An epidemiological investigation of neck pain in the white population in the greater Durban area.

By

Warren Neville Slabbert

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I, Warren Neville Slabbert, do declare that this dissertation is representitive of my own work in both conception and execution.

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Warren Neville Slabbert **Date**

Approved for final submission by:

_____ _____

Dr. V. Boodhoo **Date**
M. Tech: Chiropractic
Supervisor

_____ _____

Dr. C. Korporaal **Date**
M. Tech: Chiropractic
Co-Supervisor

Dedication

I dedicate this dissertation to my parents for all that they have done for me in my life. You both are the most amazing people and have given me everything. Thank you for all your loving support.

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My parents Neville and Wendy – Thank you so much for all your love and support through my years of studying. All that I am today is thanks to your devotion and encouragement in everything I do. You truly are the most amazing parents.

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Abstract

The aim of this study was to determine the prevalence of and risk factors for neck pain in the white population in the greater Durban area. The rational for this study was that there have been few epidemiological studies done on neck pain and even less when concerning different population groups. Discrepancies between population groups have been found in various pain related studies. The present epidemiological study eliminated any possible variables between population groups by studying only the white population in a specific geographical area (Durban). Therefore, physicians treating people with neck pain should use the risk factors that were established in this and other studies and integrate them in their treatment protocol.

The study was conducted at three shopping centres around Durban that were randomly selected. Each shopping centre was grouped by the socio-economic status of the surrounding suburbs. There were 900 participants surveyed at three shopping centres by means of a questionnaire. The data were then statistically analysed using SPSS version 15.

It was found that the overall prevalence of neck pain was 45%. The participants in this study that had neck pain were more likely to be females that were married or previously married, had a job that caused their heads to turn or to work with their arms above their heads. Lifestyle factors included one or a combination of the following: lead a stressful lifestyle, were emotional, had perceived bad posture, had previously experienced neck or head trauma, slept in awkward positions, watched television, required glasses and did not play squash.

Key terms:

Neck pain, chiropractic, epidemiology, risk factors, population, prevalence.

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Chapter 1

Introduction

1.1 Introduction

Neck pain is a feeling of distress normally from the occipit to the third thoracic vertebrae (Dorland's Pocket Medical Dictionary, 2001 and Côté, Cassidy, Carroll and Kristman, 2004), which, according to Wiesel, Boden, Borenstein and Feffer (1992) can present as either acute or chronic (over 6 months).

Neck pain has been shown to have a number of implications, which include absenteeism (Côté, Kristman, Vidmar, Van Eerd, Hogg-Johnson, Beaton and Smith, 2009 and Bostick, Ferrari, Carroll, Russell, Buchbinder, Krawciw and Gross, 2009), disability (Borghoutsa, Koesa, Vondelinga and Boutera 1999. and Cote *et al.,* 2009) and costs (Borghouts *et al.,* 1999). This supports Lee (1994) who observed that musculoskeletal disorders had a major impact on society by causing limited activity and long term disability and van den Heuvel (2007) who stated that neck pain can cause loss of work hours, decreased production and absenteeism.

According to literature there are various demographical, physical and psychosocial factors affecting neck pain (Croft, Lewis, Papageorgiou, Thomas, Jayson, Macfarlane and Silman, 2001). On a search of web sites, data bases, journal articles and the Durban University of Technology institutional repository there is only one unpublished study that focused on the factors affecting neck pain in the indigenous black population in the greater Durban area (Ndlovu, 2006) and none on the causes and factors affecting neck pain in the South African white population. Literature indicates that Race groups perceive and interpret pain differently (Portenoy, Ugarte, Fuller and Haas, 2004).

Gore (1998) stated that neck pain affects 10% of the general population at any given time. This level is supported by Cote *et al*., (2004) in their study on

the incidence and course of neck pain where they determined that the prevalence of neck pain was 14.6%.

Chiu, Ku, Lee, Sum, Wan, Wong and Yuen (2004) observed that neck pain was more common in females than males. Similarly, Ndlovu (2006) observed that indigenous African women were affected by neck pain more than their male counterparts. Furthermore, she found that neck pain increased with advancing age.

Neck pain, according to Drews' (1995) unpublished study, was just as common as back pain. This was later contradicted by Gore (1998) who observed that lower back pain is more common. This discrepancy validates the need for further research on the prevalence of neck pain.

There are many suggested and known risk factors for neck pain as detailed in Table 1.

Table 1 Known and suggested risk factors for neck pain

Demographics	Physical	Psychosocial
• Gender • Age • Lifestyle	Posture related: • Poor work habits • Poor posture • Sleeping prone • Reading in bed • Prolonged sitting • Twisting and bending of the neck and trunk Work related: • Poor work station ergonomics • Poor arm posture and support • Strenuous work with the arms • Hand-arm vibration stresses • Prolonged immobility of the head Poor conditioning: • Lack of exercise • Strenuous activity	Emotional factors: • Stress • Anxiety • Mood Social factors: • High quantitative jobs • Low co-worker support • Low socio-economic status

The risk factors mentioned in Table 1 (Lau, Sham and Wong, 1996; Murphy, 1999; Linton, 2000; Fox, Edwards and Palmer, 2000; Ariëns, van Mechelen, Bongers, Bouter and van der Wal, 2000; Ariëns, Bongers, Hoogendoorn, Houtman, van der Wal and van Mechelen, 2001 and Hush, Maher and Refshauge, 2006) should be taken into consideration for South Africans because, there are demographical, physical and psychosocial factors that may differ from international norms. Risk factors indigenous to the area of the subjects must also be considered.

Ndlovu (2006) observed that neck pain occurred in 50% of the indigenous African population, which is similar to Drews' (1995) observations of a 54% occurrence. Drews' (1995) results however, were not limited to any specific population group in 17 chiropractic clinics.

According to the international ethical guidelines for epidemiological studies that were prepared by the Council for International Organisations of Medical Sciences (CIOMS) in collaboration with the World Health Organisation (WHO), it is ethically justifiable to perform epidemiological studies as there is a need to discover methods to improve the health in different populations, groups and individuals (WHO, 2008).

Cote *et al.,* (2004) concluded in their study that there is limited current knowledge on the epidemiology of neck pain. This statement supports Lau, Sham and Wong (1996) who said that further epidemiological studies would be worth while as there is little information on the role of occupational activities as a cause for neck pain. Lau, Sham and Wong (1996) also made the comment that their study was different to those studies done elsewhere in the world because of the different population group that they worked with.

This above paragraph shows that epidemiological studies are needed and that the different population groups should be looked at individually. Cote *et al.,* (2004) made an informative summery on what their study provides which can be adopted for this study. They stated that the results would help with clinicians and policy makers for population based estimates for the incidence of neck pain. They also stated that neck pain is related to significant activity limitations and finally they mentioned that the information would be essential for health care providers to help them assess prognosis and determine treatment plans.

1.2 Aims and objectives of the study

The aim of this investigation was to determine the prevalence of and risk factors for neck pain in the white population in the greater Durban area.
The following were the objectives for the study:

- To determine the demographic profile of white people with neck pain.
- To identify risk factors that influence neck pain in white people.

- To determine a correlation of risk factors and development of neck pain.

1.3 Rationale for the study

International epidemiological studies on neck pain have been done by Gore (1998) and Cote *et al*., (2004). However, a paucity of literature exists within specific population groups.

Furthermore the majority of research performed internationally focuses mostly on whiplash injuries (Quebec Task Force, 1995). Therefore, there was a need for the development of South African based research focusing on the factors affecting neck pain to compare against international statistics and to develop independent statistics.

There had been one unpublished study investigating the indigenous black population in South Africa (Ndlovu, 2006) but none on the white population and according to literature (van der Meulen 1997; Docrat 1999; Green, Baker, Sato, Washington and Smith, 2003 and Portenoy *et al*., 2004) there have been disparities displayed between different race groups when dealing with pain perception and prevalence.

The data that was reviewed in Lintons' (2000) study demonstrated that psychological factors are influential in the development of neck pain and transition from acute to chronic pain, and not just simply a symptom or overlay of the neck pain condition. Linton (2000) also says that because of these findings, significant changes need to be done when looking at the management of neck pain and its associated disabilities.

From the information gained in this study, the factors for neck pain were identified and a guide to the prevention and management of neck pain can become more apparent.

1.4 Limitations of the study

The participants completing the questionnaires may not have completed it openly and honestly or may have left out certain questions. The research was conducted at three specified shopping centres which limited its population group to those that utilise shopping centres in general, to those that only utilised the specific shopping centres used in this study and to those that were present on the specific days visited by the researcher.

1.5 Conclusion

Since the only South African study on risk factors for neck pain has been carried out on the indigenous black population, there were still other population groups in South Africa that needed to be explored. One such group was the white population that was discussed in this dissertation because there are different perceptions and interpretations of pain compared to other race groups within the country and other international communities (van der Meulen, 1997; Docrat, 1999; Green *et al*., 2003 and Portenoy *et al*., 2004). The findings from this study can be compared with those internationally and with those found between the different population groups within South Africa. There is also a need for epidemiological studies to be done on neck pain and its causes, which was also provided in this study.

Chapter 2
Literature review

2.1 Introduction

In this chapter, the relevant literature on the subject of neck pain was reviewed as well as identifying gaps in the literature that this study was attempting to address.

2.2 Anatomy of the neck region

The neck is the main link between the head, trunk and limbs and contains many vital structures (Moore and Dalley, 1999). Pain is felt when free nerve endings (C fibres) are stimulated either chemically, mechanically or thermally (Guyton and Hall, 1997).

