The prevalence, knowledge, attitude and practice regarding self-administered over-the-counter analgesic use among patients with chronic musculoskeletal pain attending the Durban University of Technology Chiropractic Day Clinic

By

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

_____ _____08/05/2023_____

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DEDICATION

To my dearest parents, Johan and Cindy Engelbrecht, thank you for all that you have done and continue to do for me. You have made this all possible and I am grateful for your never-ending support.

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ABSTRACT

Background

Chronic pain is a major concern globally, with the greatest contributor being chronic musculoskeletal pain (CMSP). CMSP decreases quality of life, affects activities of daily living, increases work absenteeism and health care expenses.

Recommendations for the management of CMSP include exercise and the use of analgesics, such as non-steroidal anti-inflammatory drugs (NSAIDs), or more potent analgesics, including opioids. Amongst those suffering from CMSP, it is common to self-medicate with analgesics. Over-the-counter (OTC) analgesics, in particular, help patients manage their own CMSP symptoms. However, OTC medicine use can be a problem when misused.

The common reasons why patients self-medicate with OTC analgesics is the easy access to these medications; previous experience with treating their condition; and financial and economic difficulties, which prevent visiting a primary physician (for more potent analgesics), especially in developing countries.

There are many studies that have examined the prevalence of self-medication of OTC analgesics using population-based studies and some among health science students at universities but these do not focus on the prevalence of self-medication among those with CMSP. There appears to be limited research conducted in South Africa with regards to the prevalence of self-administered OTC analgesic use among patients with CMSP, especially within a chiropractic clinic setting, where the treatment of CMSP consumes a large portion of primary care.

It has also been noted in the literature that information and research needed to quantify the scale of misuse is currently lacking. Primary care physicians, including chiropractors, who more frequently treat chronic pain, are thus best suited to ascertain this by assessing the attitudes, knowledge and practices regarding self-administered OTC analgesic use amongst patients suffering from CMSP.

Method

This study is a quantitative, descriptive cross-sectional study, whereby a survey was conducted (using questionnaires) to collect data and make statistical inferences about the

population in question. A systematic approach was used to obtain numerical data about the prevalence, knowledge, attitude and practice regarding self-administered OTC analgesic use among patients with CMSP attending the Durban University of Technology (DUT) Chiropractic Day Clinic (CDC).

Permission to conduct this research study was sought from the DUT research director (Appendix A), the chiropractic clinic director (Appendix B) and the DUT Institutional Research Ethics Committee (IREC) (Appendix C). Permission from the participants was obtained by providing the participants with information (Appendix E) and consent letters (Appendix F) prior to permission for voluntary participation. Once data collection had been completed, the data were captured on an Excel spread sheet and moved to IBM SPSS version 28 for analysis. Data analysis was then conducted once all the data have been captured and coded using the various tests and descriptive statistics, including means and standard deviations, where applicable. Frequencies were reported in tables and graphs. The Chi-square goodness-of-fit-test, which is a univariate test, that was used on categorical variables to test whether any of the response options were selected significantly more or less often than that of others, was performed. Under null hypothesis, it was assumed that all responses were equally selected and a binomial test, which tests whether a significant proportion of participants select one of a possible two responses (where $p<.001$ indicates significance) was conducted.

Results

All participants who had been experiencing pain for more than three months were retained in the study. Participants with pain for less than three months or those who reported no pain were excluded. This left 204 participants in the sample. Therefore 204, out of 302 participants, were experiencing CMSP at the time of data collection and were included in the data analysis.

At the time of the study, a significant 96.1% of the participants were experiencing CMSP. Low back pain was the most frequent type of CMSP, which was reported by 60% of the participants ($p=<.001$).

A significant number of participants indicated that they obtained painkillers from the pharmacy without prescription (95.5%). Regarding the participants' responses to how often they used painkillers, 30.6% used painkillers less than every week, 42.3% used painkillers every week, but not daily, and 27% of participants used painkillers daily.

The participants were asked to select what directions they usually follow when it comes to self-medicating with OTC analgesics. The majority of the participants (54.5%) indicated that they only use OTC analgesics as directed by a pharmacist; some of the participants (51.8%)

indicated that they use their own experience of what helps relieve their pain; a further number (39.3%) indicated that they read the information insert inside the medication box. The percentages do not add up to 100% because the participants had chosen more than one option in the question.

Regarding the number of participants who responded to the use of different analgesics, most participants (70.3%) were using NSAIDs; followed by paracetamol only (57.7%); combination analgesics not easily obtainable without a prescription (54.1%); combination analgesics that can be obtained without prescription (41.1%); aspirin (15.3%) and other (0.9%).

It was determined that more participants (66.7%) indicated that they did not experience any side effects from the analgesics that they were consuming (p<.001).

Gender has shown to have an influence on self-administered analgesic use. It was found that there was a significantly larger number of females (86.2%) who used self-administered analgesics compared to males (69.1%) (p=.001). The age group 35–44 was found to be statistically more likely to use self-administered painkillers (88.9%), followed by those aged 65+ (88%) (p=0.48).

A significant number of Black participants (p=0.43) indicated that they did not use self-administered OTC analgesics (29.1%) and a significant number of participants who indicated “Other” also did not use self-administered OTC analgesics (44.4%) (p=0.43).

Conclusion

The findings from this study reinforce that primary care physicians, including chiropractors, need to take better initiatives in educating, providing better guidelines and promoting safe and effective OTC analgesic use to their CMSP patients. Considering that this study demonstrated a high prevalence of CMSP, and a high prevalence of OTC analgesic use, it is important that chiropractors understand patients with chronic pain and why they may make certain decisions. Seeking additional pain relief options like chiropractic treatment for CMSP earlier may help reduce reliance on OTC analgesic medication.

Keywords: Chronic pain, chronic musculoskeletal pain, self-medication, analgesics, over-the-counter, prevalence

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CHAPTER ONE INTRODUCTION

1.1 BACKGROUND

Chronic pain is considered a major public health concern globally (Reis *et al*. 2019; Kinney *et al*. 2020; Zhang *et al*. 2021), with chronic musculoskeletal pain (CMSP) being the greatest contributor of chronic pain conditions (Reis *et al*. 2019). CMSP results in decreased quality of life, affects normal daily activities, a loss of productivity, increased work absenteeism and increased health care expenses (Ahenkorah *et al.* 2019; Tang *et al.* 2020; Zhang *et al.* 2021).

Between 20%–33% of the global population suffer from CMSP (Zhang *et al*. 2021). The prevalence and the effects of CMSP have been reported in several studies across the world (Zitko *et al.* 2021; Kinney *et al.* 2020; Bezerra *et al*. 2018; Enthoven *et al.* 2016; Dueñas *et al.* 2015; Block and Cianfrini 2013). In South Africa, CMSP significantly contributes to years lived with disability, with low back pain and neck pain being the leading cause (Ernstzen, Hillier and Louw 2019). In a study conducted in Tshwane, South Africa, the prevalence of chronic pain was 41%, and the cause was most frequently low back pain (30%) and joint pain (23.48%) (Rauf *et al.* 2012). There is a negative impact on the lives of those who suffer from chronic pain, with 41% of patients being unable to work due to high levels of disability (Howarth *et al.* 2019).

Due to the burden of many diseases in South Africa, health-care resources are prioritised accordingly, leaving minimal resources available to manage and prevent CMSP (Adebajo and Gabriel 2010). Living with chronic pain proves to be a considerably difficult task in South Africa due to the majority (80%) of the population being serviced by the public healthcare system often in the form of primary healthcare (PHC) clinics (De Villiers, Maree and Belkum 2015).

Private health insurance in South Africa covers less than one sixth of the population (Macha *et al.* 2012). It is mainly the higher income population group and a smaller portion of middle-income group who often take out a minimum benefit cover (Macha *et al.* 2012). This minimum benefit cover, however, does not cover treatment offered by complementary practitioners, such as chiropractors, leaving lower income and middle-income chronic pain patients to seek care from more affordable clinics, such as the Durban University of Technology Chiropractic Day Clinic (DUT CDC), where treatment is offered at reduced rates. These are often the people who rely on self-medication due to their limited access to private healthcare providers (Sandler 1990).

Recommendations for the management of CMSP include exercise and the use of analgesics, such as non-steroidal anti-inflammatory drugs (NSAIDs), or more potent analgesics, including the opioids (Enthoven *et al.* 2016). Amongst those suffering from CMSP it is common to self-medicate with analgesics (Tang *et al*. 2020). Self-medication includes taking medication without a doctor's instruction or supervision (Li *et al.* 2014).

Over-the-counter (OTC) medicines are medicines that do not require a prescription and can be purchased from pharmacies and some at supermarkets (Moore *et al*. 2015; Abdi *et al*. 2018; Hange *et al*. 2022). OTC analgesics in particular help patients manage their own chronic pain symptoms. OTC medicine use can be a problem when misused. The misuse of analgesics includes extended usage of the drug past the recommended duration, increased dosages and its use for the incorrect indication (Myers, Siegfried and Parry 2000). Self-administered OTC analgesics can cause harm to the patient, either in misuse or causing a delay in the diagnosis of a more sinister underlying problem, by masking the pain and symptoms (Essa *et al.* 2019).

The common reasons patients self-medicate with OTC analgesics is the easy access to these medications; previous experience with treating their condition; and financial and economic difficulties which prevent visiting a primary physician (for more potent analgesics), especially in developing countries (Abdi *et al.* 2018). In a study conducted in South Africa, it showed analgesics were the only form of treatment received in 90% of cases among those who were suffering from low back pain (Ahenkorah *et al.* 2019).

The misuse and dependency of analgesics constitute a high international public health problem (Said, Elander and Maratos 2019). Studies have demonstrated an increase in the usage of OTC analgesics in western countries. Analgesic use in women increased from 54%–60% and from 29%–37% in men over a period of six years (Samuelsen *et al.* 2015). In pain clinics in the United States, the reported analgesic dependency ranges from 7%–31% (Kahan *et al*. 2006).

Research performed amongst Aston University students in the United Kingdom, concluded that amongst the general student population, students lacked basic understanding of popular analgesics, they were not aware of the risks or contraindications that are associated with common drugs, nor do they know the type of analgesic that is contained in popular brands (Golar 2011).

There are many studies that looked at the prevalence of self-medication of OTC analgesics using population-based studies (Sanchez-Sanchez *et al.* 2021; Marttinen *et al*. 2021) and some among health science students at universities (Abdi *et al*. 2018; Essa *et al.* 2019); however, these do not focus on the prevalence of self-medication among those with CMSP.

There appears to be limited research conducted in South Africa with regards to the prevalence of self-administered OTC analgesic use among patients with chronic pain, especially within a chiropractic clinic setting where the treatment of chronic pain consumes a large portion of primary care (Patel *et al.* 2016).

It has also been noted in the literature that information and research needed to quantify the scale of misuse is currently lacking (Cooper 2011). Primary care physicians including chiropractors who more frequently treat chronic pain are thus best suited to ascertain this by assessing the attitudes, knowledge and practices regarding self-administered OTC analgesic amongst patients suffering from CMSP (Patel *et al*. 2016).

1.2 RATIONALE

There is limited research on the prevalence of using OTC medication in South Africa (Myers, Siegfried and Parry 2000). In South Africa, studies on analgesic misuse are mostly accounted for using OTC codeine-containing drugs (Myers, Segfried and Parry 2000). Thus, research is needed to quantify the scale of use and/or misuse of various OTC analgesic medication. Furthermore, to the researcher's knowledge, there has been limited research conducted in South Africa with regards to the knowledge, attitude and practice regarding self-administered OTC analgesic use among patients with chronic pain attending a chiropractic clinic.

This research would be beneficial to chiropractors and other healthcare providers managing patients who suffer from chronic pain in terms of understanding analgesic misuse, and enable them to create awareness on the extent of misuse and potentially decrease the prevalence of misuse and promote safe analgesic use. This study's findings can further challenge the chiropractic profession to enhance their management protocols for chronic pain.

1.3 PROBLEM STATEMENT, STUDY AIMS AND OBJECTIVES

1.3.1 Problem Statement

The treatment of chronic pain consumes a large portion of PHC time (Patel *et al.* 2016), and chiropractors, as PHC providers, are able to manage chronic pain and decrease perceived pain and levels of disability (Wilkey *et al*. 2009). There is an increase in the use of OTC analgesics for the treatment of chronic pain, with a lack of basic knowledge amongst users with regards to contra-indications, side effects, ingredients which can result in misuse. The purpose of this study is to identify the prevalence, knowledge, attitude and practice of self-administered OTC analgesic use among patients with chronic pain attending a chiropractic

clinic. The findings of this study will assist in providing information to chiropractors and other primary health care physicians who regularly manage patients with chronic pain, assisting in creating awareness on the extent of use or misuse of OTC analgesics.

1.3.2 Aim of Study

The aim of the study was to investigate the prevalence, knowledge, attitude and practice of self-administered OTC analgesic use among patients with CMSP attending the DUT CDC.

1.3.3 Objectives

The objectives of the study were:

1. To determine the point and period of the prevalence of analgesic use (within the last month and within the last six months).
2. To determine if the demographics (age, sex, race, socio-economic status, private or public healthcare and education level) of the participants have an influence on OTC analgesic use.
3. To determine the intensity of CMSP in these participants.
4. To determine how CMSP affects daily activities in these participants.
5. To determine which self-administered analgesics are most commonly used.
6. To determine the participants' knowledge of the analgesic they are consuming by asking where analgesics were obtained and what directions they follow when using analgesics.
7. To determine the participants' attitudes towards the analgesic they are consuming by asking if they are satisfied with the analgesics they are using and if the participants experience any side effects from the analgesic they are using.
8. To determine the participants' practice of the analgesics they are consuming by determining the frequency of use, if participants use more than one different type of analgesic at a time, and the amount of time that participants have been self-medicating.

1.4 FLOW OF DISSERTATION

Chapter one has provided an introduction to the study and included the problem statement, background, rationale, aims and objectives, and delimitations of the study

Chapter two provides a review of the relevant literature for this study

Chapter three provides the methodology followed in this study

Chapter four presents the analysis of the data in the form of tables and figures.

Chapter five discusses the results relevant to the current literature.

Chapter six provides the conclusion, recommendations and limitations of the study.

CHAPTER TWO LITERATURE REVIEW

2.1 INTRODUCTION

Pain normally serves an adaptive role, preventing harm to oneself, but it can have negative effects on normal function, psychological and social activities. Pain is always a personal experience varying in degree and it is influenced by many factors (Raja *et al*. 2020). Chronic pain is defined by the International Association for the Study of Pain (IASP) as pain that is persistent or flares up beyond the normal period of three months required for tissue healing; this includes nociceptive pain and neuropathic pain or a combination of the two (Merskey and Bogduk 1994; Bonezzi *et al.* 2020; Raja *et al*. 2020). Recently, an additional descriptor, nociplastic pain, has been added to classify patients with chronic pain syndromes, such as nonspecific back pain that persists, in which altered central pain modulation results in central sensitisation and chronic pain in the absence of damaged tissue (Bonezzi *et al.* 2020).

Chronic pain is one of the most common reasons adults seek out primary care physicians. It is multidimensional in etiology and the effects on the individual, such as a negative effect on activities of daily living and fear avoidance behaviour, must be addressed in management and further research (Smith *et al.* 2001; Hadi, McHugh and Closs 2018). It has been linked to loss of mobility and activities of daily living, dependance on analgesics, anxiety, depression and reduced quality of life (Dahlhamer *et al.* 2018). Chronic low back pain is often considered one of the most common examples of chronic pain and is frequently treated by chiropractors.

Current recommendations for the management of CMSP comprise of exercise and the use of analgesics, such as NSAIDs or more potent analgesics, including the opioids (Enthoven *et al.* 2016). A wide variety of analgesics are available without prescription and are sold OTC. These OTC analgesics allow patients to manage their pain by themselves.

Patients commonly self-medicate with OTC analgesics due to previous experience with the condition; the ease of access of OTC analgesics; and financial and economic difficulties which prevent the patient from visiting a primary physician, especially in developing countries (Abdi *et al.* 2018). Using OTC analgesics can cause harm either by misuse of the analgesics or by masking the patients' pain and symptoms causing a delay to the hospital for a more sinister underlying problem (Essa *et al*.2019).

2.2 TYPES OF PAIN

2.2.1 Introduction on types of pain

Pain is defined as an unpleasant sensory and emotional experience resembling or associated with actual or potential tissue damage. Pain is a personal experience, influenced by social, biological and psychological factors. Although pain can serve an adaptive role, it can have poor effects on a person's well-being and function (IASP). Pain can be broken down into a variety of different types by cause, distribution and period of time it is present.

2.2.2 Nociceptive Pain

Nociceptive pain is pain or discomfort that is experienced once a nociceptor in non-neural tissue has been activated by either actual tissue damage or threatened damage; this is often a result of external trauma, such as sprains, inflammation, myofascial pain, bruises and bone fractures (Van den Eynde 2020). It is felt as a localised, constant or throbbing pain. Nociceptive pain responds well to treatment with analgesics such as NSAIDS (Kim *et al.* 2020).

2.2.3 Neuropathic Pain

Neuropathic pain is caused by disease or a lesion of the somatosensory nervous system, where there is compression occurring on nerves or nerve roots. Neuropathic pain follows a logical neuroanatomical pain pattern and can be described as ongoing burning, shooting or pricking. It is a complex condition also associated with increased sensitivity to pain stimuli (Finnerup, Kuner and Jensen 2020).

2.2.4 Nociplastic Pain

Nociplastic pain was put forward as a descriptor for chronic pain, where there is pain that comes about from an altered nociception resulting in increased sensitivity, despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors, or evidence for disease or lesion of the somatosensory system causing the pain. Patients often have a combination of nociceptive and nociplastic pain (Fitzcharles *et al.* 2021).

2.2.5 Central Sensitisation

Central sensitisation is an aspect of chronic pain, where there is a generalised hypersensitivity of pain pathways of the central nervous system, where little or no stimulation of the pain receptors in the body is enough to trigger the perception of pain (Arribas-Romano *et al.* 2020). Not only does it take little to no stimulation to trigger a pain

pathway, the pain experienced is also widespread and at a heightened level (Griensven *et al.* 2020).

2.3 CHRONIC MUSCULOSKELETAL PAIN

Chronic (non-cancer) musculoskeletal pain is defined as recurrent or persistent pain coming about from musculoskeletal structures, such as joints, bones and muscles and related soft tissue (Zhang *et al*. 2021, Treede *et al*. 2015). It is usually a result of previous injury or disease, but chronic pain is not simply an accompanying symptom but its own condition (Mills *et al*. 2019).

The ICD-11 classification introduced an idea of primary and secondary musculoskeletal pain that has integrated biomedical, psychological and socio-demographic factors that make up the complexity of CMSP (Perrot *et al*. 2019).

Chronic primary musculoskeletal pain is defined as chronic pain in the bones, joints, muscles and tendons that recurs or persists for over three months and is associated with functional disability or emotional distress (Koechlin *et al.* 2019).

Chronic secondary musculoskeletal pain is defined as a symptom that comes about from an underlying cause, such as a disease. This secondary musculoskeletal pain originates in ongoing nociception in musculoskeletal structures from systemic, local etiologies or it may be related to a deep somatic lesion. The cause can also be from inflammation, biomechanical consequences of disease of the nervous system or by structural changes (Perrot *et al*. 2019).

CMSP is considered a complex sensory and emotional experience that is different from person to person and can depend on the psychological state of the person with regards to the severity of pain experienced (Reis *et al*. 2017). Commonly in CMSP there is altered functioning of the processing of the central nervous system showing features of central sensitisation (Arribas-Romano *et al.* 2020).

CMSP is one of the world's major health, economic and social problems (Reis *et al*. 2017), with low back pain being the most common cause, with a point prevalence of 9.4%, followed by neck pain (4.9%). CMSP leads to a decrease in psychosocial and physical health, decreased daily function and quality of life (Reis *et al*. 2017).

2.4 PREVALENCE OF CHRONIC MUSCULOSKELETAL PAIN

The WHO has stated that 20%–30% of the world's population suffer from some form of CMSP, with low back pain being the main contributor to the overall burden of

musculoskeletal conditions (World Health Organization 2022). Low back pain is considered the most common cause of chronic pain, affecting over 80% of the global population at least once in their lifetime (Enthoven *et al.* 2016).

More than 100 million adult Americans live with chronic pain (Block and Cianfrini 2013) and only one third report CMSP (Kinney *et al*. 2020). In the United Kingdom, more than 14 million adults suffer with chronic pain (United Kingdom Department of Health and Social Care 2012). The prevalence of chronic pain in the Spanish population is known to vary between 10%–50% and is recognised as a serious public health problem as it conveys a socio-economic burden by impacting the person of interest and their social environment as well (Dueñas *et al.* 2015). A study conducted in Brazil showed a prevalence of CMSP being between 26.5%–20.1% (Bezerra *et al.* 2018). A study conducted in Chile reported that CMSP affects a fifth of their adult population, with chronic low back pain being the most common form (Zitko *et al.* 2021).

