | | .700 |
| | Part-time (*n*=8) | 3 (37.5) | 5 (62.5) | | | |
| | Contract (*n*=20) | 11 (55.0) | 9 (45.0) | | | |
| How many days per week do you lecture? | 1-3 (*n*=89) | 38 (42.7) | 51 (57.3) | 4.608 # | | .104 |
| | 4-5 (*n*=158) | 89 (56.3) | 69 (43.7) | | | |
| | 6 – 7 (*n*=8) | 5 (62.5) | 3 (37.5) | | | |
| How many hours do you lecture per week? | < 1 (*n*=16) | 7 (43.8) | 9 (56.3) | .480 # | | .827 |
| | 1-3 (*n*=177) | 93 (52.5) | 84 (47.5) | | | |
| | > 4 (*n*=62) | 32 (51.6) | 30 (48.4) | | | |
| Online lectures | Yes (*n*=231) | 119 (51.5) | 112 (48.5) | | | |
| Face to face theory lectures | Yes (*n*=91) | 37 (40.7) | 54 (59.3) | | | |
| Face to face practical lectures | Yes (*n*=63) | 31 (49.2) | 32 (50.8) | | | |
| Line manager support | Yes (*n*=144) | 54 (37.5) | 90 (62.5) | 26.959 | 1 | .000 |
| | No (*n*=111) | 78 (70.3) | 33 (29.7) | | | |
| Are you working remotely, on campus or both? | Remotely (*n*=11) | 2 (18.2) | 9 (81.8) | 5.776 # | | .051 |
| | On campus (*n*=94) | 47 (50.0) | 47 (50.0) | | | |
| | Both (*n*=150) | 83 (55.3) | 67 (44.7) | | | |
| Did you experience any difficulty with the transition? | Yes (*n*=151) | 104 (68.9) | 47 (31.1) | 43.407 | 1 | .000 |
| | No (*n*=104) | 28 (26.9) | 76 (73.1) | | | |
| Now that things are slowly getting back to normal, how are you coping? | Well (*n*=108) | 35 (32.4) | 73 (67.6) | 32.561 # | | .000 |
| | Moderately (*n*=140) | 95 (67.9) | 45 (32.1) | | | |
| | Not well (*n*=7) | 2 ( 28.6) | 5 (71.4) | | | |
| How many hours do you spend sitting at a desk per day? | < 1 (*n*=4) | 0 (0) | 4 (100) | 4.662# | | .197 |
| | 1 - 4 (*n*=110) | 58 (52.7) | 52 (47.3) | | | |
| | 5 – 9 (*n*=127) | 68 (53.5) | 59 (46.5) | | | |
| | > 10 (*n*=14) | 6 (42.9) | 8 (57.1) | | | |
| Do you work at a desk when working from home? | Yes (*n*=167) | 77 (46.1) | 90 (53.9) | 6.202 | 1 | .013 |
| | No (*n*=88) | 55 (62.5) | 33 (37.5) | | | |
| Is your chair comfortable? | Yes (*n*=203) | 105 (51.7) | 98 (48.3) | .001 | 1 | .980 |
| | No (*n*=52) | 27 (51.9) | 25 (48.1) | | | |
| Is your laptop/computer screen at the same level as your eyes? | Yes (*n*=101) | 31 (30.7) | 70 (69.3) | 29.740 | 1 | .000 |
| | No (*n*=154) | 101 (65.6) | 53 (34.4) | | | |
| How many hours do you spend using a computer/laptop per day? | < 1 (*n*=4) | 2 (50) | 2 (50) | 8.871 # | | .023* |
| | 1 – 4 (*n*=65) | 27 (41.5) | 38 (58.5) | | | |
| | 5 – 9 (*n*=158) | 93 (58.9) | 65 (41.1) | | | |
| | > 10 (*n*=28) | 10 (35.7) | 18 (64.3) | | | |
| How many hours do you spend using a phone per day? | < 1 (*n*=38) | 10 (26.3) | 28 (73.7) | 26.036 | 3 | .000 |
| | 1 – 4 (*n*=100) | 44 (44.0) | 56 (56.0) | | | |
| | 5 – 9 (*n*=93) | 58 (62.4) | 35 (37.6) | | | |
| | > 10 (*n*=24) | 20 (83.3) | 4 (16.7) | | | |
| Does your work interfere with family/leisure time? | Often (*n*=53) | 22 (41.5) | 31 (58.5) | 25.997 | 2 | .000 |
| | Sometimes (*n*=181) | 109 (60.2) | 72 (39.8) | | | |
| | Never (*n*=21) | 1 (4.8) | 20 (95.2) | | | |

## 4.8.4 Work-Related Risk Factors

Of the total sample (*n*=255), most of the lecturers had lectured for more than14 years and most of them were full-time staff. The work-related factors are seen in Table 4.11.

Of the 255 lecturers, more than half (*n*=158, 61.9%) reported lecturing 4–5 days per week. Of these, 56.3% (*n*=89) suffered with headache. When asked about the amount of time spent lecturing, 177 (69.4%) lecturers reported lecturing 1–3 hours a day, of which 52.5% (*n*=93) reported headaches.

A majority of lecturers (90.6%, *n*=231) reported being involved in online lecturing, with 51.5% (*n*=119) being headache sufferers.

There was a significant relationship between line manager support and headaches. Of the 144 lecturers who had support, 90 (69.5%) respondents did not experience headaches. Of the 111 who did not have support, 78 (70.3%) respondents experienced headaches.

Most of the lecturers (*n*=150) reported working both remotely and on campus, and 55.3% (*n*=83) of them reported headaches.

A significant relationship between WFH and headaches were reported, as there were 151 respondents who indicated that they experienced difficulty with the transition, of which 68.9% (*n*=104) reported headaches. There were 40.8% (*n*=104) of lecturers who did not experience difficulty and 73.1% (*n*=76) did not experience headaches.

There was a significant association between coping and headaches, since of the respondents who indicated that they were coping well, 67.6% (*n*=73) did not experience headaches. However, 67.9% (*n*=95) who were coping moderately experienced headaches.

Most of the respondents (49.8%; *n*=127) indicated that they sat at a desk between 5-9 hours, of which 53.5% (*n*=68) had headaches.

A significant association between working at a desk and headaches were reported, as majority of those who worked at a desk when WFH did not have headaches (53.9%, *n*=90), and 62.5% (*n*=55) of respondents who did not work at a desk when WFH had headaches.

There was a significant association between the laptop/computer screen level and headaches; of those who reported that their laptop/computer screen is at the same level as their eyes, 69.3% (*n*=70) were not headache sufferers. From the lecturers who indicated that it was not at the same level, 65.6% (*n*=101) reported headaches.

A significant relationship existed between the duration of laptop/computer usage and headaches, as using a laptop/computer for 5–9 hours per day was strongly related to suffering from headaches (58.9%, *n*=93)

There was a significant relationship between the duration of phone usage and headaches: of those who used a phone for 5-9 hours per day, 62.4% ($n$=58) reported headaches. Those who used a phone for >10 hours per day reported 83.3% ($n$=20) of headache sufferers.

A significant association between work interfering with family/leisure time and headaches were revealed since those who reported that work never interferes with family/leisure time, 95.2% ($n$=20) did not have headaches. Those who indicated that work sometimes interferes with family/leisure time, 60.2% ($n$=109) had headaches.

### 4.8.5 COVID-19 Related Risk Factors

There was a significant relationship between COVID-19 testing and headaches. The majority of the respondents who tested positive for COVID-19 were headache sufferers: 63 (64.9%) of 97 respondents had tested positive and reported headaches. The majority of those who did not test positive were not headache sufferers, 89 (56.3%) of 158 did not test positive and did not report headaches.

There was a significant difference between experiencing loneliness during the lockdown and headaches. There were 123 respondents who reported loneliness and 69.1% ($n$=85) reported headaches, whereas there were 132 respondents who did not report loneliness and 64.4% ($n$=85) did not experience headaches.