2.2.1 Extent

The extent of the neck is shown in Figure 2.1.

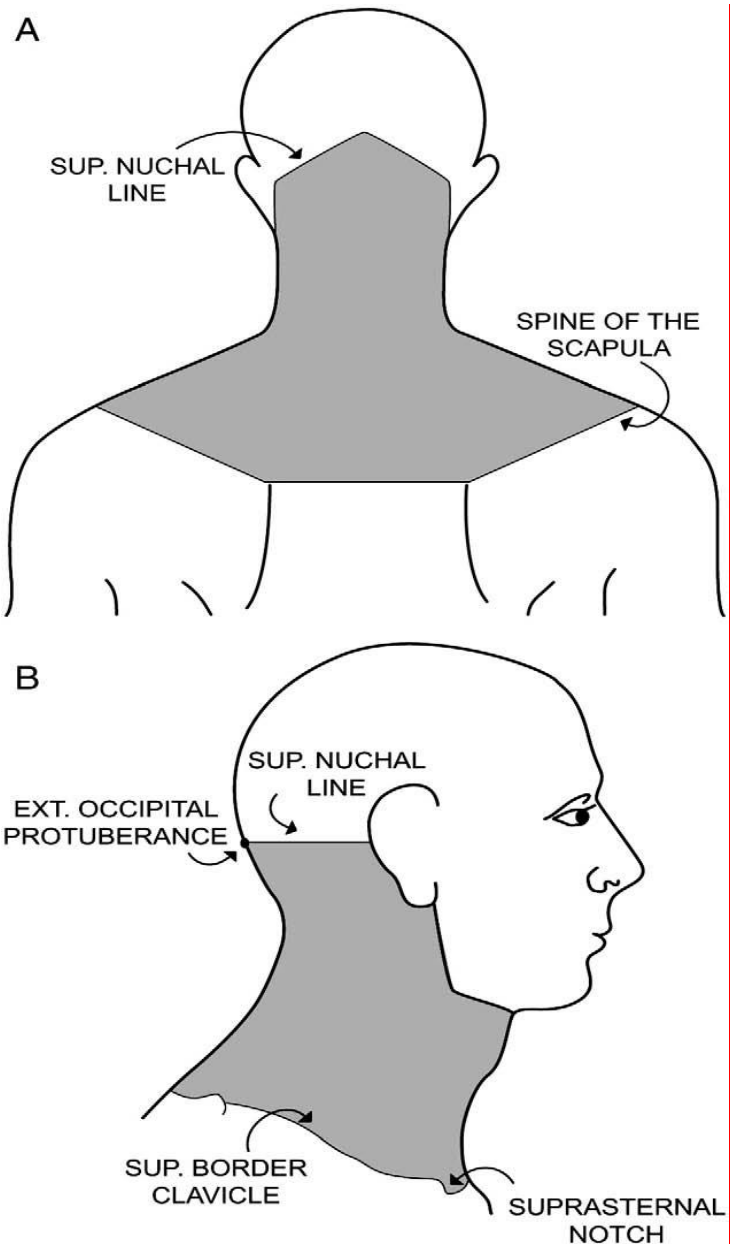

Figure 2.1: The anatomic region of the neck from the back (A) and the side (B) as defined by The Bone and Joint Decade 2000–2010 Task Force on Neck Pain and its Associated Disorders (Guzman, Hurwitz, Carroll, Haldeman, Cote, Carragee, Peloso, van der Valde, Holm, Hogg-Johnson, Nordin and Cassidy 2008).

2.2.2 Vertebrae

There are typical cervical vertebrae, C3 down to and including C6 and atypical vertebrae, C1 (atlas), C2 (axis) and C7 (vertebrae prominens) (Wiesel *et al.,* 1992 and Moore and Dalley, 1999).

2.2.3 Joints (Figures 2.2 and 2.3)

There are many types of joints in the cervical spine and some are unique to a specific level or levels. The intervertebral discs (IVD) separate the vertebral bodies from C2 to C7 but there is no disc present between the vertebral bodies of C1 and C2. The atlas has two atlanto-occipital joints linking it to the occipit from each of its lateral masses. The atlantoaxial joint, which is the most unique joint in the spine, joins C1 to C2 and is entirely stabilized by ligaments (Moore and Dalley, 1999).

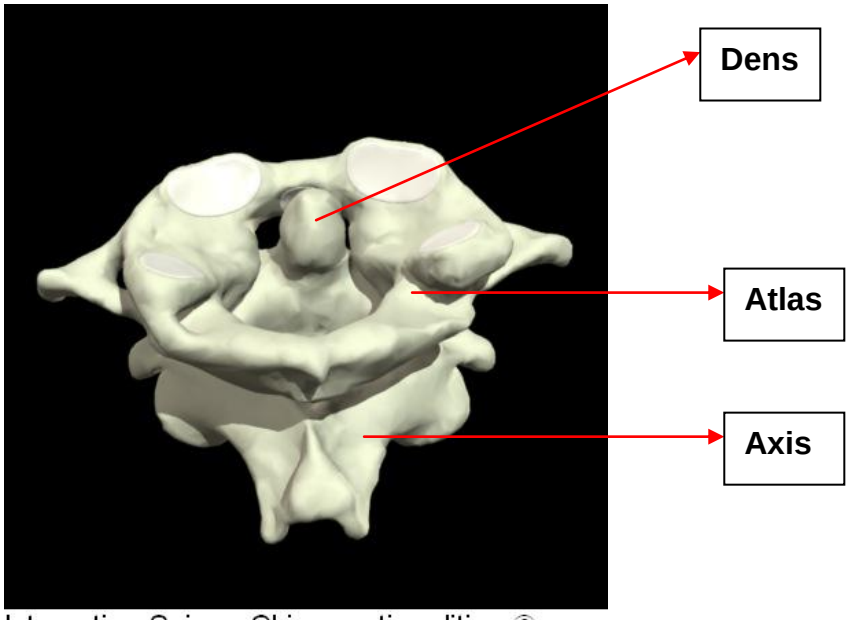

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Figure 2.2: Atlantoaxial joint

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The uncovertebral joints are found between the uncinate processes and bevelled surfaces from C3 to C6 (typical cervical vertebrae). All the vertebrae have one joint in common, the zygapophysial (facet) joints, which lie between the superior and inferior articular processes of adjacent vertebrae on both sides (Moore and Dalley, 1999). Injury to the joint causes pain as a result of free nerve endings being present in the joint capsule (Moore and Dalley, 1999). The only joints in the cervical spine without a joint capsule are the intervertebral joints. They do however cause pain when herniated because they can compress the spinal cord or nerve roots (Moore and Dalley, 1999).

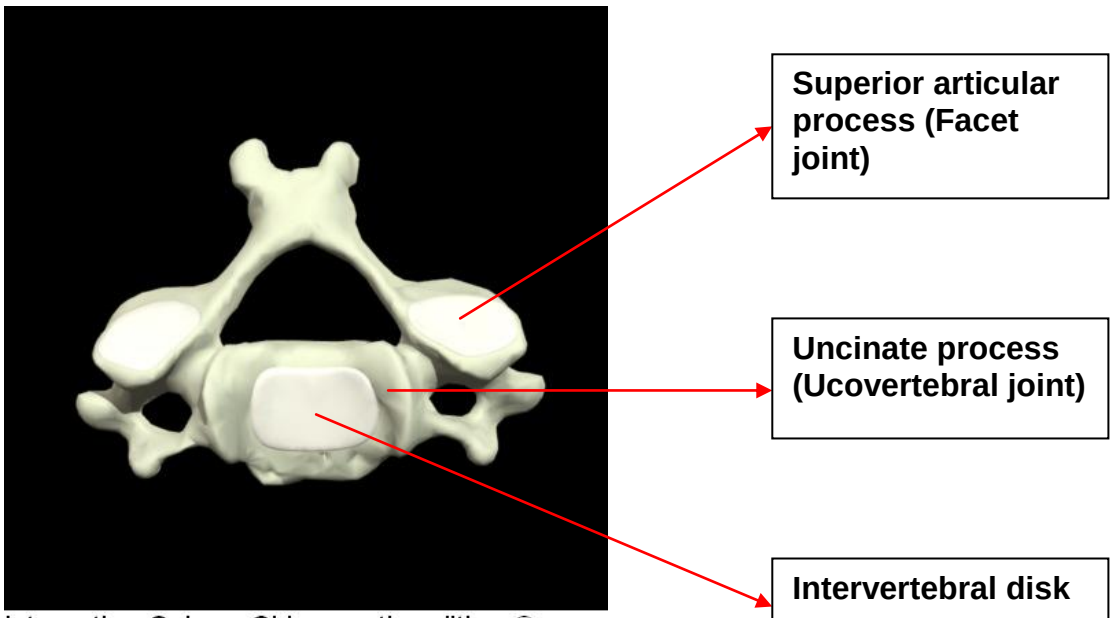

Figure 2.3: Typical vertebrae and its articular areas

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The movement of the abovementioned joints initiated by the musculature of the neck ultimately results in the movement of the head. The directions of movement of the neck are flexion, extension, rotation and lateral flexion (Moore and Dalley 1999).

