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FACULTY OF COMMUNITY AND HEALTH SCIENCES

Title: TEXT NECK SYNDROME IN UNDERGRADUATE HEALTH SCIENCE STUDENTS FROM A UNIVERSITY IN THE WESTERN CAPE: A CROSSSECTIONAL STUDY

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ABSTRACT

Cell phones are indispensable tools for the student population. Excessive exposure to these devices could lead to postural deformities that cause pain and decrease students' quality of life. Secondary musculoskeletal pain due to text neck, a repeated stress injury sustained from excessive texting on handheld devices for long periods of time, could negatively impact the academic performance of university students. The aim of the study was to determine the prevalence of text neck syndrome and its relationship with pain and functional impairment, the degree of cellphone addiction as well as to explore the perceptions regarding the prevention and management of text neck syndrome in undergraduate health science students from a university in the Western Cape. The study employed a sequential explanatory mixed method approach using a descriptive cross-sectional and exploratory study design for the quantitative and qualitative phases respectively. Stratified random sampling was used for the quantitative phase to select the participants from the 2021 year of enrollment. Purposive sampling was used for the qualitative phase of the study. Data was collected using a self-developed sociodemographic questionnaire as well as valid and reliable scales, namely, the Nomophobia questionnaire, the Numeric Pain scale and the Neck Disability Index. Data was analyzed using SPSS version 28. Descriptive statistics were applied to summarise socio-demographic information. Inferential statistics were employed to determine any association between variables. Significance was set at $p<0.05$. Focus group discussions were employed to determine the participants' perceptions of the prevention and management of text neck syndrome. Qualitative data were transcribed verbatim and thematically analysed. Reliability, validity as well as trustworthiness were addressed. Permission and ethical clearance were obtained from the Biomedical Research Ethics Committee of the University of the Western Cape (UWC), the Registrar and the Head of Departments of the Faculty of Community and Health Sciences. A total of 157 students, 140 (89.2%) females and 17 (10.8%) males with a mean age of 21.7

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(SD±4.14) years participated in the study. The majority of the participants enrolled in the Department of Physiotherapy (n=91; 58.0%). More than half of the participants (n=83, 52.9%) suffer from moderate nomophobia while 36.9% have severe nomophobia. No significant difference were found for nomophobia categories and gender (p=0.339). Seventy of the participants (44.6%) have no functional disability while 54.1% suffer from mild functional disability. Although no significant difference was found for functional disability categories and gender (p=0.831), significantly more males than females experienced neck pain at the time of data collection (χ^2=9.667, p=0.046) and reported that their work was affected by their functional disability (χ^2=8.211, p=0.042). More than a third of the students reported no pain at the time of data collection (n=59, 37.6%), while 17.2% and 15.3% experienced minimal and moderate neck pain respectively. No statistical significant gender difference was found for pain intensity (χ^2=2.997, p=0.936).A significant moderate positive correlation was found between pain intensity and functional disability (r=0.312, p=0.000). A non-significant moderate positive correlation was found between pain intensity and cell phone addiction (r=0.348, p>0.05). Significant but weak positive correlations were found for cell phone addiction and functional disability. Addiction to technology and social media, lack of knowledge and limiting screen time were some of the challenges reported by the students in the prevention of the syndrome, while time, financial constraints and consistency were challenges reported in the management of the syndrome. Cell phone addiction is evident in the student population. Neck pain affects more than half of the study population's functional ability. The results of the study provide valuable evidence that can be used to assist with the development of measures to prevent the detrimental effects of text neck syndrome in the student population and increase the awareness thereof.

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DECLARATION

I hereby declare that **"TEXT NECK SYNDROME IN UNDERGRADUATE HEALTH SCIENCE STUDENTS FROM A UNIVERSITY IN THE WESTERN CAPE: A CROSS-SECTIONAL STUDY"** is my own work, that it has not been submitted, or part of it, for any degree of examination at any other university, and that all sources I have used or quoted have been indicated and acknowledged by means of complete references.

Jeeva Immaculate IRUDAYARAJ

Signature 

November 2022

Dr Tania Steyl (supervisor)

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DEDICATION

My spouse LAWRENCE ARUL, my boys JOVAN and YOHANN and my dearly loved family. This work could not be done without you. My sincere gratitude to my family for accommodating all the inconveniences and helping me through every step of my studies. I can vividly recall my family's reassuring remarks that we can accomplish anything and anything if we work as a unit.

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I am appreciative of all the health sciences bachelor students of University of Western Cape, who took part in my thesis. Without you, the study would not have been possible! Thank you for your valuable contributions. I firmly believe that the findings of my research will undoubtedly contribute to raising young pupils' quality of life. Thank you so much to the University of Western Cape's helpful and helping team for your hard work.

My deepest gratitude to the department of physiotherapy of University of Western cape for their kindness, encouragement, and helpful advice at every stage of my journey. My sincere gratitude to my family and friends for encouraging my research both physically and mentally. Above all, last but not least, I want to express my sincere gratitude to God for his mercy in giving me this opportunity and my longing to experience His blessings for the rest of my life with my family.

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

This chapter provides information on the background of the study. It presents the health aspects of text neck syndrome and the growing burden of the syndrome globally. It further describes the statement of the problem, research questions and the aim and specific objectives of the study. Thereafter the chapter concludes with the description of the definition of the key terms used in the study, abbreviations and an outline of the chapters of the thesis.

1.2 BACKGROUND TO THE STUDY

Text neck syndrome (TNS) is a repeated stress injury sustained from excessive texting on handheld devices for long periods of time (Samani et al., 2018). It is also known as Turtle Neck Posture (Neupane et al., 2017). People who spend long hours on small electronic devices such as cellphones, are more prone to develop problems in the cervical area due to the abnormal positioning of their neck and upper back (Asher, 2019). There has been an increased use of and addiction to cellphone texting in recent years, especially among the younger population (Hoy et al., 2014; Lin et al., 2015; Damasceno et al., 2017). The weight of the head is the key factor in the development of text neck. According to Dewitt (2018), in the neutral position, the neck mechanical load on the neck is 4.5-5.4kgs. However, when bending the neck forward (4560 degrees), the mechanical load on the joints and ligaments of the cervical spine increases to 50-60 pounds, causing excessive strain on the posterior neck muscles. This change in biomechanics of the cervical spine while texting on a mobile phone could be the justification for the increasing prevalence of neck pain in the young population (Gustafsson, 2012; Hansraj, 2014; Guan et al., 2015).

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Recent days' communication and entertainment are playing a leading role in the use of handheld devices. People of all age groups are using handheld devices. Modern technology became a basic essential and necessity in our daily life. Al-Hadidi et al. (2019) proved that the duration of cellphone usage to be directly proportional to pain intensity of the neck and shoulder regions. In the aforementioned study conducted in Jordan, dentistry students' average spending hours on handheld devices were 9.8 ± 7.1 hours per day, medical students were 5.9 ± 4.2 hours per day, nursing students were 5.8 ± 5.6 hours per day while pharmacy students were 6.3 ± 3.5 hours per day. The study also revealed that female students had higher device usage time (6.9 ± 4.9 hours per day) than male students (5.6 ± 3.9 hours per day).

The increased use of handheld devices such as smartphones could be a major contributor to musculoskeletal discomfort in students. Research conducted with 503 Hongkong University students, revealed that 251(49.9%) students complained of upper limb discomfort and neck pain because of the use of electronic devices. The same study revealed that excessive usage of devices could lead to postural abnormalities (Woo et al., 2016). A study by So et al. (2017) found a positive correlation between hours of smartphone use and musculoskeletal pain, especially bilateral neck and shoulder pain. Eitivipart et al. (2018) also found changes in head-neck, neck-shoulder, shoulder-thumb, shoulder-wrist and postural changes in mobile phone users. A study conducted in Korea in 2014 found that 55.8% and 54.8% of university students using handheld devices complained of neck and shoulder pain respectively, while 42.1% and 19.2% complained of eye and arm and hand pain respectively (Kim & Kim, 2015).

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Globally internet users increased by an average of 10% per year from 2005 to 2019, accounting for 4.1 billion people using internet in 2019. Before 2005, computers were the main device when accessing the internet. The smartphone has 'replaced' the computer and the majority of

people with internet access use handheld devices such as cell phones today (International Telecommunication, 2019). As for South Africa, between 20-22 million people are mobile users, which is estimated to grow with more than 5 million people by 2023 (O'Dea, 2020). According to Global web Index, the average time spent on social media globally in 2019 was 2 hours 16 minutes. It however differs from country to country as data showed that social media users in Japan spent ½ hour per day whereas social media users in the Filipine spent four (4) hours 12 minutes per day (Digital, 2019). The time students spend on handheld devices is alarming. A study conducted with undergraduate students from Istanbul showed that 82.4 % of the students used internet services on handheld devices for eight (8) hours or more per week (Deniz & Geyik, 2015). A Nigerian study conducted in 2018, found that 89.6% of the 306 university students used internet for academic purposes, with 62% of the students reporting daily internet use (Apuke & Lyendo, 2018).

North et al. (2014) found several reasons for South African university students' use of cell phones, namely for socializing, as well as for safety and privacy purposes. In addition, differences in cellphone use by gender were found, with female students showing increased use for safety and socializing, interest in brand and trends, as well as signs of addiction. Furthermore, South African university students use their phones in curriculum activities, a finding that concur with studies conducted in China, Germany, Singapore and Japan. Mobile devices such as smartphones can be used for various purposes, namely to take notes in class, keep track of class schedules, assignments and marks, to look up meanings of words and to do presentations. Students are able to communicate with one another about class related matters outside of class. They may also look up information while in class. Library resources can as well be easily accessed (AlShareef, 2015). An explorative study conducted in 2017 regarding the use of handheld devices for study purposes of English students at the University of

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Limpopo, South Africa, revealed the majority of students used handheld devices in their learning of English (Lediga, 2018).

Addiction to cellphones are real. A study conducted in eight countries showed that 75% of people aged 25-29 years use their cellphones in bed (Deurson, 2012). Wallace (2016) found that 50% of teens and 27% of their parents are addicted to their cellphones while 80% of teens check their phones hourly and 72% feel they need to respond immediately. Titilope (2014) found that college students spent nine (9) hours per day on their cellphones, more time than what they sleep. Researchers proved that there is a strong positive correlation between cellphone use and musculoskeletal discomfort (Berolo et al., 2011; AlAbdulwahab et al., 2017). A recent study conducted in Thailand showed that university students who spent five (5) hours a day on their smartphones, experienced pain in diverse body areas, namely neck pain (32%), sore shoulders (26%), back problems (20%) and wrist and hand problems (19%) (Jakarta, 2019).

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A potential new clinical disorder is arising due to the addiction to cellphones, called nomophobia (feelings of discomfort or anxiety experienced by individuals when they are unable to use their mobile phones or utilize the conveniences these devices provide) (Lee et al., 2018). A recent study proved that participants higher in nomophobia, especially on subscales having to do with losing connectedness and giving up convenience, performed worse on the quiz for material that occurred in the 3rd quarter of the lecture. Findings indicate that having cellphones in a short lecture has its largest impact on attention and learning 10–15 min into the lecture (Mendoza et al., 2018). This is a clear indication that inappropriate use of cellphones could negatively influence the academic performance of students.

1.2 PROBLEM STATEMENT

For many people in today's society, a cell phone is one of life's essential goods. It is a common place to access music, videos and social network services. The average time spent on a cellphone per day is 5.1 hours (Kong et al., 2017). Unlike computers, the cell phone has a small screen that is likely to induce a more slouched posture towards a line of sight below eye level (Greig et al., 2005). This improper posture could lead to muscle fatigue, neck pain, shoulder pain, headaches, muscle spasm and pain radiating down the arm(s) (Okuro et al., 2011; Asher, 2019). A prolonged slouched head posture may cause the loss of the normal Cshaped curve in the cervical spine, resulting in significant pain and loss of function (Visser & van Dieën, 2006; Reuters, 2017). Researchers stated that if text neck is left untreated, it might lead to musculoskeletal impairments (Neupane et al., 2017). In addition, the secondary musculoskeletal pain due to text neck could negatively impact the academic performance of students (Mendoza et al., 2018).

1.3 SIGNIFICANCE OF THE STUDY

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Cellphones are indispensable tools for the student population. Excessive exposure to these devices could lead to postural deformities that cause pain and decrease the students' quality of life. This could have adverse effects on the academic performance of students. This growing health concern, if not treated or corrected timeously, can lead to flattening of the cervical spinal curve, onset of early arthritis, spinal degeneration and disc compression or herniation. To date, no research study regarding text neck syndrome in the university student population has been conducted in South Africa. The results of the study could provide valuable evidence-based information that can be used to assist with the development of measures to prevent the detrimental effects of text neck syndrome in the student population and increase the awareness thereof.

1.4 RESEARCH QUESTIONS

1.4.1 What is the degree of **cellphone addiction** in undergraduate health science students from a university in the Western Cape?

1.4.2 What is the degree of **functional disability** due to cell phone use in undergraduate health science students from a university in the Western Cape?

1.4.3 What is the degree of **pain** due to cell phone use in undergraduate health science students from a university in the Western Cape?

1.4.4 What is the **relationship between cellphone addiction, functional disability and pain** of undergraduate health science students from a University in the Western Cape?

1.4.5 What are the perceptions of undergraduate health science students from a university in the Western Cape regarding the **prevention and management** of text neck syndrome?

1.5 AIM OF THE STUDY

To determine the degree of cell phone addiction, functional disability and pain and its relationship with each other; as well as to explore the perceptions of undergraduate health science students from a university in the Western Cape regarding the prevention and management of text neck syndrome.

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1.6 SPECIFIC OBJECTIVES OF THE STUDY

1.6.1 To determine the degree of **cellphone addiciton** in undergraduate health science students from a university in the Western Cape.

1.6.2 To determine the degree of **functional disability** due to cell phone use in undergraduate health science students from a university in the Western Cape.

1.6.3 To determine the degree of **pain** due to cell phone use in undergraduate health science students from a university in the Western Cape.

1.6.4 To determine the **relationship between cellphone addiction, functional disability and pain** in undergraduate health science students from a university in the Western Cape.

1.6.5 To explore the perceptions of undergraduate health science students from a university in the Western Cape regarding the **prevention and management** of text neck syndrome.

1.7 DEFINITION OF KEY TERMS

Cellphone addiction - a disorder involving compulsive overuse of the mobile devices (DeSola Gutiérrez, 2016).

Functional disability - when one is limited in his or her ability to perform activities of daily living (Farahbakhsh et al., 2018).

Nomophobia - a state of socio-psychological illness (anxiety, stress and fear) due to lack of access to mobile phones. It is thought to be a modern age disorder that causes negative health risks and harmful psychological effects (Aarthi et al., 2020).

Pain - an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage (International Association for the Study of Pain (IASP), 2019)

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Text neck syndrome - a repetitive stress injury sustained from excessive texting on handheld devices for long periods of time (Samani et al., 2018).

Hand-held devices – A hand-held device is any portable device that can be carried and held in one's palm. It can be any computing or electronic device that is compact and portable enough to be held and used in one or both hands (https://www.techopedia.com/definition/16322/handheld).

1.8 ABBREVIATIONS

FCHS Faculty of Community and Health Sciences

Kg	kilogram
NDI	Neck Disability Index
NMP-Q	Nomophobia questionnaire
NPRS	Numerical Pain Rating Scale
QoL	Quality of Life
UG	Undergraduate
UK	United Kingdom
USA	United States of America
UWC	University of the Western Cape
VAS	Visual Analogue Scale
WHO	World Health Organisation

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1.9 OUTLINE OF THE CHAPTERS

The main focus areas of each chapter of the research study are summarised and described below.

Chapter One: This chapter provides information on the health aspects of text neck syndrome and the growing burden of the syndrome globally. It further describes the statement of the problem, research questions and the aim and specific objectives of the study. Thereafter the chapter concludes with the description of the definition of the key terms used in the study, abbreviations and an outline of the chapters of the thesis.

Chapter Two: This chapter provides a brief overview of the definition of text neck syndrome, it discusses the aetiology and prevalence of the syndrome, both globally and in South Africa, as well as the clinical signs and symptoms of the syndrome. In addition, the prevention and

management of text neck syndrome are addressed. Finally, the chapter ends with the Public Health Approach model as a theoretical lens in which the study was conducted.

Chapter Three: This chapter describes the methodology used in this study. The quantitative methods description will follow the description of the research setting. The profile of participants, as well as the qualitative methods used to explore the perceptions of students regarding the prevention and management of text neck syndrome will be provided. The research design, population, sampling methods, methods of data collection, instrumentation, reliability and validity, trustworthiness and data analysis are described. The chapter ends with the ethical considerations applied in the study.

Chapter Four: The results of the statistical analysis that attempted to answer the first four (4) objectives of the study, i.e. to determine the degree of cell phone addiction, the degree of functional disability, the degree of pain as well as the relationship between cell phone addiction, functional impairment and pain due to cell phone use in undergraduate health science students from a university in the Western Cape will be presented. The following will be presented in the chapter: an overview of the socio-demographic profile of the students, the degree of nomophobia, the degree of pain, the degree of functional disability as well as the relationship between nomophobia, pain and functional disability. Gender differences will also be included. The results are summarized in tables and figures where needed.

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Chapter Five: This chapter presents the results of the content analysis of the focus group discussions which attempted to answer objective five (5) of the study, namely to explore the perceptions of undergraduate health science students from a university in the Western Cape regarding the prevention and management of text neck syndrome. The description of the

participants is followed by the presentation of the findings. Verbatim quotations were used to exemplify the themes and sub-themes. To ensure anonymity and confidentiality of the participants, cryptograms were employed to present data. The quotations are itialised and three ellipsis points (…) were used to indicate unnecessary material that was omitted.

Chapter Six: Both the quantitative and qualitative results of the study with reference to the relevant literature will be discussed in this chapter. The overall aim of the present study was to determine the degree of cellphone addiction, functional impairment and pain and its relationship with each other; as well so explore the perceptions of undergraduate health science students from a university in the Western Cape regarding the prevention and management of text neck syndrome.

Chapter Seven: The conclusion of the study is provided in this final chapter. In addition, the limitations of the study are stated. Finally, recommendations that emerged based on the findings of this study are outlined

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CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides a brief overview of the definition of text neck syndrome (TNS), it discusses the aetiology and prevalence of the syndrome, both globally and in South Africa, as well as the clinical signs and symptoms of the syndrome. In addition, the prevention and management of TNS is addressed. Finally, the chapter ends with the Public Health Approach model as a theoretical lens in which the study was conducted.

2.2 DEFINITION OF TEXT NECK SYNDROME

Text neck is used to describe a repetitive stress injury or overuse syndrome where a person has his or her head flexed in a forward position, looking down at his or her cellphone or other electronic hand held device for a prolonged period of time (Neupane et al., 2017). This forward head posture increase the mechanical load on the joints and ligaments of the cervical spine, causing the posterior neck musculature to overstrain to counterbalance the effect of gravity due to the forward head position (Hansraj, 2014). However, 540lb is the average cervical spine disc compression body units in cadaveric samples, which can be resist and adopt to higher loads in living human beings (Galassi et al., 2018). This condition is a growing health concern and cause chronic musculoskeletal pain in millions of people globally, especially in the younger population (Lau et al., 2010; AlAbdulwahab et al., 2017; Kutty, 2019).