A vast majority of indicated that their workload increased during the pandemic, of those respondents 116 (55.8%) reported headaches.

**Table 4.12: COVID-19 related risk factors**

| Item | Response categories | Responses as Frequency (%) | | $X^2$ | df | p-value |
|------|---------------------|------------------|------------------|-------|-----|---------|
| | | Headache YES | Headache NO | | | |
| Have you ever tested positive for COVID-19? | Yes ($n$=97) | 63 (64.9) | 34 (35.1) | 10.898 | 1 | .001 |
| | No ($n$=158) | 69 (43.7) | 89 (56.3) | | | |
| Did you ever experience feelings of loneliness during the lockdown? | Yes ($n$=123) | 85 (69.1) | 38 (30.9) | 28.617 | 1 | .000 |
| | No ($n$=132) | 47 (35.6) | 85 (64.4) | | | |
| Has your workload increased during COVID-19? | Yes ($n$=208) | 116 (55.8) | 92 (44.2) | 7.248 | 1 | .007 |
| | No ($n$=47) | 16 (34.0) | 31 (66.0) | | | |

## 4.9 CONCLUSION

Approximately half of those sampled in this study were headache sufferers, and a significant number of lecturers reported headaches between 1–14 days in the last 30 days. A TTH was the most common, followed by MTHs. Of the questions about social history, the risk factors

which were significantly related to headaches included alcohol, lack of sleep and lack of exercise. According to the medical-related questions, wearing glasses, those who described their general health as good, and sinusitis, had a significant relationship with headaches.

Not having line manager support, transitioning to WFH, coping at work, working at a desk when at home, screen being at eye level, duration of using a computer/laptop and phone and work interfering with family/leisure time were all said to have been significantly related with headaches.

From the COVID-19 related risk factors, feelings of loneliness during the lockdown had a significant relationship with headaches. Upon impact questions, it was revealed by most respondents that headaches affect their work and mental health.

The next chapter will present an interpretation, discussion and summary of findings and guidelines.

# CHAPTER FIVE DISCUSSION

In this chapter, the significant findings from the results in the previous chapter are discussed and will be compared to studies of a similar nature. This includes the prevalence, selected risk factors and burden of primary headaches.

## 5.1 DEMOGRAPHIC FACTORS

### 5.1.1 Age

The mean age of respondents was 45.66 years with a standard deviation of 9.727 and a range from 24–76 years (Table 4.1). This study showed no relationship between age and headaches.

Contrary to that, Molarius, Tegelberg and Ohrvik (2008) revealed that headaches were more common in individuals between 22–55 years. According to Radtke (2009), headaches in a German population increased with age until 50, and declined thereafter. A study on the adult population in Jordan revealed that the age groups of 18–29 and 30–39 (82.3%) had the highest headache sufferers, followed by those who were 50 years and older (81.7%) (Alzoubi *et al.* 2009). Headaches were said to reduce in individuals older than 65 (Ruiz *et al.*, 2014). According to Straube and Andreou (2019), primary headaches usually start around five years old and are most common around 20–40 years, thereafter declining with older age.

### 5.1.2 Sex

Gender was shown to be significantly related to headaches. Of the 132 headache sufferers, 63.4% were females and 36.4% were males. Females were more prone to headaches, whereas males were more likely to not suffer from headaches, as 63.6% were not headache sufferers.

There are studies in support of the statement which show that there were more female headache sufferers compared to male sufferers (Molarius, Tegelberg and Ohrvik, 2008; Radtke, 2009; Yu *et al.* 2012; Mengistu and Alemayehu 2013).

According to Chowdhury (2012), TTH is not gender inclined. However, a study done in the Turkish population revealed that TTH was more common in females with the male: female ratio being 1: 6 respectively (Bayraktutan *et al.*, 2014).

MTH is three times more common in females than males (GBD, 2018), and periodic fluctuations of oestrogen levels during a female's ovarian cycle makes them more prone to migraines (Vetvik and MacGregor, 2017; Delaruelle *et al.*, 2018).

CTH was considered a male disorder, but in recent times this has been described more frequently in females (Allena *et al.*, 2019).

### 5.1.3 Race

Of 255 respondents, the most common race was Black (38.8%), followed by Indian (36.1%), White (18.1%), Coloured (5.5%) and Other (0.8%) (Table 4.3). In this study, there was no significant relationship between race and headache, but of the 48 Whites who answered the questionnaire, 64.6% were headache sufferers compared to 35.4% who were not headache sufferers.

In contrast, a study conducted in Ohio found that headaches were more common and of a more severe nature in the Black populace when compared to Whites (Heckman, Merrill and Anderson, 2013). According to Loder, Sheikh and Loder (2015), MTH in the United States is most common in Native Americans (17.7%), followed by Whites (15.5%), Hispanics (14.5%), Blacks (14.45) and then Asians (9.2%).

### 5.1.4 Marital Status

This study showed a significant relationship between marital status and headaches. Of the 64 single respondents, 62.5% did not have headaches, but of the 168 married respondents 59.5% were headache sufferers. Those who were married were more prone to headaches.

This finding was consistent with other studies. A study conducted among medical staff in South China revealed a higher prevalence of MTH in married women compare to unmarried women (Xie *et al.*, 2020). In an earlier study, having migraines daily appeared to be due to marital stress (Featherstone and Beitman, 1984). A study conducted on 500 people in Yazd showed that the prevalence of MTH and TTH was higher in married individuals compared to unmarried individuals, which may be caused by stress in marital life due to concerns regarding the future of children, economic problems and routine disputes (Momayyezi, Fallahzadeh and Momayyezi, 2014). Ayatollahi and Cheraghian (2005) showed a significance between marital status and headache.

## 5.2 PREVALENCE OF HEADACHES

This study indicated that 51.8% of lecturers were headache sufferers. A similar prevalence was identified in a study done in Oman which was 45% (Deleu and Hanssens, 1999), but this was on university students. In support of these findings, a study that aimed to update the documentation of headache epidemiology, from 357 publications globally, found that the prevalence of active headache was 52.0% (Stovner *et al.,* 2022).

In this study, probable TTH (41.9%) was most prevalent followed by MTH (27.9%) and CTH (10.1%). This is comparable to a study done among adults in Jordan which revealed that TTH was the most prevalent among other types (Alzoubi *et al.,* 2009). A study conducted in the Asian region also had a higher prevalence in TTH and reported the general prevalence of TTH to range between 15.6%–25.7% (Wang, 2003). In adults, the mean global prevalence for TTH is 42% (Ferrante *et al.*, 2013).

Contrary to the MTH findings, an Asian study revealed MTH to be between 8.4%–12.7% (Wang, 2003). An estimated prevalence of MTH in the world was said to be 11% (Stovner *et al.*, 2007), which was much lower than the findings in this study.

## 5.3 RISK FACTORS

The selected risk factors are discussed in the following sections.

### 5.3.1 Social Risk Factors

### 5.3.1.1 Smoking and Headaches

This study did not show a significant relationship between smoking and headaches, but, of the 40 respondents who smoked cigarettes, 60% (*n*=24) were headache sufferers**.** According to Volans and Castleden (1976), their study showed no relationship between smoking and MTH. Occasional/current smokers were said to be one of the lifestyle factors that increases the prevalence of headaches (Molarius *et al.*, 2008). A study conducted on 51 383 subjects found that headache prevalence was higher in smokers, especially in those under 40 years who smoked more than 10 cigarettes a day (Aamodt *et al.,* 2006). Another study found that the prevalence of active MTH was greater in migraineurs compared to non-migraineurs, and there was a connection between migraine attacks and the number of smoked cigarettes (Lopez-Mesonero *et al.*, 2009). Population studies have shown strong evidence of an association between CTHs and cigarette smoking (Raucci *et al.*, 2020). In contrast, more recently, the findings from a study were not in support of a strong causal relationship between any type of headache and smoking intensity (Johnsen *et al.,* 2018), as supported by this study.