2.2.4 Muscles (Figures 2.4, 2.5 and 2.6)

The neck is the most mobile section of the spine and, therefore, the muscles are elaborate and specialised for movement (Wiesel *et al*., 1992). On the posterior side of the neck are the following: superficial muscles (the trapezius and the levator scapula), muscles underlying these superficial muscles (splenius capitis, splenius cervicus and continuations of the erector spinae muscle) and deep intrinsic muscles (multifidi) (Sherk and Parke, 1989). These muscles can cause neck pain when a point of hyperirritability (trigger point) develops in the muscle (Simons, Travell and Simons, 1999).

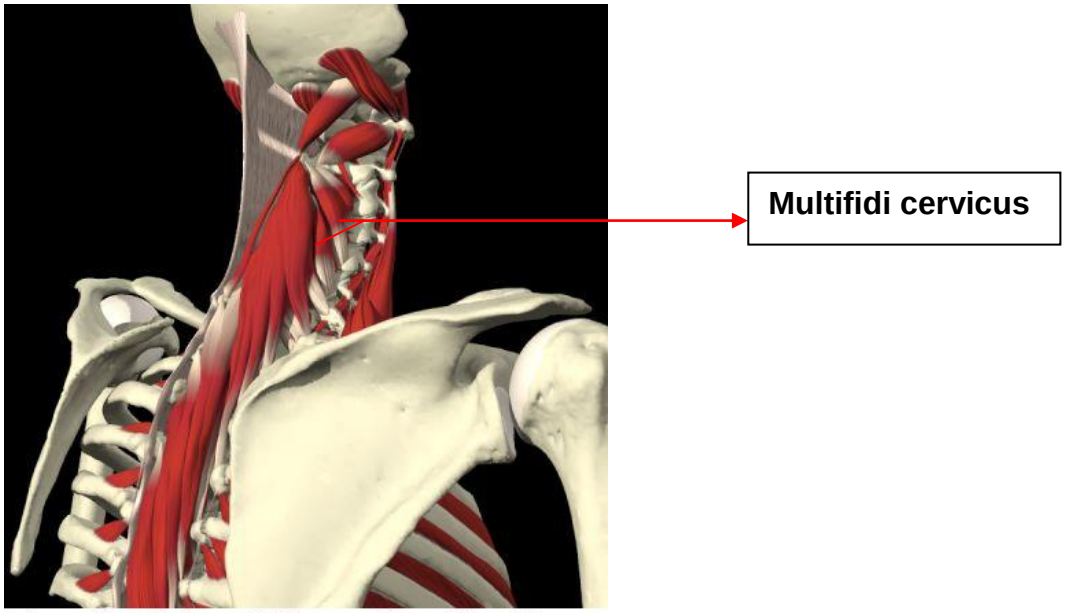

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Figure 2.4: Deep musculature

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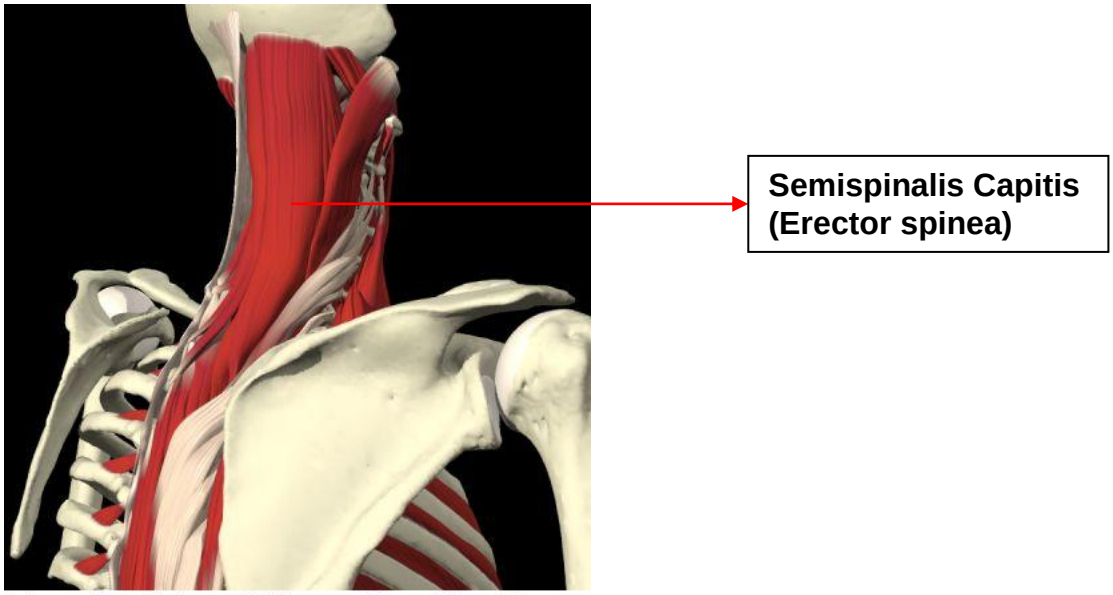

Figure 2.5: Muscles below superficial muscle layers

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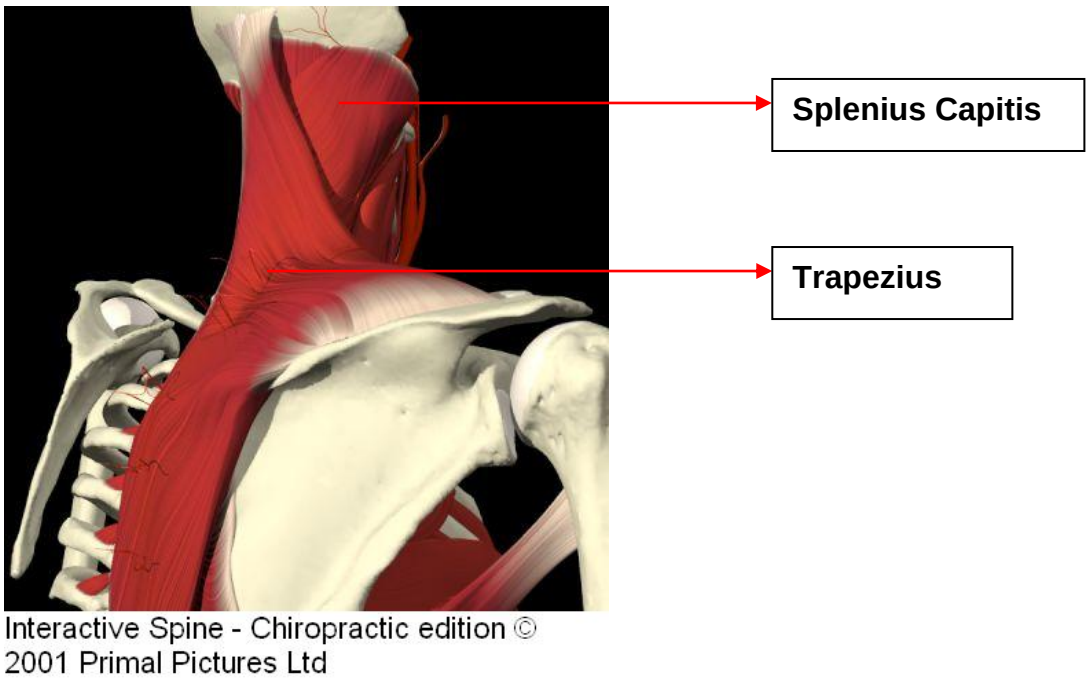

Figure 2.6: Superficial muscles

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2.2.5 Nerves (Figure 2.7)

C1: This nerve supplies the suboccipital muscles that lie in the occipital triangle and the anterior ramus.

C2: Greater occipital nerve, supplies the skin over the scalp and the neck.

C1 – C4: The ventral rami from these levels form the cervical plexus.

C5 – C8: These nerves form the brachial plexus.

(Porterfield and DeRosa, 1995 and Moore and Dalley, 1999)

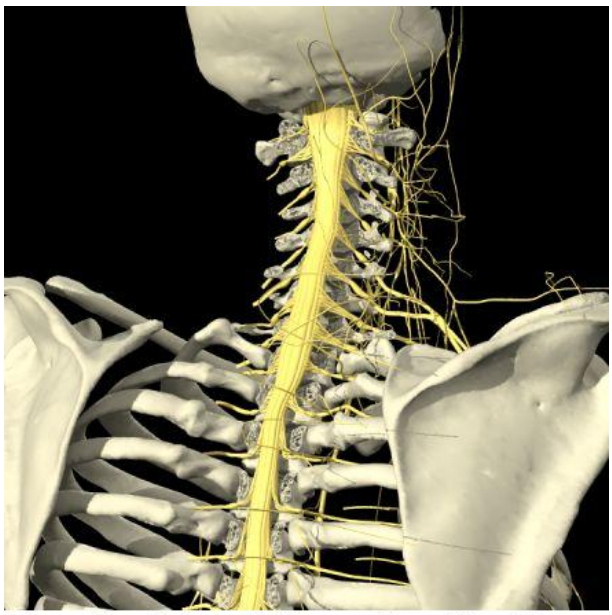

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Figure 2.7: Nerves of the cervical region

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2.3 Presentation of neck pain

Neck pain usually arises in the back of the neck and is affected by cervical motion, mainly extension and lateral flexion (Bland, 1994). Pain that arises in the neck is normally poorly localised. Upper segments sometimes radiate pain to the face, occiput or temple regions and lower segments to the shoulder, scapula, arm and chest wall (Doherty, Lanyon and Ralston, 2002).