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2.3 AETIOLOGY AND PREVALENCE OF TEXT NECK

Although cellphones have similar functions to computers and televisions, the small screen makes it difficult to maintain a proper posture. The normal spinal curvature is not maintained

because of the forward head position when using a cell phone or handheld device for an extensive time. As a result, cellphone users experience an increase in musculoskeletal problems in the neck and shoulder regions (Berolo et al., 2011). A large proportion of the global population is affected by text neck syndrome (Vate-u-lan, 2015). The majority of smartphone users are in the age group of 11- 40 years. Hakala et al. (2006) reported that 15.1% of their study population already suffered from text neck syndrome while 63.3% were at the initial stage of experiencing symptoms associated with text neck syndrome. The researchers concluded that adolescents who spent two (2) hours and more per day on a cellphone were prone to develop neck pain (21%) and shoulder pain (20%). In addition, 14% of the participants reported eye problems and 29% reported having headaches. These findings concur with that of Al-Hadidi et al. (2019) who revealed a significant positive correlation between duration of cellphone use and severity of neck pain. Very importantly the authors stipulated that neck pain due to text neck syndrome results in a huge burden on the health care system. The researchers stated that 5.8% of students with pain severity > 4 (Numerical pain rating scale score) sought emergency medical help while 12.4% of the participants visited outpatient clinics.

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Furthermore AlAbdulwahab et al. (2017) showed a strong association between cellphone addiction and neck disability as people with high addiction values are more prone to the development of functional impairment/disability in the neck. The cell phone user who spent 24 hrs per day with head dropped position will have 700-1400 hrs of excessive cervical stress in a years time. Comparatively, the angle of head flexion while texting is more in sitting than in standing (Kutty, 2019).

Worldwide cellphone users increased in 2020. Research from 2020 says that Indian youth spending 3-4 hours per day on their phones. In addition, 87% of the youth (14-18yrs) in the

USA and 79% of the youth (12-15yrs) in the UK own and use smartphones. Many studies revealed that excessive mobile usage affect the psychosocial status of the adolescents, resulting in sleep during class time and poor quality sleep at night, which automatically affect their academic performance (Yu-Yang, 2017). Smartphone users' musculoskeletal discomfort can vary, depending upon the height, weight, place, LCD screen size and posture of the user. Kim and Kim (2015) found that persons shorter than 162cm and those weighing more than 52 kgs had more neck and shoulder pain. In addition, lying when using the cell phone and having a small LCD screen increased the pain intensity in the neck and shoulder region (Kim & Kim, 2015).

Young adults have inadequate knowledge of text neck syndrome (Samani et al., 2018). Almost two thirds of the study population (65%) have not heard of the term text neck, while 42% use a mobile phone for 2 - 4 hours per day. Alarming is the fact that 27% and 20% of the study population used a cell phone for 4 - 6 hours and more than 6 hours per day respectively. Khan et al. (2018) found that most of the students in their study experienced neck pain and also lack knowledge about the effect of postural changes and warm up exercises on text neck syndrome. Furthermore, 62.4% of the students experienced continuous stress or pain in the neck while using a cell phone and 88.1% did not take a breather to relax while using their cell phone. This finding concur with a study by Shah et al. (2018) who found that students addicted to their cellphones are prone to neck and hand (pre-dominantly thumb) pain.

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A systematic review by Toh et al. (2017) regarding the prevalence and risk factors associated with musculoskeletal complaints among users of mobile handheld devices, found that the prevalence of musculoskeletal complaints among mobile device users ranges from 1.0% -

67.8%, while neck discomfort and pain have the highest prevalence rates ranging from 17.3% to 67.8%. This study also found positive correlations between neck flexion, frequency of phone calls, texting and gaming in relation to musculoskeletal complaints among mobile device users.

2.4 SIGNS AND SYMPTOMS OF TEXT NECK SYNDROME

The main symptoms of text neck syndrome include: a stiff neck (discomfort and difficulty moving the neck is usually present when moving the neck after long usage of the device); pain (localized to one spot or it may be diffused over an area, usually the lower part of the neck, described as dull aching or sharp stabbing in extreme cases); radiating pain (into the shoulders and arms; either one side or both sides); muscular weakness (usually the trapezius, rhomboids and shoulder external rotators) and headache (in the sub-occipital muscle region due to tightness of the muscle, leading to tension type headaches). In addition to these common clinical symptoms, there can also be: flattening of thoracic kyphosis, early onset arthritis, spinal degeneration and disc compression (Neupane et al., 2017; Galassi et al., 2018). During mobile phone usage, the person may adapt the same position for longer times. This leads to increased tone of neck muscles which could cause neck pain.

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The purpose of the cellphone use also contributes to pain in different parts of the body, e.g. if someone spends more than three (3) hours talking on the phone, the person is more prone to upper back discomfort, whereas reduced pain is noticed in the hand holding the device due to isometric muscle contraction of the hand muscles (gripping the phone). Ancillary use of a mobile phone less than one (1) hour (e.g. listening to music, taking photos, playing games and the use of physical activity applications), could still lead to upper back and upper extremity discomfort (Yang et al., 2017). It is thus evident that prolonged use of handheld devices leads

to changes in the alignment of the spine, including a forward head posture, rounded upper back and shoulders, hence creating tightness in the surrounded soft tissue structures (Kim et al., 2018).

2.5 PREVENTION AND MANAGEMENT OF TEXT NECK SYNDOME

2.5.1 Prevention

Prevention is the key when it comes to text neck syndrome. The following recommendations should be kept in mind while using smartphones or other handheld devices: avoid excessive usage and take frequent breaks; avoid prolonged static postures; position the device that it reduces stress on both the head or neck and the upper extremities; avoid high repetitions of movements such as prolonged typing and avoid holding large or heavy devices in one hand for long duration (Sharan et al., 2014).

Posture correction is key to the control of spinal pain and tissue damage (Galassi et al., 2018). The important tip is 20-20-20, that is every 20 minutes of using a smartphone, get up and move 20 steps away from the phone, then do some simple neck exercise for 20 seconds. This will avoid eye strain and neck problems. Using a cervical pillow while sleeping and using both index fingers instead of one thumb for texting are some of the tips to avoid text neck syndrome (Physiopedia, 2021; Kutty, 2019).

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2.5.2 Management

Rehabilitation is found to be very effective in treating the symptoms resulting from text neck syndrome. Rehabilitation can be designed as a 2 - 4 week program starting with soft tissue mobilization, Grade 1 and 2 joint mobilization, active and passive stretches of tight muscles and progressing to muscle strengthening, posture retraining and a home exercise programme

(Sharan et al., 2019). Pain relief is the main goal in acute cases. It can be achieved by regular neck movements (rotations and side flexion); restoring function to upper trapezius; chin tuck exercises, ice or heat packs and massage (Kwon et al., 2013). In chronic cases pain medication, trigger point therapy, acupuncture or injection into the facet joint(s) can be done (Neupane et al., 2019).

Forward head posture usually leads to increased stress on the neck extensor muscles. Several studies reported favourable outcomes for the use of muscle strengthening exercises to improve posture alignment, and stretching exercises for shorten muscles of the neck (Kendall et al., 2005; Neumann, 2013; Louw et al., 2017). Chung and Jeong (2018) showed that cervical flexion exercises helped to restore the cervical lordosis, increased the endurance of the deep cervical flexor muscles and increased the range of motion of the neck in all three planes, while Cho and Lee (2017) proved that upper body thoracic mobilization and cervical mobility exercises improved forward head posture. A recent study by Kim et al. (2018) found that a combination of McKenzie exercises, Myofascial release therapy and Kinesio taping were effective in improving mobile phone users' symptoms due to text neck syndrome. In addition to the abovementioned recommendations, a study by Louw et al., (2017) confirmed that one (1) hour of strengthening exercises significantly reduced pain and improved quality of life (QoL) compared to no exercise at all.

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Celenay et al. (2016) found that stabilization exercise with manual therapy was more effective in improving disability, pain intensity at night, cervical rotation movement and QoL compared to stabilization exercise alone in patients with chronic mechanical neck pain. Akhter et al. (2014) reported a significant difference in the pain and functional outcome of patients with non-specific chronic neck pain when manual therapy and an exercise regime were applied.

Significant improvement were reported on both the Visual Analogue Scale (VAS) and the Neck Disability Index (NDI). The following data shows the improvement: VAS (before) = 7.3±1.08 to 2.4± 1.17 and VAS (after) 24.1±3.2 to 16.8±2.3. Where only an exercise regime was employed, the impact on both VAS (7.6± 0.85 to 3.1±1.13) and NDI (27.2±3.1 to 19.13±2.2) were not as good as the combination of manual therapy and exercise. Kong et al. (2016) went on to report that modified cervical exercise three (3) times per day had a greater improvement in symptoms due to text neck syndrome that those exercising only once a day.

Nitsure and Welling (2014) found that gross myofascial release helped to improve the functional abilities and decreased pain in persons with mechanical neck pain. Namvar et al. (2016) also showed that myofascial release therapy techniques significantly improved the function, reduced the pain, and increase the maximum isometric contraction of neck extensor muscle in persons with non-specific chronic neck pain. Arroyo-Morales et al., (2008) found that myofascial release after exercise, increase muscle fiber length, resulting in reduced EMG amplitude. It is thus evident form research that a combination of therapeutic techniques have a better outcome on the symptoms people experience due to text neck syndrome.

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2.6 THEORETICAL FRAMEWORK OF THE STUDY

This study adopted the Public Health Approach Model as a theoretical lens in which the data was collected and analysed. The Public Health approach involves defining and measuring the problem, determine the cause or risk factors for the problem, determine how to prevent or ameliorate the problem, implementing effective strategies on a larger scale and evaluating the impact (CDC, 2012).

This study draw upon the first two steps of the model, namely to define the problem through the collection of information about the magnitude of the syndrome as well as the perception and experiences of undergraduate university students in the prevention and management of the syndrome. The descriptive paradigm will attempt to provide insight into the "what", "where", "when" and "why" or "how". Within this paradigm the "what" refers to the health issue of concern, namely text neck syndrome. The "at risk" refers to the student population. The "where" and "when" provide insight into the geographical location under surveillance, as well as the time period of observation. Finally the "why/how" attempts to explain factors contributing to both appropriate prevention and management of the syndrome, e.g. what the students do to address the problem.

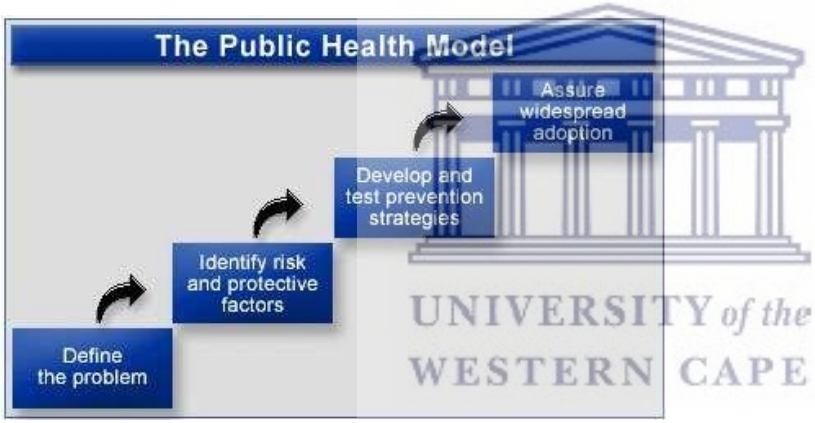

Fig 2.1 Public Health Model (CDC, 2012)

2.7 SUMMARY OF THE CHAPTER

This chapter reviewed the relevant literature pertaining to text neck syndrome. It provides a brief overview of the definition of text neck syndrome, it discusses the aetiology and prevalence of the syndrome, both globally and in South Africa, as well as the clinical signs and symptoms of the syndrome. In addition, the prevention and management of text neck syndrome are addressed. Lastly, as a point of exit, the chapter ends with the Public Health Approach model

as a theoretical lens in which the study was conducted. The next chapter will describe the methods used to reach the study objectives as outlined in Chapter one.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter provides an overview and rationale for the methodology used in the study. The research approach that guided the study is outlined, followed by a description of the research setting in which the study took place. Each phase of the study is described according to the study design, population and sampling, methods of data collection, and statistical data analysis. In addition, the ethical issues considered in the study are explained.

3.2 RESEARCH APPROACH

For the attainment of the research objectives, this study will employ a sequential explanatory mixed methods design. According to Creswell and Plano Clark (2011), this design entails the collection of quantitative data followed by the collection of qualitative data. This type of design helps to clarify the results through refinement by lengthening and exploration of the general picture given in the quantitative phase. The researcher selects this method as it gives an in depth understanding of the research problem. Creswell and Plano Clark (2011) posit that the use of quantitative and qualitative approaches together conveys an enhanced understanding of the given research problems than either approach alone. In this study the two methods will be integrated during the interpretation or discussion phase of the study.

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Figure 3.1 Sequential explanatory mixed methods design (Creswell & Plano Clark, 2011)

3.3 RESEARCH SETTING

The study was conducted at the Community and Health Sciences Faculty (FCHS) of the University of the Western Cape (UWC) situated in Bellville. Undergraduate students from the following departments and schools were invited to partake in the study: Physiotherapy, Social Work, Occupational Therapy, Dietetics, Psychology and Sport Recreation and Exercise Science, School of Nursing and School of Natural Medicine. These departments offer both undergraduate and postgraduate studies.

3.4 QUANTITATIVE PHASE OF THE STUDY

3.4.1 Study Design

This phase employed a descriptive cross-sectional design. According to Reiter (2017), descriptive cross-sectional design is used to obtain information concerning the current status of the phenomena and to describe "what exists" with respect to variables or conditions in a situation. It involves systematic data collection and is a relatively inexpensive way to collect voluminous data in a short period of time (Levin, 2006).

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3.4.2 Population and sampling

The study population was all undergraduate students from the Community and Health Sciences Faculty (FCHS) enrolled for the 2020 study year. For 2019, 3 707 undergraduate students registered in the FCHS. To allow for generalizability of the results to the specified population, the Yamane formula (Israel, 1992) was used to calculate the sample size as follows: [n = $\frac{N}{1+N(e)^2}$] where n stands for sample size, N for population and e as the level of precision which is constant (0.05). A minimum of 361 UG students would therefore have to participate in the research study to be able to generalize the results to the study population.

Stratified random sampling according to course types was employed in the study. A stratified random sampling is a technique that ensures proportional representation of the population (Babbie & Mouton, 2006). According to De Vos (2002), stratification consists of the universe being divided into a number of strata that are mutually exclusive and the members which are homogeneous with regard to some characteristic.

The following inclusion and exclusion criteria will be employed in the study:

Inclusion criteria:

Undergraduate (UG) students, aged 18-25 years; mobile phone users > 1 year; spending a minimum of 2 hours per day on the mobile phone.

Exclusion criteria:

Any known condition which could lead to pain in the neck or upper limb; any traumatic injury to the cervical spine; any congenital or pathological cervical problem; spinal stenosis; spinal tumours; trauma or fracture in the cervical area; whiplash injury; bilateral upper extremities symptoms; infection or vascular disease in the cervical area; any neurological problems; neck surgery or physiotherapy treatment for the cervical area in the past three months.

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3.4.3 Data collection instruments

Data was collected using a questionnaire (Appendix D) consisting of the following sections: 1) a self-developed socio-demographic scale, 2) The Nomophobia questionnaire, 3) the Numeric Pain scale and 4) the Neck Disability Index. Each scale with be briefly described.

- **Socio-demographic scale**

Items included age, gender, year of study enrolled in 2020, course enrolled for and hobbies.

● **The Nomophobia questionnaire (NMP-Q)**

The Nomophobia Questionnaire is a 20-item reliable and valid scale developed by Yildirim & Correia (2015). The 20 items cover four main dimensions of nomophobia: not being able to communicate, losing connectedness, not being able to access information, and giving up convenience. Each item is measured by a 7-point Likert scale, with 1 being "strongly disagree" and 7 being "strongly agree". Scores thus range from 20 to 140. Interpretation of the scores are as follows: 20 = absence of nomophobia; 21-59 = mild level of nomophobia; 60-99 = moderate level of nomophobia and 100-140 = severe nomophobia.

● **Neck Disability Index (NDI)**

The NDI is a 10-item widely used, reliable and valid scale developed to assess the effects of neck pain and symptoms during a range of functional activities (Vernon & Mior, 1991). Of the 10 items, four relate to subjective symptoms (pain intensity, headache, concentration, sleeping), four activities of daily living (lifting, work, driving, recreation) and two discretionary activities of daily living (personal care, reading). Each item is scored on a 0 to 5 rating scale, in which 0 = no pain and 5 = worst imaginable pain. Thus a maximal score of 50 is possible. A higher NDI score indicates greater neck disability (Ferreira et al., 2010). A total score of 0- 4 indicates no disability, 5-14 = mild disability, 15-24= moderate disability and 25-34 = complete disability.

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● **Numerical Pain Rating scale (NPRS)**

The NPRS is a unidimensional measure of pain intensity in individuals, including those with chronic pain (Childs et al., 2005). The respondent selects a whole number (0-10) that best reflects the intensity of his/her pain. The 11-point scale ranges from 0 = no pain to 10 = worst pain imaginable. Higher scores indicate greater pain intensity.

Reliability and validity of the scales

Reliability refers to the degree of consistency or accuracy with which an instrument measures the attribute it has been designed to measure (Polit & Hungler, 2013). Validity refers to the extent to which an empirical measure accurately reflects the concept it is intend to measure (Burns & Grove, 2009). The NMP-Q has a Cronbach's reliability of .945 (Yildirim & Correia, 2015). In addition, the Cronbach's reliability for the four subscales was .92, .87, .85, and .83 respectively. The NDI also has very good internal consistency score of 0.92 (Ferreira et al., 2010). The NPRS has excellent test-retest reliability of 0.96 and construct validity correlations ranging from 0.86 to 0.95 (Ferraz et al., 1990). According to conventional rules, any coefficient exceeding 0.70 is regarded as high (Patel et al., 2008). The content validity of the compiled instrument was assessed through peer review by a panel of experts while face validity was assessed by the implementation of a pilot study.

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Pilot study

The aim of a pilot study is to provide insight for the researcher and assist to identify potential problems in the research process (Van Teijlinger & Hundley, 2001). It was conducted to establish the instrument's face validity, how long it will take to complete and the clarity of the questions to the participants. The questionnaire was available in English as it is the language all students at UWC are taught in. Ten (10) students who qualify on the inclusion criteria of the research study were asked to complete the questionnaire (online due to Covid-19 pandemic) after written informed consent were obtained online from them. All the questions were clear and no changes were made to the questionnaire. The results of these students were not included in the final research study.