### 5.3.1.2 Alcohol and Headaches

This study showed a significant relationship between alcohol and headaches, those who drank 7-9 units a week were more likely to suffer with headaches.

Alcohol consumption, followed by a few other factors, were noted as the trigger in 10 patients who presented with CTH (Xie e*t al.,* 2013). In about one-third of MTH sufferers in retrospective studies, alcohol has been reported as a trigger for MTH. Some studies have

found that other primary headaches are also triggered by alcohol (Panconesi, 2016). In contrast, migraine prevalence was said to decrease with an increased amount of alcohol, in comparison to alcohol abstinence (Aamodt *et al.,* 2006). More recently, alcohol has been shown to increase the development of migraine by up to 51% (Peroutka, 2014).

This study did not address whether or not the respondents thought alcohol was related to their headache and, thus, this warrants further investigation.

### 5.3.1.3 Sleep and Headaches

A significant relationship existed between lack of sleep and headaches. In support of this, there was a significant relationship shown between MTH and sleep patterns (Momayyezi *et al.,* 2015). Population based studies have also shown a correlation between headaches and sleep problems (Momayyezi *et al.,* 2015).

A recent study among lecturers continuing their postgraduate education, revealed that of 41 lecturers, the percentage of insomniacs was 24.4% (Daradila *et al.,* 2021). According to Kelman and Rains (2005), MTHs were reduced with an improvement of duration of sleep. In patients who suffer from MTH or TTH, the headache-related impact may be increased due to poor sleep quality (Cho *et al.,* 2020). Studies have shown a relationship between headache frequency and poor quality of sleep in MTH sufferers (Song, 2018; Walters, Hamer and Smitherman, 2014). Other studies have suggested that deprivation of sleep was associated with an increased hyper-excitability of the brain, which, in turn, increased the susceptibility of the brain to MTH attack (Scalise *et al.,* 2006; Lang *et al.,* 2004).

### 5.3.1.4 Exercise and headaches

In this study, a lack of involvement in exercise was related to headaches. Of the 116 respondents who did not exercise, 64.7% (*n*=75) were headache sufferers.

These findings correlate with other studies which suggest that physical inactivity has an association with headache disorders (Molarius, Tegelberg and Ohrvik, 2008; Rasmussen, 1993; Varkey *et al.,* 2008). Another study has also shown a relationship between physical inactivity and an increased headache attack frequency (Varkey *et al.,* 2008). It has been shown that exercise has a protective influence on mental health, especially in relieving stress (Churchill *et al.,* 2021). This may be a likely explanation for physical inactivity having an association with headaches.

In contrast, experimental studies have reported exercise as a trigger factor for MTH, mechanisms including acute release of neuropeptides (Amin e*t al.,* 2018). However, although exercise may be a trigger for MTH, regular exercise could possibly have a prophylactic effect on the frequency of MTH (Amin *et al.,* 2018).

### 5.3.2 Medical Risk Factors

### 5.3.2.1 Head Injury and Headache

The most common reported symptom following a head injury is a headache (Lucas *et al.,* 2014). In this study, of those who had a head injury, 54.5% (*n*=6) complained of headaches but a significant relationship was not noted. A population-based study found that the risk of a new onset of headache suffering, and exacerbation was increased by exposure to head injury (Nordhaug *el al.,* 2018).

### 5.3.2.2 Glasses and Headache

The findings of this study revealed a significant correlation between wearing glasses and headaches, as 60.2% (*n*=100) who wore glasses were headache sufferers. A population-based study in India had shown that 43.8% of respondents had discontinued wearing glasses. The reasons given were that the spectacles were not comfortable, or they thought that the prescription was not correct, which suggested that the refractive services was poor (Dandona *et al.,* 2002). However, according to Jayanand (2002), an ophthalmologist who responded to the findings of the article, revealed that over the years there has in fact been an increase in the number of people who use glasses. The article further mentions that approximately 90% of individuals who had a refraction test were headache sufferers, among other symptoms, and that there is a poor understanding between the difference of eye strain and headache. There is a poor conception that refraction errors may be the leading cause of headaches and the patient is given glasses, but when the headache persists, the patient stops using glasses thinking it is the wrong prescription, when refraction errors were not even the cause of their headache in the first place (Jayanand, 2002).

### 5.3.2.3 Blood pressure and headache

Although not significant, there seemed to be an association between blood pressure and headache in this study. There have been several studies which have shown that high blood pressure is associated with headache (Badran, Weir and McGuiness, 1970; Finocchi and Sassos, 2017; Middeke *et al.,* 2008). There were 31 (51.5%) out of 60 respondents who reported high blood pressure. Other studies have suggested that those with a headache were always at risk for hypertension (Bigal *et al.,* 2010; Scher *et al.,* 2005). There is conflicting literature on the relationship between headache and blood pressure. Some studies have shown no correlation between the two (Couch and Hassanein, 1989; Ho and Benjamin, 2001), whereas another study found a correlation between MTH and blood pressure (Gardner, Mountain and Hines, 1940). A prospective study of 22 685 adults

revealed that high diastolic and systolic pressure was related with a decreased risk of non-migrainous headache (Hagen e*t al.,* 2002).

### 5.3.2.4 Sinusitis and Headache

The results of this study presented a significant relationship between sinusitis and headache: 73.3% (*n*=22) who reported sinusitis reported headaches. Since the trigeminal sensory nerves innervate all the paranasal sinuses, many noxious stimuli trigger afferent sensory volleys and this results in a headache (Bluementhal, 2001). A study on "Sinus Headache" showed that many of the patients who had chronic rhinosinusitis suffered from headaches (Maurya *et al., 2*019). Similar findings were revealed in another study that showed patients with chronic rhinosinusitis had a higher risk of chronic headache by ninefold (Aaseth *et al.*, 2010). Primary headaches including MTH, CTH, TTH, and headaches from refractive errors are often misdiagnosed as headache due to sinus (Maurya *et al.,* 2019). Results from a previous study found that of a total of 130 MTH sufferers, 106 were misdiagnosed with sinus headache (Al-Hashel *et al.,* 2013).

### 5.3.3 Psychological Risk Factors

According to headache sufferers, stress is reported as one of the main aggravating factors for headache (Swanson *et al.,* 2013; Boardman e*t al.,* 2005). In this study, there were 93 respondents who had moderate levels of stress and headache, and 28 who had high stress levels and headache. A population-based study showed that an increased amount of stress was associated with an increased frequency of headache for all subtypes (Schramm e*t al.,* 2014). However, published literature is not sufficient to determine whether primary headache sufferers experience more life stressors or if they are more reactive compared to those who are not headache sufferers (Nash and Thebarge, 2006). A study that observed 114 headache sufferers for 28 days showed a positive correlation between frequency of both headache and stressful events (Marlowe, 1998). According to Smith (2007), the higher education system reports a high level of stress. This is consistent with the findings of this study, as there were more lecturers who reported their stress levels as either high or moderate (*n*=207), compared to those who reported it as mild or none (*n*=48).

The relationship between depression/anxiety and headache is thought to be bidirectional (Malmberg-Ceder *et al.*, 2019). The results of this study show similar findings as 18 respondents who were diagnosed with anxiety were headache sufferers and 23 who were diagnosed with depression were headache sufferers. A large cross-sectional study showed that anxiety and depression were significantly associated with headaches, compared to non-headache sufferers (Zwart, 2003). However, the results of this study were slightly different as there was no significant relationship. Respondents diagnosed with anxiety and

depression were 39 and 33 respectively, but headache sufferers were 23 respondents for anxiety and 18 for depression.

### 5.3.4 Work-Related Risk Factors

Due to the COVID-19 pandemic, there was a shift to online teaching and learning. Since online learning started, the prevalence of headache had increased from 18%–42% (DiSabella, 2020). In this study, of the 90.6% who reported online lecturing, 51.5% reported headaches.