2.4 Incidence and prevalence of neck pain

Gore (1998) stated that neck pain is not as common as lower back pain. However, this contradicted Drews (1995) results from her unpublished study who observed that neck pain and lower back pain are equally as common. Hogg-Johnson, van der Velde, Carroll, Holm, Cassidy, Guzman, Côté, Haldeman, Ammendolia, Carragee, Hurwitz, Nordin and Peloso (2008) said that neck pain often co-exists with low back pain. Therefore, further research is validated on the incidence and prevalence of neck pain, including the intensity of neck pain compared to lower back pain.

Cote *et al*., (2004) determined that the prevalence of neck pain was 14.6% in the Saskatchewan adult population. This supports Gore's (1998) findings that neck pain affects 10% of the general population at any given time and Lau, Sham and Wong's (1996) observations that there was a neck pain prevalence of 16% in a Chinese population in two different housing blocks. Croft *et al*., (2001) observed that 17.9% of adults developed neck pain in the year between the two questionnaires of their study. It is important to note that the abovementioned studies mainly looked at whiplash associated neck pain. However Guez, Hilldingsson, Nilsson and Toolanen (2002) observed, in their study on the prevalence of neck pain in the general population when taking all kinds of neck pain into consideration, that the prevalence of neck pain was 43%. Lau, Sham and Wong (1996) also observed that life long prevalence of neck pain was 28%.

These discrepant results could also have been due to the fact that the population groups were different in these studies, therefore supporting the view that different population groups should be studied separately.

2.5 Diagnosis

In an article on symptoms, causes and diagnosis (http://www.spine-health.com/conditions/neck-pain/neck-pain-symptoms-causes-and-diagnosis),

the step-by-step diagnosis of neck pain was discussed and it was stated that a thorough case history must be taken first, followed by a physical examination of the patient and then an examination of the patient's neck. It was also stated that x-rays may be taken to aid in the diagnosis. This is supported by Larsson, Sogaard and Rosendal (2007), who identified in their study on work related neck pain, that the patient's complaints and manual clinical examination is the most effective way for a physician to diagnose neck pain.

2.6 Treatment options

Exercise especially cervical motion was cited as an effective treatment regime for neck pain and must be done regularly several times a week (Jenson and Harms-Ringdhal, 2007). This was supported by Hurwitz, Carragee, van der Velde, Carroll, Nordin, Guzman, Peloso, Holm, Côté, Hogg-Johnson, Cassidy and Haldeman (2008), who concluded, in their study on non-invasive treatments for neck pain, that exercise is an effective treatment plan.

Jenson and Harms-Ringdhal (2007) concluded, in their review study on treatment interventions, that transcutaneous electric nerve stimulation (TENS) or low level laser treatment (LLLT) are effective treatment tools for short term symptom reduction. Hurwitz *et al.,* (2008) also stated that LLLT can be used to treat neck pain effectively. Both these observations support Weisel *et al.,* (1992) who stated that there are many modalities that are used in the treatment of neck pain which included heat, cryotherapy, electrical modalities, traction and joint mobilization.

In his study on acute neck pain and the resultant outcomes from chiropractic treatment Haneline (2006) observed that chiropractic manipulative therapy was a successful treatment option for those that have acute neck pain. This was later supported by Hurwitz *et al.,* (2008) who mentioned that mobilization and manipulation are effective treatment options for neck pain.

2.7 Demographic factors predisposing to neck pain

2.7.1 Gender

Chiu *et al.,* (2004) observed that neck pain was more common in females than males, where 62% of females and 38% of male participants had neck pain in a study done in Hong Kong, which supports findings by Croft *et al.,* (2001) and Guez *et al*., (2002) who also noted in their respective studies that females were more prone to neck pain. Similarly, Ndlovu (2006) observed that indigenous African women were affected by neck pain more than their male counterparts. This was contradicted by Walker-Bone, Reading, Coggon, Cooper and Palmer (2004) who mentioned that gender has a weak effect on neck pain.

2.7.2 Age

Neck pain was found to increase with advancing age in the indigenous African population (Ndlovu, 2006). This was also observed by Côté, van der Velde, Cassidy, Carroll, Hogg-Johnson, Holm, Carragee, Haldeman, Nordin, Hurwitz, Guzman and Peloso (2008) in their study on the burden and determinants of neck pain in workers where they stated that age is a risk factor for neck pain. This was in contrast to Croft *et al.,* (2001) and Edmondston, Hon Yan Chan, Chi Wing Ngai, Linda, Warren, Williams, Glennon and Netto (2007) who observed in their separate studies that age had no significant effect on neck pain. Hogg-Johnson *et al.,* (2008) in their study however stated that pain increased with age to the middle years of life and then decreased from there.

2.7.3 Skill level

When looking at the level of skill, Lau, Sham and Wong (1996) in their study on prevalence and risk factors for neck pain in Hong Kong, found that neck pain was more prevalent among managers and professionals.

2.7.4 Race

A study done in America, by Green *et al*., (2003) on the comparison of white and black people before management of chronic pain, found that black people were more depressed, had clinically more pain and more sleep disturbances. However, in a similar study carried out in America on Whites, African Americans, and Hispanics (Portenoy *et al.*, 2004), which looked at pain, it was observed that pain experiences were different between the three groups, for example whites had pain for a longer period of time but with less intensity. In South Africa when looking at two different studies done on lower back pain, one on Blacks in a township (van der Meulen, 1997) and the other comparing Coloureds from Sydenham and Indians from Isipingo, (Docrat, 1999), the prevalence in all three groups was different (blacks 53.1%, Indians 45% and coloureds 32.6%).

2.7.5 Marital status

Croft et al., (2001) indicated that separated, divorced or widowed people had a higher incidence of neck pain compared with those that were married or single.

2.8 Other factors predisposing to neck pain

2.8.1 Psychosocial and psychological

When looking at specific psychological aspects, Linton (2000) groups them into four areas. Firstly, cognitive factors e.g. beliefs concerning pain, disability and perceived health; secondly, emotional factors e.g. distress, anxiety and depression; thirdly, social factors like work and family issues (but it was stated in this study that these are less convincing); and fourthly, behavioral factors in response to the pain (e.g. coping with pain and pain behaviors). Other studies also mention specific psychological factors as risk factors for neck pain; these include Carroll, Cassidy and Cote (2003) whose study on depression named it as a risk factor for neck pain. The study by Egwe and Nwuga (2008) on the

lower back in whites and Nigerians also observed that life stresses influence pain characteristics.

Linton (2000) observed in his review study that psychological factors were related to neck pain. Croft *et al*., (2001) in their study on risk factors for neck pain also stated that psychological distress was a risk factor. Hogg-Johnson *et al.,* (2008) also mentioned in their study that poor psychological health was a risk factor for neck pain. In the average people of developed countries, Linton (2000) suggested that psychological variables were more important in pain and disability development than most biomedical or biomechanical variables.

The fact that these psychological factors may only account for a part of the problem and that there may be other factors that are important in the development of neck pain, a multidimensional view should be taken where the interplay between psychological factors and these other factors are looked at (Linton, 2000).

Egwe and Nwuga (2008) also state that socio-economic factors play a role in the development of pain, which may have a significant influence on the abovementioned psychological factors and could even be integrated with them.

Guez *et al.,* (2002) stated that unemployment and blue collar employment had an influence on neck pain. However, Walker-Bone *et al.,* (2004) concluded that employment status had a weak impact on neck pain but also cautioned that when comparing blue collar workers and the unemployed to white collar workers, there were differences that may suggest there is more to observe than just the employment status.

2.8.2 Posture

When looking at the perceived poor posture of individuals Edmondston *et al.,* (2007) observed in their study on postural neck pain, that subjects with neck

pain had a negative perception of their posture compared to those that were asymptomatic. Croft *et al.,* (2001) also observed in their study that poor perceived general health was a risk factor and Hogg-Johnson *et al.,* (2008) also stated that poorer self rated health was a risk factor for neck pain.

In a study carried out by Larsson, Sogaard and Rosendal (2007), which was a review on neck and shoulder pain in workers, it was observed that work postures, repetitive movements and high force were risk factors for neck pain. This same study also established that computer work for long periods was a risk factor for neck pain. However, according to Cote *et al.,* (2004) it is unclear if sitting or standing was a risk factor for neck pain.

Ho Ting Yip, Thai Wing Chui and Tung Kuen Poon (2008) stated in their study on head posture and severity that a significant forward head posture was found more in neck pain patients than in those without. This can also be observed in Lau, Sham and Wong (1996) study on neck pain prevalence carried out in Hong Kong, which observed that reading was a significant risk factor for neck pain. They then made the conclusion that there is a link between posture and neck pain.

2.8.3 Childbirth

When looking at childbirth a study done by Schytt, Lindmark and Waldenstrom (2004) observed that commonly mothers experienced headaches, neck and shoulder complaints at two months as well as one year after childbirth. Croft *et al.,* (2001) also observed in their study on risk factors for neck pain that the number of children that a person has is a risk factor for neck pain.

2.8.4 Trauma

Guez *et al*., (2002) observed in their population based prevalence study that previous neck and head trauma, not only whiplash related, often resulted in participants developing further neck pain. This was also observed by Croft *et*

al., (2001) who stated that a prior neck injury was a separate risk factor for neck pain. Lau, Sham and Wong (1996) also observed that a past history of trauma was a risk factor for neck pain. Leinonen, Kankaanp, Vanharanta, Airaksinen and Hanninen (2005) observed in their study on urban bus drivers that repetitive micro trauma from driving did not increase neck pain.

2.8.5 Exercise

Croft *et al.,* (2001) observed in their study that poor physical health is a risk factor for neck pain. This was also observed by Larsson, Sogaard and Rosendal (2007) that strength training had a positive effect on decreasing neck pain cases but did state that there is some controversy on more intense physical exercise. Jenson and Harms-Ringdhal (2007) in their review on neck pain also concluded that exercise was beneficial in helping to prevent neck pain.