3.4.4 Data collection procedure

Permission to conduct the study was obtained from all relevant authorities (see 3.7). Due to Covid-19 as well as the Protection of Personal Information (POPIA) act, data collection was done online. The questionnaire, information sheet, consent form and all relevant instructions (set out in an email) were sent to the office of the Deputy Registrar: Academic Administration for dissemination to the relevant student population. The response was extremely poor and after six requests over a 4-month period from the Office of the Deputy Registrar: Academic, the researcher made the decision to end data collection for this phase. Enough questionnaires were completed to do the relevant statistical analysis.

3.4.5 Data analysis

Once the data was coded in Microsoft Excel, it was analysed using the Statistical Package for Social Sciences (SPSS) version 28. Descriptive statistics were employed to summarize the data on the socio-demographic information of the participants, expressed as percentages, means and standard deviations and presented in frequency tables. Continuous variables were expressed as means (SD), while categorical variables were expressed as frequencies and percentiles. Pearson's correlation coefficient test were used to determine the correlation between the nomophobia score and pain and neck disability respectively. Furthermore, significant differences were tested for using the Chi-square test (categorical variables) and student t-test (continuous variable). The results are presented in tables and graphs (histogram, bar and/ or pie charts). Statistical significance is set at $p<0.05$.

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3.5 QUALITATIVE PHASE OF THE STUDY

3.5.1 Research design

An exploratory research design using focus group discussions were used to explore the perceptions of the participants regarding the prevention and management of text neck syndrome with the aim of preserving and representing their voices (Hamell & Carpenter, 2004).

3.5.2 Population and sampling

Purposive sampling was employed for this phase of the study. All the UG health science students that participated in the quantitative phase of the research study were eligible to partake in focus group discussions (FGDs). A minimum of 15 participants were selected (five participants per FGD) (Krueger & Casey, 2009). Saturation was reached after the 2nd FGD, hence no third FGD took place.

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3.5.3 Data collection instrument

A focus group discussion guide (FGD guide) (Appendix F) with open-ended questions was developed and employed to explore the perceptions of the participants regarding the prevention and management strategies for text neck syndrome.

3.5.4 Data collection procedure

Due to Covid-19 as well as the Protection of Personal Information (POPIA) act, FGDs were done online via the Google Meet platform. The Office of the Deputy Registrar: Academic once again disseminated the request to all the students, as was the case in the quantitative phase of the study. The students had to contact the researcher if they were interested in participating in one of the FGDs. This process was tedious as the response from students were extremely poor. The request was sent out five times over a 3-month period from the Office of the Deputy

Registrar: Academic. The students that responded to the researcher was given three options (day and time for the FGD). As soon as the researcher had a minimum of four (4) participants allocated per time slot, the FGD went ahead. Krueger and Casey (2009) asserts that a focus group can consist of as few as four to six participants. Prior to the start of each FGD, the researcher explained the process to be followed and each participant signed a focus group confidentiality binding form (Appendix E) as well as a consent form that was emailed back to the researcher. Verbal consent were also sought for the FGD to be recorded on the day of data collection. Each FGD lasted approximately 30 minutes and a probing technique was used to ensure that no information is missed (Britten, 1995). The FGDs continued until saturation was reached (three FGDs in total), namely when information was repeated and no new information was obtained if the interview continues (Polit & Beck, 2003).

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Trustworthiness of the qualitative data

Trustworthiness is the degree to which the researcher is able to draw their conclusions from the outcomes of the findings yielded by the data collected (Lincoln & Guba 1985). In qualitative research this is achieved through credibility, transferability, dependability and confirmability (Polit et al., 2003). **Credibility** in this study was attained through prolonged engagement with the participants and peer examination of the data was also done.

Dependability was achieved by ensuring that the audit trail consisting of the methodology, original transcript, data analysis documents, fields' notes and comments from member checking will be transparent so that any researcher that wants to adapt the process to its own setting could do so. **Transferability** was achieved by thick description and purposive sampling techniques. **Conformability** was achieved by providing a colleague who was not involved in the study with the verbatim transcripts, analysis and process notes and summaries of the results for her opinion.

3.5.5 Data analysis

The researcher employed thematic analysis. According to Braun & Clarke (2006), thematic analysis is an approach used to extract meanings and concepts from data and includes pinpointing, examining and recording patterns or themes. The audio-recordings were transcribed verbatim by an independent person with experience in transcription. The verbatim transcription of data preserves the words or the participants. Thematic analysis was done on two levels namely; individual data and across all the participants. The steps, as given by Braun and Clark (2006) were followed, namely familiarization with the data set, generation of initial codes, searching for themes, reviewing the themes, and defining and naming themes. The processed data were presented to the researcher's peers for critique and verification of the coding, categorization and arrangement of the themes. The final themes selected were sent to the supervisor for further verification. Finally the discussion were done with the inclusion of some of these themes from the original data collected in accordance with the study aims and objectives.

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3.6 ETHICS CONSIDERATIONS

Approval were sought from the University of the Western Cape's Biomedical Research Ethics Committee (BMREC) (Appendix A). Further permission were sought from the Registrar of UWC. The aim and objectives of the study were explained and made available to all participants in the form of an information sheet (Appendix B). Informed, written consent (Appendix C) was obtained from each participant before data collection commenced. Participation was voluntary and participants were given the opportunity to withdraw from the study at any time with no consequences. Anonymity was assured through the use of a code and not the patient's name on the questionnaire. Information obtained from the questionnaires and participants were for the study only and will be handled with confidentiality. A focus group

confidentiality binding form (Appendix E) was signed before the FGDs commenced. The data collected are stored on a password-protected computer of which only the researcher and study supervisor have access to. All the data will only be discard after five years. Pseudonyms will be used to protect participants' identities when results are published. Minimal risks were expected in the study. Any sensitive issues or questions which may arise from the study and could affect the participant were observed. Fortunately, no referral of any of the participants were needed.

3.7 SUMMARY OF THE CHAPTER

The study employed a sequential explanatory mixed method approach, specifically a descriptive cross-sectional and exploratory design for the quantitative and qualitative phases respectively. Yamane formula was used to calculate the sample size of the quantitative phase followed by purposive sampling recruitment of the participants for the qualitative phase of the study. In order to conduct this study, permission was obtained from all relevant authorities. Thereafter, data was collected using a questionnaire (online completion) for the quantitative phase and SPSS version 28 was used in the analysis of the data collected. Focus group discussions via the Google Meet platform were used for data collection in the qualitative phase and thematic analysis was used for analysis. Validity, reliability and trustworthiness were taken into consideration. Participants were also fully aware of their right to withdraw from the study without any implications. The results of the quantitative and qualitative analysis are presented in Chapters 4 and 5.

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CHAPTER FOUR

QUANTITATIVE RESULTS

4.1 INTRODUCTION

As indicated in Chapter 3, the present study employed a sequential mixed method approach. Therefore the results are presented in two phases, the quantitative phase (Chapter 4) followed by the qualitative phase (Chapter 5).

Chapter four presents the statistical analysis which pursued to answer the first four (4) objectives of the study, namely 1) the degree of **cellphone addiction**, 2) the degree of **functional disability** due to cell phone use, 3) the degree of **pain** due to cell phone use and, 4) the **relationship between cellphone addiction, functional disability and pain** of undergraduate health science students from a University in the Western Cape.

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Based on the number of students enrolled in the Community and Health Sciences (CHS) Faculty in 2021, 361 students should have participated in the study for the researcher to be able to generalize the study findings to the study population. However, only 157 students completed the online questionnaire. Thus, generalizability of the results is not possible. The Covid-19 pandemic hampered data collection (online response is always expected to be lower than face to-face data collection). Complete lockdown (2020) and partial lockdown (2021) did not allow for face to-face data collection. In addition, the researcher was also dependant on the Office of the Deputy Registrar: Academic to disseminate the questionnaire via email as well as for the follow up reminder emails due to the POPIA act implemented in 2021. The period for the completion of the online questionnaire was four (4) months.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS (n=157)

The total study sample comprised of 157 students enrolled in 2021 in the Faculty of Community and Health Sciences (CHS) of the University of the Western Cape (UWC). Table 4.1 below presents a summary of the demographic profile of the participants.

Almost 90% of the participants were female (n=140, 89.2%) with only 17 (10.8%) male participants. The participants' ages ranged between 18 and 25 years (mean=21.57 years, SD±4.14). Students enrolled in their 1st and 4th year of studies accounted for more than half of the study sample (n=87, 55.4%). The majority of the participants enrolled in the Department of Physiotherapy (n=91; 58.0%), followed by 35 Nursing students (22.3%) and 14 (8.9%) and 13 (8.3%) students respectively in the Social Work and Dietetics departments. Three (3) students did not indicate the department they are registered in. Almost 80% of the participants have a hobby, as indicated in Table 4.1 below.

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Table 4.1 Socio-demographic profile of the participants (n=157)

Characteristics	Total population n (%)	Female n (%)	Male n (%)
Age (Mean = 21.7 years, SD±4.14)			
Gender	157 (100)	140 (89.2)	17 (10.8)
Year of study			
1st year	45 (28.7)	39 (24.9)	6 (3.8)
2nd year	36 (22.9)	33 (21.0)	3 (1.9)
3rd year	33 (21.0)	28 (17.8)	5 (3.2)
4th year	42 (26.8)	39 (24.9)	3 (1.9)
5th year	1 (0.6)	1 (0.6)	-
Department enrolled in			
Physiotherapy	91 (58.0)	80 (51.0)	11 (7.0)
Nursing	35 (22.3)	33 (21.0)	2 (1.3)
Social Work	14 (8.9)	13 (8.3)	1 (0.6)
Dietetics	13 (8.3)	10 (6.4)	3 (1.9)
School of Natural Medicine	1 (0.6)	1 (0.6)	-
No selection of department	3 (1.9)	3 (1.9)	-
Hobby			
Yes	122 (77.7)	109 (69.5)	13 (8.3)
No	35 (22.3)	31 (19.7)	4 (2.5)

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4.3 THE DEGREE OF CELL PHONE ADDICTION (n=157)

Participants responded to series of statements assessing their degree of cell phone addiction. The Nomophobia questionnaire is a reliable and valid 20-item scale developed by Yildirim and Correia (2015). The scale covers four dimensions of nomophobia, namely not being able to connect, losing connectedness, not being able to access information and giving up convenience. The participants rated each question using a 7-point Likert scale, ranging between "strongly disagree" and "strongly agree" (1= strongly disagree, 2= disagree, 3= somewhat disagree, 4=

neutral, 5= somewhat agree, 6= agree, 7= strongly agree). Table 4.2 below shows the responses given by the undergraduate health science students.

Table 4.2 Cell phone addiction according to the Nomophobia questionnaire (n=157)

STATEMENTS	Strongly disagree n (%)	Disagree n (%)	Somewhat disagree n (%)	Neutral n (%)	Somewhat agree n (%)	Agree n (%)	Strongly agree n (%)	chi-square value (χ^2)	P-value
Q1. I would feel uncomfortable without constant access to information on my smartphone.	0(0.0) 4(2.5)	1(0.6) 10(6.4)	2(1.3) 12(7.6)	3(1.9) 22(14.0)	6(3.8) 35(22.3)	1(0.6) 36(22.9)	4(2.5) 21(13.4)	4.567	.600
Q2. I would be annoyed if I could not look information up on my smartphone when I wanted to do so.	0(0.0) 2(1.3)	0(0.0) 7(4.5)	0(0.0) 7(4.5)	1(0.6) 10(6.4)	4(2.5) 25(15.9)	6(3.8) 56(35.7)	6(3.8) 33(21.0)	3.165	.788
Q3. Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous.	0(0.0) 12(7.6)	3(1.9) 19(12.1)	4(2.5) 16(10.2)	3(1.9) 28(17.8)	3(1.9) 33(21)	2(1.3) 24(15.3)	2(1.3) 8(5.1)	4.790	.571
Q4. I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	0(0.0) 6(3.8)	0(0.0) 6(3.8)	0(0.0) 7(4.5)	1(0.6) 20(12.7)	6(3.8) 35(22.3)	4(2.5) 33(21)	6(3.8) 33(21)	4.561	.601
Q5. Running out of battery in my smartphone would scare me.	3(1.9) 16(10.2)	2(1.3) 26(16.6)	1(0.6) 16(10.2)	1(0.6) 20(12.7)	5(3.2) 23(14.6)	3(1.9) 25(15.9)	2(1.3) 14(8.9)	3.589	.732
Q6. If I were to run out of credits or hit my monthly data limit, I would panic.	3(1.9) 20(12.7)	4(2.5) 35(22.3)	1(0.6) 10(6.4)	3(1.9) 17(10.8)	2(1.3) 19(12.1)	1(0.6) 24(15.3)	3(1.9) 15(9.6)	2.405	.879
Q7. If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	1(0.6) 11(7.0)	2(1.3) 20(12.7)	2(1.3) 7(4.5)	2(1.3) 21(13.4)	1(0.6) 22(14.0)	4(2.5) 28(17.8)	5(3.2) 31(19.7)	2.907	.820
Q8. If I could not use my smartphone, I would be afraid of getting stranded somewhere.	0(0.0) 5(3.2)	0(0.0) 14(8.9)	0(0.0) 10(6.4)	2(1.3) 11(7.0)	4(2.5) 29(18.5)	4(2.5) 35(22.3)	7(4.5) 36(22.9)	5.195	.519
Q9. If I could not check my smartphone for a while, I would feel a desire to check it.	0(0.0) 7(4.5)	2(1.3) 12(7.6)	2(1.3) 11(7.0)	2(1.3) 14(8.9)	2(1.3) 26(16.6)	4(2.5) 40(25.5)	5(3.2) 30(19.1)	2.314	.889
Q10. If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	0(0.0) 5(3.2)	5(3.2) 16(10.2)	3(1.9) 18(11.5)	0(0.0) 18(11.5)	4(2.5) 17(10.8)	0(0.0) 35(22.3)	5(3.2) 31(19.7)	12.787	**.047***

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Q11. If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	0(0.0) 2(1.3)	2(1.3) 6(3.8)	1(0.6) 8(5.1)	1(0.6) 17(10.8)	3(1.9) 24(15.3)	3(1.9) 48(30.6)	7(4.5) 35(22.3)	5.203	.518
Q12. If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	0(0.0) 7(4.5)	3(1.9) 15(9.6)	2(1.3) 18(11.5)	0(0.0) 16(10.2)	5(3.2) 32(20.4)	3(1.9) 30(19.1)	4(2.5) 22(14.0)	4.381	.625
Q13. If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	0(0.0) 4(2.5)	2(1.3) 9(5.7)	0(0.0) 15(9.6)	1(0.6) 16(10.2)	4(2.5) 30(19.1)	6(3.8) 38(24.1)	4(2.5) 28(17.8)	3.837	.699
Q14. If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	0(0.0) 6(3.8)	3(1.9) 16(10.2)	1(0.6) 8(5.1)	1(0.6) 23(14.6)	3(1.9) 25(15.9)	5(3.2) 36(22.9)	4(2.5) 26(16.6)	2.591	.858
Q15. If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	2(1.3) 16(10.2)	6(3.8) 18(11.5)	2(1.3) 19(12.1)	1(0.6) 21(13.4)	2(1.3) 21(13.4)	1(0.6) 26(16.6)	3(1.9) 19(12.1)	7.637	.266
Q16. If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	7(4.5) 43(27.4)	3(1.9) 36(22.9)	1(0.6) 21(13.4)	1(0.6) 15(9.6)	1(0.6) 10(6.4)	1(0.6) 10(6.4)	3(1.9) 5(3.2)	8.128	.229
Q17. If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks.	4(2.5) 34(21.7)	4(2.5) 35(22.3)	1(0.6) 14(8.9)	0(0.0) 19(12.1)	3(1.9) 21(13.4)	3(1.9) 10(6.4)	2(1.3) 7(4.5)	9.024	.172
Q18. If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks.	5(3.2) 23(14.6)	3(1.9) 33(21.0)	1(0.6) 16(10.2)	0(0.0) 27(17.2)	4(2.5) 20(12.7)	1(0.6) 16(10.2)	3(1.9) 5(3.2)	12.546	.051
Q19. If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	1(0.6) 10(6.4)	1(0.6) 16(10.2)	0(0.0) 12(7.6)	2(1.3) 17(10.8)	3(1.9) 29(18.5)	5(3.2) 34(21.7)	5(3.2) 22(14.0)	3.808	.703
Q20. If I did not have my smartphone with me, I would feel weird because I would not know what to do.	6(3.8) 23(14.6)	1(0.6) 39(24.8)	3(1.9) 21(13.4)	0(0.0) 11(7.0)	5(3.2) 22(14.0)	0(0.0) 14(8.9)	2(1.3) 10(6.4)	10.977	.089

Male (in black), Female (in blue) ***Significant**

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Pearson's chi – square test was used to establish whether a statistical significance exist in cellphone addiction in female and male undergraduate health science students in University of Western Cape. A significant difference was noted in only one of the statements, namely "*If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends".* Significantly more female than male students chose the statement (χ^2 = 12.787, p = .047).

Cellphone addiction, also known as nomophobia, can be categorised in four categories, as outlined in Table 4.3 below. Higher scores indicate higher nomophobia. The categories are as follow: no nomophobia (scores of 20), mild nomophobia (scores between 21 and 59), moderate nomophobia (scores between 60 and 99) and severe nomophobia (scores between 100 and 140), based on the total raw scores of the participants (Yildirim & Correia, 2015). More than half of the participants (n=83, 52.9%) suffer from moderate nomophobia while more than a third (n = 58, 36.9%) suffer from severe nomophobia, as outlined in Fig. 4.1 below.