### 5.3.5 COVID-19 Related Risk Factors

The lives of many were changed during the COVID-19 pandemic. Headaches were reported as the most common neurological manifestation of the virus (Mao, 2020; Sharma and Menon, 2022). According to a meta-analysis and systematic review, headaches were more prevalent in patients with COVID-19, by two-fold (Mutiawati *et al.,* 2020). This is consistent with the findings from this study as 97 respondents tested positive for COVID-19, and majority of them (*n*=63, 64.9%) were headache sufferers. In many studies, the rates of headache during the pandemic ranged from 6.5%–71% (Bolay, Gül and Baykan, 2020; Tostmann *et al.,* 2020).

As a result of social distancing and the imposed lockdown, loneliness became a growing concern (Lampraki *et al.,* 2022). In this study, 123 respondents reported loneliness during the lockdown. A study on a Dutch population also reported that the respondents had feelings of loneliness during the lockdown (van Tillburg e*t al., 2*021). In previous studies, there was a significant relationship between social isolation and psychological distress (Kim and Jung, 2021; Taylor e*t al., 2*018) and it is important to note that primary headaches are strongly associated with psychological distress (Kristoffersen *et al.,* 2018).

## 5.4 BURDEN OF HEADACHE

Headaches can be extremely burdensome for individuals and may have a significant impact on both social and personal lives, causing a reduced quality of life and productivity (Lipton *et al.,* 2007). In this study, 80.6% (*n*=104), a significant majority, reported that their headache interfered with work. In support of this, a study revealed that 21.7% of employees, who were MTH sufferers, and 8.5%, who were TTH sufferers, missed work (Ayatollahi, Sahebi and Borhani-Haghighi, 2009). Another study revealed a greater number of TTH sufferers who missed work, compared to MTH (Oshinaike *et al.*, 2014). However, another study showed the days when productivity at work was reduced was more significant in MTH compared to TTH (Shimizu *et al.,* 2021). In contrast to this, most of the respondents of

another study did not miss work, regardless of the type of headache. The respondents with TTH had the least amount of absenteeism, whereas there was more occasional absenteeism for MTH sufferers (Simic *et al.,* 2020).

A majority of respondents (57.4%, $n$=74) missed family/leisure activities between 1–14 days in the last three months. A study showed that both personal and work life may be affected equally (Bussone *et al.* 2004). In support of this study's findings, it was revealed that in the past month there was reduced participation in family activities in approximately half of those who were MTH sufferers (Buse *et al.,* 2016). MTH sufferers and their spouses reported that the headache caused stress in their relationships (Buse *et al., 2*016). This may have negatively affected their mental health. In this study, 73.6%, ($n$=95) respondents indicated that their headache had a negative effect on their mental health.

## 5.5 CONCLUSION

In summary, a high prevalence of primary headaches (51.8%) in lecturers was noted. Many risk factors were strongly associated with headaches (i.e alcohol, lack of sleep, wearing glasses, sinusitis etc), and this was comparable to other studies. The impact of headaches caused an interference with work and negatively affected the suffers mental health. Family and/or social activities were also disrupted when a headache occurred.

Chapter Six will discuss the conclusions of the study, the limitations, and recommendations for future studies.

# CHAPTER SIX CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

## 6.1 INTRODUCTION

In this chapter, the study conclusion are presented, followed by the limitations encountered and the recommendations that stem from the project.

## 6.2 CONCLUSION

For this study, a sample size of 247 was required; however, 255 respondents answered the questionnaire fully, which was a a response rate greater than 100%.

The mean age of respondents was 45.66 years, with a range from 24–76 years. This study showed no relationship between age and headache. There was a significant relationship between gender and headache. Of the 132 headache sufferers, 63.4% were female. There was no relationship between race and headache. However, most of the respondents were Black (38.8%), followed by Indian (36.1%), White (18.1%), Coloured (5.5%) and Other (0.8%). A significant relationship was shown between marital status and headache — of the 168 married participants, 59.5% were headache sufferers.

There was a high prevalence of primary headaches (51.8%) in lecturers across all the faculties at the Durban University of Technology. Probable tension-type headaches were the most prevalent (41.9%), followed by migraine-type headaches (27.9%), with only 10.1% experiencing cluster-type headaches. They reported that their headaches were moderate (69%) to severe (25.6%).

There were many risk factors which were strongly associated with headaches. The main social risk factors included alcohol intake, lack of sleep and lack of exercise. Having 7–9 units of alcohol a week was significantly related to suffering from headaches (100%, $n$=5). Compared to those who did not have headaches, a significant number (67.6%, $n$=25) of those who had headaches only had on average 1–4 hours of sleep a night. Not doing exercise was related to having headaches (64.7%, $n$=75). Those who exercised for the least number of hours (1–4) had shown a greater percentage of headache sufferers (43.4%, $n$=46).

According to the medical-related questions, wearing glasses (60.2%, $n$=100) and sinusitis (73.3%, $n$=22) had a significant relationship with headaches.

Not having line manager support (37.5%, $n$=54); difficulty with transitioning to WFH (68.9%, $n$=104); coping moderately at work (67.9%, $n$=95); not working at a desk when working at home (62.5%, $n$=55); laptop/computer screen not being at eye level (65.6%, $n$=101); duration of using a computer/laptop and phone; and work interfering with family/leisure time, were the work-related factors that were significantly related to headaches. Feelings of loneliness during the lockdown had a significant relationship with headaches.

The impact of headaches caused an interference with work and negatively affected the suffers mental health. Family, social or leisure activities were also neglected when a headache occurred.

This study contributes to a growing body of literature on headaches and their prevalence in university lecturers. The study highlights the disability and negative impact that headaches the sufferer. Professions like chiropractic, that can offer holistic and conservative therapies can assist in alleviating this burden.

## 6.3 LIMITATIONS

- This study was conducted at the Durban University of Technology and does not include information on headaches in lecturers from other universities.
- The reliability of this study depended on the respondents and how honest they were when answering the questionnaire.
- Headache features were determined by a questionnaire, which is not as robust as a clinical assessment with a headache diary.
- The reliability of the diagnosis of headaches were dependent on the validity of the HARDSHIP algorithm.

## 6.4 RECOMMENDATIONS

### 6.4.1 Recommendation for Research into Headaches

- Future studies should include/assess lecturers from other universities to determine if the findings in this study are similar in other populations.
- Since there were many dropouts, future studies may want to utilise a shorter questionnaire to yield a better response or administering the questionnaire in person.
- Future research could utilise a different methodology, whereby participants are examined in order to reach more accurate diagnosis, rather than utilising a self-report tool like the one used in this study.

Researchers should consider using a mixed methods or a qualitative research paradigm to allow a greater understanding of the impact of the headaches on the respondent.

## 6.4.2 Recommendation for the Durban University of Technology

- The university should invest in mental health programmes to assist staff to deal with stress, anxiety and depression. These can consist of checks or stress management workshops, held regularly, to allow staff to attend.
- The chiropractic, homoeopathy and somatology clinics at DUT could provide information about the treatments they offer, and benefits that headaches suffers may have from utilising their treatments.

In this chapter, the limitations encountered, and recommendations for future studies in the field of headaches and lecturers have been discussed.

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# APPENDICES

## Appendix 1: Permission from the Director of Research

<div align="right">

Miss D Chetty
141 Bayat Road
Orient Heights
Pietermaritzburg

</div>

Prof K Motaung
Director: Research and Post Graduate Support
Research, Innovation and Engagement
Durban University of Technology
Durban

<div align="center">

**<u>Request for Permission to Conduct Research</u>**

</div>

Dear Prof Motaung

My name is Deidré Chetty and I am currently pursuing my Master's degree in Chiropractic at the Durban University of Technology. For my dissertation, the research I wish to conduct is titled: The prevalence, selected risk factors and burden of primary headaches in lecturers at a University of Technology in KwaZulu-Natal during the COVID-19 pandemic."