2.9 Implications of neck pain

When looking at absenteeism from the work place, Cote *et al.,* (2009) in their study on the prevalence and incidence of work absenteeism found that there were 23 new cases of absenteeism per 10 000 full time equivalents that were neck pain related. Bostick *et al.,* (2009) also mentioned in their study on population beliefs about neck pain that people were taking long leaves of absence from their work and some even left their jobs. These studies demonstrated that absenteeism from work because of neck pain does occur and is a problem.

Cote *et al.,* (2009) also stated that the neck pain causes disability amongst those that work. They mentioned that neck pain is a significant burden of disability in workers. This supports Borghouts *et al.,* (1999) who, in their study on costs of neck pain, mentioned that 2.5% of all disability claims were neck pain related.

Borghouts *et al.,* (1999) observed that neck pain related costs made up 1% of Netherlands health care expenditures for 1996; this was a total of U$686 million which could be split into U$159 million for direct costs and U$526 for indirect costs. This highlights the fact that neck pain related claims and costs to countries is significant and therefore neck pain related studies are needed to help reduce these costs.

2.10 Conclusion

In conclusion the literature points out that there are specific demographic, occupational and lifestyle factors that have been shown to influence neck pain in specific population groups. The chapters that follow look at how these risk factors were incorporated and carried out in this dissertation and the results on this particular population group. These results were then discussed in terms of the literature that was discussed in this chapter.

Chapter 3
Research Design

3.1 Design

A descriptive epidemiological study was initiated by approaching white people at supermarkets at various shopping centres in the greater Durban area (www.ethekwini.gov.za/durban/government/mayor/commprofile/wardCatalog). This research was approved by the Faculty of Health Science Research and Bioethics committees (Appendix J), indicating the partial compliance with the declaration of Helsinki (Johnson, 2005).

3.2 Advertising

No advertising for this research was needed.

3.3 Methods

3.3.1 Sample method

3.3.1.1Centres

All of the shopping centres in the greater Durban area were grouped by means of the household income bracket of the surrounding areas into High, Medium and Low. Those situated on the national highways were excluded due to the fact that there was more of a possibility that people not living in the greater Durban area may utilise these shopping centres. The income of the majority of households in all areas was in the Middle-income bracket (R38401 to R307 200 per annum) but the High group had a higher percentage of high-income households (>R307 200 per annum) and the Low group had less high-income households (www.ethekwini.gov.za/durban/government/mayor/commprofile/wardCatalog). The names of the shopping centres were then

placed in three different hats according to the grouping mentioned above and one was randomly selected from each. The three shopping centres that were randomly selected were La Lucia Mall (High), Musgrave Centre (Medium), and the Pick and Pay Centre on Tara Road, Bluff (Low). Once identified, permission for the survey was granted by the respective shopping centres that the supermarkets were located in and a letter of information on the survey was provided (Appendix E).

3.3.1.2 Subjects

The samples were taken from 8am to 5pm on Saturdays, Sundays and one selected day during the week depending on each shopping centres busiest weekday. The white people were approached at the entrance of supermarkets at three shopping centres at different areas in Durban.

The researcher approached those persons that qualified for the study and asked them if they would participate in this study. If they agreed, they were given a letter of information (Appendix D) along with the questionnaire (Appendix C) on a clipboard with a pen. The questionnaire was filled out in the presence of the researcher so that the participant could enquire about any of the questions within the questionnaire.

Once the participant had completed the questionnaire, the researcher ensured all questionnaires were placed in a sealed box and thanked the participant. All information within the questionnaires was kept confidential. Names of participants were not taken to ensure confidentiality.

3.3.2 Sample size

The total number of participants amounted to 900 (Esterhuizen 2008).

3.3.3 Inclusion Criteria

The participants had to be:

- South African, white people living within the greater Durban area;
- Male or female over 18 years of age to allow for a wide range of causes of neck pain;
- Competent in English to fill in the questionnaire.

3.4 Data collection

3.4.1 Processes and procedure

The study was explained to the participant through the letter of information (Appendix D). A few chairs and a table were present to facilitate the answering of the questionnaire (Appendix C). The answering of the questionnaire was expected to take six minutes per participant.

The completed questionnaires were then placed in a sealed box. The participants were thanked for their time and their willingness to participate in the study. The researcher was available to answer any questions the participants may have had.

The information was then recorded and sent for statistical analysis, once the data collection process had been completed.

3.4.2 Measurement tool

Questions from Ndlovu's study (2006) and factors from the literature (Lau, Sham and Wong, 1996; Murphy, 1999; Linton, 2000; Fox, Edwards and Palmer, 2000; Ariens *et al*., 2000; Ariens *et al*., 2001 and Hush, Maher and Refshauge, 2006) were used in formulating the original questionnaire (Appendix A).

3.4.3 Focus group

A focus group was used to ensure that the participants were able to respond to, and understand the questionnaire without any ambiguity. The presentation of the questionnaire was also reviewed by the focus group.

There were five people in the focus group (excluding the researcher and supervisor), that were chosen because of their:

- Knowledge of the given topic, and
- Their similarity to the respondents that would take part in the study.

The members included:

- Two chiropractic master's students;
- Two lay people;
- A qualified chiropractor (who recorded the proceedings of the focus group);
- The researcher;
- The supervisor.

Each member of the group received the following documentation:

- Informed consent form. (Appendix G)
- Letter of information. (Appendix H)
- Confidentiality statement. (Appendix F)
- Code of conduct. (Appendix I)
- A copy of the original questionnaire (Appendix A).

After each person had read and signed the necessary documents (Appendices F, G and I), they were then asked to read through the questionnaire (Appendix A). Each question was then systematically read and discussed to determine whether it was:

- Relavant to the study
- Understandable and unambiguous

- Clear and simple to follow in terms of the instructions and presentation of the questions.

The main reason for the focus group was to address the validity of the questionnaire being used in this study. Changes were made to the questions that the focus group discussed only if all members agreed to the change.

3.4.4 Pilot Study

A pilot study was done prior to the commencement of the study by giving the questionnaire to four participants that fitted the inclusion/exclusion criteria. They were instructed to read and answer the questionnaire. From this the researcher was able to finalise the questionnaire by making the necessary minor changes to the questions that were seen to be problematic by the participants in terms of comprehensiveness and simplicity.

The researcher was also able to familiarise himself with the questionnaire and the possible questions that participants may ask.

3.4.5 Final discussion on the questionnaire

The original questionnaire (Appendix A) was derived from the questionnaire in Ndlovu (2006) study and from factors in the literature. This original questionnaire was then reviewed by the focus group and changes were made which led to a post focus group questionnaire being formulated (Appendix B). This modified questionnaire was then discussed in two further meetings (Chiropractic Departmental meeting and Ethics Faculty meeting) that reviewed the whole research proposal. A pilot study was then carried out. From these meetings and pilot study, the final questionnaire was formulated (Appendix C).

The specific changes at each point were as follows:

From the original (Appendix A) to the post focus group questionnaire (Appendix B),

- The entire format changed from being coded to an answerable questionnaire.
- Question 5 was removed and a Question 4.2 was introduced asking about twins.
- Highest level of education became an open ended question.
- When looking at the current and previous occupation, a table type of question was introduced (Questions 7 and 9).
- A question was introduced asking if the participant felt their job was a cause of their neck pain (Question 11).
- A question asking if the participant uses a laptop was introduced (Question 14).
- All the yes/no questions (Questions 16, 18-33 and 38) from the original questionnaire were then grouped and made into two table type questions, Question 17, the more psychological and perception type questions and Question 18, the more physical type questions.
- In Question 17, there were three extra questions asked enquiring if the participant's hobby caused their neck pain; if yes, what is their hobby and do they think their posture is bad.
- In Question 18, questions asking about the use of glasses, contact lenses and bifocals were introduced.
- Question 35 from the original questionnaire, asking about the number of exercise sessions per week was removed.
- A question asking the age that the participant first experienced neck pain was introduced (Question 22).
- The question asking, how long the current neck pain has lasted for, became an open ended question.
- The questions pertaining to the time of day that the pain was worst and least became a table type question (Question 25).

- Questions 54 and 55 pertaining to headaches and shoulder pain as well as other symptoms such as arm pain and numbness, not mentioned in the original questionnaire, were grouped in a table type question (Question 36) that queried if the participants thought that these symptoms were associated with their neck pain.

From the post focus group (Appendix B) to the final questionnaire (Appendix C),

- The layout of the final questionnaire changed to become easier for the participant to answer.
- The final questionnaire included a question to ask at what shopping mall the participant answered the questionnaire.
- The question on marital status (Question 3) and present occupational status (Question 6) became a table type question.
- Science as a category in the questions on current and previous occupation (Questions 7 and 9) was split to become health science and applied science.
- Income of household question (Question 11) was moved forward and became a table type question.
- A question asking the participants if they suffer from neck pain was introduced (Question 12).
- The questions on, occupation involving repetition of work related activities (Question 14), transport utilized to travel to work (Question 17), type of exercise (Question 19) and the activities the participant may have trouble performing because of their neck pain (Question 29), all became table type questions.
- A question was added asking if the participant answered yes to having the computer at eye level and did they then sit directly in front of the computer (Question 15.2).