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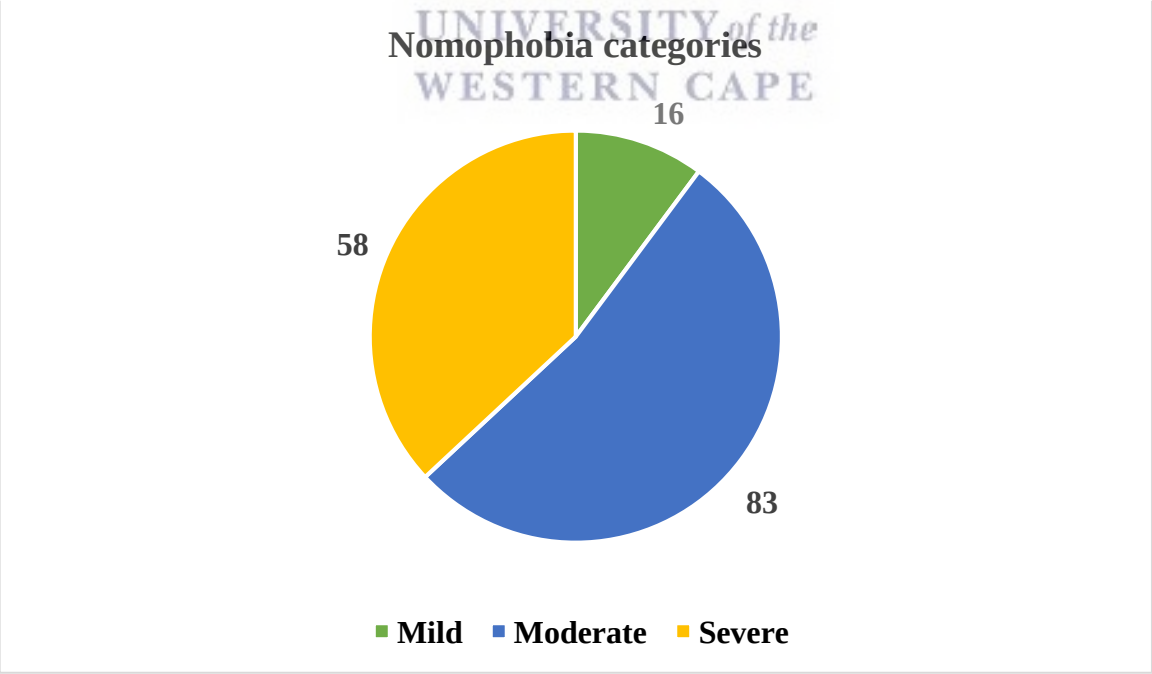

Figure 4.1 Nomophobia categories (n = 157)

Table 4.3 Nomophobia categories according to gender (n=157)

NOMOPHOBIA CATEGORIES	Total population n (%)	Female n (%)	Male n (%)	p-value
No nomophobia	-	-	-	.339
Mild nomophobia	16 (10.2)	16 (10.2)	-	
Moderate nomophobia	83 (52.9)	73 (46.5)	10 (6.4)	
Severe nomophobia	58 (36.9)	51 (32.5)	7 (4.5)	

No significant difference were found for nomophobia categories and gender (p = .339).

Analysis of the four dimensions of nomophobia resulted in the following:

a) *not being able to access information*, (Questions 1 – 4): More than two thirds of the participants (67.2%) wanted to be online whenever they want to. Not being able to connect made then anxious, annoyed and/or uncomfortable.

b) *giving up convenience* (Questions 5 – 9): More than half of the participants (57.3%) reported that they would feel afraid, anxious and scared if they could not access their phone.

c) *not being able to communicate* (Questions 10 – 15): Almost two thirds of the participants (65.3%) reported that they would feel anxious, worried and/or nervous if they are not able to communicate with friend and family.

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d) *losing connectedness* (Q 16 – 20): Just more than a third of the participants (35.2%) reported that they would feel anxious, weird and/awkward if they did not have their cell phone with them.

Table 4.4 below presents the gender differences in mean scores for cell phone addiction. Independent-samples t-test was conducted to compare the mean values of the statements for cell phone addiction for males and females. For sixteen (16) of the statements, males score higher than females. Female participants only scored higher in questions 6, 10, 15 and 20. Males scored significantly higher in four (4) statements, namely question 8 ($p = .041$), question 16 ($p = .014$), question 17 ($p = .033$) and question 18 ($p = .006$).

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Table 4.4 Gender differences in cell phone addiction / nomophobia (n = 157)

STATEMENT	Total (n=157) Mean (SD)	Female (n=140) Mean (SD)	Male (n=17) Mean (SD)	p-value	95% CI for difference
Q1. I would feel uncomfortable without constant access to information through my smartphone.	4.90 (1.559)	4.90 (1.569)	4.90 (1.519)	.651	- .753 - .835
Q2. I would be annoyed if I could not look information up on my smartphone when I wanted to do so.	5.54 (1.398)	5.49 (1.437)	6.00 (.935)	.690	-.200 - 1.214
Q3. Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous.	4.11(1.686)	4.11 (1.695)	4.18 (1.667)	.946	- .789 - .928
Q4. I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	5.24 (1.566)	5.16 (1.608)	5.88 (.993)	.920	- .071 - 1.507
Q5. Running out of battery in my smartphone would scare me.	4.01 (1.934)	3.99 (1.921)	4.18 (2.099)	.573	- .801 - 1.168
Q 6. If I were to run out of credits or hit my monthly data limit, I would panic.	3.78 (2.041)	3.80 (2.032)	3.70 (2.172)	.911	- 1.133 - 0.945
Q7. If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	4.67 (1.974)	4.65 (1.970)	4.88 (2.057)	.711	- .772 - 1.237
Q8. If I could not use my smartphone, I would be afraid of getting stranded somewhere.	5.19 (1.725)	5.10 (1.768)	5.94 (1.088)	**.041***	- .027 - 1.709

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Q9. If I could not check my smartphone for a while, I would feel a desire to check it.	5.01 (1.772)	5.00 (1.775)	5.11 (1.798)	.723	- .784 - 1.020
Q10. If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	4.77 (1.863)	4.82 (1.835)	4.35 (2.089)	.249	- 1.414 - 0.47
Q11. If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	5.42 (1.494)	5.42 (1.464)	5.47 (1.771)	.243	- .711 - .810
Q12. If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	4.66 (1.770)	4.63 (1.767)	4.88 (1.833)	.889	- .654 - 1.147
Q13. If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	5.07 (1.623)	5.03 (1.633)	5.41 (1.543)	.557	- .448 - 1.200
Q14. If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	4.85 (1.763)	4.83 (1.761)	5.05 (1.819)	.982	- .674 - 1.120
Q15. If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	4.12 (1.970)	4.19 (1.944)	3.58 (2.152)	.442	- 1.603 - .394
Q16. If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	2.77 (1.821)	2.73 (1.744)	3.05 (2.410)	**.014***	- .603 - 1.249
Q17. If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks.	3.17 (1.898)	3.11 (1.846)	3.64 (2.289)	**.033***	- .430 - 1.495
Q18. If I did not have my smartphone with me, I would feel awkward because I could not check my notifications	3.42 (1.833)	3.40 (1.766)	3.58 (2.373)	**.006***	- .744 - 1.121

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for updates from my connections and online networks.					
Q19. If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	4.71(1.843)	4.63 (1.843)	5.35 (1.765)	.417	- .214 - 1.649
Q20. If I did not have my smartphone with me, I would feel weird because I would not know what to do.	3.36 (1.915)	3.37 (1.890)	3.39 (2.172)	.348	- 1.052 -0.898

***significant**

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4.4 FUNCTIONAL DISABILITY DUE TO CELL PHONE USE (n = 157)

The Neck Disability Index is a reliable and valid 10-item scale developed for measuring selfrated disability due to neck pain (Vernon & Mior, 1991). The 10 items are pain intensity, headache, concentration, sleeping, lifting, work, driving, recreation, personal care and reading. The participants rated each item using a 6-point Likert scale. The data is presented in Table 4.5 below. According to the responses from the Neck Disability Index, none of the participants experienced any neck pain while practising personal care. Significantly more males than females reported that their work was affected by their functional disability ($\chi^2 = 8.211$, $p = .042$). In addition, significantly more males than females experienced neck pain at the time of data collection ($\chi^2 = 9.667$, $p = .046$).

Table 4.5 Functional disability according to the Neck Disability Index (n=157)

STATEMENTS (NDI)*	no disability n(%)	mild disability n(%)	moderate disability n(%)	fairly severe disability n(%)	very severe disability n(%)	worst imaginable disability n(%)	Chi square (X^2)	p-value
Pain intensity	10(6.4) 87(55.4)	3(1.9) 34(21.7)	3(1.9) 15(9.6)	- 4(2.5)	- -	1(0.6) -	9.667	**.046***
Personal care (washing, dressing)	17(10.8) 140(89.2)	- -	-	- -	- -	- -	Constant	
Lifting	15(9.6) 110(70.1)	1(0.6) 22(14.0)	- 1(0.6)	- 1(0.6)	1(0.6) 5(3.2)	- 1(0.6)	1.754	.882
Reading	15(9.6) 115(73.2)	0(0.0) 20(12.7)	2(1.3) 3(1.9)	- 2(1.3)	- -	- -	7.146	.067
Headaches	7(4.5) 32(20.4)	4(2.5) 55(35.0)	4(2.5) 27(17.2)	1(0.6) 16(10.2)	1(0.6) 5(3.2)	- 5(3.2)	4.437	.488
Concentration	5(3.2) 38(24.2)	7(4.5) 58(36.9)	3(1.9) 33(21.0)	1(0.6) 8(5.1)	1(0.6) 2(1.3)	- 1(0.6)	1.957	.855
Work	7(4.5) 93(59.2)	9(5.7) 30(19.1)	1(0.6) 14(8.9)	- 3(1.9)	- -	- -	8.211	**.042***
Driving	13(8.3) 114(72.6)	4(2.5) 16(10.2)	- 5(3.2)	- -	- -	- 5(3.2)	3.003	.391
Sleeping	8(5.1) 80(51.0)	7(4.5) 30(19.1)	2(1.3) 14(8.9)	- 9(5.7)	- 6(3.8)	- 1(0.6)	4.773	.444
Recreation	11(7.0) 103(65.6)	6(3.8) 35(22.3)	- 2(1.3)	- -	- -	- -	1.022	.600

Male (in black), Female (in blue) ***Significant**

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Functional disability can be categorised in five categories, as outlined in Table 4.6 below. Higher scores indicate higher impairment/disability. The categories are as follow: no disability (scores between 0 and 4), mild impairment (scores between 5 and 14), moderate disability (scores between 15 and 24) and severe disability (scores between 25 and 34), and complete disability (scores >34), based on the total raw scores of the participants (Ferreira et al., 2010). Seventy of the participants (44.6%) have no functional disability while more than half of the participants (n=85, 54.1%) suffer from mild functional disability, as outlined in Fig. 4.2 above.

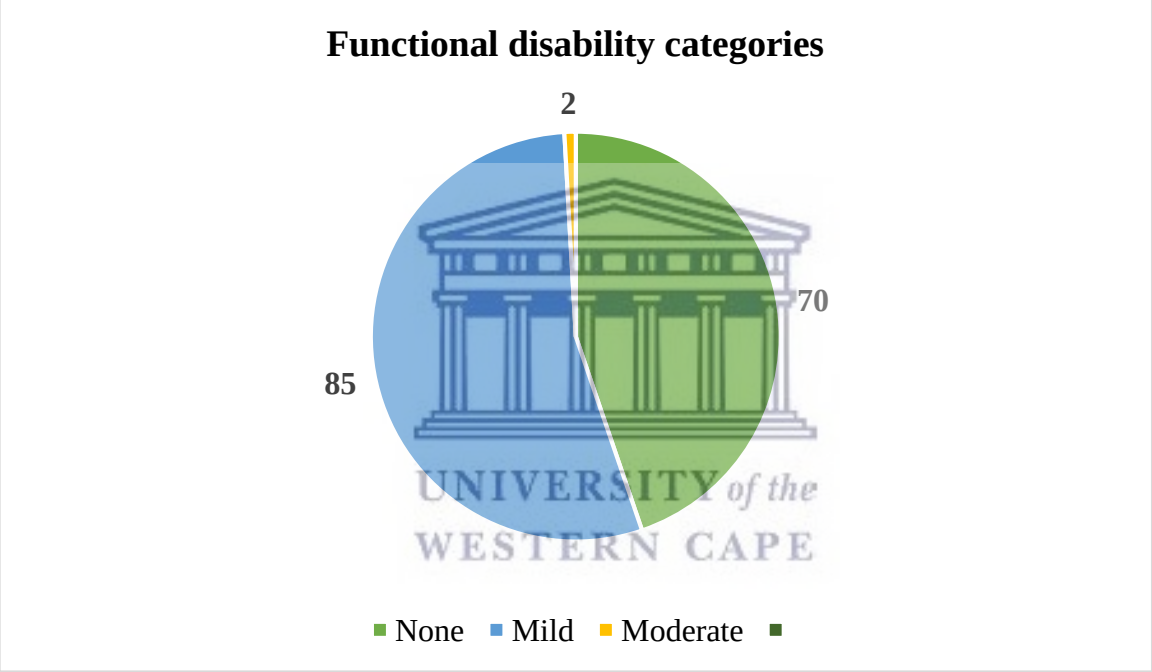

Figure 4.2 Functional disability categories (n = 157)

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Table 4.6 Functional disability categories according to gender (n=157)

FUNCTIONAL DISABILITY CATEGORIES	Total population n (%)	Female n (%)	Male n (%)	p-value
No disability	44.5	40.1	4.45	.831
Mild disability	54.1	47.7	6.36	
Moderate disability	1.3	0	1.3	
Severe disability	-	-	-	
Complete disability	-	-	-	

No significant difference was found for functional disability categories and gender (p = .831).

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4.5 DEGREE OF NECK PAIN DUE TO CELLPHONE USE (n=157)

The Numerical Pain Rating scale (NPRS) is widely used scale for pain intensity in individuals, including those with chronic pain (Childs et al., 2005). The 11-point scale ranges from 0 = *no pain* to 10 = *unable to move*. The response of male and female participants are reflected in Table 4.7 below. More than a third of the participants reported no pain at the time of data collection (n=59, 37.6%), while 27 (17.2%) and 24 (15.3%) of the participants experienced minimal and moderate neck pain respectively. No statistical significant gender difference was found for pain intensity ($\chi^2 = 2.997$, p = .936).

Table 4.7 Pain intensity according to the Numeric Pain Rating scale (n= 157)

	NUMERICAL PAIN RATING SCALE (NPRS)												
	No pain	**Minimal pain**	**Mild pain**	**Uncomfortable pain**	**Moderate pain**	**Distracting pain**	**Distressing pain**	**Unmanageable pain**	**Intense pain**	**Severe pain**	**Unable to move**	**Chisquare (x^2)**	**P-value**
Male (n=17)	8(5.1)	3(1.9)	1(0.6)	3(1.9)	2(1.3)	-	-	-	-	-	-	2.997	.936
Female (n=140)	51(32.5)	24(15.3)	22(14.0)	15(9.6)	22(14.0)	2(1.3)	-	1(0.6)	2(1.3)	1(0.6)	-		

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4.6 THE RELATIONSHIP BETWEEN CELLPHONE ADDICTION, FUNCTIONAL DISABILITY AND PAIN (n=157)

4.6.1 FUNCTIONAL DISABILITY AND PAIN

Spearman's Rho is a non-parametric test that was used to measure the strength of association between functional disability and pain. The value r = 1 means a perfect positive correlation and the value r = 1 means a perfect negative correlation. The following criteria are used to interpret the correlation: 0 - 0.3 = weak positive correlation, >0.3 - 0.7 = moderate positive correlation and >0.7 – 1.0 = strong positive correlation (Ratner, 2009).

As seen in Table 4.8 below, there is a moderate positive correlation between pain intensity (at the moment) (r = .532), recreation (r = .466), driving (r = .379), lifting (r = .315), headaches (r = .302) and pain, as reported by the Numerical Pain Rating scale (NPRS). There is no correlation between pain and personal care (washing, dressing). The only activity that does not have a statistically significant correlation with pain, as reported in the NPRS, is reading (p = .202).

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Table 4.8 Relationship between functional disability and pain (n = 157)

QUESTIONS (NDI)*	Spearman's rho Correlation' coefficient	p-value
Pain intensity (at the moment)	.532	**.000***
Personal care (washing, dressing etc.)	-	-
Lifting	.315	**.000***
Reading	.102	.202
Headaches	.302	**.000***
Concentration	.212	**.008***
Work	.284	**.009***
Driving	.379	**.000***
Sleeping	.217	**.006***
Recreation	.466	**.000***

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***significant**

4.6.2 CELLPHONE ADDICTION AND PAIN (n = 157)

Table 4.9 below illustrates the relationship between cell phone addiction and pain. A significant and strong positive correlation were found for the following questions: question 2: *I would be annoyed if I could not look information up on my smartphone when I wanted to do so* (r = .909, p = 0.009), question 11: *If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me* (r = .907, p = 0.009), question 13: *If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends* (r = .718, p=0.029) and question 19: *If I did not have my smartphone with me, I would feel anxious because I could not check my email messages* (r = .705, p =0.030).

Table 4.9 Relationship between Cell phone addiction and pain (n=157)

STATEMENTS: Nomophobia questionnaire vs Numerical Pain Rating scale (NPRS)	Spearman's rho Correlation coefficient	p-value
Q1. I would feel uncomfortable without constant access to information on my smartphone.	.229	.097
Q2. I would be annoyed if I could not look information up on my smartphone when I wanted to do so.	.909	**.009***
Q3. Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous.	.007	.214
Q4. I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	.751	-.026
Q5. Running out of battery in my smartphone would scare me.	.005	.223
Q6. If I were to run out of credits or hit my monthly data limit, I would panic.	.041	.164
Q7. If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	.032	.171
Q8. If I could not use my smartphone, I would be afraid of getting stranded somewhere.	.622	-.040
Q9. If I could not check my smartphone for a while, I would feel a desire to check it.	.485	.056
Q10. If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	.318	.080
Q11. If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	.907	**.009***
Q12. If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	.435	.063
Q13. If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	.718	**.029***

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Q14. If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	.421	.065
Q15. If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	.181	.107
Q16. If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	.027	.177
Q17. If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks.	.122	.124
Q18. If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks.	.035	.168
Q19. If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	.705	**.030***
Q20. If I did not have my smartphone with me, I would feel weird because I would not know what to do.	.006	.218

***significant**

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4.6.3 CELLPHONE ADDICTION AND FUNCTIONAL DISABILITY

Three (3) tables were created to illustrate the relationship between cell phone addiction and functional disability of the participants. The variables of the Neck Disability Index are displayed as follow**:** Table 4.10A: pain intensity, personal care, lifting; Table 4.10B: headache, concentration, work; and Table 4.10C: driving, sleeping, recreation.

Table 4.10A: A significant but weak positive correlation was found for **cellphone addiction and pain intensity**, as reported for Question 3: *Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous* (r = .202, p = .011) while a significant but weak positive correlation was found for **cellphone addiction and personal care**, as reported for Question 15*: If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken*: (r = .167, p = .037).

Table 4.10B: Similarly, significant but weak correlations were found for **cellphone addiction and concentration**, in both Question 5 (*Running out of battery in my smartphone would scare me)* and Question 6 *(If I were to run out of credits or hit my monthly data limit, I would panic).* The statistical values for both these statements were (r = .190, p = .017) and (r = .189, p = .018) respectively.

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Table 4.10C: Seven (7) of the statements of the Nomophobia questionnaire have a significant but weak positive correlation with **driving**, as illustrated in Table 4.3C below. Statistical values range between r = .201 and .290 while significance range between p = 0.000 and 0.012. Two (2) of the statements were significantly correlated with **sleeping**. A significant but weak negative correlation was found for question 11: *If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me* (r = -0.162, p = 0.043). Thus, the more worried the person, the less the person will sleep. Furthermore, a significant but weak positive correlation was found for question

19: *If I did not have my smartphone with me, I would feel anxious because I could not check my email messages* (r = .185, p = .020). Four (4) of the statements of the Nomophobia questionnaire have a significant but weak positive correlation with **recreation**, as illustrated in Table 4.3C below. Statistical values range between r = .158 and .205 while significance range between p = 0.010 and 0.049.