Within a low-income community in South Africa, the prevalence of chronic pain amongst adults was reported as being as high as 47.1% (Imgumbor *et al.* 2011). Another study on female South African miners demonstrated a prevalence of musculoskeletal pain of 50.22% (Kabongo and Naidoo 2021). In a study conducted at the pain control unit at the Universitas Hospital in Bloemfontein, South Africa, 49.28% of the participants had been diagnosed with chronic low back pain and 23.19% with chronic myofascial pain syndrome (Walker, Odendaal and Esterhuyse 2006). In a study conducted in Tshwane, South Africa, involving four PHC clinics, the prevalence of chronic pain was 41% and the cause was most frequently low back pain (30%) and joint pain (23.48%) (Rauf *et al.* 2012).

2.5 IMPACT OF CHRONIC MUSCULOSKELETAL PAIN

There is a negative impact on the lives of those who suffer from chronic pain, with 41% of patients being unable to work due to high levels of disability (Howarth *et al.* 2019). Musculoskeletal pain results in 46% of work place absences in Norway (Sandanger *et al.* 2000). CMSP is documented to have a significant emotional and financial burden on both the individual and society (Staelin, Koneru and Rawe 2017).

In South Africa, CMSP significantly contributes to years lived with disability, with low back pain and neck pain being the leading cause of years lived with disability (Ernstzen, Hillier and Louw 2019). In sub-Saharan Africa, low back pain is the second largest cause for disability resulting in large economic costs from health care expenses, decreased productivity of workers and work absenteeism (Ahenkorah *et al.* 2019).

In a study conducted at the pain control unit at the Universitas Hospital in Bloemfontein, South Africa, it was determined that the degree in which chronic pain affected the ability of the South African participants to continue with normal daily activities was significantly higher than that of a comparable American sample, by a level of 5% significance (Walker, Odendaal and Esterhuyse 2006).

It was reported that living with chronic pain in South Africa proves to be a considerably difficult task due to the majority (80%) of the population being serviced by the public healthcare system often in the form of PHC clinics (De Villiers, Maree and van Belkum 2015). South Africa's health care system is understaffed and overburdened (van der Hoeven, Kruger and Greef 2012). These primary health care clinics focus mainly on communicable diseases such as HIV and AIDS, Tuberculosis and Hypertension, leaving chronic pain to be poorly managed (De Villiers, Maree and van Belkum 2015).

2.6 RISK FACTORS FOR CHRONIC MUSCULOSKELETAL PAIN SOCIO-DEMOGRAPHIC RISK FACTORS

2.6.1 Age

While there is a gap in the research looking at chronic pain in children and adolescents, international studies reported that chronic pain prevalence increases with advancing age (Orhan *et al.* 2018, Mills *et al.* 2019). With an increase in age comes many co-morbidities and also an increased likelihood that the person has experienced an injury during the course of their life that has triggered chronic pain (Mills *et al.* 2019).

Looking at a prevalence study of CMSP among adults in Brazil, it was found that the prevalence (36%) was significantly higher among the elderly compared to other age groups, and when compared to young adults it was 26% higher in the elderly (Bezerra *et al.* 2018).

With the prevalence of CMSP rising with increasing age, it is twice as common in those over 75 years of age compared to the 25–34 year age group (Schnitzer 2006).

However, pain is not limited to the older population, in a study that was conducted across 42 countries it was determined that 20.6% of the adolescent population reported having chronic pain and 30% were amongst people aged 18-39 years old (Mills *et el.* 2019). Chronic pain in younger age groups can be due to increased stress, decreased movement and exercise and sleep deficiency these factors decrease pain threshold, increasing pain sensitivity (Kamper *et al* 2016). Sleep deficiency has also been linked to the development of acute pain into chronic pain (Andreucci *et al* 2021, Kamper *et al* 2016).

In a study conducted at the pain control unit at the Universitas Hospital in Bloemfontein, South Africa 80,31% of the patients being treated for chronic pain were 40 years or older, with the total range being 20–84 years old (Walker, Odendaal and Esterhuyse 2006).

In a study conducted in rural South Africa, it was shown that the prevalence of chronic pain increased significantly in both males and females over the age 55 years old. However, there was also an increased prevalence among the youngest age group of 24 years old and younger (Igumbor *et al.* 2011).

In a study conducted at a PHC centre in Tshwane, South Africa, looking at the prevalence of chronic pain among patients it was shown that chronic pain was significantly higher among elderly patients. This was seen in those aged 61–80 years old, where 65,56% experienced chronic pain compared to the younger age groups (Rauf *et al.* 2013).

2.6.2 Sex

Some studies have demonstrated that women are more likely to experience chronic pain than men (Orhan *et al.* 2018, Mills *et al.* 2019). One such study demonstrated that women experienced a greater pain intensity and more sites involved than men (Mills *et al.* 2019). Women have also shown to experience a poorer functional ability (Mills *et al.* 2019). In a study in a pain clinic, there were twice as many females attending than males, demonstrating that that women were more likely to seek treatment for their pain than men (Mills *et al.* 2019).

In a prevalence study conducted in Brazil, it was shown that CMSP was significantly higher among females (40%) than men (Bezerra *et al.* 2018). In a survey conducted in Hong Kong, the prevalence of CMSP was higher among females (54.8%) compared to males (45.2%) (Tang *et al.* 2020). In a study conducted in Chile, as part of the Chilean national health survey in 2017, it showed a significantly higher prevalence of CMSP in females (27.9%) compared to males (15.2%) (Zitko *et al.* 2021).

In a study conducted at the pain control unit at the Universitas Hospital in Bloemfontein, South Africa, out of the 325 participants with chronic pain, 60,23% were female (Walker, Odendaal and Esterhuyse 2006). Also, in a study conducted in rural South Africa, it was shown that females reported a significantly higher prevalence (46.2%) of chronic pain compared to males (37.1%) (Igumbor *et al.* 2011).

In another study conducted at a PHC centre in Tshwane, South Africa looking at the prevalence of chronic pain among patients, where the most common types of pain experienced were low back pain and joint pains, it was shown that the prevalence of chronic

pain was significantly higher among females (46.59%) compared to in males (34.65%) (Rauf *et al.* 2013).

In a study on CMSP comparing South Africa to Uganda, it was shown that the prevalence of moderate (43.5%) and severe (19.3%) pain in South Africa and Uganda was significantly higher in females compared to males (Wang *et al.* 2018).

2.6.3 Education

In a population study conducted in the United Kingdom, people who have lower levels of education were more likely to experience chronic pain compared to those who had a higher education level (Mills *et al.* 2019).

In a prevalence study conducted in Brazil, looking at the prevalence of CMSP among adults, it was shown that those with a lower schooling level experience significantly more CMSP (28.7%) than those with a higher education (Bezerra *et al.* 2018). A similar finding was demonstrated in a study conducted at the pain control unit at the Universitas Hospital in Bloemfontein, South Africa. In this study, 73.38% of patients with chronic pain reported having completed 12 years or less of formal education and 26.62% reported having some form of tertiary education, showing that those with a lower level of education showed a higher prevalence for CMSP (Walker, Odendaal and Esterhuyse 2006).

2.6.4 Ethnicity

In a large-scale study conducted in the United Kingdom on 500 000 people, White people were less likely to report chronic pain and were found to experience less pain related disability compared to Black patients (Mills *et al.* 2019).

In a prevalence study of CMSP conducted in Brazil, individuals that self-reported as indigenous to Brazil reported significantly more CMSP (37%) than those who self-reported as White (Bezerra *et al.* 2018).

In a large population-based epidemiological study conducted in Europe, it showed that CMSP was more prevalent in those individuals who were non-White (Orhan *et al.* 2018).

2.6.5 Socio-Economic Risk Factors

Chronic pain prevalence was found to be significantly higher in developing countries in comparison to developed countries (Mills *et al.* 2019). Population studies conducted in the United Kingdom showed that those who are socio-economically deprived are more likely to experience chronic pain and have greater levels of pain related disability than those who are more affluent (Mills *et al.* 2019).

Additionally, in a population study, it was found that, of those who were unemployed, 78.9% reported having chronic pain and 39.8% of those who were employed reported having chronic pain (Mills *et al*. 2019).

In a prevalence study of CMSP conducted in Brazil, it was shown that those individuals who were unemployed (26.4%) and those living in rural areas (24.5%) reported significantly higher prevalence of CMSP (Bezerra *et al.* 2018).

In a large population based epidemiological study conducted in Europe, it showed that CMSP was more prevalent in those individuals who were from a lower socio-economic status than those who were living in more affluent areas (Orhan *et al.* 2018).

2.6.6 Psycho-Social Risk Factors

Negative beliefs about pain, anxiety and depression are all related to developing chronic pain, and having more severe symptoms (Buscemi *et al.* 2019, Mills *et al.* 2019). Depression has been shown to have a strong link with chronic pain, where 20%-50% of patients with chronic pain have co-morbid depression. Fear and anxiety about pain are linked to an increased chance in developing chronic pain and a poorer prognosis of recovery (Mills *et al.* 2019).

In a study conducted in Brazil looking at the prevalence of CMSP among adults, it was shown that among those individuals with CMSP, 45% were also suffering from depression (Bezerra *et al*. 2018).

Increased stress levels have also been strongly associated with CMSP (Orhan *et al.* 2018, Buscemi *et al.* 2019). Stressors can include being unemployed or having high job demands, both of which have been strongly associated with developing chronic neck, shoulder and low back pain (Buscemi *et al.* 2019).

2.7 TREATMENT OF CHRONIC MUSCULOSKELETAL PAIN

Chronic pain can be a debilitating condition and is difficult to manage (Samuelsen *et al.* 2016). The recommended management of chronic pain is exercise with use of analgesics when necessary. The most common analgesics used are either the NSAIDS or opioids (Enthoven *et al.* 2016; Schnitzer 2006). The most prevalent CMSP condition, low back pain is primarily treated with paracetamol or NSAIDS which are OTC analgesics (Staelin, Koneru and Rawe 2017).

Many individuals with CMSP rely on OTC analgesics to treat their pain (Saragiotto *et al.* 2016; Staelin, Koneru and Rawe 2017; Tang *et al.* 2020; Marttinen *et al.* 2021). In a survey

conducted by Arthritis UK, it was shown that only 45% of the participants who were using OTC analgesics were satisfied with the medications (Staelin, Koneru and Rawe 2017).

Apart from analgesic use, other methods are also sought for treating chronic pain. An informed patient-centred; multidisciplinary approach is important in the management of chronic pain (Mills *et al.* 2019). Being able to identify modifiable risk factors may allow prevention of acute pain in to chronic pain (Mills *et al.* 2019). Complementary medicine is also sought for the treatment of musculoskeletal pain, of which the most frequent includes chiropractic care (Artus, Croft and Lewis 2007). In a study that was conducted in Cape Town, South Africa, amongst participants with chronic low back pain, the results indicated that 90% of the participants received analgesics as their only form of treatment and very few received patient education or advice on how to better manage their CMSP (Ahenkorah *et al.* 2019).

An approach to the management of chronic pain that is more holistic, multidisciplinary and patient driven (Staelin, Koneru and Rawe 2017) has shown better short-term and long-term pain relief than that with purely medical interventions, such as analgesics (Walker, Odendaal and Esterhuyse 2006). Within a South African context, the attainment of this ideal is very difficult, where there is limited financial resources, a wide geographical distribution of patients and shortages of the appropriate expertise (Walker, Odendaal and Esterhuyse 2006). Due to the burden of many diseases in South Africa, health-care resources are prioritised accordingly, leaving minimal resources available to manage and prevent musculoskeletal pain effectively (Adebajo and Gabriel 2010).

2.8 OVER-THE-COUNTER ANALGESIC USE

Analgesics are drugs that are used to relieve pain. These include NSAIDS, paracetamol, aspirin, steroids, opioids and antidepressants, such as amitriptyline (Kim *et al.* 2020). In South Africa, schedule 0 medications are sold in supermarkets and general stores (Padayachee *et al*. 2019); these include paracetamol and aspirin. Schedule 1 and 2 medications are sold OTC at pharmacies, these include certain NSAIDs and combination analgesics which often contain low doses of codeine (Padayachee *et al*. 2019; Carney *et al*. 2016).

Over-the-counter analgesics are analgesics that are available without a prescription (Moore *et al.* 2015; Abdi *et al.* 2018). The sale of OTC medication allows patients to self-medicate and manage their own symptoms easily (Li *et al.* 2014). They are the most commonly used drugs to manage chronic pain, with studies showing an increase in the usage of OTC analgesics in western countries. Analgesic use in women increased from 54%–60% and

from 29%–37% in men over a period of six years (Samuelsen *et al.* 2015). In Sweden, looking at the usage of OTC analgesics in women, it was shown that there was a significant increase in usage from 26%–58% over a 12 year period, where the use of Paracetamol had increased threefold (Hange *et al.* 2022).

The reasons cited for the frequent use of OTC analgesics in developing countries include financial difficulties for visiting a physician, a lack of time to wait in lines at public clinics or hospitals and the easy access to OTC medications (Abdi *et al.* 2018).

Previous studies showed a high prevalence of self-administered analgesic use worldwide among healthcare students (Essa *et al.* 2019; Abdi *et al.* 2018; Albusalih *et al.* 2017). It is noted that 79.9% of healthcare students in Serbia University self-medicate (Essa *et al.* 2019). The study found that the most commonly used groups of medications were acetaminophen (paracetamol) and NSAIDs. Students were using an average of 3.45 drugs at a time as well as increased doses of analgesics. The self-medication of analgesics included both OTC analgesics and those prescribed by a physician. These students face high risks of adverse side effects and drug interactions as they are using multiple analgesics and their knowledge of drug interactions, side effects and contraindications was found to be low (Essa *et al.* 2019).

Similarly, in the United Kingdom, university students were found to lack basic understanding of common analgesics and they were unaware of the side effects and contraindications associated with these common drugs (Golar 2011). Although self-medication is common among all students, those with a higher education level in the health science department have shown to be more responsible with self-administered analgesic users **(**Klemenc-Ketis, Hladnik and Kersnik 2009).

In a review of 28 publications on self-medication among the elderly, the prevalence of self-medication of analgesics was found to be between 20%–60%. and the usage of analgesics was associated with being female and having difficulties with performing normal activities of daily living (Perrot *et al.* 2018). The increased prevalence of self-medication in the elderly is also due to an increase in co-morbidities (Perrot *et al.* 2018). Contrary to this, a study in Pakistan showed that people aged 20–25 years were more likely to self-medicate using OTC oral analgesics despite their lack of knowledge with regards to side effects and contraindications. In Pakistan, it was also noted that it is the educated community that prefer OTC drugs to avoid paying for a doctor’s consultation for something deemed mild enough to self-medicate (Li *et al.* 2014).

In developing countries, however, patients might lean towards self-medication due to lack of medical staff thus leading to growing concerns of misuse from a lack of knowledge of the

medication (Li *et al.* 2014). In a survey conducted in Nevada, USA, amongst adolescents on their knowledge of analgesics and OTC drugs, it was reported that only 55% were able to interpret the drug information label, which raised concerns (Kelly *et al.* 2018).

In a survey conducted in Iran, amongst health science students, it was noted that self-medication was not associated with gender and that self-medication was observed in every person (Abdi *et al.* 2019). The study also concluded that the rate of self-medication was higher amongst students with a higher income and higher among students without any medical insurance than those who had access to medical insurance (Abdi *et al.* 2018).

In a review of 49 publications on OTC analgesic use, several risk factors were identified. These were a greater pain intensity, increasing age and being female (Perrot *et al.* 2018). This review also highlights that the usage of OTC analgesic is growing world-wide while there has been no associated improvement in health (Sanchez-Sanhez *et al.* 2021).

In a study conducted in South Africa which looked at the OTC analgesic usage among runners, it was determined that the prevalence was high, with 64% of runners using OTC analgesics and 17% using more than one concurrently. NSAIDs were the most commonly used analgesic (71%) followed by combination analgesics and paracetamol (Thorpe, Blockman and Burgess 2021).

There is little research on the knowledge attitude and practice regarding OTC analgesic usage in South Africa. Further investigations are required to understand the use and misuse of OTC analgesics to provide better guidelines, education and promote safe and effective OTC analgesic use (Kawuma *et al.* 2021).

2.9 OTC ANALGESIC MISUSE

OTC analgesics are relatively safe to use when done so appropriately (Perret *et al.* 2018). However, self-medication has led to a misuse of analgesics (Li *et al.* 2014). The misuse of analgesics includes extended usage of the drug past the recommended duration, increased dosages and its use for the incorrect indication (Myers, Siegfried and Parry 2000). While self-medication of OTC analgesics is expected to be safe and efficient, misuse due to interactions, contraindications or prolonged use should not be overlooked (Perrot *et al.* 2018). Misuse of OTC analgesics increases the risk of side effects and becoming reliant on the drug (Thorpe, Blockman and Burgess. 2021).

2.10 OTC ANALGESIC USE IN CHRONIC MUSCULOSKELETAL PAIN

In a survey conducted amongst 500 participants with CMSP in Norway, participants were asked which OTC analgesics they had taken in the previous week. Of these participants, 95% had non-specific myofascial pain syndrome and 5% had osteoarthritis. The results revealed that 32% had taken NSAIDs, 20% had used a codeine containing product, 15% paracetamol and 8% muscle relaxants (Holtedahl 2004).

In chronic conditions such as CMSP, that require long-term treatment, there is a consensus that paracetamol should be the first line analgesic due to its more favourable side effects than those of NSAIDs even though it is less effective as an analgesic (Schnitzer 2006).

For musculoskeletal conditions such as back pain, degenerative arthritis and soft tissue rheumatism, which all favour a natural history and require a need for symptomatic treatment, the use of self-management and analgesics have been recommended as a first line treatment (Le Parc *et al.* 2002). The most commonly used OTC analgesics include aspirin, paracetamol and ibuprofen (Le Parc *et al.* 2002).

2.11 COMMON OTC ANALGESICS

2.11.1 Paracetamol

Paracetamol is one of the most commonly used OTC analgesics worldwide and is used to manage mild to moderate pain (Barriere *et al.* 2019, Dreyer *et al.* 2016). Paracetamol is a schedule 0 medication, meaning it can be obtained from supermarkets, convenience stores and pharmacies in South Africa (Department of Health South Africa 2003), making it easily accessible and cost effective (Padayachee *et al*. 2019). Paracetamol is a generally safe analgesic when used as directed (Van Rensburg and Reuter 2019; Dreyer *et al.* 2016). Due to paracetamol being so easily accessible, there is a perception of it being harmless (Eaves 2015). This perception may lead to misuse of the drug, which includes increased doses, taking it more frequently than what is recommended or using it for extended periods of time (Myers, Siegfried and Parry 2000). This may lead to unintentional poisoning or overdose, which is a common cause of acute liver failure or hepatotoxicity. Other side effects of paracetamol include kidney and liver damage, decreased platelet and white blood cell count and hypersensitivity, such as skin rashes (Cairns *et al*. 2019; Van Wyk 2016).

Analgesic effects of paracetamol occur through central and peripheral mechanisms of action. Paracetamol is responsible for an indirect inhibition of COX enzymes. Peripherally it decreases prostaglandin synthesis causing reduced transduction in the sensory nerves

resulting in a decreased transmission of painful stimuli, reducing the pain sensation. Centrally, paracetamol prevents the increase in central nervous system prostaglandins that are stimulated by peripheral pain stimuli (Van Rensburg and Reuter 2019).

2.11.2 Aspirin

Aspirin is a type of NSAID, a salicylic acid derivative, with Disprin® being a common OTC trade name. Aspirin is widely available in South Africa and, being a schedule 0 drug, it can be bought from local supermarkets, convenience stores and pharmacies (Department of Health South Africa 2003). Aspirin's uses include being an analgesic, anti-platelet, anti-inflammatory and anti-pyretic. Aspirin only has an anti-inflammatory effect at high doses of up to 5.4g per day, due to the increased possibility of adverse sides effects at high doses it is not normally used as an anti-inflammatory (Dreyer *et al.* 2016). Aspirin non-selectively inhibits both COX 1 and COX 2 enzymes, preventing the formation of prostaglandins and thromboxane and, as a result, it has therapeutic effects and side effects (Dreyer *et al.* 2016).

Aspirin possesses analgesic and anti-inflammatory effects which are helpful in the management of musculoskeletal pain (Schellack and Gani 2022).

2.11.3 Nonsteroidal Anti-Inflammatory Drugs

NSAIDs are a class of medications that are used as an anti-inflammatory, anti-pyretic and analgesic. These effects allow NSAIDs to help with managing arthritic conditions, muscle pain, gout, pyrexia and dysmenorrhea (Ghlichloo and Gerriets 2022, Dreyer *et al.* 2016). Their mechanism of action is too non-selectively inhibit cyclo-oxygenase (COX 1 and COX 2) enzymes preventing the formation of prostaglandins and thromboxane resulting in the therapeutic effects (Dreyer *et al.* 2016).

NSAIDs are divided into groups based on their selectivity and chemical structure: Salicylic acid derivatives (aspirin), Acetic acid derivatives (diclofenac, indomethacin, ketorolac), Propionic acid derivatives (ibuprofen, naproxen, ketoprofen), Oxicams (piroxicam, lornoxicam, meloxicam) and Fenamates (mefenamic acid) (Ghlichloo and Gerriets 2022, Dreyer *et al.* 2016). Aspirin is schedule 0 and easily accessible OTC. Most NSAIDs are schedule 3, meaning they require a prescription from a doctor to acquire them. However certain NSAIDs, such as diclofenac, ibuprofen, naproxen and piroxicam, can be prescribed OTC in limited quantities by a pharmacist. These usually do not exceed a maximum period of five days (Department of Health South Africa 2003).