- A question asking if the participant's laptops are raised (Question 16.2) was introduced only pertaining to the participants that said yes to using a laptop.
- The tables from the post focus group questionnaire, Questions 17 and 18, were combined to form one table (Question 18) and the question asking if the participants hobby was a cause of their neck pain was removed.
- The question asking what age the participants first experienced neck pain (Question 22) was moved after the instruction stating that only people with neck pain should answer the following questions.

The questionnaire was divided into three parts:

A. Demographics, which had questions pertaining to, age, gender, marital status, births, education and occupation.
B. Risk factors, which included factors that may have had an influence on neck pain.
C. Clinical, which was only answered by participants that have had neck pain and the questions pertaining to their neck pain.

The headings for these three parts were taken out to simplify the final questionnaire.

3.4.6 Measurement frequency

Due to the nature of the study, the intervention was once off, with the filling out of the questionnaire.

3.5 Data analysis

SPSS version 15.0 was used for data analysis (SPSS Inc, Chicago, Ill, USA). A *p* value of <0.05 was considered as statistically significant.

Descriptive analysis involved presenting or graphing categorical variables as counts and percentages, and quantitative variables as mean and standard deviation. Associations between demographic and risk factors and neck pain were examined bivariately using Pearson's chi square or Fisher's exact tests as appropriate for categorical factors, or student's t-tests in the case of quantitative parametric data. In order to examine the adjusted independent effects of all factors which were found to be individually significant in the bivariate analysis, multivariate binary logistic regression analysis was done. A backwards elimination modelling technique was used, based on likelihood ratios, with entry and exit probabilities set to 0.05 and 0.010 respectively. Results were reported as odds ratios, 95% confidence intervals and *p* values (Esterhuizen 2009).

Chapter 4
Results

4.1 Introduction

The results of the research study are recorded in this chapter.

4.2 Data

Primary Data-
The primary data in this study were collected from the questionnaire that was compiled specifically to be used for this study.

Secondary Data-
The secondary data was all the data that were sourced to make up the questionnaire as well as the data incorporated in the make up of this dissertation. The data were sourced from but not limited to books, internet sources, journal articles and government publications.

4.3 Abbreviations and key terms

n = Number of participants
SD = standard deviation
p value = Statistical significance value (p values of less than 0.05 were considered to be significant)

4.4 Results

4.4.1 Introduction

Nine hundred (900) participants took part in this study. Of these, 895 responded to the question about whether they had neck pain, of these 405 (45.3%) had neck pain (Table 2).

4.4.2 Demographic profile of white people with neck pain

The frequency of neck pain sufferers from each of the three centres was identical, as shown in Table 2.

Table 2 Prevalence of neck pain

	Frequency	Total respondents	Percent
La Lucia	135	298	45.3
Musgrave Park	135	299	45.2
Pick n Pay Centre	135	298	45.3
Total	405	895	45.3

The participants from the three centres were different in terms of all demographic variables (Table 3) except for number of pregnancies where the median was 2 in all three centres (p=0.293), and the prevalence of twins or triplets (p=0.543).

Table 3 Demographics for each shopping centre

		Centre						p value
		La Lucia (n=299)		Musgrave Park (n=301)		Pick n Pay Centre (n=300)		
		Count	%	Count	%	Count	%	
Gender	Male	103	34.4%	142	47.2%	131	43.7%	0.005
	Female	196	65.6%	159	52.8%	169	56.3%	
Age	Mean (SD)	44.2 (16)		38.4 (17)		41.1 (15)		<0.001
Marital status	Married	162	54.4%	109	36.2%	134	45.0%	<0.001
	Divorced	30	10.1%	21	7.0%	44	14.8%	
	Widowed	15	5.0%	16	5.3%	14	4.7%	
	Single	78	26.2%	128	42.5%	84	28.2%	
	Separated	1	.3%	3	1.0%	6	2.0%	
	Staying together	12	4.0%	24	8.0%	16	5.4%	
Education level	Grade 10	6	2.1%	14	4.7%	22	7.5%	0.002
	Grade 11	6	2.1%	3	1.0%	5	1.7%	
	Matric	134	46.2%	115	38.7%	143	48.5%	
	Bachelor's or diploma	118	40.7%	131	44.1%	108	36.6%	
	Honour's	15	5.2%	14	4.7%	7	2.4%	
	Master's	8	2.8%	17	5.7%	3	1.0%	
	PhD	3	1.0%	3	1.0%	7	2.4%	
Number of pregnancies	Median	2		2		2		0.293
Present Occupational status	Self employed	69	23.2%	67	22.3%	51	17.0%	0.011
	Retired	36	12.1%	25	8.3%	22	7.3%	
	Employed	124	41.6%	140	46.7%	143	47.7%	
	Student	23	7.7%	35	11.7%	35	11.7%	
	Unemployed	18	6.0%	5	1.7%	13	4.3%	
	Housewife	8	2.7%	13	4.3%	21	7.0%	
	Employed part time	20	6.7%	15	5.0%	15	5.0%	
Twins/triplets	Yes	4	1.3%	4	1.3%	7	2.3%	0.543
	No	295	98.7%	297	98.7%	293	97.7%	

Continued….. Table 3 Demographics for each shopping centre

		La Lucia (n=299)		Musgrave Park (n=301)		Pick n Pay Centre (n=300)		
		Count	%	Count	Count	%	Count	
Income	<=R4800	2	.8%	1	.4%	4	1.4%	<0.001
	R4801-9600	0	.0%	8	2.9%	3	1.1%	
	R9601-R19200	10	4.0%	16	5.7%	7	2.5%	
	R19201-R38400	9	3.6%	7	2.5%	11	3.9%	
	R38401-R76800	16	6.3%	24	8.6%	31	11.1%	
	R76801-153000	23	9.1%	46	16.4%	58	20.7%	
	R153001-R307200	39	15.5%	46	16.4%	58	20.7%	
	R307201-R614400	38	15.1%	38	13.6%	44	15.7%	
	R614401-R1208800	32	12.7%	13	4.6%	12	4.3%	
	R1208801-R2457600	23	9.1%	19	6.8%	14	5.0%	
	>R2457601	15	6.0%	7	2.5%	8	2.9%	
	N/A	45	17.9%	55	19.6%	30	10.7%	

4.4.2.1 Age

The mean age of the 405 participants with neck pain was 41 years with a standard deviation of 15 years and a range from 18 to 79 years. This shows that there was a good cross section of ages for the study covering most areas of working life from students to newly appointed workers to veteran workers to retirees thus covering different stresses and activities across a wide age range. This good cross section also covers the natural aging process for degeneration.

Table 4 Age of participants with neck pain

N	Valid	405
	Missing	0
Mean		40.63
Std. Deviation		15.248
Minimum		18
Maximum		79

4.4.2.2 Gender

In this study, it was observed that of the people suffering with neck pain, 66.13% were female and 33.87% were male (Figure 4.1). These values show that females are much more susceptible to neck pain. This could be due to the different work and home stresses, activities and genetic make up of females compared to their male counterparts.

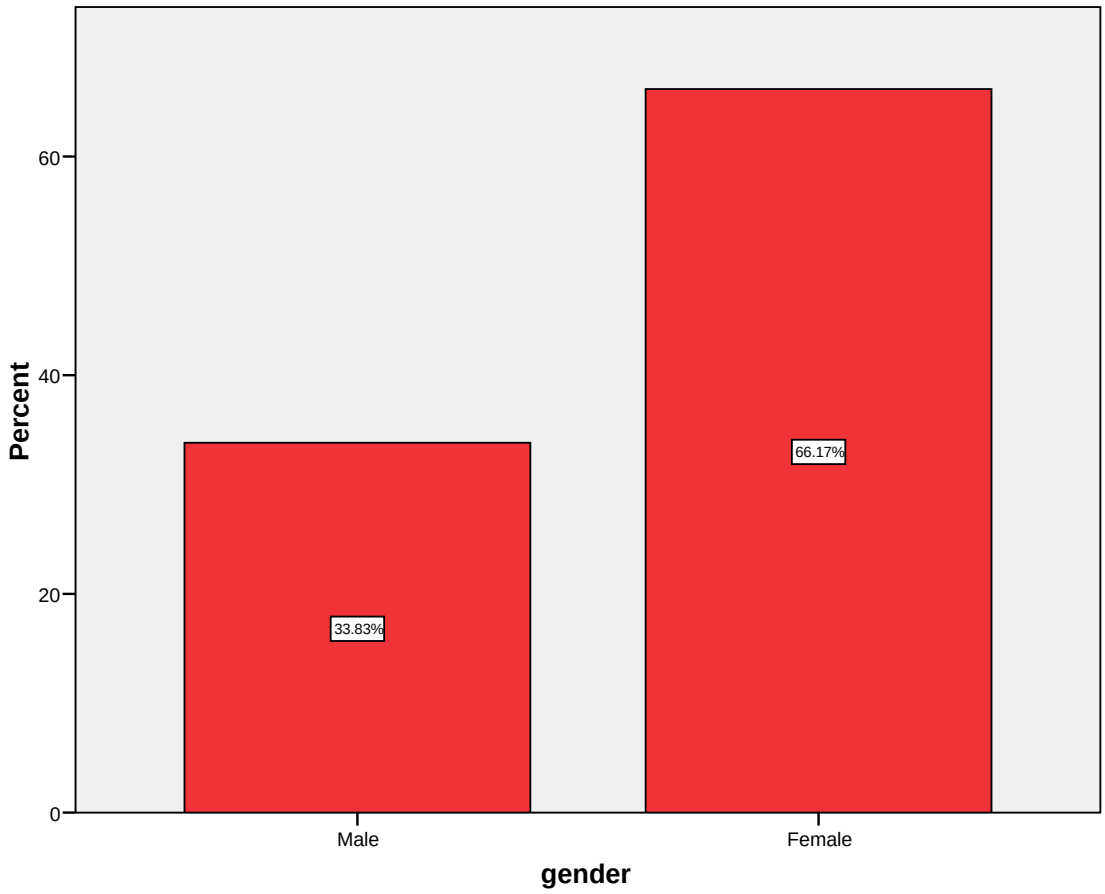

Figure 4.1: Gender of participants with neck pain (n=405)

4.4.2.3 Marital status

Most of the participants with neck pain in this study were married persons (46.53%). Single people represented 28.47%, with the rest of the participants separated, staying together, widowed and divorced ranging from 1% to 13.12%, respectively (Figure 4.2).