Table 4.10A Cellphone addiction and functional disability (pain intensity, personal care, lifting) (n=157)

STATEMENTS OF THE NOMOPHOBIA QUESTIONNAIRE	VARIABLES OF THE NECK DISABILITY INDEX					
	Pain intensity		Personal care		Lifting	
	Spearman's rho Correlation coefficient	p-value	Spearman's rho Correlation coefficient	p-value	Spearman's rho Correlation coefficient	p-value
Q1. I would feel uncomfortable without constant access to information on my smartphone.	0.065	0.416	0.144	0.071	0.035	0.666
Q2. I would be annoyed if I could not look information up on my smartphone when I wanted to do so.	0.049	0.540	0.110	0.170	0.007	0.927
Q3. Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous.	0.202	**0.011***	0.098	0.224	0.128	0.110
Q4. I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	-0.032	0.686	0.051	0.529	-0.033	0.684
Q5. Running out of battery in my smartphone would scare me.	0.010	0.900	0.137	0.087	0.028	0.731
Q6. If I were to run out of credits or hit my monthly data limit, I would panic.	0.083	0.303	0.134	0.095	-0.027	0.741
Q7. If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	0.085	0.292	0.574	0.157	-0.034	0.676
Q8. If I could not use my smartphone, I would be afraid of getting stranded somewhere.	-0.022	0.783	-0.006	0.941	0.043	0.589

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Q9. If I could not check my smartphone for a while, I would feel a desire to check it.	0.051	0.524		0.039	0.624		0.060	0.454
Q10. If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	-0.008	0.919		0.120	0.135		0.079	0.325
Q11. If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	-0.124	0.122		0.074	0.354		-0.032	0.693
Q12. If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	-0.052	0.521		0.149	0.063		0.054	0.500
Q13. If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	-0.094	0.239		0.090	0.263		-0.044	0.580
Q14. If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	0.050	0.531		0.049	0.542		0.045	0.577
Q15. If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	-0.046	0.564		0.167	**0.037***		0.037	0.643
Q16. If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	0.100	0.214		0.109	0.173		0.030	0.710
Q17. If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks.	0.031	0.697		0.038	0.639		0.007	0.927
Q18. If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks.	0.088	0.276		0.094	0.242		-0.015	0.854
Q19. If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	0.078	0.331		0.134	0.095		0.057	0.482
Q20. If I did not have my smartphone with me, I would feel weird because I would not know what to do.	0.077	0.337		0.155	0.053		0.086	0.283

***significant**

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Table 4.10B Cellphone addiction and functional disability (headache, concentration, work) (n=157)

STATEMENTS OF THE NOMOPHOBIA QUESTIONNAIRE	VARIABLES OF THE NECK DISABILITY INDEX					
	Headache		Concentration		Work	
	Spearman's rho Correlation coefficient	p-value	Spearman's rho Correlation coefficient	p-value	Spearman's rho Correlation coefficient	p-value
Q1. I would feel uncomfortable without constant access to information on my smartphone.	0.076	0.347	0.108	0.178	-0.031	0.697
Q2. I would be annoyed if I could not look information up on my smartphone when I wanted to do so.	-0.010	0.902	-0.005	0.953	-0.086	0.282
Q3. Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous.	0.112	0.164	0.114	0.156	-0.021	0.799
Q4. I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	-0.149	0.062	-0.019	0.810	-0.102	0.203
Q5. Running out of battery in my smartphone would scare me.	0.024	0.768	0.190	**0.017***	0.118	0.140
Q6. If I were to run out of credits or hit my monthly data limit, I would panic.	0.042	0.599	0.189	**0.018***	0.097	0.225
Q7. If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	0.012	0.886	0.098	0.223	0.053	0.510
Q8. If I could not use my smartphone, I would be afraid of getting stranded somewhere.	0.091	0.257	0.142	0.075	0.050	0.530

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Q9. If I could not check my smartphone for a while, I would feel a desire to check it.	0.064	0.429		0.112	0.163		0.100	0.214
Q10. If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	-0.014	0.860		0.058	0.474		-0.030	0.712
Q11. If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	-0.088	0.275		0.042	0.600		-0.084	0.297
Q12. If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	-0.007	0.930		0.122	0.128		0.015	0.855
Q13. If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	-0.024	0.767		0.085	0.289		-0.055	0.496
Q14. If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	0.006	0.945		0.111	0.165		-0.034	0.673
Q15. If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	0.086	0.286		0.067	0.407		-0.088	0.272
Q16. If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	0.020	0.803		0.082	0.310		0.030	0.710
Q17. If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks.	-0.040	0.619		0.084	0.293		0.020	0.801
Q18. If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks.	-0.023	0.778		0.135	0.093		0.122	0.127
Q19. If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	0.022	0.789		0.072	0.369		0.103	0.199
Q20. If I did not have my smartphone with me, I would feel weird because I would not know what to do.	0.020	0.804		0.109	0.174		0.038	0.637

***significant**

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Table 4.10C Cellphone addiction and functional disability (driving, sleeping, recreation) (n=157)

STATEMENTS OF THE NOMOPHOBIA QUESTIONNAIRE	VARIABLES OF THE NECK DISABILITY INDEX					
	Driving		Sleeping		Recreation	
	Spearman's rho Correlation coefficient	p-value	Spearman's rho Correlation coefficient	p-value	Spearman's rho Correlation coefficient	p-value
Q1. I would feel uncomfortable without constant access to information on my smartphone.	0.246	**0.002**	0.059	0.465	0.099	0.217
Q2. I would be annoyed if I could not look information up on my smartphone when I wanted to do so.	0.108	0.180	0.015	0.853	0.051	0.529
Q3. Being unable to get the news (e.g. happenings, weather, etc.) on my smartphone would make me nervous.	0.290	**0.000***	0.065	0.418	0.159	**0.047***
Q4. I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	0.102	0.205	-0.043	0.593	-0.023	0.774
Q5. Running out of battery in my smartphone would scare me.	0.125	0.120	-0.065	0.416	0.205	**0.010***
Q6. If I were to run out of credits or hit my monthly data limit, I would panic.	0.114	0.155	0.026	0.745	0.183	**0.022***
Q7. If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	0.258	**0.001***	-0.021	0.791	0.155	0.053
Q8. If I could not use my smartphone, I would be afraid of getting stranded somewhere.	0.091	0.254	0.084	0.296	0.012	0.881

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Q9. If I could not check my smartphone for a while, I would feel a desire to check it.	0.201	**0.012***		-0.015	0.847		0.112	0.162
Q10. If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	0.097	0.229		-0.036	0.652		0.087	0.281
Q11. If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	0.100	0.214		-0.162	**0.043***		0.088	0.275
Q12. If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	0.131	0.102		-0.023	0.779		0.026	0.749
Q13. If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	0.096	0.230		-0.015	0.852		-0.011	0.894
Q14. If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	0.152	0.058		-0.053	0.507		0.018	0.826
Q15. If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	0.006	0.942		0.087	0.279		-0.029	0.722
Q16. If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	0.159	0.047		0.018	0.825		0.089	0.267
Q17. If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-to-date with social media and online networks.	0.209	**0.009***		0.014	0.859		0.039	0.625
Q18. If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks.	0.272	**0.001***		0.048	0.549		0.085	0.289
Q19. If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	0.114	0.155		0.185	**0.020***		0.158	**0.049***
Q20. If I did not have my smartphone with me, I would feel weird because I would not know what to do.	0.231	**0.004***		-0.073	0.366		0.123	0.125

***significant**

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4.7 SUMMARY OF THE CHAPTER

The following fundamental results were obtained from the analysis of the quantitative data of the 157 students that participated in the study:

1. More than half of the participants (n=83, 52.9%) suffer from moderate nomophobia (cell phone addiction) while more than a third (n = 58, 36.9%) suffer from severe nomophobia. No significant difference were found for nomophobia categories and gender (p = .339).
2. A significant difference in gender were noted in only one (1) of the statements of the Nomophobia questionnaire, namely "*If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends".* Significantly more female than male students chose the statement (χ^2 = 12.787, p = .047).
3. With regards to cell phone addiction: males scored significantly higher in four (4) statements, namely question 8 (p = .041), question 16 (p = .014), question 17 (p = .033) and question 18 (.006).
4. Analysis of the four dimensions of nomophobia resulted in the following:
   a) *not being able to access information*: More than two thirds of the participants (67.2%) wanted to be online whenever they want to. Not being able to connect made then anxious, annoyed and/or uncomfortable.
   b) *giving up convenience:* More than half of the participants (57.3%) reported that they would feel afraid, anxious and scared if they could not access their phone.
   c) *not being able to communicat*e: Almost two thirds of the participants (65.3%) reported that they would feel anxious, worried and/or nervous if they are not able to communicate with friend and family.
   d) *losing connectedness*: Just more than a third of the participants (35.2%) reported that they would feel anxious, weird and/awkward if they did not have their cellphone with them.

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5. Significantly more males than females reported that their work was affected by their functional disability ($\chi^2 = 8.211$, $p = .042$).
6. In addition, significantly more males than females experienced neck pain at the time of data collection ($\chi^2 = 9.667$, $p = .046$).
7. Seventy of the participants (44.6%) have no functional disability while more than half of the participants (n=85, 54.1%) suffer from mild functional disability. No significant differences were found for functional disability categories and gender ($p = .831$).
8. More than a third of the participants reported no pain (n=59, 37.6%), while 27 (17.2%) and 24 (15.3%) of the participants experienced minimal and moderate neck pain respectively. No statistical significant gender differences were found for pain intensity ($\chi^2 = 2.997$, $p = .936$).
9. There is a moderate positive correlation between pain intensity (at the moment) ($r = .532$), recreation ($r = .466$), driving ($r = .379$), lifting ($r = .315$), headaches ($r = .302$) and pain. There is no correlation between pain and personal care. The only activity that does not have a statistically significant correlation with pain is reading ($p = .202$).
10. A significant and strong positive correlation was found for four (4) of the statements related to cell phone addiction and pain.
11. Significant but weak positive correlations were found for cell phone addiction and functional disability. Only one statement related to sleeping had a significant but weak negative correlation ($r = -.162$, $p = .043$). Thus the more worried the person, the less the person will sleep.

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The next chapter will outline the perceptions of undergraduate health science students from a university in the Western Cape regarding the prevention and management of text neck syndrome.

CHAPTER FIVE

QUALITATIVE ANALYSIS

5.1 INTRODUCTION

This chapter contains the result of the content analysis of the focus group discussions which attempted to answer the last objective of the study, namely to explore the perceptions of undergraduate health science students from a university in the Western Cape regarding the prevention and management of text neck syndrome. Purposive sampling was employed as participants that completed the quantitative part of the study were invited to partake in the FGDs.

5.2 FOCUS GROUP DISCUSSIONS WITH HEALTH SCIENCE STUDENTS

The focus groups were facilitated by the researcher in an online environment. Seven (7) students, five (5) females and two (2) males with a mean age of 20.29 years (SD = 1.11), agreed to participate. The focus groups took place at a time convenient for all the group members. Each participant was encouraged to wholeheartedly participate in the discussions. The following questions were asked in the FGDs:

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1. In your own words, how would you ***describe text neck syndrome***?
2. What would you say can be done ***to prevent*** text neck syndrome?
3. What would you say can be done ***to manage of treat the symptoms*** of text neck syndrome?
4. What are the ***challenges***, if any, you think people with text neck might face ***in the prevention*** of the syndrome?
5. What are the ***challenges***, if any, you think people with text neck syndrome might face ***in the management*** of their symptoms?
6. ***Anything else*** you want to add to our discussion regarding the topic?

5.2.1 PRE-DETERMINED THEMES AND SUB-THEMES

Table 5.1 Pre-determined, emerging and sub-themes

Pre-determined themes	Sub-themes
Understanding the syndrome (definition)	-
Prevention of text neck syndrome	Ergonomics / Posture
	Limit screen time
	Stretching and physical activity
	Taking breaks from screen time
	Education
Management of the symptoms of text neck syndrome	Stretching
	Strengthening
	Application of heat
	Pain medication
Challenges in the prevention of the syndrome	Addiction to technology and social media
	Limiting screen time
	Lack of knowledge
Challenges in the management of the symptoms of the syndrome	Time
	Financial constraints
	Consistency
	Lack of knowledge
Emerging themes	**Sub-themes**
Recommendations	-

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Verbatim quotes will be used to further exemplify the abovementioned themes.

5.2.1.1 Understanding the syndrome (definition)

The majority of the participants have not heard of text neck syndrome before they participated in the study, but they could figure out what it entails. See the excerpts below.

> *"I would say when you are on your phone for a longtime… and it is just becoming worse since we moved to online learning. Now we use our phones a lot, even when doing work … so it is a constant issue."* **(PT1, 19 years)**

> *"I am basically just going to say that it is an abnormal posture that developed due to constantly leanly forward… or being on your laptop for a long period of time…or on your phone…"* **(PT2, 19 years)**

> *"I don't have a great idea of it. I can just imagine posture involved when you texting on your phone as it put more strain on your neck."* **(PT3, 20 years)**

> *"I think it is the pain you feel after being on your phone for a longtime. I am familiar with the term, for example when I use my phone for a longtime, I feel pain in my neck if I maintain the same posture, you know."* **(PT4, 21 years)**

> "*I was thinking text neck syndrome might be bending your neck forward for long period of time on your phone that can cause quite a few complications.*"
>
> **(PT5, 22 years)**

Only one student was not sure of what the syndrome is.

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"*I am not sure what it is, but if you listen to the word, bend your neck forward on your phone…sounds like that."* **(PT7, 20 years)**

5.2.1.2 Prevention of text neck syndrome

The participants had a very good idea of what could be done to prevent the onset of text neck syndrome. Suggestions are related to ergonomics, limiting screen time, stretching and physical activity, taking breaks from screen time and education.

a) Ergonomics / Posture

"I would say proper ergonomics, like ensuring the desk is the proper height, the laptop as well… chair providing proper postural support." **(PT1, 19 years)**

"I would say that better posture, sitting posture, texting posture and maybe lifting the phone up to eye level. Ergonomics, meaning lifting the desk higher so that your neck is not flexed all the time." **(PT5, 22 years)**

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"*I would say ergonomics… definitely, especially when you are working for long times on tablets or a laptop."* **(PT6, 21 years)**

b) Limit screen time

"…and also when you are not on the phone or laptop for work purpose, try to limit the amount of time on the phone when not necessarily needed." **(PT1, 19 years)** *"I want to say…an hour before you are suppose to go to bed, try to limit the amount of time on the phone while laying down, because what I find is I end up doing this and*

then my neck is in a weird position which feels comfortable, when you change the position, then it is painful and stiff." **(PT2, 19 years)**

c) Stretching and physical activity

"I would suggest stretches, especially for your back and your neck to release the tension and maybe to do the random activity like walking, playing with the dog etc." **(PT1, 19 years)**

Apart from doing specific stretches, two female participants expressed the need to get away from the device (phone or laptop) for a while and do some physical activity.

"…and get up, just walk around, get a glass of water, and then come back and continue work" **(PT2, 19 years)**

"…move around in order to limit the pain on your neck." **(PT3, 20 years)**

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d) Taking breaks from screen time

"I would say like even if you have a lot of work to do you could take some breaks… like if you are studying take a break after every chapter." **(PT1, 19 years)**

"I was going to say that we must ensure whenever we are studying or may be online, we must take some break, so that you move around in order to limit the pain on your neck." **(PT4, 21 years)**

e) Education

Educating people on the importance of a good posture and taking breaks from the devices in the prevention of text neck syndrome was also noted by two participants.

"I think education on the consequences of keeping the neck flexed for a long time… education on posture correcting." **(PT5, 22 years)**

"*I will also say that education about taking resting periods when working on electronic devices… so taking frequent rest periods."* **(PT7, 20 years)**

5.2.1.3 Management of the symptoms of text neck syndrome

The participants had a very good idea of how to treat the symptoms of text neck syndrome. The excerpts below explain:

a) Stretching

Most of the participants acknowledged the inclusion of stretches in the treatment regime of text neck syndrome.

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"There is some stretches you can do, by putting your hand behind your head, pulling your neck down and release the some of the pressure in the back of your neck, and also titling the head sides but I am sure physiotherapy like message technique also help." **(PT3, 20 years)**

"…and then stretch the muscles that are constantly being contracted."

(PT1, 19 years)

"*I also thought of stretches…, moving the neck sideways."* **(PT4, 21 years)**

b) Strengthening

The importance of strengthening of weak muscles was also expressed by a female physiotherapy student.

> *"You can also strengthen the other muscles that are being overly stretched the entire time… kind of bring them back to normal."* **(PT2, 19 years)**

c) Application of heat

One of the physiotherapy student participants mentioned the application of heat to the affected area.

> *"If something should help, warm compression (hot pack) on the neck could relieves some pain and maybe also help for the stiffness in the neck."* **(PT1, 19 years)**

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d) Pain medication

A female participant cautioned to the use of self-medication.

> *"…talk to the doctor about maybe what type of pain medication because you should not take your own kind of pain medication and this normally would use, because it may cause some adverse effect which you don't know of."* **(PT2, 19 years)**

5.2.1.4 Challenges in the prevention of text neck syndrome

Breaking a bad habit (addiction) as well as limiting screen time due to work were the challenges mentioned by two of the participants.

a) Addiction to technology and social media

"With one of the main causes being on your phone, I think the problem people could have is like kind of technologies addiction and social media addiction." **(PT3, 20 years)**

"Basically going to say the same thing… that seriously… the habit would be quite difficult to break it." **(PT4, 21 years)**

b) Limiting screen time

Some people may find it very difficult to limit their screen time due to work commitments.

"I would say that some people depend on technology for their work. They can't limit the use of their laptop. It is not as bad as the use of a phone as the neck could be more in a flexed position with a phone. For example, I am class rep, so I will send lots of messages on the class group chat. I use my phone a lot, it is work-related." **(PT2, 19 years)**

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"Some people… it's their job, it is compulsory to be on the mobile devices … that can be a problem, because it is the only way they can do their job. They really don't have a choice." **(PT5, 22 years)**

c) Lack of knowledge

People may not be aware of text neck syndrome and how it could affect their daily live.

"Actualy…the biggest one might be lack of knowledge." **(PT6, 21 years)**

5.2.1.5 Challenges in the management of the symptoms of text neck syndrome

a) Time

Finding time in a busy schedule, could hamper the management of the symptoms a person may experience. See the excerpt below.

> *"I think one of the challenge might be specially if they are really busy… to find the time to go to the doctor or physiotherapist."* **(PT2, 19 years)**

b) Financial constraints

One partipants stated that money could be a challenge as treatments can be very expensive.

> *"…And yes, finances can be a huge challenge."* **(PT1, 19 years)**

c) Consistency

People do not always keep up with their treatment. This could be attributed to different reasons.