Adverse effects of NSAIDs include gastric side effects (nausea, abdominal pain, vomiting, ulcer formation and erosion); renal side effects with long-term use and large doses (renal damage, worsened hypertension, cardiac failure and angina pectoris); haemorrhage

(increased blood clotting time); central nervous system side effects (headaches, dizziness, drowsiness, confusion and mental depression); and bronchoconstriction in patients with a history of asthma (Dreyer *et al.* 2016).

NSAIDs are of the most commonly consumed OTC analgesic globally; this may be attributed to its accessibility as an OTC analgesic (Thorpe, Blockman and Burgess 2021). In an American survey, ibuprofen or ibuprofen containing analgesics were found to be the most commonly used OTC NSAID. They were also frequently used inappropriately, where it was documented that 44% of participants consumed more than the recommended dosage on the label (Perrot *et al.* 2018).

In a United Kingdom epidemiology study, one of five people over the age of 65 years were taking NSAIDs such as ibuprofen. It was suggested that ibuprofen offered effective short-term pain relief in musculoskeletal conditions but it had little efficiency in complicated low back pain (Schnitzer 2006).

2.11.4 Selective COX 2 Inhibitors

Selective COX 2 inhibitors are a group of NSAIDs that selectively block the COX 2 isoenzyme therefore decreasing the gastrointestinal side effects. They are equal to NSAIDs in terms of analgesic, anti-pyretic and anti-inflammatory properties. Types of selective COX 2 inhibitors include, celecoxib (Celebrex®), etroicoxib (Arocxia®) and parecoxib (Rayzon®) (Dreyer *et al.* 2016).

Like the non-selective NSAIDs, this group of drugs are only available as OTC in limited quantities (Department of Health South Africa 2003).

The side effects of selective COX 2 inhibitors include an increased risk for cerebrovascular and cardiovascular adverse events after prolonged use due to the inhibition of anti-platelet and vasodilatory prostacyclin that causes platelet aggregation and vasoconstrictor effects of thromboxane to prevail (Dreyer *et al.* 2016).

2.11.5 Combination Analgesics

Over-the-counter combination analgesics typically contain codeine in combination with paracetamol, aspirin or other NSAIDS. The reason for this combination is to reduce the need for increased doses for analgesia as the combination results in a synergistic effect (Shaheed, Maher and McLachlan 2016).

These combination analgesics are widely available from pharmacies and are commonly used to manage pain conditions such as headaches or musculoskeletal pain (Shaheed, Maher and McLachlan 2016).

2.12 SIDE EFFECTS OF ANALGESICS

In a Norwegian study, it was noted that the long-term effects of using analgesics had not been largely investigated (Samuelsen *et al.* 2016). OTC analgesics can lead to adverse reactions and side effects and, especially when incorrect self-diagnoses have been made, a person is consuming incorrect dosages or as a result of interactions with other medications (Sanchez-Sanchez *et al.* 2021). However, side effects are well known and have been particularly associated with NSAIDs (Samuelsen *et al.* 2016).

A study conducted at a French academic hospital showed that 2% were experiencing adverse effects after consuming self-medication and of those it was mainly because of consuming NSAIDs, and patients presenting with gastro-intestinal complications (Perrot *et al*. 2018).

In recent years, COX-2 inhibitors have been linked to serious cardiovascular, cardiorenal and cutaneous adverse reactions, particularly when used over long periods. Increased caution should be taken when using COX-2 inhibitors and non-selective NSAIDs, especially those considered high risk, such as having hypertension or congestive heart failure (Schnitzer 2006).

Documented adverse effects from codeine containing combination analgesics include renal impairment, haemorrhage and more commonly, tiredness, nausea and an irritated stomach (Shaheed, Maher and McLachlan 2016).

In a study conducted on patients with musculoskeletal pain, in France, taking OTC analgesics, it was shown that of those patients taking aspirin, 20.5% reported adverse side effects; 17% of those using paracetamol and 15% of those taking ibuprofen reported adverse effects. The dose used were the approved doses for OTC analgesic treatment in France and other countries (Le Parc *et al.* 2002). The side effects included abdominal pain, dyspepsia, digestive complications and few neurological symptoms. Overall, ibuprofen demonstrated the lowest adverse side effects (Le Parc *et al.* 2002).

2.13 CONCLUSION

Primary care physicians see chronic pain patients more frequently, thus allowing them to assess the attitude, knowledge and practice of self-administered OTC analgesic use in pain management (Patel *et al.* 2016). There appears to be limited research conducted in South Africa with regards to the prevalence of self-administered OTC analgesic use among patients with chronic pain, especially within a chiropractic clinic setting.

The treatment of chronic pain takes up a large amount time of primary care (Patel *et al.* 2016) and chiropractors and chiropractic student interns, as PHC providers, are able to manage chronic pain and decrease perceived pain as well levels of disability (Wilkey *et al.* 2009). This information would be beneficial to chiropractors and other healthcare providers managing patients who suffer from chronic pain in terms of creating awareness on the possibility and extent of misuse, thus further challenging the chiropractic profession to enhance the management protocols for chronic pain.

CHAPTER THREE METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the methodology that was followed during the study. It includes the study design, permissions sought, study population and setting and study location. The method and procedures for participant recruitment, sampling, measurement tools are also discussed. Focus group, pilot study, study procedures, COVID-19 protocols, data analysis and ethical considerations associated with this study are also presented in this chapter.

3.2 STUDY DESIGN

This study is a quantitative, descriptive cross-sectional study, whereby a survey was conducted (using questionnaires) to collect data and make statistical inferences about the population in question. Quantitative studies are beneficial to make general inferences about the general population. Cross sectional designs are used to assess the prevalence in clinical based settings, these studies are usually inexpensive and conducted relatively fast (Setia 2016). A systematic approach was used to obtain numerical data about the prevalence, knowledge, attitude and practice regarding self-administered OTC analgesic use among patients with CMSP attending a chiropractic clinic.

3.3 PERMISSION

Permission to conduct this research study was sought from the DUT research director (Appendix A), the chiropractic clinic director (Appendix B) and the DUT Institutional Research Ethics Committee (IREC) (Appendix C). Permission from the participant was obtained by providing the participant with information (Appendix E) and consent letters (Appendix F) first prior to permission for voluntary participation.

3.4 STUDY POPULATION AND SETTING

The participants recruited were patients who suffer from CMSP that attended the DUT CDC.

3.5 PARTICIPANT RECRUITMENT

Patients coming into the DUT CDC for treatment were recruited as participants for the study. The researcher was in the Clinic to place the information letter (Appendix E), consent forms (Appendix F) and the questionnaire (Appendix D) in the patient file before their appointment. Information (Appendix E) and consent letters (Appendix F) were provided prior to

permission for voluntary participation. Where the chiropractic students treating the participants were able to give the information letter (Appendix E), consent forms (Appendix F) and questionnaire (Appendix D) to the participants to fill out when they left to discuss with the clinician. Fellow chiropractic students who were treating patients in clinic were given information on the study via email and a presentation on the study and how they can assist via a Zoom meeting. The questionnaire contains questions that if the participant does not fit the inclusion criteria, they were able to stop answering and hand it in. The researcher was in the Clinic when the questionnaires were handed out to be able to answer any questions participants may have had. The questionnaire (Appendix D) and consent form (Appendix F) were returned to the patient file and handed in to reception, where the files were placed in quarantine for 24 hours due to COVID-19 safety protocols that were in place.

3.6 SAMPLING

3.6.1 Sample Size

After email communication with a biostatistician, the sample size of 300 participants was determined.

In 2019, the DUT CDC saw 1368 new patients. Using a 95% confidence level, 5% margin of error and a population size of 1368, a sample size of 300 participants were determined (Esterhuizen 2021). A convenience approach to sampling was employed. Convenience sampling is a non-probability sampling method whereby participants were chosen due to their convenient accessibility and proximity, being patients in the DUT CDC.

The researcher conducted data collection until the stipulated sample size was reached. All participants who met the inclusion and exclusion criteria were invited to participate in the study.

3.6.2 Inclusion Criteria

- Participant needs to be over the age of 18 years.
- Participants need to have CMSP (for three months or more) and currently self-medicating with OTC analgesics.
- Participants must sign an informed consent form before taking part in the study.

3.6.3 Exclusion Criteria

- Participants who present with acute pain.
- Participants who have consumed analgesics for less than a week.

- The participants who did not complete the informed consent form.
- Participants under the age of 18 years.

3.7 MEASUREMENT TOOLS

The questionnaire (Appendix D) that was designed and used was adapted, with permission (Appendices I, J and K), from Patel *et al.* (2016); Klemenc-Ketis, Hladnik and Kersnik (2009) and Samuelsen *et al.* (2015), who used the combined questionnaires from the Tromso 5 (2001-2002) and Tromso 6 (2007-2008) which are on-going population-based surveys in Norway. The researcher created a survey by adapting these questionnaires for a South African context. The questionnaires were available both in English and also translated into isiZulu which is included in Appendix D.

Table 3.1: Sections in the questionnaire adapted for this study

Sections in questionnaire adapted for this study	Authors
Section A: Demographics and socio-economic factors	Patel *et al.* (2016), Tromso 5 (2001-2002) and Tromso 6 (2007-2008)
Section B: General health, experience of chronic pain and use of health services.	(Samuelsen *et al.* 2015) who used the combined questionnaires from the Tromso 5 (2001-2002) and Tromso 6 (2007-2008).
Section C: Self-medication the participants' relationship with medication, prevalence, practice and relationship to health and disease	(Klemenc-Ketis, Hladnik and Kersnik 2009).

3.8 EXPERT PANEL (FOCUS GROUP)

To ensure validity and strengthen the questionnaire, an expert panel (focus group) was conducted.

An expert panel (focus group) is a group of people purposefully selected by the researcher often containing professionals in the field and a member of the public who is unfamiliar with the topic to appraise each question in the questionnaire. The aim of the expert panel is to draw on individual experiences, knowledge, attitudes and perception through interaction to add validity to the research's topic (Nyumba 2018: 20).

For the focus group in this study, participants were approached and invited to be a part of the expert panel for this study. The participants included one member of the chiropractic staff involved in survey research, the researcher, the supervisor and two chiropractic students with experience in conducting survey research. Each participant was asked to read

a letter of information (Appendix E), sign a letter of consent (Appendix F) and confidentiality (Appendix G) before the commencement of the focus group.

At the focus group discussion, the researcher introduced the research topic, as well as the aims and objectives of the study, and proceeded with going through the questionnaire for the study. Each question was interrogated and participants were allowed to ask questions and share input with regards to the question. Following the focus group discussion, amendments were made to the questionnaire to make it more appropriate and comprehensive prior to the pilot study. Due to the current COVID-19 pandemic, this expert panel discussion was conducted via an online platform (MS Teams).

3.9 PILOT STUDY

Following IREC approval, a pilot study was conducted. A pilot study is a small-scale version of the research study used to test research techniques in preparation for the full-scale study. The pilot study is conducted to locate potential problem areas or shortfalls in the study procedure. It determines the feasibility of the study protocol, recruitment of subjects, testing the measurement instrument (the questionnaire). The pilot study also determines the appropriateness and comprehensiveness of the questionnaire and the ease of data entry and analysis (Hassan, Schattner and Mazza 2006).

Three participants who met the inclusion criteria were invited to participate in the pilot study. They were given a letter explaining the study (Appendix E) and asked to sign an informed consent form (Appendix F). They then received a questionnaire and questionnaire evaluation form (Appendix H) to complete where they can report any problems encountered whilst answering the survey. Comments were taken into consideration and incorporated into the post focus group questionnaire. A final questionnaire was then completed for the main study. The participants who were part of the pilot study were not included in the sample for the main study.

Inclusion criteria:

- Participants over the age of 18 years.
- Participants with CMSP and currently self-medicating with analgesics.
- Participants who signed an informed consent form before taking part in the study.

Exclusion criteria:

- Participants who presented with acute pain.
- Participants who have consumed analgesics for less than a week.

- The participants who did not complete the informed consent form.

3.10 STUDY PROCEDURE

- The necessary permissions (as discussed in 3.3) were sought prior to conducting the survey. Once permission had been obtained, the researcher contacted all the chiropractic students working in the CDC and invited them to an online information presentation (via Zoom), advising them on the assistance required for data collection. They were also sent an information letter via email. (Appendix H). CDC students were asked to assist with the research by distributing a questionnaire, empty envelope, information and consent forms to their patients during their appointment time, but once the chiropractic student had left the room. Participants were asked to place completed questionnaires into the envelope, then return the envelope and signed consent form to the student treating them, to be placed back into the patient file.
- The researcher provided the questionnaire (Appendix D) along with an envelope, the consent forms (Appendix F) and information forms (Appendix E) and placed them into the participants' file at the clinic reception prior to the participants' appointment.
- All the relevant forms were placed in all patient files that had previously signed a protection of personal information consent form, allowing them to participate in any research being conducted in the DUT CDC. The chiropractic student treating the patient was then able to ask the patient if they would like to participate in the research study once they were in the treatment room.
- The information forms and consent forms had to be read and signed by the participants before they answered the questionnaire.
- The researcher was in the clinic at all times when questionnaires were being distributed to answer any questions that participants may have had with regards to the questionnaire or the research.
- The researcher had been given permission to sit in the file room in reception on days that the researcher was not on clinic duty, enabling the researcher to be available for participants.
- The researcher obtained an isiZulu speaking research assistant that was able to help any Zulu participants with the questionnaire with any problems regarding translation. There was also an isiZulu questionnaire, information letter and consent form that participants had the choice of whether to complete the questionnaire in English or in isiZulu.

- Once the questionnaire was completed, it was then placed in the patient file by the chiropractic student treating the participant and handed in at reception for a quarantine period of 24 hours following COVID-19 protocol.
- Once the quarantine period was over, the DUT CDC receptionist removed the questionnaire and consent forms from the participants' files and placed them into a sealed box while she was processing the files.
- There was only one receptionist in charge of processing files and she was asked to sign a confidentiality agreement (Appendix G) to maintain participant confidentiality.
- The consent forms and questionnaires were kept in a sealed box in a safe place to ensure confidentiality of the participant until data were captured.
- The researcher kept a log of patient file numbers that had received the questionnaire to stop participants from filling out the questionnaire more than once if they were returning for follow up appointments.
- Completed surveys were then coded for confidentiality and tracked using a tracking sheet.
- All tracking sheets, questionnaires and consent forms did not require any personal identity information to maintain confidentiality of the participant.
- Once data collection had been completed, the ballot boxes were unsealed and captured, for the purpose of data analysis and reporting.
- The surveys were then coded and captured on an Excel spread sheet and moved to SPSS version 28 for data analysis.

3.11 COVID-19 PROTOCOLS

The DUT CDC COVID-19 protocols were adhered to as prescribed. These included patient screening, taking their temperature and sanitising upon arrival. Patients were scheduled at staggered intervals to avoid patients waiting in the reception area. Each chiropractic student intern was responsible for sanitising all surfaces in their respective rooms before and after treating patients. Everyone was required to wear a mask at all times.

The researcher purchased 20 pens which were was sanitised and included in the participant file to assist participants in filling out the questionnaire. These were then returned to reception with the participants' files, to be sanitised by the researcher before being used again.

The documents were left in the participants' files to quarantine for a period of 24 hours before being removed and placed into a sealed box by the DUT CDC receptionist.

3.12 DATA ANALYSIS

Once data collection had been completed, the data were captured on an Excel spread sheet and moved to IBM SPSS version 28 for analysis. The data analysis was then conducted once all the data have been captured and coded using the following tests; descriptive statistics including means and standard deviations where applicable. Frequencies were reported in tables and graphs. Chi-square goodness-of-fit-test, which is a univariate test, used on categorical variables to test whether any of the response options were selected significantly more or less often than that of as, was performed. Under null hypothesis, it was assumed that all responses were equally selected and a binomial test, which tests whether a significant proportion of participants select one of a possible two responses (where $p<.001$ indicates significance) was conducted.

3.13 ETHICAL CONSIDERATIONS

Maintaining participant confidentiality was ensured through multiple steps. There was no personal information on the survey; participants names, identification details or contact details were not included in the survey. All surveys (Appendix D) were only coded by the researcher. The confidentiality of participants was maintained by the researcher.

All participants were given an information document (Appendix E) and were required to sign an informed consent (Appendix F). Informed consent required potential participants to be provided with information about the study in which they had been invited to participate in. The purpose was for the participants to be able to freely decide whether or not to participate in the study. It also allowed the prospective participant the opportunity to decline or withdraw from the study at any time without negative consequences for them (Crow *et al*. 2007).

3.13.1 Autonomy

Autonomy refers to the participants ability to live their own life and make their own decisions that are not the product of external forces manipulating that individual, it is being able to make independent choices (Christman 2003). The participants received a letter of information (Appendix E) explaining the study and the questionnaire to the participant so that they were aware in what they were participating. Giving the participants information on the study allowed them to freely make their own decision on whether or not to participate in the study maintaining the participants' autonomy.

3.13.2 Justice

Justice is the appropriate and fair treatment of an individual. Where the primary concern is maintained fairness to the individual (Varkey 2021). There was no bias when handing out

surveys. Questionnaires were distributed to all patients attending the DUT CDC during the time of data collection. Patients could then read the letter of information and if they were experiencing chronic musculoskeletal pain they were able to complete the questionnaire.

3.13.3 Non-Maleficence

Non-maleficence is the responsibility of the practitioner or researcher to do no harm to the participant (Varkey 2021). No harm was done to participants of the study, as all participant information was coded for data collection and confidentiality of all participants had been maintained.

3.13.4 Beneficence

Beneficence is the responsibility of the practitioner to uphold a moral code, help patients and ultimately to act for the benefit of the patient (Varkey 2021). The participation of patients in the study was beneficial to the body of knowledge on the prevalence, knowledge and impact of self-medication among patients with chronic pain. This information would be beneficial to chiropractors and other healthcare providers managing patients who suffer from chronic pain in terms of understanding analgesic misuse, thus contributing to decreasing the prevalence of misuse and promoting safe analgesic use.

3.14 CONCLUSION

In this chapter the focus was on illustrating the methodology that was used to conduct the research. Information was provided on the participant sample and setting of the research. The measures used to conduct data collection and data analysis were also outlined.

CHAPTER 4 RESULTS

4.1 INTRODUCTION

This chapter presents the results obtained from the analysis of the data collected in this study. The results are presented by a description of the participants demographic characteristics, then a description of the participants CMSP, the prevalence of the use of self-administered OTC analgesics, a description of the use of self-administered OTC analgesics followed by the relationship pertaining to the participants demographics, CMSP and usage of self-administered OTC analgesics.

4.2 SAMPLE SIZE

All participants who had been experiencing pain for more than 3 months were retained in the study. participants with pain for less than three months or those who reported no pain were excluded. This left 204 participants in the sample. Therefore 204, out of 302, participants were experiencing CMSP at the time of data collection and were included in the data analysis. Those who did not select having chronic pain were either receiving treatment for acute pain or if they were in no pain were receiving rehab or maintenance treatment.

4.3 DEMOGRAPHICS

Participants were asked to answer questions on their demographic characteristics, these being age, gender, race and level of education, the results are shown in Figure 4.1.