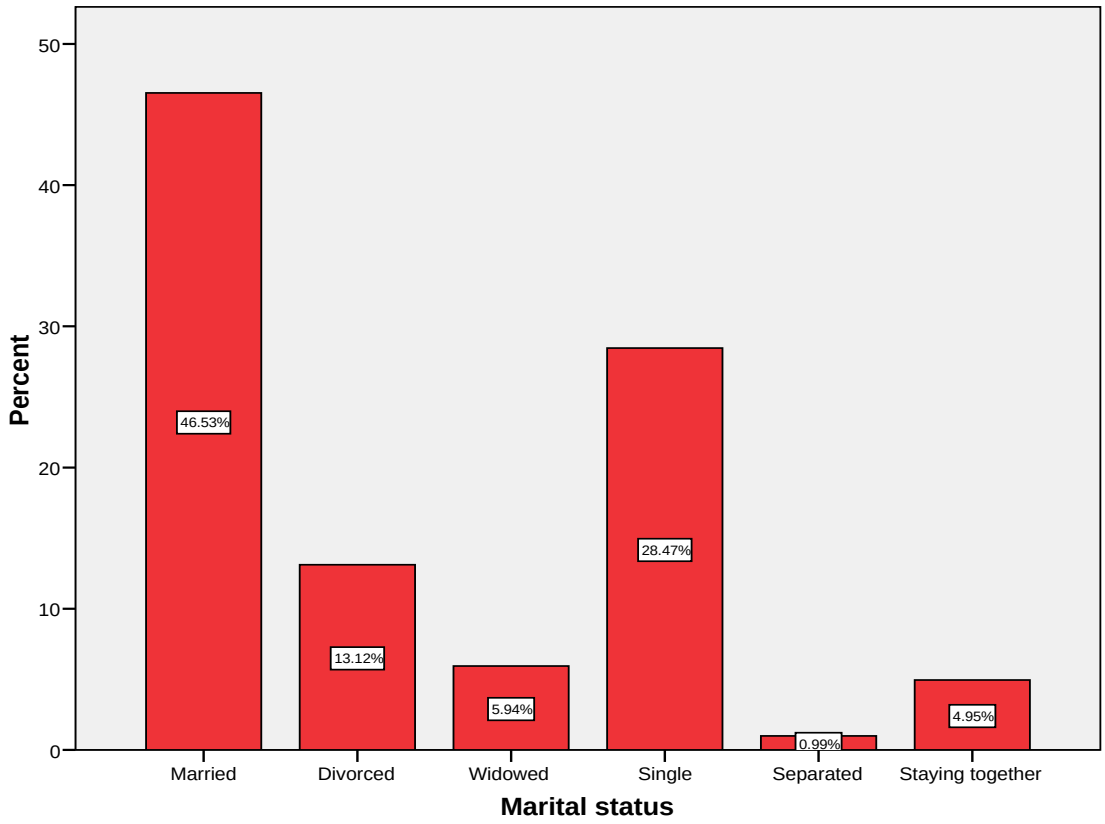

Figure 4.2: Marital status of participants (n=404)

4.4.2.4 Pregnancies

In the group of female respondents with neck pain, the average number of pregnancies was 1.7 with a standard deviation of 1.5 and a range from 0 to 7 (Table 5). There were only five respondents with neck pain who had had twins or triplets.

Table 5 Number of pregnancies

N	Valid	267
	Missing	138
Mean		1.66
Std. Deviation		1.511
Minimum		0
Maximum		7

4.4.2.5 Level of Education

The educational level of participants with neck pain is shown in Table 6. This sample was on the whole highly educated with most participants having achieved their matric and further tertiary education, 44.7% having a matric (secondary education), 42.5% having a tertiary education in the form of a Bachelor's degree or diploma, 3.0% having an Honour's degree and 3.3% a Master's degree. There were even three participants (0.8%) with a PhD degree. This would imply that most of the people with neck pain had a job with varying amounts of stress, as well as different types of activities depending on the type of their job (Table 6).

Table 6 Level of education

		Frequency	Percent
Valid	Grade 10	20	5.0
	Grade 11	3	.8
	Matric	178	44.7
	Bachelor's or diploma	169	42.5
	Honour's	12	3.0
	Master's	13	3.3
	PhD	3	.8
	Total	398	100.0
Missing		7	
Total		405	

4.4.2.6 Occupational status

The present study observed that 45.4% of the participants with neck pain were employed and 22.9% were self-employed (Figure 4.3). Unemployed participants, housewives, those employed part-time, retired participants and students were in the minority ranging from 3.7% to 7.9% respectively. These figures indicate that most of the participants with neck pain were employed (full-time employees) or were running there own businesses (self employed).

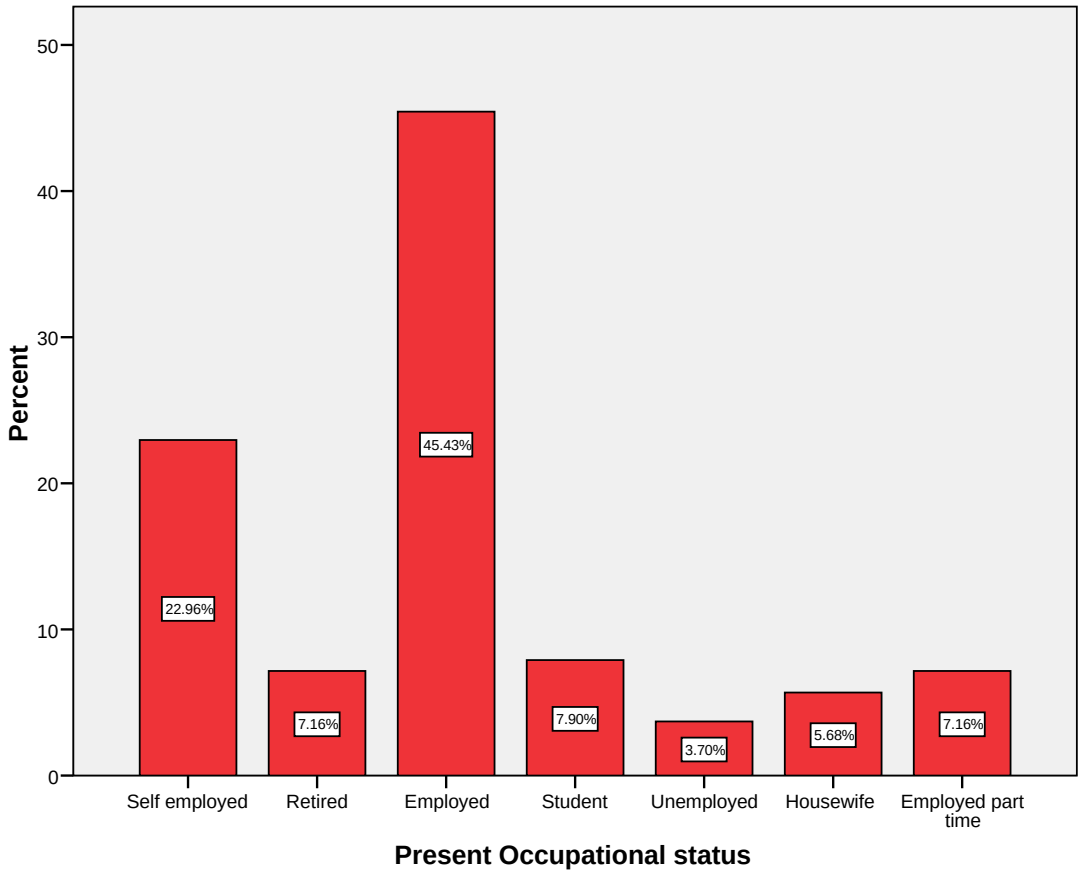

Figure 4.3: Present occupational status of participants with neck pain (n=405)

4.4.3 Clinical features of neck pain in this population

4.4.3.1 Age when first experienced neck pain

The age that participants first experienced neck pain is shown in Table 7. The mean age was found to be 28 years with a standard deviation of 13 years. These results show that people who have neck pain develop it at a fairly young age and hence mostly in their early working years.

Table 7 Age when first experienced neck pain

N	Valid	348
	Missing	57
Mean		27.66
Std. Deviation		12.987
Minimum		12
Maximum		74

4.4.3.2 Severity of pain

On the question of the severity of neck pain, it was found that 51.1% of the neck pain suffers mostly described it as moderate with 39.5% describing it as being mild and 9.3% as severe (Table 8). The higher level of reported mild to moderate neck pain could be due to the fact that people who generally experience increasing levels of neck pain, normally get treatment of some kind to stop the progression before it gets too severe therefore leaving most people with mild to moderate neck pain.