I hereby seek your consent to access lecturers at the Durban University of Technology, in order to collect data. Due to COVID-19, the data collection will be done using an online survey.

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

If you require any further information, please do not hesitate to contact me on 072 261 3621 or deidrechetty@outlook.com..

Yours sincerely,




Deidré Chetty
Durban University of Technology

## Appendix 2: Ethics Clearance Certificate

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

P O Box 1334, Durban, South Africa, 4001

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

www.dut.ac.za

12 August 2022

Ms D Chetty
141 Bayat Road
Orient Heights
Pietermaritzburg

Dear Ms Chetty

**The prevalence, selected risk factors and burden of primary headaches in lecturers at a university of Technology (UoT) in KwaZulu-Natal during the COVID-19 pandemic**
**Ethical Clearance number IREC 122/22**

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

We are pleased to inform you that the data collection tool has been approved. Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the DUT-IREC acknowledges receipt of your gatekeeper permission letter.

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

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

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

Yours Sincerely

Prof J K Adam
Chairperson: DUT-IREC

**ENVISION** 2030    transparency · honesty · integrity · respect · accountability
fairness · professionalism · commitment · compassion · excellence

**Appendix 3: Permission Letter from Professor Timothy Steiner**

Re: DUT Chiropractic Research
Steiner, Timothy J t.steiner@imperial.ac.uk
To deidre Chetty deidrechetty@outlook.com
Tuesday 2022/02/01 12: 20

Hello. You have permission to use this questionnaire for the purposes of your research. Please acknowledge the original manuscript, and explicitly describe any adaptations and modifications, in your publications.

I hope all goes well.

Best wishes

Timothy Steiner

**From:** Deidre Chetty <deidrechetty@outlook.com>
**Sent:** 01 February 2022 07: 52
**To:** Steiner, Timothy J <t.steiner@imperial.ac.uk>
**Subject:** DUT Chiropractic Research

Dear Professor Steiner

My name is Deidré Chetty and I am a Master's student at the Durban University of Technology in South Africa. My current research topic is titled : "The prevalence, selected risk factors and burden of primary headaches in lecturers at a University of Technology in KwaZulu-Natal during the COVID-19 pandemic."

My research objectives are:

1. To determine the prevalence and types of primary headaches suffered by lecturers at the University
2. To determine the socio-demographic, medical history, work-related and COVID-19 related risk factors for the primary headaches
3. To determine the personal impact of the primary headaches in terms of work, family and social life

I hereby request your permission to use the Headache-attributed restriction, disability, social handicap and impaired participation (HARDSHIP) questionnaire for the purposes of my research. If your permission is granted, your questionnaire will be adapted and modified to suit my research study.

Kind regards

Deidré Chetty

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**Appendix 4: Letter of Information**



**LETTER OF INFORMATION**

**Dear Participant, I would like to welcome you and thank you for your interest in participating**

**Title of the Research Study:** The prevalence, selected risk factors and the burden of primary headaches in lecturers at a University of Technology in KwaZulu-Natal during the COVID-19 pandemic

**Principal Investigator/s/researcher:** Deidre Chetty, MHsc Chiropractic student

**Supervisor:** Dr Penny Orton - PhD Nursing

**Collaborator**: Dr Laura O'Connor - MTech: Chiropractic

**Brief Introduction and Purpose of the Study:**

Headaches in lecturers have not been well documented in South Africa, yet they play such an integral role in the lives of students. During the last two years, COVID-19 has forced lecturers to transition to online learning and adapt to a "new normal", which has placed an extra burden on them. This study is a quantitative descriptive cross-sectional survey which will provide information on the prevalence and the socio-demographic, medical history, work-related and COVID-19 related risk factors for the primary headaches within the lecturer population at the Durban University of Technology (DUT). The personal impact that headaches have in terms of work, family and social life will also be investigated.

**Aim**

The aim of this study is to determine the prevalence, selected risk factors and burden of primary headaches in lecturers at a University of Technology (UoT) in KwaZulu-Natal during the COVID-19 pandemic

**Outline  of the Procedures**

All willing participants who have completed the informed consent (see below) are encouraged to complete the questionnaire. Participation in the study will not interrupt participants as it will take 10-15 minutes to complete. Participants are free to withdrawn from the study at any point, even while completing the questionnaire, if they feel any discomfort at any stage

**Risks or Discomforts to the Participant:**

There are no foreseeable risks or discomfort if you participate in this study

**Explain to the participant the reasons he/she may be withdraw from the Study:**

You may withdraw from the study if any of the questions make you feel uncomfortable. There will be no adverse consequences if you choose to withdraw from the study

**Benefits:**

You may find comfort in talking about your headache experiences. Your full co-operation will also add to the existing body of knowledge about headaches, therefore this will benefit lecturers in terms of creating awareness and the chiropractic profession and other health care providers.

**Remuneration:**

No remuneration will be offered for participating in this study

**Costs of the Study**:

There are no costs associated with participating in this study

**Confidentiality:**

All information gathered by this study is confidential. The questionnaire will be analysed by a statistician and all information will only be used for research purposes. No personal information will be published in the final dissertation of this study. All personal information that relates to your participation in this study will be treated confidentially and answers to the questionnaire will be processed anonymously.

**Research-related Injury:**

Not applicable to this study as it is an online questionnaire based study

**Storage of all electronic and hard copies including tape recordings**

This will be kept for five years and discarded afterwards

**Persons to contact in the Event of Any Problems or Queries:**

The researcher, Deidre Chetty        deidrechetty@outlook.com or 072 261 3621

My supervisor, Dr Penny Orton              pennyo@dut.ac.za

My collaborator, Dr O'Connor        lauraw@dut.ac.za

You may also contact the DUT Institutional Research Ethics administrator on 031 373 2375. Any related complaints may be reported to the Director: Research and Postgraduate Support Dr L Linganiso on 031 373 2577 or researchdirector@dut.ac.za.

Your assistance is greatly appreciated

Deidre Chetty

**Appendix 5: Informed Consent**



## CONSENT

**Full Title of the Study:** The prevalence, selected risk factors and the burden of primary headaches in lecturers at a University of Technology in KwaZulu-Natal during the COVID-19 pandemic

**Names of Researcher/s:** Deidre Chetty

**Statement of Agreement to Participate in the Research Study:**

☐ I hereby confirm that I have been informed by the researcher, Deidre Chetty researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: IREC 122/22,

☐ I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

☐ I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

☐ In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher. ☐ I may, at any stage, without prejudice, withdraw my consent and participation in the study.

☐ I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

☐ I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____    _____    _____    _____

**Full Name of Participant**                        **Date**                      **Time**                      **Initials**

I, Deidre Chetty (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Deidré Chetty

_____    _____    _____

**Full Name of Researcher**                     **Date**                     **Signature**

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## Appendix 6: Questionnaire Focus Group