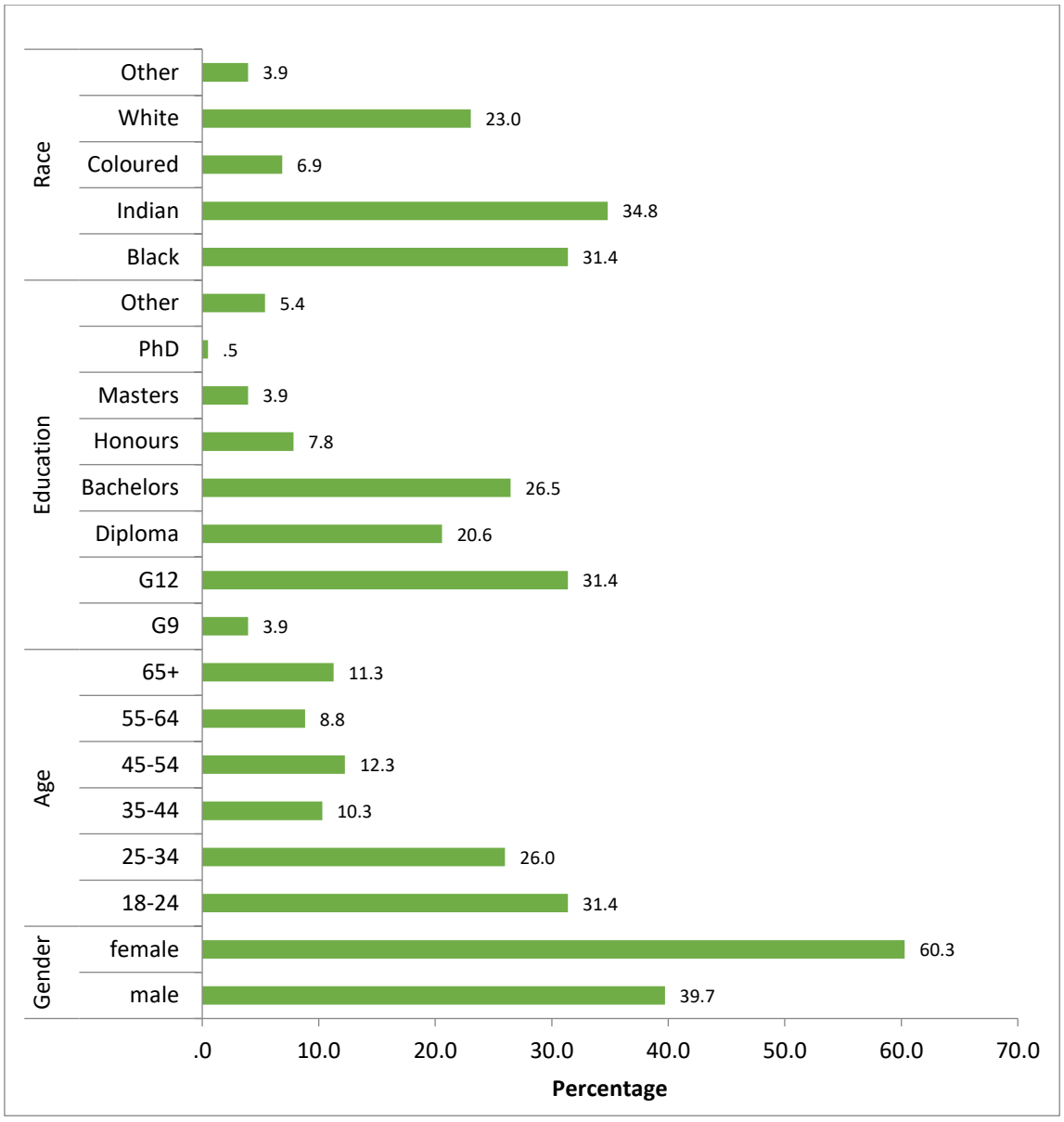

Figure 4.1: Demographic factors of the participants

As shown in Figure 4.1, the study population comprised of more females (60.3%; *n*=123) than males (39.7%; *n*=81). Most of the participants were aged 18–24 years (31.4%; *n*=64) followed by those aged 25–34 years (26%; *n*=53), 45–54 years (12.3%; *n*=25), 65 and older (11.3%; *n*=23), 35–44 years (10.3%; *n*=21) and 55–64 years (8.8%; *n*=18). The majority of the participants had some form of education including a grade 12 (31.4%; *n*=64), followed by a Bachelor's degree (26.5%; *n*=54), a diploma (20,6%; *n*=42), Honours degree (7.8%; *n*=16), other (5.4%; *n*=11) and both grade 9 and Master's degree (3.9%; *n*=8) and only 1 PhD participant (0.5%; *n*=1). Most of the participants were Indian (34.8%; *n*= 71), followed by Black (31.4%; *n*=64), White (23.0%; *n*=47), Coloured (6.9%; *n*=14) and Other (3.9%; *n*=8).

4.4 HEATH CARE FACILITIES WHERE TREATMENT IS SOUGHT

Participants were asked to indicate whether they use public health care services or private health care services, the results are indicated in Figure 4.2.

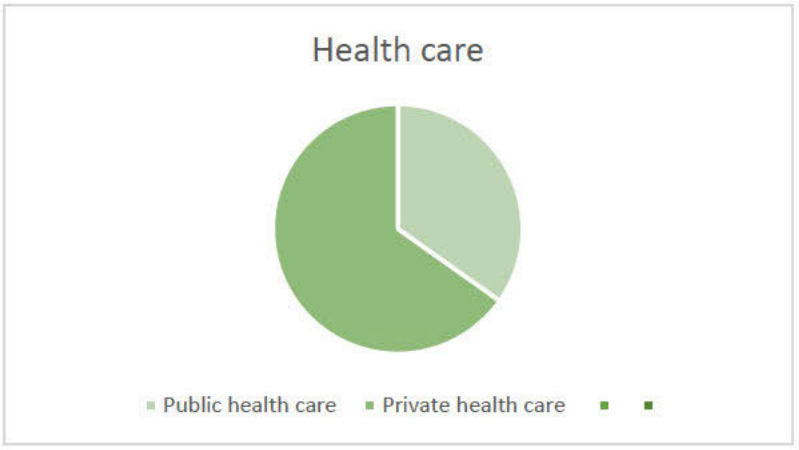

Figure 4.2: Public vs private health care services

As shown in Figure 4.2, the majority of the participants were using private health care facilities (65.2%, *n*=133), compared to those relying on public health care services (34.8%, *n*=71).

4.5 CHRONIC MUSCULOSKELETAL PAIN

Table 4.1: Participants who were experiencing CMSP at the time of the study

Item	Frequency (%)		*n*	*p*-value
	Yes	No		
Are you currently experiencing any musculoskeletal pain?	196 (96.1)	8 (3.9)	204	<.001*

* Indicates significance at the 95% level

As shown in Table 4.1, at the time of the study a significant 96.1% of the participants were experiencing CMSP.

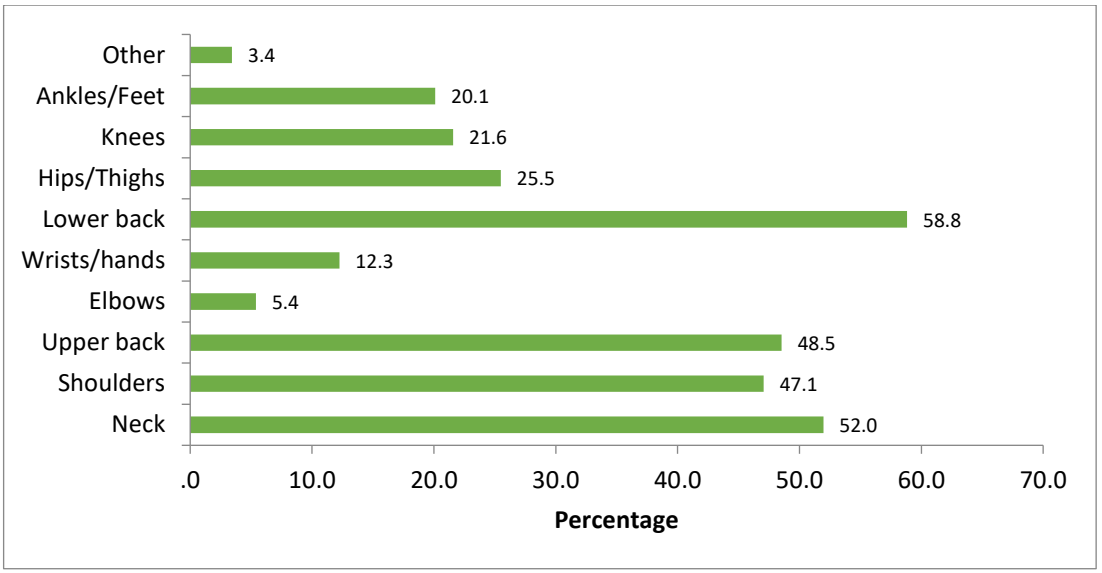

Figure 4.3: Areas of CMSP that were being treated at the chiropractic clinic at the time of the study

As shown in Figure 4.3, low back pain was the most frequent type of CMSP which was reported by 60% of the participants (p=<.001); followed by neck pain (52%), upper back pain (48.5%), shoulders (47.1%), hips and thighs (25.5%), knees (21.6%), ankles and feet (20.1%), hands and wrists (12.3%), elbows (5.4%) and other (3.4%) which represented temporomandibular pain. The percentages do not add up to 100% as participants were able to choose multiple areas of CMSP.

Participants were asked to describe their pain. Figure 4.4 reflects the participants' responses.

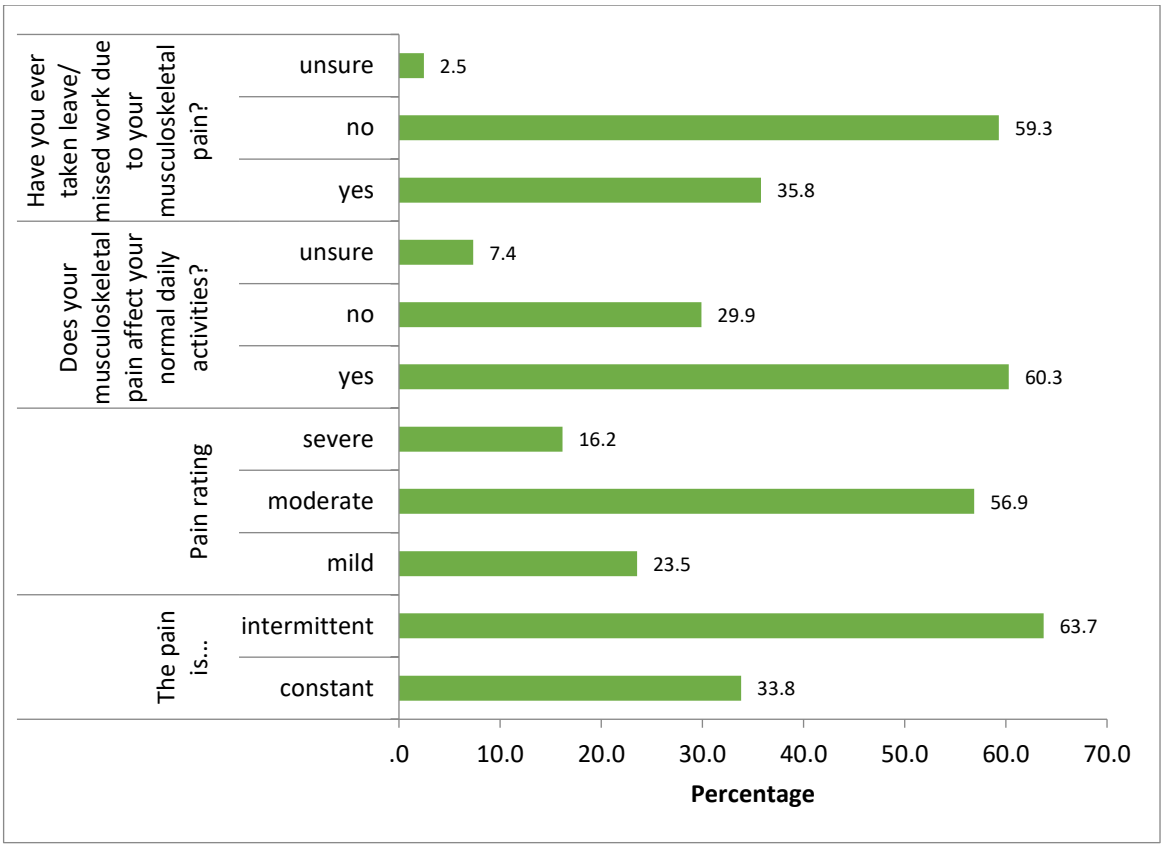

Figure 4.4: Description of the participant's pain

As shown in Figure 4.4, using the Chi-squared goodness-of-fit test, which tests if any response option is selected significantly more than others, it was indicated that a significant number of participants were experiencing intermittent pain (63.7%, *n*=130) (*p*=<.001), while 33.8% (*n*=69) were experiencing constant musculoskeletal pain. When asked how they would rate their pain, a significant number of participants indicated that their pain was moderate (58.9%; *n*=116) (*p*=<.001) while 24.2% (*n*=48) indicated mild pain and 16.8% (*n*=33) indicated that their pain was severe. When participants where asked if their pain affects their normal daily activities a significant number (61.8%; *n*=123) (*p*=<.001) said yes. When participants were asked if they have ever taken leave or missed work due to their musculoskeletal pain, a significant number of participants (60.8%; *n*=121) (*p*=<.001) indicated yes.

4.5 ANALGESIC USE AMONGST PARTICIPANTS

Table 4.2: Participant's usage of self-administered analgesics

Item	Frequency (%)		*n*	*p*-value
	Yes	No		
Do you ever use self-administered painkillers?	158(79.8)	40(20.2)	198	<.001*
Are you currently self-medicating for your musculoskeletal pain?	112(57.4)	83(42.6)	204	<.001*

The number of participants who had used and are currently using self-administered painkillers was significantly higher than those who reported not having used or currently using painkillers to treat their CMSP. The numbers are reflected in Table 4.2.

Participants were asked where they acquired the painkillers which they self-administered. Results are reflected in Figure 4.5.

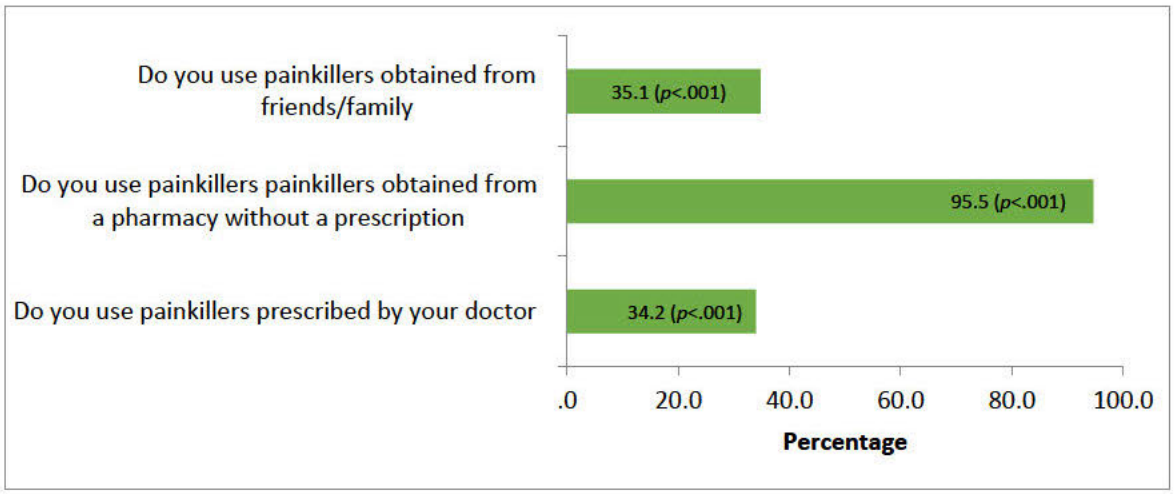

Figure 4.5: The source of participants self-administered analgesics (n=112)

As shown in Figure 4.5, a significant number of participants indicated that they did not use painkillers prescribed by their doctor (65.8%). While a significant number of participants indicated that they obtained painkillers from the pharmacy without prescription (95.5%) and a significant number indicated that they did not use painkillers obtained from friends or family members (64.9%). The percentage does not equal 100% as participants were able to choose more than one option.

Participants were further questioned as to the frequency of their usage of painkillers. Table 4.3 demonstrates how often painkillers were used by the participants.

Table 4.3: How often participants were using self-administered analgesics (*n*=112)

	Category	Frequency (%)
How often do you use painkillers?	Less than every week	34(30.6)
	Every week	47(42.3)
	Daily	30(27.0)

As shown in Table 4.4, there were no statistically significant differences to the participants' response to how often they used painkillers: 30.6% used painkillers less than every week, 42.3% used painkillers every week but not daily and 27% of participants were using painkillers daily.

Those who used painkillers daily (27%) were asked how many times a day they used them. These results are reflected in the table below.

Table 4.4: Frequency of daily usage of analgesics (*n*=30)

	Category	Frequency (%)	*p*-value
If you use painkillers daily, how many times per day do you use them?	Once a day	10(33.3)	<.001
	Twice a day	14(46.7)	
	Three times a day	5(16.7)	
	Four/more times a day	1(3.3)	

As shown in Table 4.5, there was significant difference in the number of times a day the participants used analgesics, with more participants using it twice a day (46.7%) and once daily (33.3%).

Table 4.5: Participants who were using more than one type of analgesic/s at a time (*n*=111)

	Frequency (%)	
	Yes	No
Do you ever use more than one type of painkiller at a time?	64(57.7)	47(42.3)

As shown in table 4.6, while more participants do use more than one painkiller at a time (57.7%), it is not statistically significant (p=0.128)

How the participants used their analgesics and what directions they followed was further investigated. Figure 4.6 reflects these results.

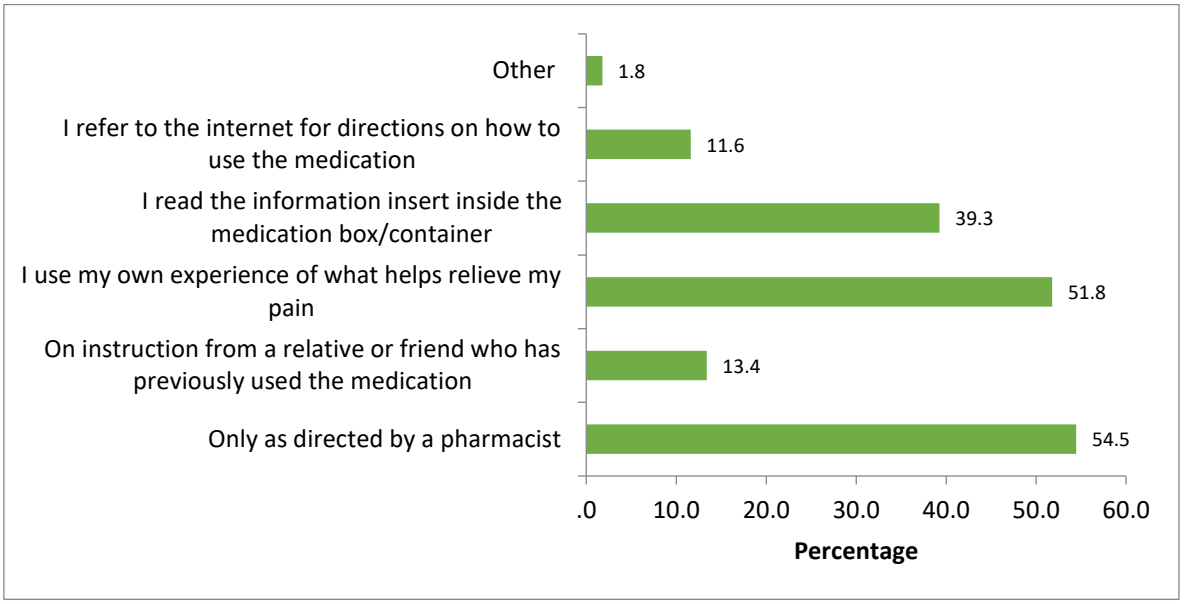

Figure 4.6 The directions participants followed when using self-administered analgesics

As shown in Figure 4.6, when participants were asked to select what directions they usually follow when it comes to self-medicating with OTC analgesics, the majority of the participants (54.5%) indicated that they only use OTC analgesics as directed by a pharmacist; 51.8% of the participants indicated that they use their own experience of what helps relieve their pain; 39.3% indicated that they read information insert inside the medication box; 13.4% indicated that they use the OTC analgesics on instruction from a relative or friend who has previously used the medication and 11.6% indicated that they refer to the internet for directions on how to use the medication. The percentages do not add up to 100% because the participants had chosen more than one option in the question.

Participants were asked questions about which analgesics they commonly used to manage their chronic pain. Figure 4.7 represents these results.

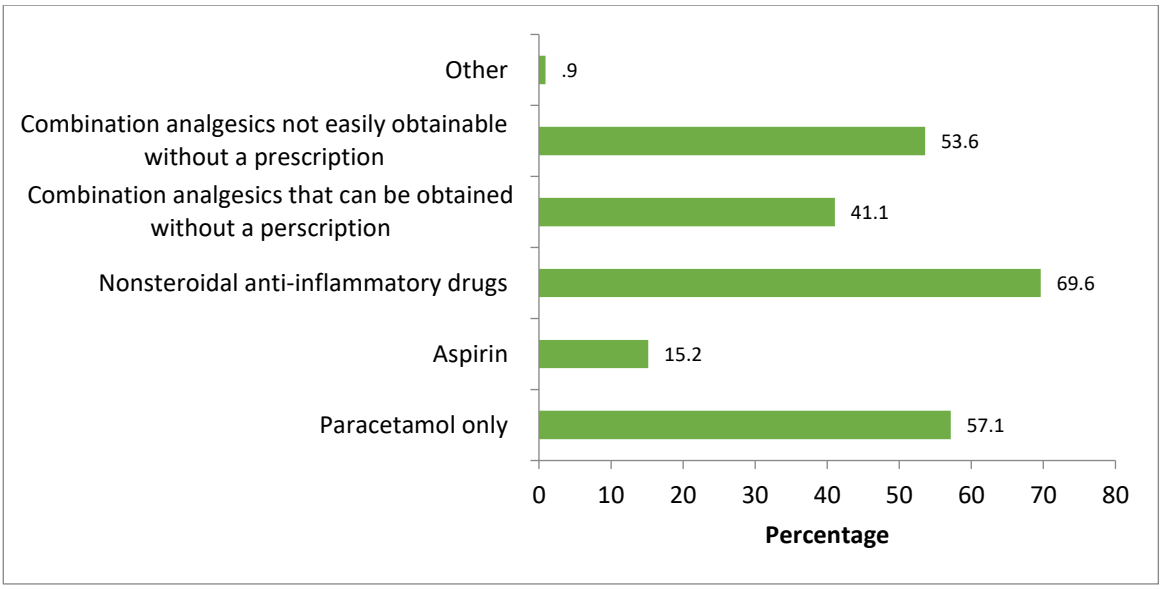

Figure 4.7: Commonly used self-administered analgesics (n=111)

Figure 4.7 demonstrates the number of participants who responded to the use of different analgesics. Most participants (70.3%) were using NSAIDs, followed by paracetamol only (57.7%), combination analgesics not easily obtainable without a prescription (54.1%), combination analgesics that can be obtained without prescription (41.1%), aspirin (15.3%) and other (0.9%).