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> *"Consistency… unable to continue with the type of management that they are using. It is the same with exercising… it is easy to start, but very difficult to keep up with it."* **(PT4, 21 years)**

d) Lack knowledge of the syndrome

If people are not aware of the syndrome and how to prevent or manage the symptoms, how can it be expected of them to choose the most appropriate treatment for instance?

"Resources as well…the communities don't have much education (about the syndrome). If they are not informed or educated about techniques and the syndrome, they wouldn't know about it, they will leave it (the pain) and not seek help." **(PT3, 20 years).**

"*I would say education. Some people would know. As a physio student, we know this is what you do…to stretch the neck, while other people might not even know how to access this knowledge."* **(PT7, 20 years)**

Another participant confirmed that it is easy to just take pain medication.

"When they are not well, they will just take a panado."
(PT2, 19 years)

5.2.2 EMERGING THEME

Only one theme emerged from the thematic qualitative data analysis.

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5.2.2.1 Recommendations

One female participant stated the importance of the inclusion of the syndrome, its prevention as well as management of the symptoms in the curriculum, as technology is here to stay. "*Because of Covid and online learning, it (the syndrome) is more common. It should be added in the curriculum, because in future it will be more common."* **(PT1, 19 years)**

5.3 SUMMARY OF THE CHAPTER

Results of the qualitative data help us to comprehend the students' understanding of text neck syndrome, the things they find appropriate to prevent as well as manage the syndrome, the

challenges participants might have in the prevention of the syndrome as well as the management of the symptoms of the syndrome. The next chapter will present the discussion of both the quantitative and qualitative results.

CHAPTER SIX

DISCUSSION

6.1 INTRODUCTION

This chapter gives a deliberation based on the results generated in the study with respect to the research questions aims and objectives, as indicated in the first chapter of the study. Triangulation of the quantitative and qualitative results will be in this chapter, to give a conclusive discussion. Finally, piecing together of the results and empirical evidence revealed in the literature review section, will be done to complete the discussion.

The discussion opens with the degree of cellphone addiction, the degree of functional disability due to the cellphone use, the degree of pain due to cellphone use, the relationship between cellphone addiction, as well as functional disability and pain in undergraduate students from a University in the Western Cape. The perceptions of the participants regarding the prevention and management of Text neck syndrome will also be discussed.

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Text Neck syndrome (TNS) is a present-day term that combines the symptoms of repeated neck and head pain caused by prolonged texting or looking down at the cell phone or any other portable electronic device. A recent study by Neupane et al., (2017) found that 79% of the population between the ages of 18-44 spend only two (2) hours of their working day without their cell phone in their hand. The researchers went on stating that prolonged exposure to forward head posture is a result of TNS that can lead to degeneration in the structure of the cervical spine because the head exerts extra weight on the shoulders and neck necessitating them to carry the extra load (Neupane et al., 2017). The frequent forward flexion can change the cervical spine, curvature, supporting ligaments, tendons, musculature, the bony segments, commonly causing postural change and pain on the neck and associated areas. Repeated performance of texting on a smartphone causes from tolerable to severe neck pain experienced

by a user while bending their neck. Users often adjust their physical posture based on the smartphone to be able to still use the phone. Anna et al. (2018) showed that 66.7% of people who used the smartphone for 3 hours or more while seating or standing experienced neck pain.

6.2 THE DEGREE OF CELLPHONE ADDICTION IN UNDERGRADUATE HEALTH SCIENCE STUDENTS

The sudden outbreak of the COVID-19 pandemic had an intense effect on the time people spent on their mobile devices. Although several benefits are reported from using cellphones, for instance online social interaction, entertainment, and access to information (Sreenivas & Philip, 2019), the researchers went on to say that the increased interaction via cell phones, in some cases, has hampered people's day-to-day activities. Cell phone addiction can be considered a behavioral addiction (Cha & Seo, 2018; Kiran et al., 2018).

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In the present study more than half of the participants (n=83, 52.9%) suffer from moderate nomophobia while more than a third (n = 58, 36.9%) suffer from severe nomophobia. Literature exploring cell phone addiction in the university population found both high and low prevalence rates. The prevalence of cellphone addiction amongst Belarusian and Polish students were 10.4% and 22.9% respectively (Karjewska-Kulak et al., 2018), 29.8% amongst s medical college students (Chen et al., 2017), 48.0% amongst King Saud university student (Aljomaa, et al., 2016) and 59.8% in Jordanian students (Albursan, et al., 2019). The results of the present study differ to that of a study by Albursan et al. (2022) who found that 37.4% of the sample were addicted to smartphone use. In addition nomophobia prevalence in the present study also differ to that of Alhassan et al. (2019). This Middle Eastern study reported a prevalence of 17% and 64% for severe and slight cell phone addiction respectively. A study conducted amongst medical and dentistry students from Pakistan in 2020 found prevalence's of 16%, 67% and 17% for mild, moderate and severe nomophobia respectively (Khan et al., 2020). An

Indian study conducted by Kiran et al. (2018) also reported a very low nomophobia prevalence in college students (5.1%). On the other hand, two studies conducted in Pakistan and India reported that the prevalence of nomophobia was 43.6% and 42.5%, respectively (Chaudary et al., 2019; Ahmed et al., 2019). These findings are more in line with that of the present study.

In the present study, no significant difference was found for nomophobia and gender ($p = .339$). In a study conducted in a public university, it was reported that gender did not affect the level of smartphone addiction (Albursan et al., 2022). The finding also concur with results from research done by Lopez-Fernandez (2017) and Kwon et al. (2013). To the contrary, a recent study by Kumari et al., (2021) found that females were more nomophobic than the male participants. It is however important to note the methodological differences in these studies, namely the use of a different nomophobia scales, the age difference of their study participants due to the inclusion of both undergraduate and post-graduate students as well as different classification of nomophobia categories when reporting their results.

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The results of the present study regarding the four dimensions of nomophobia are as follows: *Not being able to access information*: More than two thirds of the participants (67.2%) wanted to be online whenever they want to. Not being able to connect made then anxious, annoyed and/or uncomfortable. *Giving up convenience:* More than half of the participants (57.3%) reported that they would feel afraid, anxious and scared if they could not access their phone. *Not being able to communicat*e: Almost two thirds of the participants (65.3%) reported that they would feel anxious, worried and/or nervous if they are not able to communicate with friend and family. *Losing connectedness*: Just more than a third of the participants (35.2%) reported that they would feel anxious, weird and/awkward if they did not have their cell phone with them. The results of the present study concur with recent studies which show that excessive smartphone use is associated with problems of mental health and impaired

psychological wellbeing (Wacks & Weinstein, 2021). There is consistent evidence for comorbidity between excessive smartphone use and other psychiatric disorders, such as depression and anxiety, as well as the effect of cellphone use on the mental health of participants (Weinstein et al., 2014). In addition, excessive smartphone use is related to loneliness, stress, and other negative emotions (Pera, 2020; Karsay et al., 2019).

6.3 FUNCTIONAL DISABILITY DUE TO CELLPHONE USE IN UNDERGRADUATE HEALTH SCIENCE STUDENTS

In the present study, seventy of the participants (44.6%) have no functional disability while more than half of the participants (n=85, 54.1%) suffer from mild functional disability. No significant differences were found for functional disability categories and gender (p = .831).

The findings concur with a study conducted in six medical colleges in Saudi Arabia in 2021 where 49.5% of the participants reported mild functional disability (Alsiwed et al., 2021). However, the findings of the present study do not corroborate with a study conducted in India where 36.4% have mild functional disability, 23.4% have moderate functional disability, 2% have permanent functional disability (Kumar et al., 2021). The difference could be attributed to an older study population (aged 18 – 44 years) in the study of Kumar et al. (2021). Furthermore AlAbdulwahab et al. (2017) reported that cellphone addiction can lead to significant neck disability due to poor posture associated with smartphone use. The authors suggested that individuals make efforts to reduce the time spent using cellphones and to maintain an appropriate posture while using them as prolonged cell phone use can lead to defective forward head posture. The suggestion by the authors were echoed by participants in the FGDs in the present study. They said that screen time should be limited, frequent breaks should be taken while spending a lot of time on a cellphone and that people should be made aware of correct posture and relevant ergonomics while using a cell phone. The present study

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findings also concur with a very recent study by Chu (2022). The researcher suggested that frequent breaks along with correct posture while using a cellphone will be the crucial aspects in the prevention of the onset and management of text neck syndrome.

It is of utmost importance to prevent the onset of TNS in all populations, but more so in the adolescent and young adult population that use their phones a lot more. Knowledge regarding the syndrome is a key component in the prevention of TNS. In the FGDs, participants mentioned the importance of education and that challenges to the prevention of TNS include addiction to technology as well as lack of knowledge. The latter concur with a study by Samani et al. (2018) that demonstrated a low level of awareness of text neck syndrome amongst the young adult population. According to this study only 35% of the study population has heard of TNS while only 21% of those that heard of the syndrome know about the preventive measures.

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6.4 NECK PAIN DUE TO CELL PHONE USE IN UNDERGRADUATE HEALTH SCIENCE STUDENTS

More than a third of the participants reported no pain (n=59, 37.6%), while 27 (17.2%) and 24 (15.3%) of the participants experienced minimal and moderate neck pain respectively. No statistical significant gender differences were found for pain intensity ($\chi^2 = 2.997$, $p = .936$).

The findings of the present study echoe the research by Kim and Kim (2015). The authors found that smartphone use was correlated with musculoskeletal pain. Although the present study's findings are much lower than research conducted in Lahore where 42% of the medical and dental students complained of neck pain due to prolonged cellphone use (Khan et al., 2020). In addition, almost 60% (59.1%) of the participants of a study conducted amongst university students in Saudi Arabia complained of neck pain while using electronic devices. The percentage of moderate and severe neck pain were 22.3% and 4.4% respectively (Elsiddig et

al., 2022). Hadidi et al. (2019) reported a 74.8% prevalence of neck pain equal or less than 4/10 (minimal to moderate) in university students from Jordania. It should be kept in mind that the difference in findings can be due to different research instrument used, different scoring of instruments as well as confounding factors in a specific cohort of participants.

6.5 THE RELATIONSHIP BETWEEN CELL PHONE ADDICTION, FUNCTIONAL DISABILITY AND PAIN

6.5.1 FUNCTIONAL DISABILITY AND PAIN

In the present study a moderate positive correlation were found between pain intensity (at the moment) (r = .532), recreation (r = .466), driving (r = .379), lifting (r = .315), headaches (r = .302) and pain, as reported by the Numerical Pain Rating scale (NPRS). The NMP-Q has a positive correlation with the NDI ($r = 0.36$; $p < 0.001$). The aforementioned findings of the present study coincide with a study conducted in Saudi Arabia where results of 428 college students showed a significant relationship between functional disability, as measured by the NDI and neck pain ($p<0.001$) (Alsiwed et al., 2021). A study by Khadim et al. (2018) showed a pronounced association between neck pain and neck disability. As neck pain increased from mild to moderate and severe levels, it indicated more neck disability among nurses. The same scenario is found in the present study.

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6.5.2 CELL PHONE ADDICTION AND PAIN

In the present study a significant and strong positive correlation was found for four (4) of the statements related to cellphone addiction and pain, namely: *I would be annoyed if I could not look information up on my smartphone when I wanted to do so* (r = .909, p = 0.009), *If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me* (r = .907, p = 0.009), *If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends* (r = .718,

p=0.029) and *If I did not have my smartphone with me, I would feel anxious because I could not check my email messages* (r = .705, p =0.030).

Although the results differ with regards to the strength of the correlation, a significant relationship was found between pain cell phone addiction in and Turkish study (r = 0.457; p = 0.001) (Mustafaoglu, 2021) as well as in a study by Alsiwed et al., (2021). The researchers found a significant, but weak relationship between cell phone use and severity of pain (r = 0.14, p = 0.001) and duration of pain (r = 0.1, p = 0.001) respectively. The difference in results can be attributed to other methodologies employed in the studies as well as different study populations (e.g. age, gender).

6.5.3 CELLPHONE ADDICTION AND FUNCTIONAL DISABILITY

Significant but weak positive correlations was found for **cellphone addiction and pain intensity** (r = .202, p = .011) and **cellphone addiction and personal care** (r = .167, p = .037). Several other aspects of daily living also had significant, but weak correlations (either positive or negative) with **cellphone addiction.** Two (2) of the statements were significantly correlated with **sleeping**. A significant but weak negative correlation was found for question 11: *If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me* (r = -0.162, p = 0.043). Thus, the more worried the person, the less the person will sleep. Furthermore, a significant but weak positive correlation was found for question 19: *If I did not have my smartphone with me, I would feel anxious because I could not check my email messages* (r = .185, p = .020).

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Although the correlations in the present study were weak, it still was significant. The findings concur with research conducted in Saudi Arabia where smartphone addiction was significantly associated with neck problems and disability in healthy young students (AlAbdulwahab et al.,

2017). Two Turkish studies also found a positive (weak to moderate) and significant correlation between cell phone addiction and disability in a cohort of nursing students (Yilmaz et al., 2017) and 501 university students respectively (Guloglu & Yalcin, 2021). Significant and moderate positive correlations between nomophobia and functional disability were also reported in and Indian study by Ahmed et al. (2019) ($r = 0.32$, $p = 0.001$) as well as research conducted in Pakistan ($r = 0.41$, $p<0.001$) (Khan et al., 2020) and Saudi Arabia ($r = 0.328$, $p < 0.001$) (Alsiwed et al., 2021).

6.6 SUMMARY OF THE CHAPTER

With regard to the objectives, the majority of the university students in this study are addicted to their cellphones, just more than half of them have mild functional disability and less than a third of the students experienced minimal to moderate neck pain due to cellphone use. The participants also have appropriate knowledge regarding the prevention and management of text neck syndrome. However, whether they apply this knowledge in their daily life is questionable. The findings of the present study are in line with research conducted in the university population globally.

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CHAPTER SEVEN

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

This final chapter provides conclusion of the study. In addition, the limitations of the study will be outlined. Finally, recommendations that emerged based on the findings of this study will be reported on.

7.2 CONCLUSION OF THE STUDY

Modern technology became a basic essential and necessity in our daily life. Cell phones offer a range of mobile applications for communication, education, and entertainment and have become an essential part of everyday life. Text neck is a repeated stress injury sustained from excessive texting on handheld devices for long periods of time (Samani et al., 2018). People who spend long hours on small electronic devices such as cellphones, are more prone to develop problems in the cervical area due to the abnormal positioning of their neck and upper back (Asher, 2019). There has been an increased use of and addiction to cellphone texting in recent years, especially among the younger population (Hoy et al., 2014; Lin et al., 2015; Damasceno et al., 2017). Addiction to cellphones can cause serious problems, especially for students. These problems, which now appear to start in childhood, can manifest as a social as well as physical problem for a minority of individuals over time. Because cellphones are now more frequently used by individuals than computers, it is not surprising that various negative effects of excessive cell phone use have emerged. Cellphone users browse the internet, use social media, chat with other users, play games, listen to music, and perform many other activities on their cellphones. During these tasks, individual may be engaged in one position for a long time without moving or making specific movements repeatedly leading to various

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musculoskeletal disorders. Forward head posture has been correlated with chronic musculoskeletal pain which in turn correlates with functional disability.

North et al. (2014) found several reasons for South African university students' use of cellphones, namely for socializing, as well as for safety and privacy purposes. Furthermore, South African university students use their phones in curriculum activities, a finding that concur with studies conducted in China, Germany, Singapore and Japan. Cellphones can be used to take notes in class, keep track of class schedules, assignments and marks, to look up meanings of words and to do presentations. Students are able to communicate with one another about class related matters outside of class. They may also look up information while in class (AlShareef, 2015).

The present study was about Text neck syndrome among health science students from a university in the Western Cape. The specific research objectives were 1) to determine the degree of **cellphone addiction**, 2) the degree of **functional disability** due to cell phone use, 3) the degree of **pain** due to cell phone use and, 4) the **relationship between cellphone addiction, functional disability and pain** in undergraduate health science students from a university in the Western Cape. Furthermore, the study explored the participants' perception regarding the **prevention and management** of text neck syndrome.

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Text neck syndrome is an alarming problem as more people engage in technology. Prevention is the first step in managing text neck syndrome. Jung et al. (2016) suggests that it is of great importance to start paying more attention to the duration of cellphone use as well as the neck posture developed when using hand-held devices. Evidence has proven that regular neck exercises, postural awareness and ergonomic guidelines will reduce the risk of developing neck pain and musculoskeletal disorders associated with prolonged use of hand-held devices

(Abdelhameed and Abdel-aziem, 2016). By creating awareness and educating people of the risk factors, underlying causes, symptoms and prevention strategies of text neck syndrome, this health burden could be curbed. If left untreated, TNS can lead to cervical degeneration along with other medical, psychological, and social complications. As previously explained, cellphone addiction (nomophobia) is associated with neck pain and disability in healthy young adults. The results of the present study reveal the importance of informing society, especially the student population about the physical risks of cellphone addiction. Individuals should strive to reduce the time spent using a cellphone and try to maintain a proper posture during use.

7.3 LIMITATIONS OF THE STUDY

- Since the study was a cross-sectional study, cause-and effect relationships cannot be determined.
- The study sample was very small due to a very slow response to completing the online questionnaire as well as to participate in the online FGDs. In addition, the majority of the participants was female health science students and do not represent the total population of university students, therefore results cannot be generalized.
- The study did not assess and adjust for potential confounders (e.g. computer screen usage, television viewing positions, backpack usage, desk ergonomics, mental health and physical activity).
- The questionnaire was self-reported and therefore was subject to method biases which may be affected by the tendency among respondents for social popularity.
- The study focused only on health science students from one university in the Western Cape. This calls for future research to include the entire student population to see if there is a difference between the prevalence as well as the perceptions regarding the prevention and management of text neck syndrome in health science vs students from other faculties.

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- The study was also limited to one university only. This calls for future research to be done at all the universities in South Africa to have a holistic picture of text neck syndrome in university students.

7.4 RECOMMENTDATIONS

- Future studies should include a larger cohort for more generalizable results, representing the entire student population at a university or at multiple universities.
- Attention should be directed towards the safe use of technology and increasing public awareness of the threats of excessive and potentially problematic cell phone and other hand-held device use.
- The study findings heightened the need to design preventive or advisory pamphlets or programmes, to address and reduce problematic use of cellphones and its adverse consequences in the student population as well as other populations (children, adolescents, adults).
- Text neck syndrome should be included in the undergraduate curriculum of university students as well as in the continuous training of health care professionals.

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WESTERN CAPE

REFERENCES

Aarthi, K., Prathap, L., Jothi, P.A., & Preetha, S. (2020). Nomophobia and its impact on health and mind – A structured review. *European Journal of Molecular & Clinical Medicine, (7)*1, 334-341.

Abdelhameed, A. & Abdel-Aziem, A. (2016). Exercise training and postural correction improve upper extremity symptoms among touchscreen smartphone users. *Hong Kong Physiotherapy Journal, 35*, 37-44.