**SECTION A**

| Demographics: Please fill in or place an X where necessary | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| What is your sex? | Male | | | Female | | | | | |
| What is your age? | ____ years | | | | | | | | |
| What is your weight? | ____kg | | | | | | | | |
| What is your height? | ____m | | | | | | | | |
| What is your race? | Black | | White | | Indian | | Coloured | | Other |

| Social history: Please place an X where necessary | | | | | |
|---|---|---|---|---|---|
| Do you smoke tobacco? | Yes | | No | | |
| If yes, how often? | Daily | | Weekly | | Occasionally |
| Do you drink alcohol? | Yes | | No | | |
| If yes, how many units do you drink per week?<br>**1 unit = 350ml of beer or 1 small glass of wine or 1 tot of spirit (a double tot = 2 units)** | | | | _____units | |
| Do you usually eat three meals a day? | Yes | | No | | |
| How many hours of sleep do you get per night? | 1-4 | | 5-9 | | >10 |

| Medical history: Please place an X or fill in where necessary | | | | | |
|---|---|---|---|---|---|
| Have you had a head injury in the last 3 months? | Yes | | No | | |
| If yes, have you had treatment? | Yes | | No | | |
| Do you wear glasses? | Yes | | No | | |
| When last were your eyes tested? | | | | | |
| Please tick the appropriate box/es you have been diagnosed or if you have a history with any the following: (you may tick more than 1 box) | **High blood pressure** □ | | **Low blood pressure** □ | | |
| | **Diabetes** □ | | **Cerebral stroke** □ | | |
| | **Anaemia** □ | | **Thyroid disease** □ | | |
| | **Cancer** □ | | **Seizures** □ | | |
| Other?<br>Please specify | | | | | |

| Psychological: Please place an X where necessary | | | | |
|---|---|---|---|---|
| Are you usually highly stressed? | **Yes** | | **No** | |
| Do you have panic attacks? | **Yes** | | **No** | |
| Have you been diagnosed with depression? | **Yes** | | **No** | |
| Have you been diagnosed with anxiety? | **Yes** | | **No** | |
| Have you had treatment by a psychiatrist or counsellor? | **Yes** | | **No** | |

| Work related: Please answer the following questions and place X where necessary | | | | | |
|---|---|---|---|---|---|
| How long have you been a lecturer? | _____ years | | | | |
| Indicate the nature of your lecturing appointment? | Full time | | Part time | Contract | |
| How many days per week do you lecture? | _____ days/week | | | | |
| How many hours do you lecture per day? | _____ hours/day | | | | |
| Describe the manner in which you have lectured over the last year: | Online lectures | | | | |
| | Face to face theory lectures | | | | |
| | Face to face practical lectures | | | | |
| On average, how much time do you spend per week on lecture preparation? | | | | | |
| Do you hold another occupation? | Yes | | No | | |
| If yes, please state the occupation: | | | | | |
| If you are feeling unwell/ in pain, do you have line manager support? | Yes | | No | | |
| Are you working remotely, on campus or both? | Remotely | | On campus | | Both |
| Did you experience any difficulty working from home? | Yes | | No | | |
| How many hours do you spend sitting at a desk per day? | ___ hours/day | | | | |
| Do you work at a desk when working at home? | Yes | | No | | |
| If yes, is your desk height appropriate for your work? | Yes | | No | | |
| If no: where do you work: | | | | | |
| Dining room table | Yes | | No | | |
| Sofa | Yes | | No | | |
| On the bed | Yes | | No | | |
| Other: | | | | | |
| Is your chair comfortable for you? | Yes | | No | | |
| Are your feet supported? | Yes | | No | | |
| Is your laptop/computer screen at the same level as your eyes? | Yes | | No | | |
| How many hours do you spend using a laptop/computer per day? | ____ hours/day | | | | |
| How many hours do you spend using a phone a day? | hours/day | | | | |
| Does your work interfere with family or leisure time? | Yes | | No | | |
| COVID-19 related questions: Please place an X where necessary | | | | | |
| Have you tested positive for COVID-19? | Yes | | No | | |
| If yes, do you have any side effects from COVID-19? | Yes | | No | | |
| Have you ever experienced feelings of loneliness during the lockdown? | Yes | | No | | |
| Has your workload increased since COVID-19? | Yes | | No | | |

**Section B**

**Screening: Please tick or fill in where necessary**

Have you ever had a headache?                 Yes □   No □

If yes, please answer the rest of the questionnaire. If no, you are now complete. Thank you for participating

Have you had a headache during the last 12 months?          Yes □  No □

On how many days in the last 3 months did you have a headache?      _____ days

Have your headaches worsened since COVID-19?               Yes □         No □

Do you think wearing a mask aggravates your headache?      Yes □         No □

Daily headache questions: Please fill in where necessary

How long do these headaches usually last?

(Please enter the amount of minutes or hours or tick the box)

_____minutes or _____hours or  □  never goes away

Do you take medication to treat it?          Yes □      No □

If yes, what medication do you use the most often to treat your headache? Please list it here

_____

In the last 30 days, how many days did you take medication for your headache?

_____Days

| **Diagnostic questions: Please fill in or tick where necessary** | | | |
|---|---|---|---|
| How often do you have **this type of headache**? (please tick box or enter the number of days per month or per year) | ☐ every day | _____ days/month | _____ days/year |
| How long does **this type of headache** usually last? (please enter the number of minutes, hours or days, or tick the box) | ____mins, ____hours or ____days never goes away ☐ | | |
| Is your last answer **with or without** medication? | with ☐ | without ☐ | |
| How long would it last **if you did not take medication**? (please enter the number of minutes, hours or days) | ____mins, ____hours or ____days | | |
| How bad is **this type of headache** usually? (please tick one box) | ☐ not bad | ☐ quite bad | ☐ very bad |
| During a headache, do one or more of these happen to you? <br> - Your eye turns red on one side only <br> - Your eye waters on one side only <br> - Your nose runs on one side only <br> - Your nose gets congested on one side only | Yes☐   No☐ | | |
| There are many ways of describing a headache, but most are either throbbing or pressing. Thinking still of **this type of headache**, which best describes the pain? (please tick one box) | ☐ **Throbbing pressing, or pulsating squeezing** (this means varying in **or** time with the heart beat) **tightening** | | |
| Is this the worst pain you have ever experienced? | no ☐      yes ☐ | | |
| Is the pain of **this type of headache** usually on only one side of the head? (please tick one box) | no ☐      yes ☐ | | |
| Does exercise (like walking or climbing stairs) tend to make it worse? (please tick one box) | no ☐      yes ☐ | | |
| Thinking still of **this type of headache**, how does it affect your ability to do day-to-day activities? (please tick one box) | ☐ can do everything normal | ☐ cannot do some things | ☐ can do nothing as |
| With **this type of headache**, do you usually feel nauseated (as though you may vomit or throw up)? (please tick one box) | no ☐      yes ☐ | | |
| With **this type of headache**, do you usually actually vomit (throw up)? (please tick one box) | no ☐      yes ☐ | | |
| When you have **this type of headache**, does daylight or other lighting bother you? In other words, do you prefer to be in the dark? (please tick one box) | ☐ no | ☐ not sure | ☐ yes (this question refers to ordinary levels of light, not bright lighting) |
| When you have **this type of headache**, does noise bother you? In other words, do you prefer to be in the quiet? (please tick one box) | ☐ no | ☐ not sure | ☐ yes (this question refers to ordinary levels of noise, not very loud noise) |

**Section C**

| Impact questions<br>The next questions are about the effects your headaches have on **your own life**. | | | |
|---|---|---|---|
| Have your headaches interfered with your work? | no ☐    yes☐ | | |
| On how many days in the last 3 months did you skip work due to your headache? | _____days | | |
| On how many days in the last 3 months could you do less than half of your usual work due to your headache? | _____days | | |
| Do you believe your headaches have made you less successful in your career? | no☐ yes☐ | | |
| Do you feel that your family and friends understand and accept your headaches? | ☐ no | ☐ partly | ☐ yes, fully |
| Do you avoid telling people that you have headaches? | no ☐    yes ☐ | | |
| Have your headaches ever caused a long-term relationship or partnership to break down? | no ☐    yes ☐ | | |
| On how many days in the last 3 months did you miss family or leisure activities because of your headache? | _____days | | |
| When you have a headache at work, what do you usually do? | | | |
| When you have a headache at home, what do you usually do? | | | |

Thank you for taking the time to answer all the questions!