The following examples were provided with each group of analgesics: paracetamol only (e.g. Panado®; Dolorol®, Painamol®, Napamol®); aspirin (e.g. Disprin®); nonsteroidal anti-inflammatory drugs (eg. Brufen®; Nurofen®; Voltaren®; Cataflam ®, Ponstan®); combination analgesics that can be obtained without a prescription (e.g. Adcodol®; Syndol®; Grandpa®; Betapyn®); combination analgesics not easily obtainable without a prescription (e.g. Stilpane; Stopayne; Myprodol; Mybulen; Mypaid; Gen-payne); and Other.

The participants were asked questions about how long they self-medicated using OTC painkillers before seeking chiropractic care. Figure 4.8 represents the results.

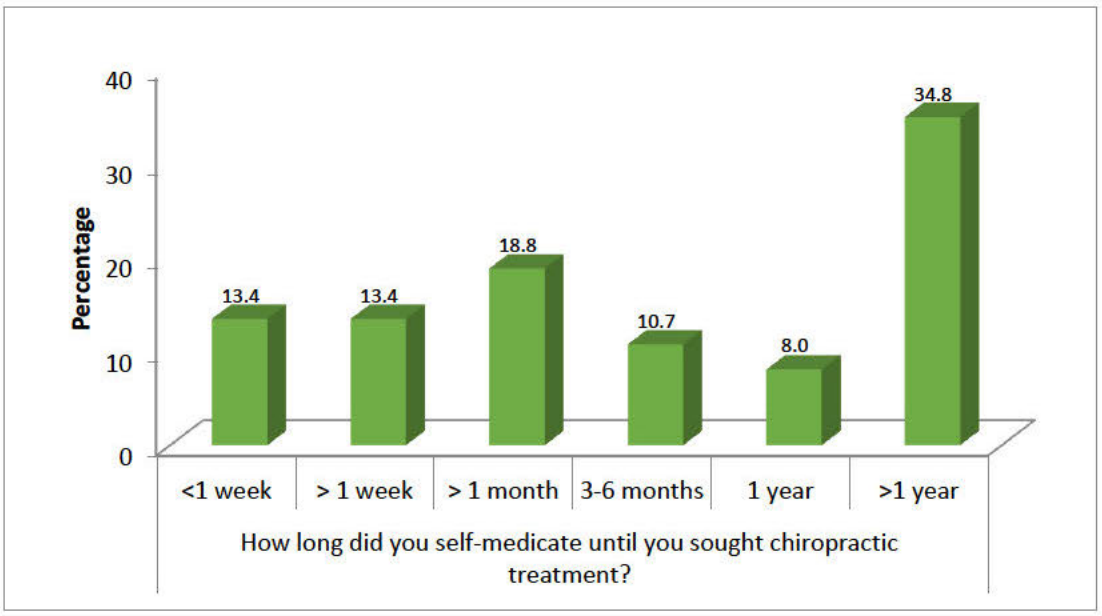

Figure 4.8: Duration that participants self-medicated prior to seeking chiropractic treatment

As shown Figure 4.8, using the Chi-square goodness-of-fit-test, it was determined that a significant number of the participants (39.1%) only sought chiropractic treatment for their CMSP after one year of self-medicating with OTC analgesics ($p<.001$).

The participants were questioned about their satisfaction with the analgesics that they were consuming. Table 4.6 represents the results.

Table 4.6: Participant satisfaction with their self-administered analgesics

	Category	Frequency (%)	*p*-value
How satisfied are you with the painkiller/s you are using?	Very satisfied	12(10.8)	<.001
	Neutral	73(65.8)	
	Not satisfied	26(23.4)	

As shown in Table 4.6, using the Chi-square goodness-of-fit-test, it was determined that a significant number of the participants (65.8%) were neutral about their satisfaction with the analgesics that they were using, while 23.4% were not satisfied and only 10.8% of the participants were satisfied with the analgesics they were using.

Questions were asked about possible side effects that the participants experienced with their self-administered analgesics. These results are reflected in Table 4.7.

Table 4.7: Prevalence of side effects from using self-administered OTC analgesics

	Frequency (%)		*n*	*p*-value
	Yes	No		
Do you experience any side effects from the painkiller/s you are using?	37(33.3)	74(66.7)	111	<.001*

As shown in Table 4.7, using the binomial test, it was determined that more participants (66.7%) indicated that they did not experience any side effects from the analgesics that they were consuming, compared to 33.3% of participants who reported having side effects. This difference was found to be significant.

4.6 RELATIONSHIP BETWEEN PARTICIPANT DEMOGRAPHICS AND SELF-ADMINISTERED ANALGESICS

The data was analysed to look for relationships between participant demographic characteristics and the use of self-administered analgesics, Figure 4.9 demonstrates these relationships.

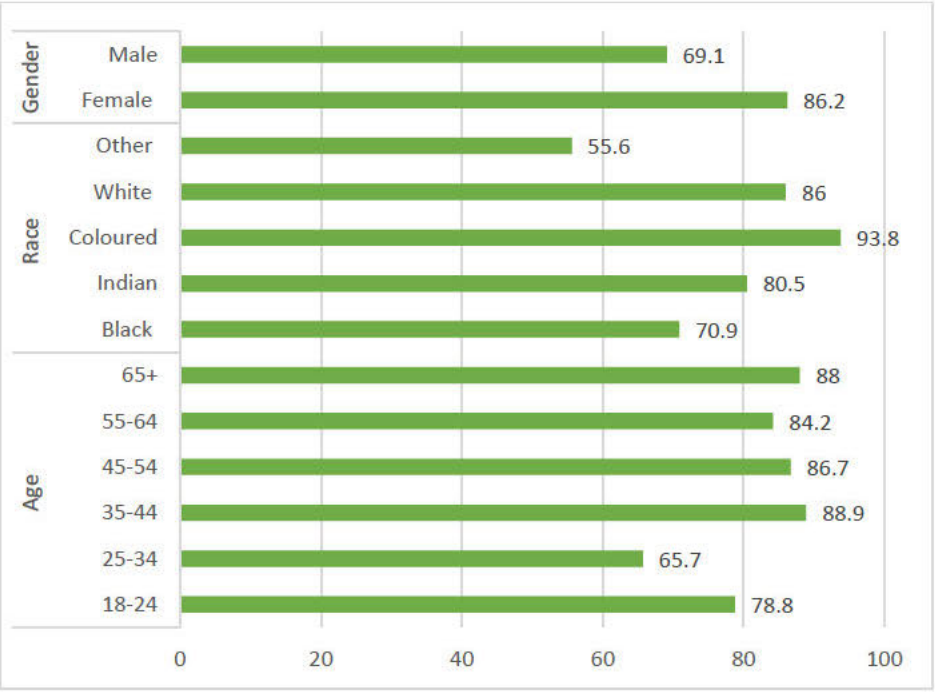

Figure 4.9: The relationship between gender, race and age and the use of self-administered painkillers

According to Figure 4.9, gender has shown to have an influence on self-administered analgesic use. It was found that there was a significantly larger number of females (86.2%) who used self-administered analgesics compared to males (69.1%) (p=.001). The age group 35–44 was found to be statistically more likely to use self-administered painkillers (88.9%) followed by those aged 65+ (88%); age 45–54 (86.7%); age 55–64 (84.2%); age 18–24 (78.8%) and the lowest being age 25–34 years with (65.7%) (p=0.48). A significant number of Black participants (p=0.43) indicated that they did not use self-administered OTC analgesics (29.1%) and a significant number of participants who indicated "Other" also did not use self-administered OTC analgesics (44.4%) (p=0.43). Examining the participants who indicated that they were using self-administered OTC analgesics, 93.8% were Coloured, 86% were White, 80.5% were Indian, 70.9% were Black and only 55.6% of the participants indicated 'Other' as their race. However, these findings were not significant.

Table 4.8 represents the results regarding the treatment facilities used by participants and the use of combination analgesics.

Table 4.8: The relationship between public and private health care and the use of combination analgesics that can be obtained without a prescription.

Treatment facility	**Responses as Frequency (%)**		***p*-value**
	Yes	No	
Public health care	22(55.0)	18(45.0)	.030
Private health care	24(33.8)	47(66.2)	
Total	46(41.4)	58(6)	

As shown in Table 4.8, there was a significant number of participants who use public health care services who were also using OTC combination analgesics (55%), compared to only (33.8%) of participants who use private health care services.

CHAPTER 5 DISCUSSION

5.1 INTRODUCTION

In this chapter, the results of this study will be discussed relative to the aims and objectives, and compared with other studies from the available literature within the African and international context. Plausible reasons for the findings will also be discussed.

5.2 DEMOGRAPHIC INFORMATION OF PARTICIPANTS

Most of the participants were comprised of females (60.3%), which was in line with other studies that demonstrated that females were more likely to seek out treatment for their CMSP (Mills *et al.* 2019) and females had a higher participation rate in studies (Imgumbor *et al*. 2011; Abdi *et al.* 2018; Essa *et al*. 2019). This larger female participant population can be explained by the influence of social expectations which leads to a variation in which males and females perceive their pain and respond to it. Samulowitz *et al*. (2018) explained that the measure of pain can be influenced by social norms, such as males being taught that they need to be tough and tolerate the pain, whereas females are allowed to be sensitive and verbalise their pain without ridicule. Women, therefore, seek out treatment more often than men as they feel it is socially acceptable to verbalise and show their pain, causing men to avoid seeking out health care (Samulowitz *et al.* 2018). Another theory put forward is that women, to a greater degree than men are accustomed to internal pain from child birth and menstruation giving women a greater awareness about their bodies and, therefore, recognise pain more often than men (Samulowitz *et al.* 2018).

Participants' ages were grouped in 10-year increments from 18–65 years and older, with the largest age group being 18–24 years old. This may be since the DUT CDC is on the university campus giving students easy access to the Chiropractic Clinic. When asked about occupation, 20.1% of participants indicated that they were students, which explains the larger proportion of participants being in the 18–24 year age group. This also explains why approximately a third of the participants (31.4%) reported having some form of education, including a grade 12.

In this study, the majority of the participants were Indian (34.8%), followed by Black (31.4%), White (23.0%), Coloured (6.9%) and Other (3.9%). Durban is a large city with a total population of approximately 600 000 residents. Of these residents, the population is made up of the following ethnic groups: 51.1% Black Africans, 24% Indian, 15.3% White and 8% Coloured (South Africa, Department of Statistics 2011). This study does not show a true representation of the population in Durban. This may be due to the relatively small sample

size of this study and that chiropractic treatment is still not well known in Durban. The latter was demonstrated in a study conducted at a public health care facility serving a rural community south of Durban, where it was found that none of the participants were aware that chiropractic treatment existed at all (Khumalo and Haffejee 2022).

5.3 PREVALENCE OF CHRONIC MUSCULOSKELETAL PAIN

The literature presents a variety of reports on the prevalence of CMSP ranging from 10%–50.22%, WHO has reported that 20%–30% of the world's population suffer from some form of CMSP (World Health Organization 2022). Among 14 countries in Europe, the prevalence of CMSP was 30% (Cimas *et al.* 2017); in America 20.8% (Reuter and Fichthorn 2019); among the Spanish population, it has been known to vary between 10%–50% (Duenas *et al*. 2015), in Brazil 20%–26.5% (Bezerra *et al.* 2018) and Chile reported one sixth of their population being affected by CMSP (Zitko *et al.* 2021). In South Africa, 50.22% of female miners presented with CMSP (Kabongo and Naidoo 2021). Other South African studies reported a prevalence of 41% in Tshwane (Rauf *et al*. 2021) and 49.28% in Bloemfontein.

In this study, 204 of the 302 (67.5%) participants reported having CMSP at the time of data collection; the other 32.5% of participants were experiencing acute pain. This is relatively higher than those reported in the existing literature.

Other South African studies have reported the prevalence of CMSP as 50.22% amongst female miners (Kabongo and Naidoo 2021); 41% amongst patients attending primary health care clinics in Tshwane (Rauf *et al*. 2012); 47.1% amongst an adult population within a low-income community in South Africa (Imgumbor *et al.* 2011); and 49.28% amongst patients in a pain control unit at the Universitas Hospital in Bloemfontein (Walker, Odendaal and Esterhuyse 2006).

South Africa had the highest prevalence when compared to other low-income countries, which is in line with developed countries prevalence rates. These include Brazil, 20%–26.5% (Bezerra *et al*. 2018) and Chile, where one fifth of the adult population had CMSP (Zitko *et al*. 2021). In an American study amongst students attending a university, the prevalence of CMSP was 20.8% (Reuter and Fichthorn 2019) and in a population-based study among people over the age of 50, across 14 European countries the prevalence of CMSP was 35% (Cimas *et al.* 2017).

The high prevalence of CMSP in South Africa may be partially explained by the high prevalence of communicable diseases, such as HIV, AIDS and TB, and non-communicable diseases, such as hypertension and diabetes, which are all chronic conditions that plaque the South African population (Khumalo and Haffejee 2022, Rauf *et al.* 2012). HIV and AIDS,

as well as the anti-retroviral treatment used for treating HIV, often result in chronic systemic inflammation, causing the development of CMSP syndromes, where both the infection and treatment have musculoskeletal side effects. In a community-based health clinic in Toronto, it was found that 80% of patients with HIV were suffering from chronic neck pain, as compared to 20% in non-HIV patients (Injeyan *et al*. 2018).

Tuberculosis commonly affects the lungs but other sites can also be involved, including the spine, peripheral bones and joints causing musculoskeletal pain, referred to as extrapulmonary TB, and is not a common manifestation of the disease (Vielgut *et al.* 2022). CMSP is a common comorbidity in those who have diabetes and those with diabetes are twice as likely to have musculoskeletal complaints compared to the general population (Rehling *et al.* 2019). CMSP may arise as a diabetic complication called polyneuropathy, or pain in joints and surrounding tissues may be because of advanced glycation end products as a result of the pathogenesis of diabetes (Rehling *et al*. 2019). Hypertension has shown a causal relationship with the development of spine related syndromes and chronic back pain, by mechanisms involving the arterial supply of the spine, causing an impaired supply of nutrients to the vertebrae and related structures leading to degeneration and pain (Suri *et al.* 2018).

The high prevalence of CMSP in South Africa may also be a result of poor awareness on how to treat and manage CMSP by PHC providers resulting in the lack of effective treatment of CMSP conditions (Rauf *et al.* 2012). Most of the general population in South Africa use PHC facilities (De Villiers, Maree and van Belkum 2015) and few seek specialised treatment, such as chiropractic treatment. This is due to a lack of awareness and cost of allied health care services, such as chiropractic care, which is not offered within the public sector in South Africa (Khumalo and Haffejee 2022). It should also be noted that there is only one affordable chiropractic clinic in the region, this being the DUT CDC. Notwithstanding this, the results in this study showed that a majority of participants were using private health care facilities. The DUT CDC may have a majority of participants using private health care because patients are able to claim back a reimbursement for their treatment from their medical insurances if chiropractic treatment is covered by their scheme.

The high prevalence of CMSP noted in this study compared to others could be due to the actual study setting. Chiropractic is a specialised field and chiropractors regularly treat patients with CMSP. Chiropractors offer manual treatment for musculoskeletal disorders that provide more effective long-term relief when compared to drug therapy (Khumalo and Haffejee 2022).

5.4 CLINICAL FEATURES OF CHRONIC MUSCULOSKELETAL PAIN

This study revealed that a significant proportion of participants (63.7%) experienced intermittent CMSP and 33.8% had constant pain. This is higher than a Norwegian study, where 26% reported experiencing constant pain (Samuelsen *et al.* 2016). In a study conducted among patients at pain clinics in Italy, 63.5% reported having constant pain and 36.5% reported having intermittent pain (Latina *et al.* 2019). This study reported a significantly lower prevalence of constant pain compared to pain clinics in Italy. This may be because patients in this study were undergoing chiropractic treatment for their pain, reducing the number of patients experiencing constant pain.

When participants were asked to rate their pain, a significant number (58.9%) indicated that their pain was moderate, while 24.2% indicated mild and 16.8% indicated that their pain was severe. This is in line with a previous South African study on chronic pain where moderate pain was reported more frequently (69.2%), while 4.1% reported having mild pain and 26.6% having severe pain (Igumbor *et al.* 2011). In a study conducted in Italy among patients attending pain clinics, there was a higher incidence of severe pain (54%) compared to those who reported moderate pain (38%) and mild pain (7%) (Latina *et al.* 2019). These results are expected as those with moderate to severe pain are more likely to frequent chiropractors or pain clinics than those with mild pain.

This study showed a negative impact on the lives of those with CMSP, where 61.8% of participants reported that they were unable to perform normal daily activities due to their chronic pain, in line with a previous South African study (Walker, Odendaal and Esterhuyse 2006). A significant 60.8% indicated that they had missed work or taken leave due to their pain, which is also comparable to other studies (Sandanger *et al*. 2000; Ahenkorah *et al.* 2019; Howarth *et al.* 2019).

The number of participants who reported that their CMSP was affecting their normal daily activities may appear high when comparing it to the small 16% that reported severe pain, but 58.9% reported moderate pain which can also significantly impact a person's normal daily activities. Participants may have musculoskeletal conditions, such as osteoarthritis, which can significantly restrict normal function of the joint/s involved, even if they are not in severe pain (Blyth *et al*. 2019). Furthermore, the high proportion of those who reported missing work in response to the question "Have you ever taken leave/ missed work due to your musculoskeletal pain?" could be due to participants missing work in the past possibly before they began treatment for their CMSP.

5.5 PREVALENCE OF USE OF SELF-ADMINISTERED OVER-THE-COUNTER ANALGESICS

The literature has presented a variety of reports on the use of self-medication of OTC analgesics, with prevalence ranges from 20%–79.9% depending on the country or group of individuals who participated in the studies (Essa *et al.* 2019; Abdi *et al*. 2018; Perrot *et al*. 2018; Albusalih *et al.* 2017; Lukovic *et al.* 2014; Holtedahl 2004). The higher prevalence was shown to be associated with being female and increasing age (Hange *et al.* 2022; Perrot *et al.* 2018; Samuelsen *et al.* 2015). The prevalence among healthcare students in Serbia had the highest prevalence of 79.9% (Lukovic *et al*. 2014). The study was conducted amongst 1st, 2nd and 6th year medical students at a university, where the majority of the participants were females and the mean age was 22 years old which is comparable to this study, where majority of participants were female and the most prevalent age group was 18–24 years old but the aforementioned study did not target participants with CMSP but rather the general student population from 1st, 2nd and 6th years from the Medical Science department (Lukovic *et al.* 2014).

This study revealed that 79.8% of the participants had used self-administered analgesics previously to manage their CMSP and there was a point prevalence of 57.4% of participants who were using self-medication at the time of the study. This is comparable to previous studies conducted in western countries, such as Sweden and Norway. This may be because these studies, like the current study, also investigated the prevalence of OTC analgesic use among participants with chronic pain (Hange *et al.* 2022; Samuelsen *et al.* 2015; Holtedahl 2004).

The findings in this study are also in line with a previous South African study which reported a prevalence of 64% of runners using OTC analgesics. However, in the latter mentioned study, the runners were using OTC analgesics to manage sports injuries enabling participants to continue to run with injuries in order to maintain fitness or as a prophylactic so they would not feel pain after a run (Thorpe, Blockman and Burgess 2021).

The prevalence of OTC analgesic use may be high in South Africa due to the high prevalence of CMSP. Chronic pain has been shown to double the risk of taking analgesics, as seen in a study conducted in Norway, which showed that persistent self-medication of OTC analgesics was found to be 10% among those suffering from chronic pain, compared to 4% among the general population (Samuelsen *et al.* 2016). Chronic pain is also a risk factor for daily analgesic use (Domenichiello and Ramsden 2019). The prevalence of using OTC analgesics was found to increase with increased pain intensity, duration, frequency and number of areas involved (Samuelsen *et al*. 2016).

Another reason for the high prevalence of OTC use in this study is that it has been evident that in South Africa there is relatively easy access to OTC medications (Abdi *et al.* 2018; Padayachee *et al.* 2019). In South Africa, schedule 0 medications are sold at supermarkets and general stores and schedule 1 and 2 are sold OTC in pharmacies. In South Africa, codeine containing products are sold OTC in low doses, compared to Australia, who are moving codeine containing products to prescription only (Padayachee *et al*. 2019).

In a study comparing OTC codeine containing products between South Africa, United Kingdom (UK) and Ireland, it was found that in the UK that the maximum amount of codeine in combination products is 12.8mg per dose with a maximum pack size of 32 tablets; in Ireland the maximum pack size is 24 tablets; whereas, in South Africa, the maximum amount of codeine in combination products was 20mg, with pack sizes of up to 100 tablets. This indicates that the amount of OTC codeine-containing products is more readily available in South Africa, when compared to the UK and Ireland (Carney *et al*. 2016).