Ahmed, S., Aketer, R., Pokhrel, N., & Samuel, A. (2019). Prevalence of text neck syndrome and SMS thumb among smartphone users in college going students: cross sectional survey study. *Journal of Public Health, 29*, 411 – 416.

Akhter, S., Khan, M., Ali, S.S., & Soomro, R.R. (2014). Role of manual therapy with exercise regime versus exercise regime alone in the management of non-specific chronic neck pain. *Pakistan Journal of Pharmaceutical Sciences, 27*(6 Suppl), 2125–2128.

UNIVERSITY of the
WESTERN CAPE

AlAbdulwahab, S.S., Kachanathu, S.J., & AlMotairi, M.S. (2017). Smartphone use addiction can cause neck disability. *Musculoskeletal Care, 15*(1), 10-12.

Albursan, I.S., Al Qudah, M.F., Dutton, E., Hassan, E.M.A.H., Bakhiet, S.F.A., Alfnan, A.A., Aljomaa, S.S., & Hammad, H.I. (2019). National, sex and academic discipline difference in smartphone addiction: A study of students in Jordan, Saudi Arabia, Yemen and Sudan. *Community Mental Health Journal, 55*, 825–830.

Alsiwed, K., Alserwani, R., Alshaikh, S., Howaidi, R., Aljahdali, A., Bassi, M. (2021). The prevalence of text neck syndrome and its association with smart phone use among medical

students in Jeddah Saudi Arabia. *Journal of Musculoskeletal Surgery and Research, 5*(4), 266272.

Alhassan, A.A., Alqadhib, E.M., Taha, N.W., Almutairi, A.F. (2018). The relationship between addiction to smartphone usage and depression among adults: a cross sectional study. *BMC Psychiatry* 18, 148.

Al-Hadidi, F., Bsisu, I., AlRyalat, S.A., Al-Zu'bi, B., Bsisu, R., Hamdan, M., Kanaan, T., Yasin, M., & Samarah, O. (2019). Association between mobile phone use and neck pain in university students: A cross-sectional study using numeric rating scale for evaluation of neck pain. *PloS one*, *14*(5), e0217231. https://doi.org/10.1371/journal.pone.0217231

Anna, C., Varrecchia, T., Bibbo, D., Orsini, F., Schmid, M., & Conforto, S. (2018). Effect of different smartphone uses on posture while seating and standing. 2018 IEEE International Symposium on Medical Measurements and Applications (MeMeA). https://doi.org/10.1109/memea.2018.8438686

UNIVERSITY of the
WESTERN CAPE

Aljomaa, S.S., Qudah, M.F.A., Albursan, I.S., Bakhiet, S.F., & Abduljabbar, A.S. (2016). Smartphone addiction among university students in the light of some variables. *Computers in Human Behavior, 61*, 155–164.

Apuke, O.D., Lyendo, T.O. (2018). University students' usage of the internet resources for research and learning: forms of access and perceptions of utility. *Heliyon,17,4*(12):e01052. https://doi.org/10.1016/j.heliyon.2018.e01052

Arroyo-Morales, M., Olea, N., Martínez, M.M., Hidalgo-Lozano, A., Ruiz-Rodríguez, C., & Díaz-Rodríguez, L. (2008). Psychophysiological effects of massage-myofascial release after exercise: a randomized sham-control study. *Journal of Alternative and Complementary Medicine, 14*(10), 1223–1229.

Asher, A. (2019). Could your smart phone be ruining your cervical pain spine? Retrieved August 15, 2019 from:

https://www.verywellhealth.com/is-your-smart-phone ruining-your-neck 297018

Babbie, E. & Mouton, J. (2006). The practice of social research. Cape Town, South Africa: *Oxford University Press.*

Berolo, S., Wells, R.P., & Amick, B.C. (2011). Musculoskeletal symptoms among mobile hand-held device users and their relationship to device use: a preliminary study in a Canadian university population. *Applied Ergonomics, 42*(2), 371-378.

Braun, V. & Clark, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.

Britten, N. (1995). Qualitative Research: Qualitative interviews in medical research. Retrieved January 24, 2020 from:

https://doi.org/10.1136/bmj.311.6999.251

Burns, N., & Grove, S. (2009). The practice of nursing research: Appraisal, synthesis and generation of evidence. 6th Edition, Saunders Elsevier, St. Louis.

UNIVERSITY of the WESTERN CAPE

Celenay, S.T., Akbayrak, T., & Kaya, D.O. (2016). A Comparison of the Effects of Stabilization Exercises Plus Manual Therapy to Those of Stabilization Exercises Alone in Patients With Nonspecific Mechanical Neck Pain: A Randomized Clinical Trial. *The Journal of Orthopaedic and Sports Physical Therapy*, *46*(2), 44–55.

Cha, S., & Seo, B. (2018). Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking services and games use. *Health Psychology, 5*, 2–15.

Chaudary, A.A., Aslam, F., Ali, A., Asghar, A.R., Bashir, H., & Awais, A.(2019). Frequency of text neck syndrome in medical students due to excessive usage of electronic devices. *Journal of Pakistan Orthopaedic Association, 31,* 79-82.

Chen, B., Liu, F., Ding, S., Ying, X., Wang, L., & Wen, Y. (2017). Gender differences in factors associated with smartphone addiction: A cross-sectional study among medical college students. *BMC Psychiatry, 17*, 341.

UNIVERSITY of the
WESTERN CAPE

Childs, J. D., Piva, S. R., & Fritz, J. M. (2005). Responsiveness of the numeric pain rating scale in patients with low back pain. *Spine*, *30*(11), 1331-1334.

Cho, J., Lee, E., & Lee, S. (2017). Upper thoracic spine mobilization and mobility exercise versus upper cervical spine mobilization and stabilization exercise in individuals with forward head posture: a randomized clinical trial. *BMC Musculoskeletal Disorders, 18*(1), 525.

Chu, E.C. (2022). Preventing the progression of text neck in a young man: A case report. *Radiology Case Report, 17*(3), 978-982.

Chung, S., & Jeong, Y.G. (2018). Effects of the craniocervical flexion exercise and isometric neck exercise compared in patients with chronic pain: a randomised controlled trial. *Physiotherapy Theory and Practice, 34*(12), 1-10.

Creswell, J.W. & Plano Clark, V.L. (2011). Designing and Conducting Mixed Method Research. 2nd ed. Thousand Oaks, CA: Sage.

Damasceno, G.M., Ferreira, A.S., Nogueira, L.A.S., Reis, F.J.J., Andrade, I.C.S., & Meziat-Filho, N. (2017). Text neck and neck pain in 18–21-year-old young adults. *European Spine Journal, 2*, 1249–1254.

Deniz, H.M., & Geyik, K.S. (2015). An Embirical Research of Global Internet usage patterns of Undergraduate students. *Procedia Social and Behavioural Sciences, 195*, 895-904.

De Vos, A.S. (2002). Research at Grass Roots, for the social sciences and human service professions (2nd eds). Pretoria: Van Schaik Publishers.

UNIVERSITY of the
WESTERN CAPE

Dewitt, D. (2018). How does text neck cause pain? Retrieved October 26, 2019 from: https://www.spine-health.com/conditions/neck-pain/how-does-text-neck-cause-pain

Digital 2019: Global digital overview (2019), available from:
https://datareportal.com/reports/digital-2019-global-digital-overview

Duerson, M.H. (2012). We're addicted to our phones: 4% worldwide say they couldn't go a single day without their mobile device in their hand. Retrieved August 16, 2019 from:
https://www.nydailynews.com/life-style/addicted-phones-84-worldwide-could-single-day-mobile-device-hand-article-1.1137811

Eitivipart, A.C., Viriyarojanakul, S., Redhead, L. (2018). Musculoskeletal disorder and pain associated with smartphone use: A systematic review of biomechanical evidence. *Hong Kong Physiotherapy Journal*, 38(2), 77-90.

Elsiddig, A.I., Altalhi, I.A., Althobaiti, M.E., Alwethainani, M.T., & Alzahrani, A.M. (2022). Prevalence of neck and shoulder pain among Saudi universities' students who are using smartphones and computers. *Journal of Family Medicine and Primary Care, 11*(1), 194-200.

Ferraz, M.B., Quaresma, M.R., Aquino, L.R., Atra, E., Tugwell, P., & Goldsmith, C.H. (1990). Reliability of pain scales in the assessment of literate and illiterate patients with rheumatoid arthritis. *The Journal of Rheumatology*, *17*(8), 1022-1024.

Ferreira, M.L., Borges, B. M., Rezende, I.L., Carvalho, L.P., Soares, L.P., Dabes, R.A.I., ... & Ferreira, P.H. (2010). Are neck pain scales and questionnaires compatible with the international classification of functioning, disability and health? A systematic review. *Disability and Rehabilitation*, *32*(19), 1539-1546.

UNIVERSITY of the
WESTERN CAPE

Galassi, G., Genovese, M., Ariatti, A., & Malagoli, M. (2018). "Text-Neck "- an epidemic of the modern era of cellphones? *The Spine Journal, 18,* 712-715.

Greig, A.M., Straker, L.M., & Briggs, A.M. (2005). Cervical erector spinae and upper trapezius muscle activity in children using different information technologies. *Physical Therapy*, *91*, 119-126.

Grove, S.K., Burns, N., & Gray, J. (2012). *The practice of nursing research: appraisal, synthesis, and generation of evidence*. Elsevier Health Sciences.

Guan, X., Fan, G., Wu, X., Zeng, Y., Su, H., Gu, G., Zhou, Q., Gu, X., Zhang, H., & He, S. (2015). Photographic measurement of head and cervical posture when viewing mobile phone: a pilot study. *European Spine Journal, 24*, 2892-2898.

Guloglu, S.B., & Yalcin, U. (2021). The Effect of Smartphone Addiction on Neck Pain and Disability in University Students. *Kafkas Journal of Medical Science, 11*(2), 225–230.

Gustafsson, E. (2012). Ergonomic recommendations when texting on mobile phones. *Work, 41(Suppl 1),* 5705-5706.

Hakala, P.T., Rimpela, A.H., Saarni, L.A., & Salminen, J.J. (2006). Frequent computer-related activities increase the risk of neck, shoulder and low back pain in adolescents. *European Journal of Public Health, 16*(5), 536-541.

UNIVERSITY of the
WESTERN CAPE

Hamel, K.W., & Carpenter, C. (2004). *Qualitative research in evidence-based rehabilitation* (pp. 1-13). Edinburgh, Scotland: Churchill Livingstone.

Hansraj, K.K. (2014). Assessment of stresses in the cervical spine caused by posture and position of the head. *Surgical Technology International, 25*, 277-279.

Hoy, D., March, L., Woolf, A. et al. (2014). The global burden of neck pain: estimates from the Global Burden of Disease 2010 Study. *Annals of the Rheumatic Diseases, 73*, 1309-1315.

Israel, D. G. (1992). Determining sample size. University of Florida, PEOD6

International Association for the Study of Pain (2019) IASP's Proposed New Definition of Pain Released for Comment. Accessed January 24, 2020 from:

https://www.iasp-pain.org/PublicationsNews/NewsDetail.aspx?ItemNumber=9218

Jakarta (2019). Your smartphone might be the cause of your neck pain. Retrieved January 18, 2020 from:

https://www.thejakartapost.com/amp/life/2019/01/18/your-smartphone-might-be-the-cause-of-your-neck-pain-new-study-says.html

Jung, S., Lee, N., Kang, K., Kim, K. & Lee, D. (2016). The effect of smartphone usage time on posture and respiratory function. *The Journal of Physical Therapy Sciences, 28,* 186-189.

Karjewska-Kulak, E., Kulak, W., Stryztals, A., Prokopowicz, W., & Marcinkowski, J.T. (2018). Problematic mobile phone using among the Polish and Belarusian university students, a comparative study. *Progress in Health Sciences, 2,* 45–50.

Karsay, K., Schmuck, D., Matthes, J., & Stevic, A. (2019). Longitudinal effects of excessive smartphone use on stress and loneliness: the moderating role of self-disclosure. *Cyberpsychology, Behaviour, and Social Networking, 22*, 706 – 713.

Kendall, F., et al. (2005). Muscle testing and function with posture and pain. 5th Edition, Lippincott Williams & Wilkins Publisher, Philadelphia.

UNIVERSITY of the WESTERN CAPE

Khadim, I., Tanveer, F., Ahmad, A. & Gillani, S.A. (2018). Association between neck pain and functional disability among nurses. *Rawal Medical Journal, 43*(2), 242-244.

Khan, A.F., Gillani, S.F., Khan, A.F., & Wahid, A. (2018). Are you suffering pain neck due to smartphone text neck syndrome? *Pakistan Journal of Medical and Health Sciences, 12*(3), 1095-1097.

Khan, F., Waqa, A., & Niazi, S. (2020). Text neck syndrome among students of medical and dental college in Lahore. *Journal of Sharif Medical and Dental College, 6*(1), 5-8.

Kim, H.J., & Kim, J.S. (2015). The relationship between smartphone use and subjective musculoskeletal symptoms and university students. *Journal of Physical Therapy Science, 27,* 575-579.

Kim, J., Kim, S., Shim, J., Kim, H., Moon, S., Lee, N., Lee, M., Jin, E., & Choi, E. (2018). Effects of McKenzie exercise, Kinesio taping, and myofascial release on the forward head posture. *Journal of Physical Therapy Science, 30*(8), 1103-1107.

UNIVERSITY of the
WESTERN CAPE

Kim, D., Kim, C., & Son, S. (2018). Neckpain in adults with forward head posture: Effects of cranio vertebral angle and cervical range of motion, *Osong Public Health and Research Perspectives, 9*(6), 309–313.

Kiran, S., Sanjana, J.S., & Reddy Naik, J. (2018). Mobile phone addiction: Symptoms, impacts and causes - A review. In Proceedings of the International Conference on Trends in Industrial & Value Engineering, Business and Social Innovation ICIVBS-2018, Bangalore, India, 4 April, 81–86.

Kong, Y.S., Kim, Y.M., & Shim, J.M. (2017). The effect of modified cervical exercise on smartphone users with forward head posture. *Journal of Physical Therapy Science, 29*(2), 328331.

Krueger, R.A. & Casey, M.A. (2009). Focus groups: A Practical Guide for Applied Research 4th Ed. Thousand Oaks, CA: Sage publications.

Kumar, R., Kumari, S., Bharti, P., & Sharma, D. (2021). Nomophobia: A rising concern among Indian students. *Industrial Psychiatry Journal, 30*(2), 230-233.

Kumari, S., Kumar., R., Sharma., D. (2021). Text Neck Syndrome - The pain of Modern Era. *International Journal of Health Science and Research, 11*(11), 161-165.

Kutty, N.A.M. (2019). Text neck: a global epidemic of the modern era. *Yoga Physical Therapy, 4*(1), 14-16.

UNIVERSITY of the
WESTERN CAPE

Kwon, M. Lee, J.Y., Won, W.Y., Park, J.W., Min, J.A., & Hahn. C. (2013). Development and validation of a smartphone addiction scale (SAS). *PLoS One* 2013; 8: e56936.

Lau, K.T., Cheung, K.Y., Chan, M.H., Lo, K.Y., Chiu, T.T.W. (2010). Relationships between sagittal postures of thoracic and cervical spine presence of neck pain, neck pain severity and disability. *Manual Therapy, 15(*5), 457-462.

Lediga, S.M. (2018). The use of handheld mobile devices: An exploratory study of English language student educators. Unpublished thesis, University of Limpopo.

Lee, S., Kim, M., Medoza, J.S. & McDonough, I.M. (2018). Addicted to cellphones: exploring the psychometric properties between nomophobic questionnaire and obsessiveness in college students. *Heliyon, 4*(11), e00895.

Levin, K. (2006). Study design III: Cross-sectional studies. *Evidence Based Dentistry, 7*, 24 - 25.

Lin, Y-H., Lin, Y-C., Lee, Y-H., Lin, P-H., Lin, S-H., Chang, L-R., Tseng, H-W., Yen, L-Y., Yang, C.C.H. & Kuo, T.B.J. (2015). Time distortion associated with smartphone addiction: identifying smartphone addiction via a mobile application. *Journal of Psychatristic Research, 65*,139-145.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. SAGE Publications Inc.

Lopez-Fernandez, O. (2017). Short version of the smartphone addiction scale adapted to Spanish and French: towards a cross-cultural research in problematic mobile phone use. *Addictive Behavior, 64*, 275–80.

Louw, S., Makwela, S., Manas, L., Meyer, L., Terblanche, D., & Brink, Y. (2017). Effectiveness of exercise in office workers with neck pain: A systematic review and meta-analysis. *The South African Journal of Physiotherapy, 73*(1), a392.

Mendoza, J.S., Pody, B.C., Lee, S., Kim, M., & McDonough, I.M. (2018). The effect of cellphones on attention and learning: The influences of time, distraction, and nomophobia. *Computers in Human Behavior, 86*, 52–60.

UNIVERSITY of the WESTERN CAPE

Mustafaoglu, R., Yasaci, Z., Zirek, E., Griffiths, M.D., & Ozdincler, A.R. (2021). The relationship between smartphone addiction and musculoskeletal pain prevalence among young population: a cross-sectional study. *Korean Journal of Pain, 34*(1), 72-81.

Namvar, H., Olyaei, G., Moghadam, B.A., & Hosseinifar, M. (2016). Effect of myofascial release technique on pain, disability, maximum isometric contraction of the extensor muscles and pressure pain threshold in patients with chronic non-specific neck pain: Double blinded randomized clinical trial. *International Journal of Medical Research of Health Sciences,* (5), 7s, 500-506.

Neumann, D. A. (2013). *Kinesiology of the musculoskeletal system-e-book: foundations for rehabilitation*. Elsevier Health Sciences.

Neupane, S., Ali, U., & Mathew, A. (2017). Text Neck Syndrome - Systematic Review. *Imperial Journal of Interdisciplinary Research, 3*(7), 141-148.

Nitsure, P., & Welling, A. (2014). Effect of Gross Myofascial Release of Upper Limb and Neck on Pain and Function in Subjects with Mechanical Neck Pain with Upperlimb Radiculapathy: A Clinical Trial. *Journal of International Dental and Medical Research, 1*(3), 8-16.

North, K., Johnston, K., & Ophoff, J. (2014). The Use of Mobile Phones by South African Students. *Informing Science and Information Technology, 11*, 115-138.

O'Dea, S. (2020). Number of smartphone users in South Africafrom 2014-2023. Retrieved July 15, 2022 from:

https://www.statista.com/statistics/488376/forecast-of-smartphone-users-in-south-africa/

UNIVERSITY of the
WESTERN CAPE

Okuro, R.T., Morcillo, A.M., Riberiro, M.A., Sakano, E., Conti, P.B., & Ribeiro, J.D. (2011). Mouth breathing and forward head posture: effects on respiratory biomechanics and exercise capacity in children. *The Brazilian Journal of Pulmonology, 37,* 471-479.

Patel, H., Elkman, I., Spertus, J.A., Wasserman, S.M. & Persson, L. (2008). Psychometric properties of a Swedish version of the Kansas City Cardiomyopathy in a Chronic Heart Failure population. *European Journal of Cardiovascular Nursing,* 7, 214-221.