## Appendix 7: Final Questionnaire

**Section A**

| Demographics: Please complete the following questions by filling in an answer or choosing an appropriate option | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| What is your age? | ____ years | | | | | | | | | |
| What is your sex? | Male | | | Female | | | | | | |
| What is your race? | Black | | White | | Indian | | Coloured | | Other | |
| What is your marital status? | Single | | Married | | Divorced | | Widowed | | Other | |

| Social History: Please choose an appropriate option | | | | | |
|---|---|---|---|---|---|
| Do you smoke tobacco? | Yes | | No | | |
| If yes, how often do you smoke? | Daily | | Weekly | | Occasionally | |
| Do you drink alcohol? | Yes | | No | | |
| If yes, how many units do you drink per week? **1 unit = 350ml of beer or 1 small glass of wine or 1 tot of spirit (a double tot = 2 units)** | 1-3 units 4-6 units 7-9 units >10 units | | | | |
| Do you usually eat three meals a day? | Yes | | No | | |
| On average how many hours of sleep do you get per night? | 1-4 | | 5-9 | | >10 |
| Do you exercise? | Yes | | No | | Occasionally |
| If yes, how many hours per week do you exercise for? | 1-4 | | 5-9 | | >10 |

| **Medical History: Please complete the following questions by filling in an answer or choosing an appropriate option** | | | | | |
|---|---|---|---|---|---|
| Have you had a head injury in the last 3 months? | Yes | | No | | |
| Do you wear glasses? | Yes | | No | | |
| In general, how would you describe your health? | Excellent | Very good | Good | Fair | Poor |

| Please tick the appropriate box/es you have been diagnosed with or if you have a history with any of the following: (you may tick more than 1 box) | **High blood pressure** □ | **Low blood pressure** □ |
|---|---|---|
| | **Diabetes** □ | **Cerebral stroke** □ |
| | **Anaemia** □ | **Thyroid disease** □ |
| | **Cancer** □ | **Seizures** □ |
| | **Sinusitis** □ | **Hayfever** □ |
| Other? Please specify | **N/A** □ | |
| | | |

| **Psychological: Please choose ONE option** | | | | |
|---|---|---|---|---|
| How would you rate your stress levels? | **High** | **Moderate** | **Mild** | **None** |
| Have you been diagnosed with depression? | **Yes** | | **No** | |
| Have you been diagnosed with anxiety? | **Yes** | | **No** | |

| **Work related: Please choose an appropriate option where necessary** | | | | |
|---|---|---|---|---|
| How long have you been a lecturer? | 0-3 years | 4-8 years | 9-13 years | >14 years |
| Indicate the nature of your lecturing appointment? | Full time | | Part time | Contract |
| How many days per week do you lecture? | 1-3 days | | 4-5 days | 6-7 days |

| How many hours do you lecture per day? | < 1 hour | 1-3 hours | | > 4 hours | |
|---|---|---|---|---|---|
| Describe the manner in which you have lectured over the last year: **You may choose more than one option** | Online lectures | | | | |
| | Face to face theory lectures | | | | |
| | Face to face practical lectures | | | | |
| If you are feeling unwell/ in pain, do you have line manager support? | **Yes** | | **No** | | |
| Are you working remotely on campus or both? | **Remotely** | | **On campus** | | **Both** |
| Did you experience any difficulty with the transition to working from home during COVID-19? | **Yes** | | **No** | | |
| Now that things are slowly getting back to normal, how are you coping? | **Coping well** | **Moderately coping** | | **Not coping well** | |
| How many hours do you spend sitting at a desk per day? | **<1 hou** | **1-4 hours** | **5-9 hours** | **>10 hours** | |
| Do you work at a desk when working from home? | **Yes** | | **No** | | |
| If yes, is your desk height appropriate for your work? | **Yes** | | **No** | | |
| Is your chair comfortable for you? | **Yes** | | **No** | | |
| Is your laptop/computer screen at the same level as your eyes? | **Yes** | | **No** | | |
| How many hours do you spend using a laptop/computer per day? | **< 1 hour** | **1-4 hours** | **5-9 hours** | **>10 hours** | |
| How many hours do you spend using a phone a day? | **< 1 hour** | **1-4 hours** | **5-9 hours** | **>10 hours** | |
| Does your work interfere with family or leisure time? | **Often** | **Sometimes** | | **Never** | |

| COVID-19 related questions: Please choose ONE option | | | | |
|---|---|---|---|---|
| Have you tested positive for COVID-19? | **Yes** | | **No** | |
| Did you ever experience feelings of loneliness during the lockdown? | **Yes** | | **No** | |
| Has your workload increased during COVID-19? | **Yes** | | **No** | |

**Section B**

**Screening: Please choose an appropriate option**

Are you a headache sufferer?

Yes □          No □

**If yes, please answer the rest of the questionnaire. If no, you are now complete. Thank you for participating. Please submit your questionnaire**

Have you had a headache during the last 12 months?   Yes □          No □

During the last 30 days, on how many of these days did you have a headache?

1-14 days□       >15days□

Have your headaches worsened during the pandemic?          Yes □          No □

Do you think wearing a mask aggravates your headache?          Yes □          No □

Does anyone in your immediate family suffer from similar headaches?    Yes □     No □

Do you take medication to treat your headache?          Yes □          No □

In the last 30 days, how many days did you take medication for your headache?

< 9 days □  >10 days □

Please think about your headaches.

Do you think they are all of one type, or are they of more than one type?

One □   More than one □

**If you answered one, the next questions are to diagnose the headache. If you answered more than one, please focus upon the headache type that on the whole bothers you the most.**

| Diagnostic questions: Please complete the questions below by filling in an answer or choosing an appropriate option | | |
|---|---|---|
| How long does **this type of headache** usually last? | □ <u>minutes</u> □ hours □ days <br> **never goes away** □ | |
| With regards to your last answer, is this when you have taken medication? | **Yes** □ | **No** □ |
| How long would it last **if you did not take medication**? | _____ **hours** <br> _____ **days** | |
| How bad is **this type of headache** usually? | **Mild** □  **Moderate** □ **Severe** □  **Extremely severe** □ | |
| During a headache, do one or more of these happen to you? <br> - Your eye turns red on one side only <br> - Your eye waters on one side only <br> - Your nose runs on one side only <br> - Your nose gets congested on one side only | **Yes** □          **No** □ | |
| Does your headaches occur in cycles (i.e. occurs in a routine pattern)? | **Yes** □ **No** □ | |
| Do you experience excruciating pain that is generally situated in, behind or around one eye, but may radiate to other areas of your face, head and neck? | **Yes** □ **No** □ | |
| There are many ways of describing a headache, but most are either throbbing or pressing. <br> Thinking still of **this type of headache**, which best describes the pain? | □          □ <br> **Throbbing pressing, or pulsating squeezing** (this means varying in **or** time with the heart beat) **tightening** | |
| Is the pain of **this type of headache** usually on only one side of the head? | **no** □          **yes** □ | |
| Does exercise (like walking or climbing stairs) tend to make it worse? | **no** □          **yes** □ | |
| With **this type of headache**, do you usually feel nauseated (as though you may vomit or throw up)? | **no** □          **yes** □ | |
| With **this type of headache**, do you usually actually vomit (throw up)? | **no** □          **yes** □ | |
| When you have **this type of headache**, does daylight or other lighting bother you? In other words, do you prefer to be in the dark? (this question refers to <u>ordinary</u> levels of light, not bright lighting) | □          □ <br> **no**          **yes** | |
| When you have **this type of headache**, does noise bother you? In other words, do you prefer to be in the quiet? (this question refers to <u>ordinary</u> levels of noise, not very loud noise) | □          □ <br> **no**          **yes** | |

**Section C**

| Impact questions | |
|---|---|
| The next questions are about the effects your headaches have on **your own life**. | |
| Have your headaches interfered with your work? | no ☐     yes☐ |
| On how many days in the last 3 months did you miss work due to your headache? | None     1-14     15-30     >31 days<br>☐          ☐          ☐             ☐ |
| Do you feel that your family and friends understand and accept your headaches? | ☐ no     ☐ partly     ☐ Yes fully |
| Do you avoid telling people that you have headaches? | no ☐     yes ☐ |
| Have your headaches ever caused a long-term relationship or partnership to break down? | no ☐     yes ☐ |
| On how many days in the last 3 months did you miss family or leisure activities because of your headache? | None  1-14  15-30  >31 days<br>☐     ☐      ☐      ☐ |
| When you have a headache at work, what do you usually do? | Take medication ☐<br>Go home☐<br>Other ☐ |
| When you have a headache at home, what do you usually do?<br>If other, please specify what you do | Take medication ☐<br>Lie down ☐ Sleep ☐<br>Other ☐ |
| Do you think your headaches have had a negative effect on your mental health? | no ☐  yes ☐ |

**Thank you for taking the time to answer all the questions!**

**Appendix 8: Diagnostic Algorithm**

# *Lifting The Burden*

**In official relations with the World Health Organization**

**The Global Campaign against Headache**

## Diagnostic algorithm for headache according to the diagnostic questions in the HARDSHIP questionnaire

Responses to the diagnostic questions of the HARDSHIP questionnaire, for each bothersome headache separately identified by the participant, should be entered into this algorithm.