Additionally, in a study asking participants to answer questions on their self-medication use in South Africa, Ireland and the UK, it was shown that in South Africa, 13% reported weekly purchases of OTC codeine-containing products compared to 6% in Ireland and 16% in the UK, showing that South Africans were more likely to purchase OTC codeine containing products when compared to Ireland but less likely when compared to the UK (Wells *et al.* 2018).

Over-the-counter analgesics are advertised directly to the consumer, where the relatively easy access creates a sense of harmlessness and justifies regular consumption of the OTC analgesics (Padayachee *et al.* 2019; Eaves 2015). In Ireland, codeine-containing products are kept out of sight of customers and advertisement of these products is prohibited (Carney *et al.* 2016). For the management of chronic pain, patients desire a fast, simple solution which justifies the continued use of OTC analgesics (Eaves 2015). The daily experience of pain makes it improbable that persons will not seek out simple pain relief. OTC medications appear appealing as they are portrayed as safe alternatives to prescription medications.

In a qualitative study conducted in the United States, where participants were asked about OTC analgesics, participants thought of OTC medications as ‘not real’ medications and, therefore, not harmful. Many participants chose not to share their chronic pain experience with anyone, including their health care provider, and instead preferred to self-medicate using OTC analgesics to avoid being labelled as a chronic pain patient (Eaves 2015).

In another study on chronic pain patients and their experiences, it was noted that when visiting a physician, these patients felt disrespected and were treated as if they were a burden to the medical staff. Many patients were suspected of ‘drug seeking’ when

presenting with chronic pain as a complaint and felt as though they were not taken seriously. Patients complained that their providers often did not believe them. It was found that chronic pain patients experienced a stigma towards them regarding interactions with physicians which has led to an increased time until a diagnosis is made and poor pain management (Driscoll *et al.* 2018).

This study showed that the majority (65%) of the participants were using private health care, which is not comparable with the general population of South Africa, where 80% use public health care services (Padayachee *et al.* 2019). This likely means that most of the participants in this study had access to medical insurance. People with medical insurance often have a savings or added benefits that cover the cost of OTC medications, increasing the ease of access to OTC analgesics by decreasing cost and saving time by not having to consult a doctor for medication or pain relief. This ease of access creates a false sense of safety, that OTC medications are not harmful and can be used frequently (Padayachee *et al*. 2019).

Individuals may also be struggling with financial difficulties and are unable to visit a private general practitioners or physicians or do not have time to wait in lines at public clinics or hospitals (Abdi *et al.* 2018). In South Africa, there is very limited access to preventative musculoskeletal care and education among medical physicians regarding diagnosis, management and rehabilitation of musculoskeletal disorders, thereby leaving patients with chronic pain to seek relief from self-medication using OTC analgesics (Adebajo and Gabriel 2010; Ernstzen, Hiller and Louw 2019).

Another finding in this study demonstrated that there was a significant relationship between the participants who were using public health care services who were also using combination analgesics (55%) compared to 33.8% of participants who were using private health care. The only statistically significant relationship was found between the use of OTC combination analgesics and participants who use public health care services. In the literature it has been shown that the use of self-administered OTC analgesics was higher among those who did not have access to medical insurance (Abdi *et al*. 2018). Participants using PHC services maybe more likely to purchase OTC combination analgesics due to their increased analgesic capability when it comes to the treatment of CMSP, compared to that of aspirin or paracetamol (Shaheed, Maher and McLachlan 2016).

5.6 RELATIONSHIPS BETWEEN PATIENT DEMOGRAPHICS, CMSP AND SELF-ADMINISTERED OVER-THE-COUNTER ANALGESIC USE

This study revealed that a significant 86.2% of females were using OTC analgesics, compared to 69.1% of males to manage their pain (p=.001). The literature has presented a variety of reports showing a higher prevalence of self-medication of OTC analgesics amongst women compared to men (Samuelsen *et al.* 2015; Perrot *et al.* 2018; Hange *et al.* 2022).

This may be due to women being more likely to experience chronic pain than men and they have also been shown to experience a greater intensity of pain and a poorer functional ability due to their pain (Igumbor *et al.* 2011; Bezerra *et al.* 2018; Orhan *et al.* 2018; Mills *et al*. 2019; Tang *et al.* 2020; Zitko *et al*. 2021). This may explain why women are more likely to self-medicate with OTC analgesics than men.

When looking at the relationship between age and self-administered OTC analgesic use, it was revealed in this study that the prevalence of OTC analgesic use was high in both the 35–44 year old age group (88.9%) and those in the 65 years and older age group (88%). This is comparable to some studies in the literature that state the highest prevalence of OTC analgesic use is associated with the elderly (Perrot *et al.* 2018). Contrary to this, in a study in Pakistan, people aged 20–25 years were more likely to use self-administered analgesics, as the elderly were more likely to use prescription analgesics (Li *et al*. 2014). This middle-aged group of participants may be more likely to self-medicate with OTC analgesics, as the elderly are known to use more prescription medications than OTC medication (Li *et al*. 2014).

The prevalence of OTC analgesic use found amongst those aged 65 and older in this study was higher (88%) than the prevalence of OTC analgesic use among the elderly in a review of 28 studies, where it was found to be between 20%–60% (Perrot *et al.* 2018). This may be because in the elderly there is an increase in co-morbidities (Perrot *et al.* 2018) and with the increasing age of life expectancy in South Africa and growing population, the elderly receives very little healthcare, especially when it comes to chronic musculoskeletal conditions (Wang *et al.* 2018). This may result in the elderly becoming more reliant on self-medication compared to those in other countries.

In this study, a statistically significant number of Black participants (29.1%) indicated that they did not use self-administered OTC analgesics (p=.043). A study based in a rural community in South Africa with participants comprising of predominantly Black ethnicity as

their target population demonstrated that 24.5% consulted a traditional healer for their CMSP (Imgumbor *et al*. 2011). This may be a reason why Black participants were less likely to use OTC analgesics than other ethnicities as they are likely to seek out traditional healing.

5.7 DESCRIPTION OF OVER-THE-COUNTER ANALGESICS USED

When participants were asked where they acquired the painkillers which they self-administered the results reflected that majority (94.6%) obtained painkillers from the pharmacy without a prescription, 34.8% reported obtaining painkillers from friends or family and 33.9% used painkillers prescribed by their doctor.

In a study conducted in Ghana amongst people from a rural community, the majority (32.5%) obtained their self-medication from licensed drug outlets such as kiosks and supermarkets, 21.3% from family and friends and 20% from pharmacies (Mensan *et al*. 2019). The number of participants who obtained their self-medication from family and friends is lower when compared to this study (30%), but it was reported that family and friends had a significant influence on participants choice of medication and was the most common reason participants practiced self-medication. In the aforementioned study, it was reported that there was a high dissatisfaction (39%) noted and incidence of adverse effects (56.2%) as it is likely that incorrect self-diagnosis had been made and as a result incorrect choice of medication (Mensan *et al.* 2019). In this study it was also noted that the majority of participants obtained their self-medication from the pharmacy, where it is anticipated that they would receive advice and instructions from a pharmacist likely decreasing the risk of adverse events and increasing the likelihood that the correct medication choice had been made.

In a study conducted in Sudan, it was reported that majority (78%) of participants obtained their self-medication from pharmacies, 55% used medications found at home and 11% from family and friends (Isameldin, Saeed and Mousnad 2020). The majority of participants who obtain their self-medication from pharmacies is comparable with this study that also showed most participants obtaining self-medication from pharmacies. However, the 11% from family and friends is much lower than this study, where over 30% reported obtaining medication from family and friends. This study may have shown a higher number of people obtaining analgesics from family and friends due to the ease of access and decreased cost associated with using what is available instead of purchasing the correct medications for the problem being treated. This however may increase the chances of side effects and decrease the satisfaction of the medication as it may be being used for the incorrect indication (Sanctis *et al.* 2020).

When asked how often they used self-administered painkillers, 42% reported using painkillers every week but not daily, which is comparable to 47% of participants using OTC analgesics at least once per week in a study in Norway (Dale *et al.* 2015), Almost a third (30.6%) of participants said they used OTC analgesics less than every week and 27% reported using painkillers daily which is relatively higher than Norwegian studies that reported daily analgesic use among those with chronic pain to be 12.1% and 11% respectively (Dale *et al.* 2015; Samuelsen *et al.* 2016). The increased number of people who use analgesics daily in this study may be because of the high number of participants who reported CMSP. This study also showed that over 30% of participants reported constant pain, as compared to 20% of participants with constant pain in Norway (Samuelsen *et al.* 2016). Not only is chronic pain a risk factor for daily analgesic use, but the prevalence increases with increased pain intensity, frequency, duration and number of areas involved (Domenichiello and Ramsden 2019; Samuelsen *et al.* 2016).

In this study, of those who used painkillers daily, 46.7% used them twice per day, 33.3% used them once a day, 16.7% used them three times a day. Only 3.3% reported using painkillers four or more times per day. In a study conducted in a hospital in Johannesburg, South Africa, it was revealed that 39% of the participants were using analgesics daily, 18% twice a day, 17% three times per day and 17% four or more times per day (Govender and Brand 2018). This study revealed a higher prevalence of OTC analgesic use two and three times per day, when compared to the study conducted in Johannesburg, but when looking at the prevalence of four or more times per day, this study was much lower. The statistics from this study may appear inflated because it is reported as a percentage of the 27% of participants who reported daily usage so it is not a true reflection of the number of participants using OTC analgesics multiple times a day.

The increased amount and frequency of OTC analgesics increases the risk for side effects, drug interactions and analgesic dependance (Abdi *et al.* 2018). Consuming more than the recommended dose of OTC analgesics or consuming them for longer than the recommended period is considered inappropriate use or misuse of the drug. This misuse can cause harm by masking symptoms and delaying the diagnoses of a possible serious condition (Essa *et al.* 2019; Abdi *et al.* 2018)

This study demonstrated that 57.7% of participants used more than one type of analgesic at a time, which was higher than the 17% that used more than one type of analgesic at a time in a comparable South African study that was conducted amongst runners who were using OTC analgesics to treat running related injuries, so that they could keep running to maintain fitness and participation in events (Thorpe, Blockman and Burgess 2021). This may be because amongst those suffering from CMSP taking more than one type of

analgesic concurrently is common, as was shown in a previous Norwegian study that demonstrated that the incidence of analgesic use increased with an increase in pain severity, frequency and duration (Samuelsen *et al.* 2016).

When participants were asked to select what directions they usually follow when it comes to self-administering analgesics, more than half (54.5%) indicated that they use OTC analgesics as directed by a pharmacist. This is congruent with the majority of the participants obtaining OTC analgesics from the pharmacy. In contrast, this is lower than 67% in Iran (Abdi *et al*. 2018), which could be due to the study in Iran being conducted amongst health science students, who have easier access to pharmaceutical advice and information (Abdi *et al.* 2018). It may also be lower due to more than 30% of participants who reported obtaining analgesics from family or friends therefore not having had the opportunity to consult a pharmacist. However, when looking at a previous study in Saudi Arabia, it was shown that only 13% followed the advice of a pharmacist (Babakor and Ghamdi 2018) and 25% in a previous South African study (Thorpe, Blockman and Burgess 2021).

When looking at the number of participants who followed the advice of family and friends, it was shown that about a quarter of participants in Saudi Arabia (Babakor and Ghamdi 2018) and almost half in a previous South African study followed the advice of family and friends (Thorpe, Blockman and Burgess 2021). These results were both higher than the 13.4% in this study that follow the instructions of friends or family members. This study may have a lower prevalence of participants following the instruction of their family or friends because CMSP patients often chose not to talk about their pain and prefer to manage their pain on their own to avoid feeling like a burden to those around them (Eaves 2015) unlike the previous South African study where the participants were using OTC analgesics to improve their running performance or treat acute injuries (Thorpe, Blockman and Burgess 2021).

Relying on friends and family for medical advice, especially if they are not medical professionals could be to the participants detriment. This can lead to incorrect self-diagnoses and as a result consumption of the incorrect medications or incorrect doses increasing the risk of side effects or analgesics that are ineffective (Rusu *et al*. 2022; Isameldin, Saeed and Mousnad 2020; Mensan *et al.* 2019).

On questioning participants regarding the directions that they follow when using their painkillers, it was found that in this study over 50% of participants indicated that they use their own past experience on what helps relieve their pain. Less than 40% indicated that they read the information insert in the medication box and 11% indicated that they refer to the internet for directions on how to use the medication. The literature reveals that in Iran

the most prevalent directions followed when self-administering analgesics was previous experience about the condition (58%) (Abdi *et al.* 2018) and 45.1% in Saudi Arabia (Babakor and Ghamdi 2018). These findings are comparable to the results of this study. This may be because the study conducted in Saudi Arabia was conducted among patients attending health care clinics, which is similar to this study. The study conducted in Iran was among health science students at a university where the majority of participants were between 18–24 years old which is in line with this study which also had a majority of participants aged 18–24 years old. The study conducted in Saudi Arabia also indicated a comparable proportion (44%) of participants to this study who read the information leaflet (Babakor and Ghamdi 2018). In Iran, 16.5% of participants used the internet as a source of information when self-administering OTC medication (Abdi *et al.* 2018).

The implications of not reading the information leaflet inside the medication box or using additional sources such as the internet has a negative impact on persons consuming OTC analgesics. OTC analgesics are considered safe and not harmful by patients and as a result are often misused (Tesfamariam *et al.* 2019; Barrenberg and Garbe 2015). In a study in Eritrea, it was shown that over 14% of participants purposefully took more than the recommended dose to maximise the effectiveness of the OTC analgesics (Tesfamariam *et al.* 2019). The information leaflets contain important information on dose recommendations, contraindications, drug interactions and side effects, not reading this can increase chance of the medications being misused, ineffectiveness and side effects (Tesfamariam *et al.* 2019; Barrenberg and Garbe 2015). This study revealed that the majority (70.3%) were using NSAIDs, which is comparable to a previous South African study that showed NSAIDs to be the most commonly consumed OTC analgesic (71%), followed by combination analgesics and paracetamol (Thorpe, Blockman and Burgess 2021). NSAIDs are able to provide relief for mild to moderate pain and are recommended for musculoskeletal pain and inflammation. Some commonly used NSAIDs include Ibuprofen, Diclofenac, aspirin and Naproxen (Van Wyk 2016). Most are only available with a prescription but a limited quantity can be obtained OTC. Self-administration with NSAIDs may occur due to medication being left over from previous prescriptions or from medication obtained from pharmacists who may provide without a prescription, or from other sources like family and friends (Rusu *et al*. 2022; Isameldin, Saeed and Mousnad 2020; Department of Health South Africa 2003).

In Saudi Arabia, 49% of participants used NSAIDs (Essa *et al*. 2019) and in the UK and Ireland, it was shown that 46% of participants used NSAIDs for their CMSP (Staelin, Koneru and Rawe 2017) and 32% in Norway (Holtedahl 2004), which is lower than the 70.3% shown in this study. South Africans may be more likely to use NSAIDs for their CMSP because they help with managing arthritic conditions, muscle pain and other musculoskeletal

conditions (Ghlichloo and Gerriets 2022; Dreyer *et al*. 2016). As previously explained, most NSAIDs are only available with a prescription but a limited quantity can be obtained OTC. Self-administration with NSAIDs may occur due to left over medication from previous prescriptions or from medication obtained from pharmacists who may provide it without a prescription, or from other sources such as family and friends (Rusu *et al*. 2022; Isameldin, Saeed and Mousnad 2020; Department of Health South Africa 2003).

Paracetamol is a safe and effective drug for managing mild to moderate pain conditions (Padayachee *et al*. 2019; Van Wyk 2016); it is an easily available OTC analgesic and it is a cost-effective option available from pharmacies, supermarkets and convenience stores (Padayachee *et al*. 2019). Paracetamol is safe and highly recommended for self-medication when taken at the correct doses (Van Wyk 2016). However, when taken incorrectly, it may lead to accidental poisoning or overdose which is one the most common causes of acute liver failure. Some toxic effects which may occur from exceeding the recommended dose or prolonged use include liver and kidney damage. These may occur even without intention when the drug is overused due to a lack of instruction from a doctor or pharmacist. Other adverse effects could include blood disorders, such as a decreased platelet count or hypersensitivity reactions presenting as a rash. (Cairns *et al*. 2019; Van Wyk 2016).

In other studies, it was found that the most common OTC analgesic participants were using was paracetamol, with a prevalence of 96.5% in Saudi Arabia (Essa *et al.* 2019), 60% in Iran (Abdi *et al.* 2018) and 52% in the UK and Ireland (Staelin, Koneru and Rawe 2017). These figures are comparable to this study, which revealed 57.7% of participants using paracetamol with NSAID usage being higher.

Some combination analgesics can be obtained OTC from a pharmacy. They are effective in managing mild to moderate types of pain (Wells *et al.* 2018). Combination analgesics usually contain low doses of codeine, together with a simple analgesic, such as aspirin, paracetamol or another NSAID, typically Ibuprofen. The reason for the combination of analgesics is for their synergistic properties resulting in their analgesic effect (Mill *et al.* 2018; Shaheed, Maher and McLachlan 2016).

In a previous study among South African runners, the use of combination analgesics was between 9%–43% (Thorpe, Blockman and Burgess 2021) and in a study conducted in Norway among patients with CMSP, 20% of them were using OTC combination analgesics (Holtedahl 2004), which is lower than the findings of this study which showed 54.1% of participants using combination analgesics. This may be because, in this study, participants had CMSP and combination analgesics are more effective in the treatment of musculoskeletal pain, compared to aspirin or paracetamol (Shaheed, Maher and McLachlan

2016). A concern in this regard is that long-term use, usage past the recommended period of time, or incorrect doses can lead to a higher risk of side effects, such as constipation, gastro-intestinal complications, drowsiness, dizziness, nausea or more seriously nephrotoxicity may occur (Mill *et al.* 2018; Wells *et al.* 2018; Shaheed, Maher and McLachlan 2016).

In the literature there are few reports on the prevalence of the use of aspirin but this may be because aspirin is an NSAID and may have been reported under NSAIDs, or that aspirin is not usually used as an anti-inflammatory as it lacks substantial anti-inflammatory effects at normal therapeutic doses (Dreyer *et al.* 2016). In this study, it was revealed that 15.3% of participants were using aspirin for their CMSP, which is higher than 8.1% reported by a Norwegian study (Dale *et al.* 2015). This demonstrates that using medication without proper instructions could lead to the incorrect choice of analgesic being used with little effect on the CMSP. The use of aspirin may be higher in this study due to it being easily accessible in South Africa. Disprin®, which is a leading brand of aspirin in South Africa, is available in pharmacies, local supermarkets and informal stores, making it a popular choice for pain relief among South Africans (Padayachee 2021).

When participants were asked about their satisfaction with the OTC analgesics that they were using, only 10.8% were satisfied. This is much lower than a study conducted in UK where 45% of participants were satisfied with their OTC analgesics (Staelin, Koneru and Rawe 2017) and almost 60% of participants in a study conducted in Ghana were satisfied with their OTC analgesics (Mensan *et al.* 2019). This high rate of dissatisfaction may be attributed to incorrect self-diagnoses being made and as a result incorrect self-medication of the condition in question (Rusu *et al.* 2022; Mensan *et al.* 2019). It may also be due to incorrect choice of medication such as aspirin being used for CMSP, which is not as effective as other NSAIDs or a combination analgesic for the treatment of CMSP (Dreyer *et al.* 2016; Shaheed, Maher and McLachlan. 2016). Another reason for the high prevalence of dissatisfaction may be from participants following the incorrect directions for the medication that is being used, with half of the participants using their own discretion gained from prior experience with medication and over 13% relying on directions from family and friends. There is, therefore, much possibility for possible misuse or incorrect doses because of self-medicating.

The literature reported side effects from OTC analgesics to be between 2%–20.5% in France (Perrot *et al*. 2018; Le Parc *et al*. 2002), and 13% and 7.1% in two studies conducted in Saudi Arabia (Essa *et al.* 2019; Babakor and Ghamdi 2018). This is lower than the number of participants experiencing side effects in this study (33.3%). Side effects could occur due to incorrect use of the medication, incorrect dosages, poor knowledge of the possible

contraindications that may be present, incorrect self-diagnosis or drug interactions from the use of multiple medications taken together.

The types of side effects that were most commonly reported in this study were drowsiness and fatigue, nausea, stomach complaints, blurred vison, brain fog and euphoria. The literature revealed some of the common side effects of analgesics to be nausea and vomiting, stomach ache, stomach ulcers, rash, diarrhoea, constipation and vertigo (Babakor and Ghamdi 2018). The use of NSAIDs is associated with gastro-intestinal side effects such as nausea, vomiting, abdominal pain, stomach ulcers, and erosions causing gastric bleeds. Long-term effects and large doses can lead to worsened hypertension, angina, cardiac failure, bronchoconstriction in patients with asthma and central nervous system side effects such as headaches, dizziness, confusion and drowsiness (Govender and Brand 2018; Perrot *et al*. 2018; Dreyer *et al*. 2016).