Pera, A. (2020). The psychology of addictive smartphone behavior in young adults: problematic use, social anxiety, depressive stress. *Frontiers in Psychiatry, 11*, article 573473.

Physiopedia -What is TextNeck (2021). available from: https://www.physio-pedia.com/Text_Neck

Physiopedia - Surfers Neck (2019). available from: https://www.physiopedia.com/Surfer's_Neck?utm_source=physiopedia&utm_medium=related_articles&utm_campaign=ongoing_internal

Polit, D.F. & Beck, C.T. (2003). Nursing research Principles and Methods. 7th Ed, Lippincott Williams and Wilkins, Philadelphia.

Polit, D.F., & Hungler, B.P. (2013). Essentials of nursing research: Methods, appraisal and utilization (8th eds), Philadelphia: Lippincott Williams and Wilkins.

Reiter, B. (2017). Theory and Methodology of Exploratory Social Science Research. *International Journal of Sciences and Research Methodology*, *5*(4), 129-150.

UNIVERSITY of the WESTERN CAPE

Reuters, T. (2017). Smartphone -related neck pain on the increase. Retrieved April 14, 2019 from:

https://www.cbc.ca/news/health/text-neck-study-1.4071191

Rodríguez-Fuentes, I., De Toro, F.J., Rodríguez-Fuentes, G., de Oliveira, I.M., Meijide-Faílde, R., & Fuentes-Boquete, I.M. (2016). Myofascial release therapy in the treatment of occupational mechanical neck pain: a randomized parallel group study. *American Journal of Physical Medicine and Rehabilitation, 95*(7), 507-515.

Samani, P.P., Athavale, N.A., Shyam, A., & Sancheti, P K. (2018). Awareness of text neck syndrome in young-adult population. *International Journal of Community Medicine and Public Health, 5*(8), 3335-3339.

Sreenivas, R. & Philip, L. (2019). Impact of nomophobia and mobile addiction among undergraduate students in Bangalore. *International Journal of Scientific Research and Reviews, 7,* 989–1008.

So, B.C.L., Cheng, A.S.K., & Szeto, G.P.Y. (2017). Cumulative IT Use Is Associated with Psychosocial Stress Factors and Musculoskeletal Symptoms. *International Journal of Environmental Research and Public Health, 14*(12), 1541.

Shah, P., & Sheth, M. (2018). Correlation of smartphone use addiction with text neck syndrome and SMS thumb in physiotherapy students. *International Journal of Community Medicine and Public Health, 5*(6), 2512-2516.

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WESTERN CAPE

Sharan, D., Mohandoss, M., Ranganathan, R., & Jose, J. (2014). Musculoskeletal disorders of the upper extremities due to extensive usage of hand held devices. *Annals of Occupational and Environmental Medicine, 26,* 22.

Titilope, A.O. (2014). Socio-psychological dimensions of mobile phone addiction and usage patterns amongst teenagers in higher institutions of learning in Kwara State. *International Journal of Information and Communication Technology Education*, *10* (2), 1-13.

Toh, S.H., Coenen, P., Howie, E.K., & Starker, L.M. (2017). The associations of mobile touch screen device use with musculoskeletal symptoms and exposures: A systematic review. PLoS One, 12(8):e0181220.

Techopedia (2015). What does handheld mean? Available from: *https://www.techopedia.com/definition/16322/handheld*

Van Teijlingen, E., & Hundley, V. (2001). The Importance of Pilot Studies. *Social Research Update,* 35, 1–4.

Vate-U-Lan, P. (2015). Text Neck epidemic: a growing problem for smart phone users in Thailand. *International Journal of Computer Internet Management, 23*(3), 55-61.

Vernon, H., & Mior, S. (1991). The Neck Disability Index: a study of reliability and validity. *Journal of Manipulative and Physiological Therapeutics*, *14*(7), 409-15.

Visser, B., & Van Dieën, J.H. (2006). Pathophysiology of upper extremity disorders. *Journal of Electromyography and Kinesiology, 16*, 1-16.

UNIVERSITY of the WESTERN CAPE

Wacks, Y. & Weinstein, A.M. (2021). Excessive Smartphone Use Is Associated With Health Problems in Adolescents and Young Adults. *Frontiers in Psychiatry, 12*, article 669042. https://doi:10.3389/fpsyt.2021.669042

Wallace, K. (2016). Half of Teens Think they're Addicted to their Smartphones. *CNN, Turner Broadcasting.* Retrieved February 17, 2020 from: https://edition.cnn.com/2016/05/03/health/teens-cell-phone-addiction-parents/index.html

Woo, E.H., White, P., & Lai, C.W (2016). Ergonomics standards and guidelines for computer workstation design and the impact on users' health - a review. *Ergonomics*, *59*(3), 464-475.

Weinstein, A.M., Feder, K., Rosenberg, K., & Dannon. P. (2014). Internet addiction- criteria evidence and treatment. In: Rosenberg KP, Feder CL, editors. Behavioral Addictions: Criteria, Evidence and Treatment. Burlington Elsevier Science USA, p. 99–117.

Xie, Y., Szeto, G., & Dai, J. (2017). Prevalence and risk factors associated with musculoskeletal complaints among users of mobile handheld devices: A systematic review. *Applied Ergonomics*, *59*, 132–142. https://doi.org/10.1016/j.apergo.2016.08.020

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Yildirim, C., & Correia, A-P. (2015). Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. *Computers in Human Behaviour, 49,* 130-137.

Yilmaz, D., Çinar, H.G., & Özyazıcıoğlu, N. (2017). The Examination of Relationship between Smart Phone, Internet Addiction and Upper Extremity Fuctional Activity Levels among Nursing Students. *SDÜ Journal of Health Science, 8*(3), 34–39.

Yu-Yang, S., Chen, M., Huang, Y., Lin, C., & Chang, J. (2017). *Association between smartphone use and musculoskeletal discomfort in adolescent student. Journal of Community Health, 42,* 423 - 430.

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25 May 2020

Ms JI Irudayaraj
Physiotherapy
Faculty of Community and Health Sciences

Ethics Reference Number: BM20/4/8

Project Title: Text neck syndrome in undergraduate health science students from a university in the Western Cape: a cross-sectional study.

Approval Period: 15 May 2020 – 15 May 2023

I hereby certify that the Biomedical Science Research Ethics Committee of the University of the Western Cape approved the scientific methodologyand ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report annually by 30 November for the duration of the project.

Permission to conduct the study must be submitted to BMREC for record-keeping.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Director: Research Development
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Appendix B

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INFORMATION SHEET

Research Title: **Text neck syndrome in undergraduate health science students from a university in the Western Cape: a cross-sectional study.**

What is this study about?

This study is being conducted by **Jeeva Immaculate IRUDAYARAJ,** a Masters student at the University of the Western Cape, South Africa. The purpose of this research is to determine the prevalence of text neck syndrome and its relationship with pain and functional impairement, the degree of cellphone addiction as well as to explore the perceptions regarding the prevention and management of text neck syndrome in undergraduate health science students. The results of the study could provide valuable information that can be used to assist with the development of measures to prevent the detrimental effects of text neck syndrome and increase the awareness thereof.

What will I be asked to do if agree to participate?

You will be asked to:

- Complete a self-administered questionnaire regarding your socio-demographic information, self-reported mobile phone addiction, the effect of neck pain on a range of functional activities as well as your neck pain intensity. The completion of the questionnaire will take approximately 15 minutes.
- Participate in a focus group organised by the researcher. The focus group discussion will be recorded after you have signed the consent form. The focus group discussion will take about 30 to 45 minutes. The information from the tapes will help the researcher to comprehend what transpired in the discussion.

Will my participation in this study be kept confidential?

Your participation in this study will be kept confidential at all times and to help enhance this confidentiality, the following measures have been put up.

- **Questionnaires** will not contain any information that will identify you personally as your name will not be included. Only codes known to the researcher will be used for identification purposes. The researcher will be the only one who will have access to this information. The data collected will be stored in a locker only accessible to the researcher.
- **Focus group discussions**: Confidentiality is dependent on your fellow participants. However, all participants will sign a focus group confidentiality binding form. From the researcher's point, your name will not be included in the recordings and the typed documents. Only codes will be used to identify you. All the tapes will be destroyed

once the data has been transcribed and documented. The transcribed verbatim data will be stored on a password protected computer of which only the researcher will have access to and discard after five years.

If a report or article about this study is published, your identity will be protected as Pseudonyms will be used to protect participants' identities when results are published.

What are the risks of this research?
Minimal risks are anticipated in this study. However, all human interactions and talking about one's experience or just the profession at large carry some amount of risk. Risks will be reduced by encouraging each participant to respect each other's opinion during the discussion. Any sensitive issues or questions which may arise from the study and could affect the participant will be observed and carefully handled accordingly or referred to an expert for appropriate attention.

What are the benefits of this study?
This research is not designed to benefit you personally but your participation and the results of this study will help the researcher to learn more about text neck syndrome. The information will be used to help with the development of prevention strategies based on the results of this study. Furthermore, this study may serve as an area of further research based on the findings.

Do I have to be a part of this research and can I withdraw my participation at any time?
You are free to decide whether or not to take part in this study. If you decide to participate, you are free to withdraw from the study at any time and you will not to penalised in anyway.

What if I have questions?
This research is being conducted by **Mrs. Jeeva Irudayaraj** at the University of the Western Cape. If you have any questions about the research study itself, please contact myself at: jovanjeeva@gmail.com, or the study supervisor, Dr Tania Steyl at tsteyl@uwc.ac.za. Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

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Appendix C

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CONSENT FORM

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

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Participant's name……..

Participant's signature……..

Date……

Biomedical Research Ethics Committee

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Appendix D
ID code……

QUESTIONNAIRE

INSTRUCTIONS: Please tick in the box for your best response.

SOCIO-DEMOGRAPHIC PROFILE

Q1. Age of the participant in years: …….

Q2. Gender of the participant: male ☐ female ☐

Q3. Year of study: 1st ☐ 2nd ☐ 3rd ☐ 4th ☐ Other……

Q4. Current course: …….

Q5. Hobbies: Yes ☐ No ☐ If yes, specify…….

NOMOPHOBIA QUESTIONNAIRE

Based on your current situation, to what extent do you agree with the following statements?

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Items		Strongly Disagree						Strongly agree
Q6.	I would feel uncomforatble without constant access to information trought my smartphone.	1	2	3	4	5	6	7
Q7.	I would be annoyed if I could not look information up om my smartphone when I wanted to do so.	1	2	3	4	5	6	7
Q8.	Being unable to get the news (e.g. happenings, weather, etc.) om my smartphone would make me nervous.	1	2	3	4	5	6	7
Q9.	I would be annoyed if I could not use my smartphone and/or its capabilities when I wanted to do so.	1	2	3	4	5	6	7
Q10.	Running out of battery in my smartphone would scare me.	1	2	3	4	5	6	7
Q11.	If I were to run out of credits or hit my monthly data limit, I would panic.	1	2	3	4	5	6	7
Q12.	If I did not have a data signal or could not connect to Wi-Fi, then I would constantly check to see if I had a signal or could find a Wi-Fi network.	1	2	3	4	5	6	7
Q13.	If I could not use my smartphone, I would be afraid of getting stranded somewhere.	1	2	3	4	5	6	7

Q14.	If I could not check my smartphone for a while, I would feel a desire to check it.	1	2	3	4	5	6	7
Q15.	If I did not have my smartphone with me, I would feel anxious because I could not instantly communicate with my family and/or friends.	1	2	3	4	5	6	7
Q16.	If I do not have my smartphone with me, I would be worried because my family and/or friends could not reach me.	1	2	3	4	5	6	7
Q17.	If I did not have my smartphone with me, I would feel nervous because I would not be able to receive text messages and calls.	1	2	3	4	5	6	7
Q18.	If I did not have my smartphone with me, I would be anxious because I could not keep in touch with my family and/or friends.	1	2	3	4	5	6	7
Q19.	If I did not have my smartphone with me, I would be nervous because I could not know if someone had tried to get hold of me.	1	2	3	4	5	6	7
Q20.	If I did not have my smartphone with me, I would feel anxious because my constant connection to my family and friends would be broken.	1	2	3	4	5	6	7
Q21.	If I did not have my smartphone with me, I would be nervous because I will be disconnected from my online identity.	1	2	3	4	5	6	7
Q22.	If I did not have my smartphone with me, I would be uncomfortable because I could not stay up-todate with social media and online networks.	1	2	3	4	5	6	7
Q23.	If I did not have my smartphone with me, I would feel awkward because I could not check my notifications for updates from my connections and online networks.	1	2	3	4	5	6	7
Q24.	If I did not have my smartphone with me, I would feel anxious because I could not check my email messages.	1	2	3	4	5	6	7
Q25.	If I did not have my smartphone with me, I would feel weird because I would not know what to do.	1	2	3	4	5	6	7

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NUMERICAL PAIN RATING SCALE (NPRS)

Choose only ONE score (0-10) that indicates your pain intensity.

Q26.

Severity score		**Description of experience**
10	**Unable to move**	I am in bed and can't move due to my pain. I need someone to take me to the emergency room to get help for my pain.
9	**Severe**	My pain is all that I can think about. I can barely talk or move because of the pain.
8	**Intense**	My pain is so severe that it is hard to think of anything else. Talking and listening are difficult.

7	**Unmanageable**	I am in pain all the time. It keeps me from doing most activities.
6	**Distressing**	I think about my pain all the time. I give up many activities because of my pain.
5	**Distracting**	I think about my pain most of the time. I cannot do most of the activities I need to do each day because of the pain.
4	**Moderate**	I am constantly aware of my pain but I can continue most activities.
3	**Uncomfortable**	My pain bothers me but I can ignore it most of the time.
2	**Mild**	I have a low level of pain. I am aware of my pain only when I pay attention to it.
1	**Minimal**	My pain is hardly noticeable.
0	**No pain**	I have no pain.

NECK DISABILITY INDEX (NDI)

The following questions will give us information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the ONE box that applies to you.

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Q27 SECTION 1: PAIN INTENSITY

- □ I have no pain at the moment.
- □ The pain is very mild at the moment.
- □ The pain is moderate at the moment.
- □ The pain is fairly severe at the moment.
- □ The pain is very severe at the moment.
- □ The pain is the worst imaginable at the moment.

Q28 SECTION 2: PERSONAL CARE (WASHING, DRESSING ETC.)

- □ I can look after myself normally without causing extra pain.
- □ I can look after myself normally but it causes extra pain.
- □ It is painful to look after myself and I am slow and careful.
- □ I need some help but can manage most of my personal care.
- □ I need help every day in most aspects of self care.
- □ I do not get dressed, I wash with difficulty and stay in bed.

Q29 SECTION 3: LIFTING

□ I can lift heavy weights without pain.

□ I can lift heavy weights but it gives extra pain.

□ Pain prevents me lifting heavy weights off the floor, but I can manage if they are conveniently placed, for example on a table.

□ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.

□ I can only lift very light weights.

□ I cannot lift or carry anything.

Q30 SECTION 4: READING

□ I can read as much as I want to with no pain in my neck.

□ I can read as much as I want to with slight pain in my neck.

□ I can read as much as I want to with moderate pain in my neck.

□ I can't read as much as I want to because of moderate pain in my neck.

□ I can hardly at all because of severe pain in my neck.

□ I cannot read at all.

Q31 SECTION 5: HEADACHES

□ I have no headaches at all.

□ I have slight headaches, which com infrequently.

□ I have moderate headaches, which come infrequently.

□ I have moderate headaches, which come frequently.

□ I have severe headaches, which come frequently.

□ I have headaches almost all the time.

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Q32 SECTION 6: CONCENTRATION

□ I can concentrate fully when I want to with no difficulty.

□ I can concentrate fully when I want to with slight difficulty.

□ I have a fair degree of difficulty in concentrating when I want to.

□ I have a lot of difficulty in concentrating when I want to.

□ I have a great deal of difficulty in concentrating when I want to.

□ I cannot concentrate at all.

Q33 SECTION 7: WORK

□ I can do as much work as I want to.

□ I can only do my usual work, but no more.

□ I can do most of my usual work, but no more.

□ I cannot do my usual work.

□ I can hardly do any work at all.

□ I can't do any work at all.

Q34 SECTION 8: DRIVING

□ I can drive my care without any neck pain.

□ I can drive my care as long as I want with slight pain in my neck.

□ I can drive my care as long as I want with moderate pain in my neck.

□ I can't drive my care as long as I want because of moderate pain in my neck.

□ I can hardly drive at all because of severe pain in my neck.

□ I can't drive my care at all.

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Q35 SECTION 9: SLEEPING

□ I have no trouble sleeping.

□ My sleep is slightly disturbed (less than 1 hour sleepless).

□ My sleep is mildly disturbed (1-2 hours sleepless).

□ My sleep is moderately disturbed (2-3 hours sleepless).

□ My sleep is greatly disturbed (3-5 hours sleepless).

□ My sleep is completely disturbed (5-7 hours sleepless).

Q36 SECTION 10: RECREATION

□ I am able to engage in all my recreation activities with no neck pain at all.

□ I am able to engage in all my recreation activities with some neck pain at all.

□ I am able to engage in most, but not all of my usual recreation activities because of pain in my neck.

□ I am able to engage in a few of my usual recreation activities because of pain in my neck.

□ I can hardly do any recreation activities because of pain in my neck.

□ I can't do any recreation activities at all.

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THANK YOU FOR PARTICIPATING IN THE RESEARCH

Appendix E

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FOCUS GROUP CONFIDENTIALITY BINDING FORM

Research Title: Text neck syndrome in undergraduate health science students from a university in the Western Cape: a cross-sectional study.

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way. I hereby agree to uphold the confidentiality of the discussions in the focus group by not unveiling the identity of other participants or any aspects of their contributions to members outside of the group.

I agree to be audiotaped during my participation in this study I do ☐

not agree to be audiotaped during my participation in this study ☐

UNIVERSITY of the WESTERN CAPE

Participant's name……..

Participant's signature……

Date……

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Appendix F

FOCUS GROUP GUIDE

Introduction

Hello everyone, my name is Jeeva Immaculate IRUDAYARAJ. Thank you for accepting to take part in this research. I will be leading the discussion and would like to encourage you all to participate fully and to be as interactive as possible in this discussion.

You are reminded not to use your real names or anything that will identify you or other. Please be honest in sharing your perception regarding the prevention and management of text neck syndrome as these will help me to make better recommendations. During this interview, there will be times when I will ask follow up questions to seek clarity.

Do you have any questions before we start? With your permission, I would like to turn on the tape recorder and begin the focus group.

1. In your own words, how would you describe text neck syndrome?
2. What would you say can be done to prevent text neck syndrome?
3. What would you say can be done to manage of treat the symptoms of text neck syndrome?
4. What are the challenges, if any, you think people with text neck might face in the prevention the syndrome?
5. What are the challenges, if any, you think people with text neck syndrome might face in the management of their symptoms?
6. Anything else you want to add to our discussion regarding the topic?

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