The algorithm must be applied from the beginning in each case.

**Begin here:**

| | HARDSHIP question | Response | Value | Action |
|---|---|---|---|---|
| **Flags for manual review** | 14 | Headache on ≥15 days/month | 0 | Continue with migraine algorithm |
| | | | 1 | Continue below |
| | 18 | Acute medication on ≥10 days/month | 0 | Not medication-overuse headache (MOH); manually review for final diagnosis |
| | | | 1 | Possible MOH; manually review for final diagnosis |

| Migraine algorithm | HARDSHIP question | Response | Value | Calculate 1st intermediate score | Calculate 2nd intermediate score | Final score and diagnosis |
|---|---|---|---|---|---|---|
| B | 21/23 | < 4 h | 0 | | | 0 |
| | | > 3 d (72 h) | 0 | | | 0 |
| | | ≥ 4 h and ≤ 3 d (72 h) | 1 | | | 1 |
| C | 24 | Not bad | 0 | 24+25+26+27 ≥ 2 <br> 24+25+26+27 < 2 | | 1 <br> 0 |
| | | Quite bad | 1 | | | |
| | | Very bad | 1 | | | |
| | 25 | Pulsating/throbbing yes | 1 | | | |
| | | Pressing/tightening yes | 0 | | | |
| | 26 | One side | 1 | | | |
| | | Both sides | 0 | | | |
| | 27 | Worsened by physical activity yes/no | 1/0 | | | |
| D | 29 | Nausea yes/no | 1/0 | N+V ≥ 1: 1 <br> N+V = 0: 0 | n/v+pt/pn ≥ 1 <br> n/v+pt/pn = 0 | 1 <br> 0 |
| | 30 | Vomiting yes/no | 1/0 | | | |
| | 31 | Photophobia (pt) yes/no | 1/0 | Pt+pn = 2: 1 | | |
| | 32 | Phonophobia (pn) yes/no | 1/0 | Pt+pn ≤ 1: 0 | | |
| | | | | | B+C+D = 3 | **Migraine** |
| | | | | | B+C+D < 3 | Not migraine, go to **TTH algorithm** |

| TTH algorithm | HARDSHIP question | Response | Value | Calculate 1st intermediate score | Calculate 2nd intermediate score | Final score and diagnosis |
|---|---|---|---|---|---|---|
| B | 21/23 | < ½ h | 0 | | | 0 |
| | | > 7 d | 0 | | | 0 |
| | | ≥ ½ h and ≤ 7 d (168 h) | 1 | | | 1 |
| C | 24 | Not bad | 1 | 24+25+26+27 ≥ 2 <br> 24+25+26+27 < 2 | | 1 <br> 0 |
| | | Quite bad | 1 | | | |
| | | Very bad | 0 | | | |
| | 25 | Pulsating/throbbing yes | 0 | | | |
| | | Pressing/tightening yes | 1 | | | |
| | 26 | One side | 0 | | | |
| | | Both sides | 1 | | | |
| | 27 | Worsened by physical activity yes/no | 0/1 | | | |
| D | 29 | Nausea yes/no | 1/0 | N+V ≥ 1: 0 <br> N+V = 0: 1 | n/v+pt/pn = 2 <br> n/v+pt/pn < 2 | 1 <br> 0 |
| | 30 | Vomiting yes/no | 1/0 | | | |
| | 31 | Photophobia (pt) yes/no | 1/0 | Pt+pn ≤ 1: 1 | | |
| | 32 | Phonophobia (pn) yes/no | 1/0 | Pt+pn = 2: 0 | | |
| | | | | | B+C+D = 3 | **TTH** |
| | | | | | B+C+D < 3 | Not TTH, go to **probable migraine algorithm.** |

| Probable migraine algorithm | HARDSHIP question | Response | Value | Calculate 1st intermediate score | Calculate 2nd intermediate score | Final score and diagnosis |
|---|---|---|---|---|---|---|
| B | 21/23 | < 4 h | 0 | | | 0 |
| | | > 3 d (72 h) | 0 | | | 0 |
| | | ≥ 4 h and ≤ 3 d (72 h) | 1 | | | 1 |
| C | 24 | Not bad | 0 | 24+25+26+27 ≥ 2 <br> 24+25+26+27 < 2 | | 1 <br> 0 |
| | | Quite bad | 1 | | | |
| | | Very bad | 1 | | | |
| | 25 | Pulsating/throbbing | 1 | | | |
| | | Pressing/tightening | 0 | | | |
| | 26 | One side | 1 | | | |
| | | Both sides | 0 | | | |
| | 27 | Worsened by Activity yes/no | 1/0 | | | |
| D | 29 | Nausea yes/no | 1/0 | N+V ≥ 1: 1 <br> N+V < 1: 0 | n/v+pt/pn ≥ 1 <br> n/v+pt/pn < 1 | 1 <br> 0 |
| | 30 | Vomiting yes/no | 1/0 | | | |
| | 31 | Photophobia (pt) | 1/0 | Pt+pn = 2: 1 | | |
| | 32 | Phonophobia (pn) | 1/0 | Pt+pn ≤ 1: 0 | | |
| | | | | | B+C+D = 2 | **Probable migraine** |
| | | | | | B+C+D < 2 | Not pMig, go to **probable TTH algorithm** |

| Probable TTH algorithm | HARDSHIP question | Response | Value | Calculate 1st intermediate score | Calculate 2nd intermediate score | Final score and diagnosis |
|---|---|---|---|---|---|---|
| B | 21/23 | < ½ h | 0 | | | 0 |
| | | > 7 d | 0 | | | 0 |
| | | ≥ ½ h and ≤ 7 d (168 | 1 | | | 1 |
| C | 24 | Not bad | 1 | 24+25+26+27 ≥ 2<br>24+25+26+27 < 2 | | 1<br>0 |
| | | Quite bad | 1 | | | |
| | | Very bad | 0 | | | |
| | 25 | Pulsating/throbbing | 0 | | | |
| | | Pressing/tightening | 1 | | | |
| | 26 | One side | 0 | | | |
| | | Both sides | 1 | | | |
| | 27 | Worsened by physical activity yes/no | 0/1 | | | |
| D | 29 | Nausea yes/no | 1/0 | N+V ≥ 1: 0 | n/v+pt/pn = 2 | 1 |
| | 30 | Vomiting yes/no | 1/0 | N+V = 0: 1 | n/v+pt/pn < 2 | 0 |
| | 31 | Photophobia (pt) yes/no | 1/0 | Pt+pn ≤ 1: 1 | | |
| | 32 | Phonophobia (pn) yes/no | 1/0 | Pt+pn = 2: 0 | | |
| | | | | | B+C+D = 2 | **Probable TTH** |
| | | | | | B+C+D < 2 | Not pTTH, **undetermined headache** |