Paracetamol's side effects are rare but can occur when taken in large doses or for extended periods of time. These include hepatotoxicity, acute liver failure, hypersensitivity which is presented as a skin rash, kidney damage and blood complications, decreased platelet and white blood cell count (Cairns *et al.* 2019; Van Wyk 2016). Combination analgesics usually contain low doses of codeine, which is a weak opioid and another simple analgesic such as paracetamol or NSAIDs. Possible side effects of the inclusion of codeine include, constipation, drowsiness, dizziness, nausea, headaches, stomach irritation and more rarely euphoria and blurred vision (Shaheed, Maher and McLachlan 2016; Mill *et al.* 2018).

This study revealed that 39.1% of participants only sought chiropractic treatment after one year of self-administering analgesics, which is a significant amount of time that patients were regularly self-medicating with OTC analgesics before seeking additional pain management. This long period of self-medication may contribute to the high prevalence of side effects and low satisfaction rates of the analgesics being used.

Chiropractic care consists of conservative treatment for musculoskeletal conditions. In a study conducted on patients with low back pain who had previously never sought chiropractic treatment, it was shown they had favourable outcomes after receiving treatment. This included a decrease in pain severity and an improvement in functional ability. Additionally, it has been reported in the United States that participants who were receiving chiropractic care reported significantly less pain medication use than those who were just receiving normal medical care for their low back pain (Goertz *et al.* 2018).

CHAPTER 6 CONCLUSION

6.1 INTRODUCTION

This chapter presents a summary of the results of this study, and conclusions from the study. The studies limitations and recommendations for future research will also be discussed.

6.2 CONCLUSION

This study investigated the prevalence, knowledge, attitude and practice regarding self-administered OTC analgesic use among patients with CMSP attending the DUT CDC, in Durban, South Africa. This study demonstrated a prevalence of CMSP to be almost 70%, where over 60% had intermittent pain and majority had a moderate pain intensity. Many participants (61%) reported not being able to perform normal activities of daily living and over 60% had missed work or have had to take leave in the past due to their CMSP. This indicates a negative impact on the lives of those with CMSP.

This study revealed a period prevalence of self-administered OTC analgesic use of almost 80% and a point prevalence of almost 60% at the time of the study. The prevalence of self-medication was significantly higher among females (86.2%) compared to males (69%). Age groups 35–44 years old and 65 years and older had the highest prevalence of self-medication (88%). It was found that a significant number, almost 30%, of Black South Africans did not self-administer OTC analgesics. This study revealed a relationship between those using PHC services and combination analgesics, where the use of combination analgesics was significantly higher compared to those using private health care services.

Over 90% of participants indicated that they obtained their OTC analgesics from a pharmacy without a prescription and over 30% indicated that they obtain analgesics from family and friends. The frequency of usage of OTC analgesics varied, with over 40% taking analgesics weekly but not daily, and 27% reporting daily use of OTC analgesics. Of those who reported daily usage, over 40% indicated taking them twice per day and a third indicated taking painkillers once a day. Almost 60% of participants reported taking more than one type of analgesic concurrently. More than half of the participants followed the advice of the pharmacist when consuming analgesics, and half indicated that they rely on their own previous experience with the medication. Less than 40% of participants read the information leaflet found in the packaging of the analgesics to determine how to use their analgesics.

NSAIDs were the most frequently used group of analgesics, with 70% of participants relying on them for pain relief. Almost 60% of participants were using paracetamol; more than half were using combination analgesics; and a smaller percentage (15%) were using aspirin (the figures do not equate to 100% as participants were able to choose more than one type of drug if they were using multiple analgesics). Satisfaction with the use of OTC analgesics was low, with only 10% reporting that they were satisfied with the analgesic they were using and a third of participants reported having experienced side effects from the OTC analgesic.

This study showed that almost 40% of participants self-medicated for over a year before seeking additional pain relief from chiropractic treatment, demonstrating that participants self-medicated for extended periods of time. The low satisfaction rates and relatively high prevalence of side effects indicates that there may be misuse of OTC analgesics. This is cause for concern as prolonged use, increased doses, using more than one type of analgesic at a time, not knowing the indication or contraindications of the drug all increase the risk of adverse effects or drug interactions.

The findings from this study reinforce that primary care physicians, including chiropractors, need to improve their initiative in educating, providing better guidelines and promoting safe and effective OTC analgesic use (Kawuma *et al*. 2021) to their CMSP patients. Considering that this study demonstrated a high prevalence of CMSP, as well as a high prevalence of OTC analgesic use, it is important that chiropractors understand patients with chronic pain and why they may make certain decisions. Seeking additional pain relief options, like chiropractic treatment, for CMSP earlier may help reduce reliance on OTC analgesic medication.

6.3 LIMITATIONS

This study relied on self-reporting by participants using a questionnaire which may not be as reliable as interviews, in which questions may be better explained. A small sample size was used and the demographic characteristics, such as the ethnic groups, differed from that of the general population represented in Durban. This study had a majority of participants who were using private health care services, whereas in the general public, the majority of people rely on PHC services, making these results difficult to generalise to the general population.

This study only looked at the different groups of OTC analgesics and did not focus on specific brand names of drugs. The participants may have found it difficult to choose a type or group of analgesic if the name of the analgesic that they were using was not present in the examples provided or if they did not know the type of drug they were using. This study

only focused on oral OTC analgesics and did not include topical analgesics or prescription medication participants might have been taking.

6.4 RECOMMENDATIONS

It is recommended that in future studies a larger sample size be used so that the results can be better generalised. Qualitative interviews would allow more descriptive detail into the types and usage of analgesics. Such a study would provide a more in-depth understanding on the use and experience of OTC analgesics in those with chronic pain.

Furthermore, given the high prevalence of self-medication with analgesics among CMSP patients who regularly visit chiropractors, and the potential role identified in chiropractors being educators and advisors to their patients on safe analgesic use, future research should investigate the extent of chiropractors' knowledge regarding various analgesics to determine their preparedness for such a role.

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APPENDICES

Appendix A: DUT Research Director Permission

Directorate for Research and Postgraduate Support
Durban University of Technology
Tromso Annexe, Steve Biko Campus
P.O. Box 1334, Durban 4000
Tel.: 031-3732576/7
Fax: 031-3732946

7th June 2022
Ms Donna Engelbrecht
c/o Department of Chiropractic
Faculty of Health Sciences
Durban University of Technology

Dear Ms Engelbrecht

PERMISSION TO CONDUCT RESEARCH AT THE DUT

Your email correspondence in respect of the above refers. I am pleased to inform you that the Institutional Research and Innovation Committee (IRIC) has granted **Gatekeeper Permission** for you to conduct your research "The prevalence, knowledge, attitude and practice regarding self-administered over-the-counter analgesic use among patients with chronic musculoskeletal pain attending the Durban university of Technology Chiropractic Day Clinic" at the Durban University of Technology. **Kindly note that this letter must be issued to the IREC for approval before you commence data collection.**

The DUT may impose any other condition it deems appropriate in the circumstances having regard to nature and extent of access to and use of information requested.

We would be grateful if a summary of your key research findings would be submitted to the IRIC on completion of your studies.

Kind regards.
Yours sincerely

PROF. KEO MOTAUNG
ACTING-DIRECTOR: RESEARCH AND POSTGRADUATE SUPPORT DIRECTORATE

Appendix B: Permission to Conduct Research by DUT CDC Director

MEMORANDUM

To : Prof Adam
Chair: IREC

From : Dr Desiree Varatharajullu
Head of Department: Chiropractic
Clinic Director: Chiropractic Day Clinic: Chiropractic

Date : 04.06.2022

Re : Request for permission to use the Chiropractic Day Clinic for research purposes

Permission is hereby granted to:

Ms Donna Engelbrecht (Student Number: 21714089)

Research title: "The prevalence, knowledge, attitude and practice regarding self-administered over-the-counter analgesic use among patients with chronic musculoskeletal pain attending the Durban University of Technology Chiropractic Day Clinic."

Ms Engelbrecht, is requested to submit a copy of her FRC/IREC approved proposal along with proof of her M.Tech: Chiropractic registration to the Clinic Administrator/s before she starts with her research in order that any special procedures with regards to her research can be implemented prior to the commencement of her seeing patients.

Thank you for your time.

Kind regards

Dr D Varatharajullu

Head of Department: Chiropractic

Clinic Director: Chiropractic Day Clinic: Chiropractic

Cc: Mrs Linda Twiggs: Chiropractic Day Clinic

Dr Y. Thandar: Supervisor

Appendix C: Permission to Conduct Research by IREC

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
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

20 July 2022

Ms D Engelbrecht
152 Station Ridge Road
Durban North
4051

Dear Ms Engelbrecht

The prevalence, knowledge, attitude and practice regarding self-administered over-the-counter analgesic use among patients with chronic musculoskeletal pain attending the Durban University of Technology Chiropractic Day Clinic
Ethical Clearance number IREC 099/22

The 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 IREC acknowledges receipt of your gatekeeper permission letters.

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

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

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

Yours Sincerely

Prof J K Adam
Chairperson: DUT-IREC

Appendix D1: Questionnaire (English)

Appendix D

THE PREVALENCE, KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING SELF-ADMINISTERED ANALGESIC USE AMONG PATIENTS WITH CHRONIC MUSCULOSKELETAL PAIN ATTENDING THE DURBAN UNIVERSITY OF TECHNOLOGY CHIROPRACTIC DAY CLINIC

Dear Sir/ Madam

I would like to offer you a warm welcome to my study and appreciate your time in completing this short survey. The estimated time to complete this survey is 10 minutes.

In this survey we would like to know about your experience with chronic musculoskeletal pain and its duration as well as information about your use of analgesics (painkillers) to treat your musculoskeletal pain. This includes information on the type of painkillers you use, how often you use them and your opinion on the painkillers you use.

Please carefully read the questions and answer them. The survey will remain anonymous.
Thank you for your time and willingness to contribute to scientific research.

TICK THE APPROPRIATE BOXES IN THE QUESTIONS BELOW.

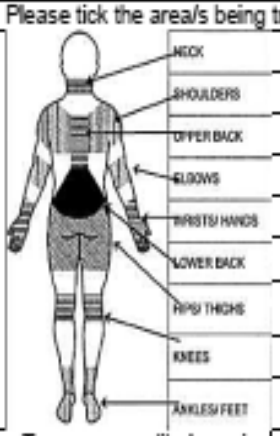
1. GENERAL INFORMATION

Please indicate your gender	Male		Female									
Please indicate you age	18-24		25-34		35-44		45-54		55-64		65 and older	
Indicate the highest level of education you have completed	Grade 9		Grade 12		Diploma		Bachelors		Honours		Masters		PhD		Other	
Please indicate your race	Black		Indian		Coloured		White		Other			
Do you use private or public health care for musculoskeletal pain? You may tick more than one box	Public hospitals		Private hospital		Public clinic		Private GP's		Private specialist			
What is your current occupation?												

2. MUSCULOSKELETAL COMPLAINTS

a. Have you experienced any musculoskeletal pain?	Yes		No	
b. Are you currently experiencing any musculoskeletal pain?	Yes		No	
c. If Yes, how long have you been experiencing musculoskeletal pain?	Less than 3 months		More than 3 months	

If you have chosen **NO** pain or your pain is **less than 3 months** – you **DONOT** need to complete the survey. You may please hand in your survey. Thank you for taking part in this survey.
If you have experienced pain for **more than 3 months**, please continue with the survey.

d.	Please tick the area/s being treated at your chiropractic session. You may tick more than one box.						
							
Other i.e. Temporomandibular pain							
e.	Is your pain	Constant (all the time)			Intermittent (comes and goes)		

f.	How would you rate your pain at this time?	Mild		Moderate		Severe	
g.	Does your musculoskeletal pain affect your normal daily activities?	Yes		No		I am not sure	
h.	Have you ever taken leave/ missed work due to your musculoskeletal pain?	Yes		No		I am not sure	

3. USE OF ANALGESICS (PAINKILLERS)

Self-administered medication means taking your own medication without the prescription or supervision of a doctor. This can be done with the advice of a pharmacist, family members/friends or personal experience.				
a. Do you ever use self-administered painkillers?	Yes		No	
b. Are you currently self-medicating for your musculoskeletal pain?	Yes		No	

If **NO**, please hand in your survey. Thank you for taking part in this survey. If **YES** please continue

c.	Do you use: (you may select more than one option)	painkillers prescribed by your doctor		painkillers obtained from a pharmacy without a prescription		Painkillers obtained from friends/family					
d.	How often do you use painkillers?	Less than every week		Every week but not daily		Daily					
e.	If you do use painkillers daily, how many times per day do you use them?	Once daily		2 times a day		3 times a day		4 or more times a day		Not applicable	
f.	Do you ever use more than one type of painkiller at a time?	Yes		No							

g. Please indicate which directions you follow when using your painkillers. You may tick more than one option.

Only as directed by a pharmacist	
On instruction from a relative or friend who has previously used the medication	
I use my own experience of what helps relieve my pain	
I read the information insert inside the medication box/container	
I refer to the internet for directions on how to use the medication	
Other	
If other please specify	

h. Please indicate what type of painkiller/s you use. You may tick more than one option

Paracetamol only (eg. Panado®;Dolorol®, Painamol®, Napamol®)	
Aspirin (eg. Disprin®)	
Nonsteroidal anti-inflammatory drugs (eg. Brufen®; Nurofen®; Voltaren®; Cataflam ®, Ponstan®)	
Combination analgesics that can be obtained without a perscription (eg. Adcodol®; Syndol®; Grandpa®; Betapyn®)	
Combination analgesics not easily obtainable without a prescription e.g., Stilpane; Stopayne; Myprodol; Mybulen; Mypaid; Gen-payne	
Other	
If other please state the name of the medication.	

i.	How long did you self-medicate until you sought chiropractic treatment?	Less than 1 week		Over 1 week		Over 1 month		3-6 months		1 year		More than 1 year	
j.	How satisfied are you with the painkiller/s you are using?	Very satisfied		Neutral		Not satisfied	
k.	Do you experience any side effects from the painkiller/s you are using?	Yes		No	
l.	If you have experienced side effects, please list 5 side effects that you may have experienced as a result of the painkiller/s you take.														

Thank you for taking the time to answer all the questions! Please hand in your survey.

Appendix D2: Questionnaire (IsiZulu)

UKUSABALALA, ULWAZI, ISIMO SENGQONDO KANYE NOKWENZA MAQONDANA NOKUSEBENZISA IZIDAMBISI EZIDAMBISA IZINHLUNGU EZIGULINI EZINOBUHLUNGU OBUNGAPHELI BEMISIPHA NAMATHAMBO EZIHAMBA UMTHOLAMPILO WASEDURBAN UNIVERSITY OF TECHNOLOGY CHIROPRACTIC DAY CLINIC.

Mnumzane/ Nkosikazi othandekayo

Kulolu cwaningo singathanda ukwazi ukuthi zingaki iziguli ezisebenzisa amaphilisi ezinhlungu, ulwazi lwakho, isimo sengqondo kanye nendlela osebenzisa ngayo ngamaphilisi ezinhlungu owaphuzayo kanye nokuthi ingabe ubhekene nobuhlungu obungapheli bemisipha namathambo, obuqhubekile esikhathini esiyizinyanga ezintathu.

Sicela ufunde ngokucophelela imibuzo bese uyiphendula. Izimpendulo zizogcinwa ziyimfihlo. Ukuphendula lemibuzo kuzothatha isikhathi esilinganiselwe kwi mizuzu eyishumi. Siyabonga ngesikhathi sakho nokuzimisela kwakho ukufaka isandla ocwaningweni lwesayensi.

KOKELELA (KHETHA) KUMABHOKISI ANEMIBUZO NGEZANSI.

1. ULWAZI OLUVAMILE

Sicela ukhethe ubulili bakho				Owesilisa								Owesifazane											
Sicela ukhethe iminyaka yakho				18-24		25-34		35-44		55-64		65 nangaphezulu											
Sicela ukhethe izinga lemfundo elikhulu onalo	U standard 7		Umati kuletsheni		iDiploma		iBachelors		iHonours		iMasters		iPhD										
Sicela ukhethe uhlanga lwakho	Black		Indian		Coloured		White		Olunye														
Ingabe usebenzisa ukunakekelwa kwezempilo okuzimele noma komphakathi?									Komphakathi		Okuzimele												
Uyini umsebenzi wakho wamanje?																							

2. IMPILO EJWAYELEKILE

Ungasilinganisa kanjani isimo sakho sempilo jikelele?	Sikahle		Siphakathi		Sibi																		
Uyabhema?	Yebo		Cha																				
Uma uthe yebo, kangakanani?	Nsukuzonke		Njalo ngeviki		Ngezikhathi ezithile																		
Ingabe uyaphuza utshwala?	Yebo		Cha																				
Uma uthe yebo, uphuza kangakanani?	Nsukuzonke		Njalo ngeviki		Ngezikhathi ezithile																		

3. IZIKHALAZO ZAMATHAMBO NEMISIPHA

a. Useke waphathwa izinhlungu zamathambo kanye nemisipha?	Yebo		Cha	
Uma uthe yebo, sezikuphathe isikhathi esingakanani?	Ngaphansi kwezinyanga ezintathu		Ngaphezu kwezinyanga ezintathu	
Uma ukhethe ukuthi awunazo izinhlungu noma unazo kodwa zikuphathe izinyanga ezingaphansi kwezintathu - sicela ubuyisele iphepha elinezimpendulo zakho. Siyabonga ngokubamba iqhaza kulolu cwaningo. Uma ukhethe ukuthi unobuhlungu osekukuphathe ngaphezu kwezinyanga ezintathu, sicela uqhubeke nokuphendula imibuzo.				
b. Sicela ukhethe izindawo olashwa kuzo emtholampilo weChiropractic. Ungakhetha noma ikangaki ebhokisini elilodwa.				
Intamo/Amahlombe				
Izingalo				
Umgogodla ongasenhla				
Okhalweni				
Emilenzeni				
Ezinye izindawo, sicela ucacise. Isibonelo, ekhanda				
c. Sicela ukhethe: ingabe izinhlungu zakho	Ezangemihla ngemihla (zihleli zikhona)		Ziyanyamalala zibuye zibuye	
d. Ungabukala kangakanani ubuhlungu bakho njengamanje, kusukela ku zero kuya eshumini, uzero usho ukuthi awuzwa buhlungu njengamanje kanti ishumi lisho ukuthi usezinhlungwini kakhulu? 0 1 2 3 4 5 6 7 8 9 10 →				

e. Uma usezinhlingwini ingabe okuphi okwenzayo kulokhu:	Uyeka into okade uyenza		Wehlisa kancane		Uyaqhubeka nento okade uyenza	
f. Ingabe ubuhlungu bunomthelela emsebenzini oyenza mihla ngemihla?			Yebo		Cha	
g. Wake waphutha emsebenzini noma wathatha ilivu ngenxa yezinhlungu?			Yebo		Cha	

4. Ukusetshenziswa kwemithi

Imithi ozazisayo isho ukuthatha imithi yakho ngaphandle kokuqondiswa udokotela. Lokhu kungenziwa ngezeluleko zikasokhemisi, amalungu omndeni/abangane noma ulwazi lomuntu siqu.							
a. Ingabe njengamanje uyazelapha ngezinhlungu zakho ngamaphilisi owathengile?		Yebo		Cha			
Uma impendulo ithi Cha, sicela ungenise ubuyisele imibuzo yakho. Siyabonga ngokubamba iqhaza kule nhlolovo.							
b. Ingabe uke uwasebenzise amaphilisi ezinhlungu ozinikeza wona?		Yebo		Cha			
c. Uyakusebenzisa lokhu:	Amaphilisi ezinhlungu owanikezwe udokotela		Amaphilisi ezinhlungu owathole ekhemisi ngaphandle kwencwadi yadokotela		Amaphilisi ezinhlungu owathole kumngani noma ezihlobweni		Konke lokhu okubaliwe
d. Ujwayele ukuwasebenzisa isikhathi esingakanani amaphilisi ezinhlungu?	Ngaphansi kweviki		Njalo ngeviki kodwa ayi nsuku zonke		Zinsuku zonke		
Uma ungawasebenzisi zinsuku zonke amaphilisi ezinhlungu sicela uweqe umbuzo F							
e. Uma usebenzisa amaphilisi ezinhlungu nsuku zonke, kangaki ngosuku?							
f. f. Ingabe uke usebenzise amaphilisi ezinhlungu angaphezu kwelilodwa ngesikhathi?	Yebo		Cha				

g. Sicela ukhombise ukuthi uwasebenzisa kanjani amaphilisi ezinhlungu

Kuphela njengoba kuqondiswe usokhemisi	
Ngeziyalezo ezivela kwisihlobo noma umngane oke wasebenzisa umuthi ngaphambilini	
Ngokuhlangenwe nakho kwami kokusiza ekudambiseni ubuhlungu bami	
ngifunda ulwazi olufakwe ebhokisini/esitsheni semithi	
ngibheka ku-inthanethi ukuze ngithole iziqondiso zokuthi usetshenziswa kanjani umuthi	

h. Sicela ukhethe ukuthi inhloboni yamaphilisi ezinhlungu owasebenzisayo

Paracetamol (eg. Adco-dol®; Panado co®)	
Aspirin (eg. Disprin plus®)	
Ibuprofen (eg. Gen-payne®; Myprodol®)	
Codeine containing products (eg. Nurofen plus®; Gen-pyn®; Panadeine)	
Doxylamine containing products (eg. Syndol®; Adco-dol®; Acurate®)	
Nonsteroidal anti-inflammatory drugs (eg. Diclofenac)	
Ahlanganisiwe (eg. Stilpane®, Myprodol®)	
Amanye	
Uma uthe amanye, sicela ubhale phansi igama lawo	

i. Uwasebenzise isikhathi esingakanani amaphilisi uze ufune ukwelashwa kwe-chiropractic?	Ngaphansi kweviki elilodwa		Ngaphezulu kweviki elilodwa		Ngaphezulu kwenyanga		Kuqala ku 3 kuya ku 5 wezinyanga		Onyakeni		Ngaphezulu konyaka			
j. Sicela ubhale imiphumela engemihle ewu-5 evamile okungenzeka uke wabhekana nayo ngenxa yamaphilisi ezinhlungu owaphuzayo. Uma ngabe awuzange ube nemiphumela emibi, ungashiya ibhulokhi ingenalutho.														

Siyabonga ngokuzinika isikhathi sokuphendula yonke imibuzo!

Appendix E1: Information Letter (English)

LETTER OF INFORMATION

Title of the Research Study: The prevalence, knowledge, attitude and practice regarding self-administered over-the-counter analgesic use among patients with chronic musculoskeletal pain attending the Durban University of Technology Chiropractic Day Clinic.

Principal Investigator/s/researcher: Donna Engelbrecht, B. Tech: Chiropractic (DUT)

Co-Investigator/s/supervisor/s: Dr Yasmeen Thandar, PhD (Pharmacology) (DUT).

Brief Introduction and Purpose of the Study:
Good day. Thank you for considering participating in my study. This letter serves to provide you with some background of my study. I am a 6th year student at Durban University of Technology doing research for my Masters degree in Chiropractic. I would like to invite you to participate in the research. Chronic pain is pain that persists for more than a period of three months. Which is commonly treated by Chiropractors. Recommendations for chronic pain management include exercise and the use of painkillers. A variety of painkillers are available without prescription and are sold over-the-counter (OTC). These painkillers allow patients to manage their pain by themselves. Research in this area is currently lacking and information is required to quantify the scale of OTC painkiller use amongst patients with chronic musculoskeletal pain.

Outline of the Procedures:
The treatment of chronic pain consumes a large portion of primary healthcare and Chiropractors, as primary healthcare providers, are able to manage chronic pain and decrease perceived pain and levels of disability. There is an increase in the use of OTC analgesics, with a lack of basic knowledge amongst users with regards to contraindications, side effects, ingredients and misuse especially in the chiropractic clinic setting. The aim of the study is to investigate the prevalence, knowledge, attitude and practice of self-administered OTC analgesic use among patients with chronic musculoskeletal pain attending the Durban University of Technology Chiropractic Day Clinic.

Completion of this survey will take place at Durban University of Technology Chiropractic Day clinic. The inclusion criteria of the study are as follows, you need to be over the age of 18 years, you need to have chronic musculoskeletal pain and currently be self-medicating with painkillers, you will need to sign an informed consent form before taking part in the study. Should you decide to participate in this study please read over and complete the consent form before continuing to the questionnaire. Please answer the questionnaire truthfully, all answers in the questionnaire will remain anonymous the questionnaire should take approximately 5-10 minutes for you to complete. Once you have completed the questionnaire, please return the questionnaire along with a signed consent form back to the chiropractic student treating you, to be placed back in to your patient file.

Risks or Discomforts to the Participant:
There are no risks associated with this study.

Explain to the participant the reasons he/she may be withdraw from the Study:
Please note that participation in this study is voluntary and you may withdraw from the study at any point if you wish to do so.

6 August 2020

Appendix E2: Information Letter (IsiZulu)

INCWADI YOLWAZI

Isihloko socwaningo: Ukusabalala, ulwazi, isimo sengqondo kanye nokwenza maqondana nokusebenzisa izidambisi ezidambisa izinhlungu ezigulini ezinobuhlungu obungapheli bemisipha namathambo ezihamba umtholampilo waseDurban University of Technology Chiropractic Day Clinic.

Umcubunguli Oyinhloko: Donna Engelbrecht, B. Tech: Chiropractic (DUT)

Umphathi: Dr Yasmeen Thandar, PhD (Pharmacology) (DUT).

Isingeniso esifushane kanye nenjongo yocwaningo:
Usuku oluhle. Ngiyabonga ngokucabangela ukuhlanganyela esifundweni sami. Le ncwadi isiza ukukunikeza isizinda esithile sokufunda kwami. Ngingumfundi owenza unyaka wesithupha eDurban University of Technology ngenza ucwaningo ngeziqu zami zeMasters kuChiropractic. Ngithanda ukukumema ukuthi ubambe iqhaza ocwaningweni. Ucwaningo lumayelana nobuhlungu obungapheli ubuhlungu obuqhubekayo isikhathi esingaphezu kwezinyanga ezintathu, okuvame ukwelashwa ngama-Chiropractors. Izincomo zokulawula ubuhlungu obungapheli zihlanganisa ukuvivinya umzimba kanye nokusetshenziswa kwamaphilisi ezinhlungu. Amaphilisi ezinhlungu anhlobonhlobo ayatholakala ngaphandle kwencwadi kadokotela futhi athengiswa ngaphandle kwekhawunta (OTC). Lawa maphilisi ezinhlungu avumela iziguli ukuthi zilawule ubuhlungu bazo ngokwazo. Ucwaningo kule ndawo alukho okwamanje futhi ulwazi luyadingeka ukuze kulinganiswe isilinganiso sokusetshenziswa kwamaphilisi ezinhlungu phakathi kweziguli ezinezinhlungu ezingapheli zamathambo nemisipha.

Uhlaka Lwezinqubo:
Ukwelashwa kobuhlungu obungapheli kudla ingxenye enkulu yokunakekelwa kwezempilo okuyisisekelo kanye namaChiropractors, njengabahlinzeki bezempilo abayinhloko, bayakwazi ukuphatha ubuhlungu obungapheli futhi banciphise ubuhlungu obubonakalayo kanye namazinga okukhubazeka. Kukhona ukwanda kokusetshenziswa kwamaphilisi ezinhlungu atholakala ngaphandle kwencwadi yadokotela, lokhu kwenzeka ngaphandle kolwazi lokuthi lamaphilisi anomthelela muni empilweni yalowo owasebenzisayo. Inhloso yalolu cwaningo ukuphenya ukusabalala, ulwazi, isimo sengqondo kanye nokwenza kokusetshenziswa kwamaphilisi wokudambisa izinhlungu ezingapheli phakathi kweziguli ezinobuhlungu obungapheli bemisipha namathambo eziya emtholampilo waseDurban University of Technology Chiropractic Day Clinic.

Ukuphothulwa kwalolu cwaningo kuzokwenziwa e-Durban University of Technology Chiropractic Day Clinic. Izindlela zokufakwa kocwaningo zimi kanje, udinga ukuthi ube ngaphezu kweminyaka eyishumi nesishagalombili, udinga ukuba nobuhlungu obungapheli bemisipha futhi njengamanje uzilapha ngamaphilisi ezinhlungu, uzodinga ukusayina ifomu lokuvuma ukuthi unolwazi ngaphambi kokuba ubambe iqhaza. Uma kwenzeka unquma ukubamba iqhaza kulolu cwaningo sicela ufunde futhi ugcwalise ifomu lemvume ngaphambi kokuqhubeka nohlu lwemibuzo. Sicela uphendule uhlu lwemibuzo ngeqiniso, zonke izimpendulo kuhlu lwemibuzo zizogcinwa ziyimfinhlo. Ukuphendulwa kwemimuzo kuzothatha cishe imizuzu emihlanu kuya kweyishumi ukuthi ugcwalise. Uma

usuliqedile uhlu lwemibuzo, sicela ubuyisele uhlu lwemibuzo kanye nefomu lemvume esayiniwe emuva kumcwaningi noma umfundi we-chiropractic okwelaphayo, ukuze abuyiselwe efayeleni lakho lesiguli.

Ubungozi noma ukungaphatheki kahle kombambi qhaza:
Abukho ubungozi ekubambeni kwakho iqhaza kulolu cwaningo.

Incazelo ngokuthi kungani umbambi qhaza engase ahoxe kulolu cwaningo:
Isaziso: njengomuntu ovolontiyayo kulolu cwaningo, ukhululekile ukuhoxa kulolu cwaningo noma yingasiphi isikhathi, ngaphandle kokuthi uchaze izizathu.

Izinzuzo: Imininingwane ezotholakala kulolu cwaningo izosiza ukuthi ama Chiropractors namanye amalunga ezenhlalakahle akwazi ukwelapha iziguli ezisezihlungwini ezenzeka mihla ngemihla, nokuthi aqwashise iziguli ngokusebenzisa ngokweqile kwamaphilisi ezinhlungu. Ngokwenza njalo kuzokwenza umehluko ngendlela ama chiropractors alapha izinhlungu.

Inkokhelo:
Ngeke uthole inkokhelo ngokubamba iqhaza kulolu cwaningo.

Izindleko Zocwaningo:
Azikho izindleko kubabambi qhaza.

Ukugcinwa kuyimfihlo:

Yonke imininingwane yababamba iqhaza ngeke idalulwe ukuze kuqinisekiswe ukuthi igcinwa iyimfihlo. Imiphumela evela kulolu cwaningo izosetshenziselwa izinjongo zocwaningo kuphela futhi izofinyelelwa kumcwaningi nethimba labagadi kuphela.

Imiphumela yocwaningo: Imiphumela yocwaningo izoshicilelwa bese itholakala emtaphweni wolwazi e-DUT.

Ukugcinwa kwawo wonke amakhophi kwi-computer kanye namakhophi angamaphepha:

Uma ucwaningo seluqediwe, irekhodi yombambi qhaza izogcinwa emtholampilo e-Chiropractic Day Clinic (CDC). Irekhodi lizokhiywa, lifakwe ikhodi futhi ligcinwe. Irekhodi ekwi-computer lizogcinwa ku-USB evikwelwe ngobuchwepheshe bamanje futhi i-USB izotholakala e-DUT CDC. Wonke amakhophi azocutshungulwa, azolahlwa ngemva kweminyaka emihlanu futhi yonke irekhodi elikwi-computer lizosuswa.

Abantu ongabathinta esimweni sanoma iziphi izinkinga noma uma unemibuzo:
Uma unezinkinga noma imibuzo ephathelene nocwaningo, sicela uxhumane nomcwaningi noma nelungu lethimba labaqondisi kulezi zinombolo ezibalwe ngezansi. Umcwaningi Donna Engelbrecht (079 849 5942), umphathi Dr Yasmeen Thandar (083 459 4381) Uma ungagculisekile ngendawo ethile yalolu cwaningo, sicela ukhululeke ukudlulisa noma yiziphi izikhalazo e-Durban University of Technology Research and Ethics Administrator ku-031 373 2375 noma kuMqondisi: Ucwaningi oweseka Ngeziqu, uDkt L. Linganiso ku-031 373 2577 noma researchdirector@dut.ac.za.

Ngiyabonga ngokubamba iqhaza kulolu cwaningo.

Donna Engelbrecht

Appendix F1: Consent Letter (English)

Appendix F

CONSENT

Full Title of the Study: The prevalence, knowledge, attitude and practice regarding self-administered over-the-counter analgesic use among patients with chronic musculoskeletal pain attending the Durban University of Technology Chiropractic Day Clinic

Names of Researcher/s: Donna Engelbrecht

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Donna Engelbrecht (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: IREC 099/22,
- 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 computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant	**Date**	**Time**	**Signature / Right Thumbprint**

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

Donna Engelbrecht		
Full Name of Researcher	**Date**	**Signature**
Full Name of Witness (If applicable)	**Date**	**Signature**
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

6 August 2020

Appendix F2: Consent Letter (IsiZulu)

Imvume

Isihloko socwaningo: Ukusabalala, ulwazi, isimo sengqondo kanye nokwenza maqondana nokusebenzisa izidambisi ezidambisa izinhlungu ezigulini ezinobuhlungu obungapheli bemisipha namathambo ezihamba umtholampilo waseDurban University of Technology Chiropractic Day Clinic.

Amagama abacwaningi: Donna Engelbrecht

Isitatimende sesivumelwano sokubamba iqhaza kucwaningo:

- Ngiyaqinisekisa ukuthi ngazisiwe ngumcwaningi, _____ (name ofresearcher), mayelana nezimo, ukuziphatha, izinzuzo kanye nobungozi balolu cwaningo. Inombolo yocwaningo ekwishwe isigungu sabaphethe lolucwaningo: (**This is where you will write your ethical clearance number once you get it.**) : _____,
- Ngiphinde ngathola, ngafunda futhi ngaqonda ngemininingwane ebhalwe ngenhla (Incwadi yombambiqhaza yolwazi) mayelana nocwaningo.
- Ngiyazi ukuthi imiphumela yocwaningo, okuhlanganisa imininingwane yomuntu siqu mayelana nobulili bami, ubudala, usuku lokuzalwa, amagama okuqala kanye nokuxilongwa kuzocutshungulwa ngokungaziwa kwenziwe umbiko wocwaningo.
- Ngokubheka izidingo zocwaningo, ngiyavuma ukuthi idatha eqoqwe phakathi nalolu cwaningo ingacutshungulwa ohlelweni lwekhompuyutha ngumcwaningi.
- Ngingakwazi, nganoma yisiphi isikhathi, ngaphandle kokubandlulula, ngihoxise imvume yami nokubamba iqhaza ocwaningweni.
- Ngibe nethuba elanele lokubuza imibuzo futhi (ngokuzithandela kwami) ngazitshela ukuthi ngikulungele ukubamba iqhaza ocwaningweni.
- Ngiyaqonda ukuthi okutholakele okusha okubalulekile okuthuthukiswe phakathi nalolu cwaningo okungenzeka okuhlobene nokubamba kwami iqhaza kuzokwenziwa kutholakale kimi.

_____	_____	_____	_____
Igama lombambiqhaza	**Usuku**	**Isikhathi**	**Isiginisha**

Mina, _____(name of researcher) ngiyaqinisekisa ukuthi umbambi qhaza uthole incazelo egcwele mayelana nohlobo, ngokuziphatha, nangosizo, nangobungozi balolucwaningo.

_____	_____	_____
Igama lomcwaningi	**Usuku**	**Isiginisha**
_____	_____	_____
Igama lofakazi(uma ekhona)	**Usuku**	**Isiginisha**
_____	_____	_____
Igama lomzali osemthetheni (uma ekhona)	**Usuku**	**Isiginisha**

Appendix G: Letter of Confidentiality

IMPORTANT NOTICE: This form is to be read and filled in by every member participating in the focus group, before the focus group meeting convenes.

CONFIDENTIALITY STATEMENT AND CODE OF CONDUCT: Focus group

1. All information contained in the research documents and any information discussed during the focus group meeting must be kept private and confidential. This is especially binding to any information that may identify any of the participants in the expert group.

2. None of the information shall be communicated to any other individual or organization outside of this specific focus group as to the decisions of this focus group.

3. The information from this focus group will be made public in terms of a dissertation/thesis and/or journal publication, which will in no way identify any of the participants involved in this focus group.

4. The returned questionnaires will be coded and kept anonymous in the research process.

5. The focus group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will be stored securely under password protection.

6. All data generated from this expert group (including the recording) will be kept for five years in a secure location at Durban University of Technology and thereafter will be destroyed.

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

Please print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's Name: _____ Signature: _____

Appendix H: Questionnaire Evaluation Form

Questionnaire evaluation form: Pilot study

Once you have gone through the questionnaire please report any questions, concerns or suggestions you may have with regards to the questionnaire.

Thank you for participating in the pilot study.

Section and question number	Concern	Suggestion

Appendix I1: Permission to use questionnaire

Tejal Patel <t5patel@uwaterloo.ca> Thu, Apr 30, 2020, 8:37 PM

to Feng, me

Hi Donna,

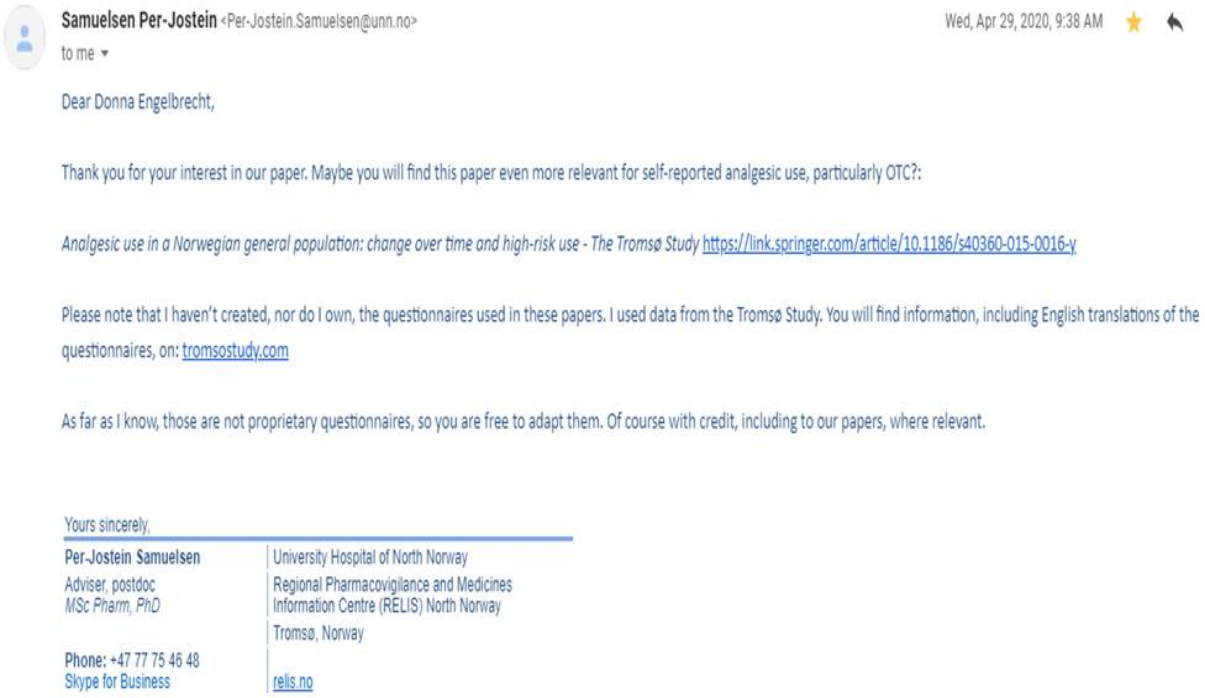
Thank you for reaching out and requesting permission to use/adapt our questionnaire in your research. I am emailing to grant you permission.

Thanks,
Tejal

Tejal Patel, BScPharm, PharmD
Assistant Clinical Professor, University of Waterloo School of Pharmacy
Co-Director, Master of Advanced Pharmacy Practice Program, University of Waterloo School of Pharmacy
Assistant Clinical Professor (part-time), DeGroote School of Medicine, McMaster University
Pharmacy Lead, MINT Memory Clinics (formerly called Primary Care Collaborative Memory Clinics)
Research Scientist, Schlegel-University of Waterloo Research Institute for Aging
Affiliate Researcher, Waterloo Institute for Complexity and Innovation
Faculty and Coach, Advancing Frailty Care in the Community Collaboration, Canadian Foundation of Healthcare Improvement

University of Waterloo School of Pharmacy
10 Victoria St S
Kitchener, ON N2G 1C5
Tel: 519-888-4567 x 21337
Email: t5patel@uwaterloo.ca

Appendix I2 Permission to use questionnaire



Samuelsen Per-Jostein <Per-Jostein.Samuelsen@unn.no> Wed, Apr 29, 2020, 9:38 AM

to me

Dear Donna Engelbrecht,

Thank you for your interest in our paper. Maybe you will find this paper even more relevant for self-reported analgesic use, particularly OTC?:

Analgesic use in a Norwegian general population: change over time and high-risk use - The Tromsø Study https://link.springer.com/article/10.1186/s40360-015-0016-y

Please note that I haven't created, nor do I own, the questionnaires used in these papers. I used data from the Tromsø Study. You will find information, including English translations of the questionnaires, on: tromsostudy.com

As far as I know, those are not proprietary questionnaires, so you are free to adapt them. Of course with credit, including to our papers, where relevant.

Yours sincerely,

Per-Jostein Samuelsen
Adviser, postdoc
MSc Pharm, PhD

Phone: +47 77 75 46 48
Skype for Business

University Hospital of North Norway
Regional Pharmacovigilance and Medicines Information Centre (RELIS) North Norway
Tromsø, Norway

relis.no

Appendix I3: Permission to use questionnaire

Zalika Klemenc Ketiš <zalika.klemenc@um.si> Tue, Apr 28, 2020, 4:38 PM
to me

Dear Donna Engelbrecht,

I attached the questionnaire. You may use it / adapt it for your research needs.

Best regards,

---

assoc. prof. Zalika Klemenc-Ketiš, MD, PhD
Community Health Centre Ljubljana, Slovenia
Chair of the Department of Family Medicine, Medical Faculty, University of Maribor, Slovenia
EQuiP President
WONCA Europe EB member
E: zalika.klemenc@um.si
equip.we@gmail.com | equip.woncaeurope.org/
Become a member of our Facebook Group | Join the discussion on LinkedIn

EQuiP European Society for Quality and Safety in Family Practice
A network organisation within WONCA Region Europe - ESGP/FM