Table 8 Severity of pain

		Frequency	Percent
Valid	Mild	140	39.5
	Moderate	181	51.1
	Severe	33	9.3
	Total	354	100.0
Missing		51	
Total		405	

4.4.3.3 Time of day when neck pain is worst and least

The majority of participants said that their neck pain was either most or least in the morning with least being a slightly higher percentage (Figure 4.4). There were also a substantial number of people who said that their neck pain was worse in the evenings. These results could be due to the fact that the majority of people have high risk factors for neck pain during the day hence their pain in the evenings or they had poor sleeping posture, which would explain their pain in the mornings.

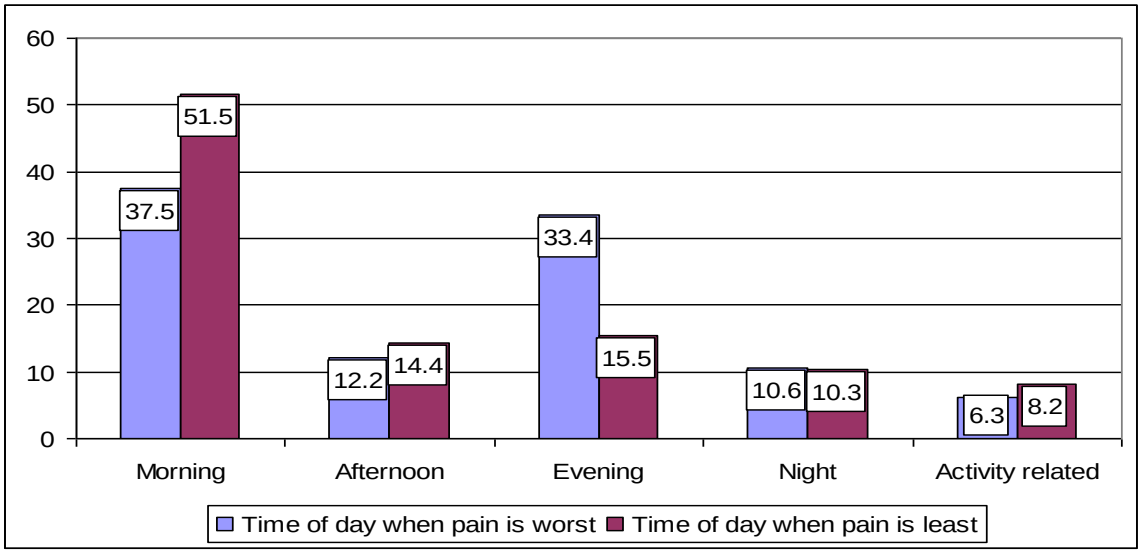

Figure 4.4: Time of day when neck pain is worst and least

4.4.3.4 Frequency of neck pain

The results for frequency of neck pain showed that the majority of participants experienced neck pain intermittently (43.4%) whilst 32.3% experience pain often, 13.5% seldom and 10.8% constant (Table 9). This points to the fact that the participants were suffering from neck pain fairly often which could mean that they are repeating the cause of their neck pain.

Table 9 Frequency of neck pain

		Frequency	Percent
Valid	Seldom	49	13.5
	Intermittently	157	43.4
	Often	117	32.3
	Constantly	39	10.8
	Total	362	100.0
Missing		43	
Total		405	

4.4.3.5 Onset of neck pain

Most of the participants reported that their pain started gradually without injury (47.6%) with 22.3% saying that they were unsure how their neck pain began (Table 10). This shows that the participants were mainly being subjected to repetitive risk factors for neck pain over long periods, which is causing their neck pain to start slowly and build up gradually.

Table 10 Onset of neck pain

		Frequency	Percent
Valid	Gradually without injury	171	47.6
	Abruptly without injury	23	6.4
	Gradually after injury	50	13.9
	Abruptly after injury	35	9.7
	Unsure	80	22.3
	Total	359	100.0
Missing	System	46	
Total		405	

4.4.3.6 Progression of neck pain

The majority of the participants (69.6%) said that their neck pain remained the same with 13.5% reporting worsening pain and 9.3% reporting improvement (Figure 4.5). This could be because of the continual exposure to risk factors, which is keeping neck pain status as “staying the same” despite the fact that maybe these people are attempting some sort of treatment.

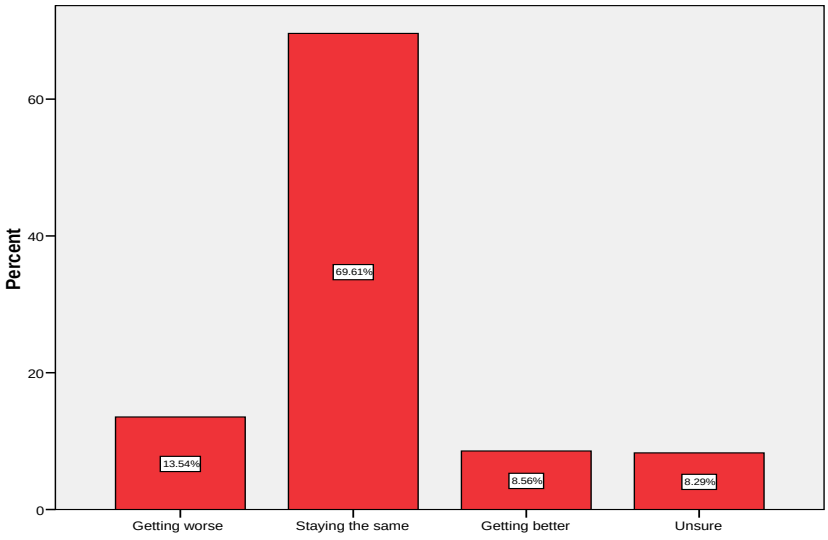

Figure 4.5: Status of neck pain (n=362)

4.4.3.7 Activities affected by neck pain

Figure 4.6 shows that sleeping was the activity most affected (27.7%) by neck pain, followed by concentrating (16.0%) and work (14.6%). This is probably due to the fact that when relaxed and trying to sleep people are more aware of their neck pain.

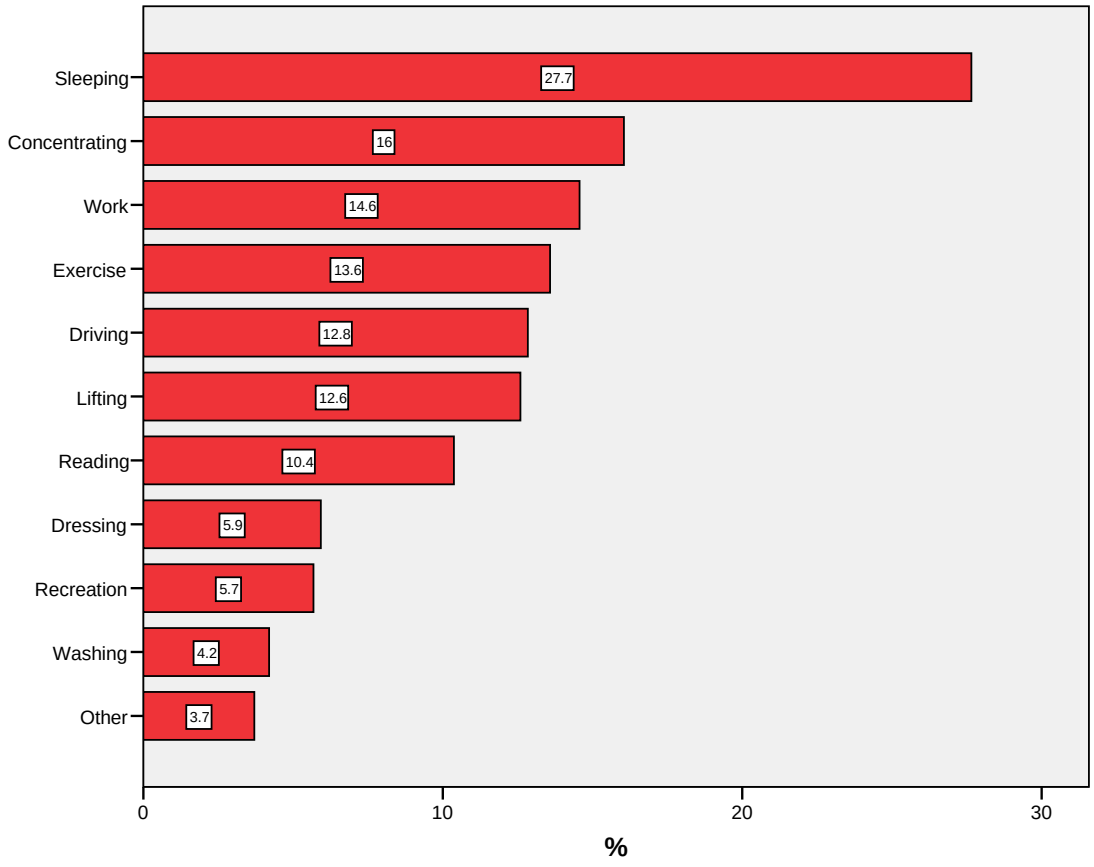

Figure 4.6: Percentage who reported having trouble with the listed daily activities

4.4.3.8 Disability resulting from neck pain

Most of the participants reported that they did not develop a disability from neck pain (43.3%) with 34.7% saying they had mild disability, 20.1% moderate and 1.9% severe (Figure 4.7). This would be in keeping with the fact that most of the participants had mild to moderate neck pain, which would be less likely to develop into a disability.

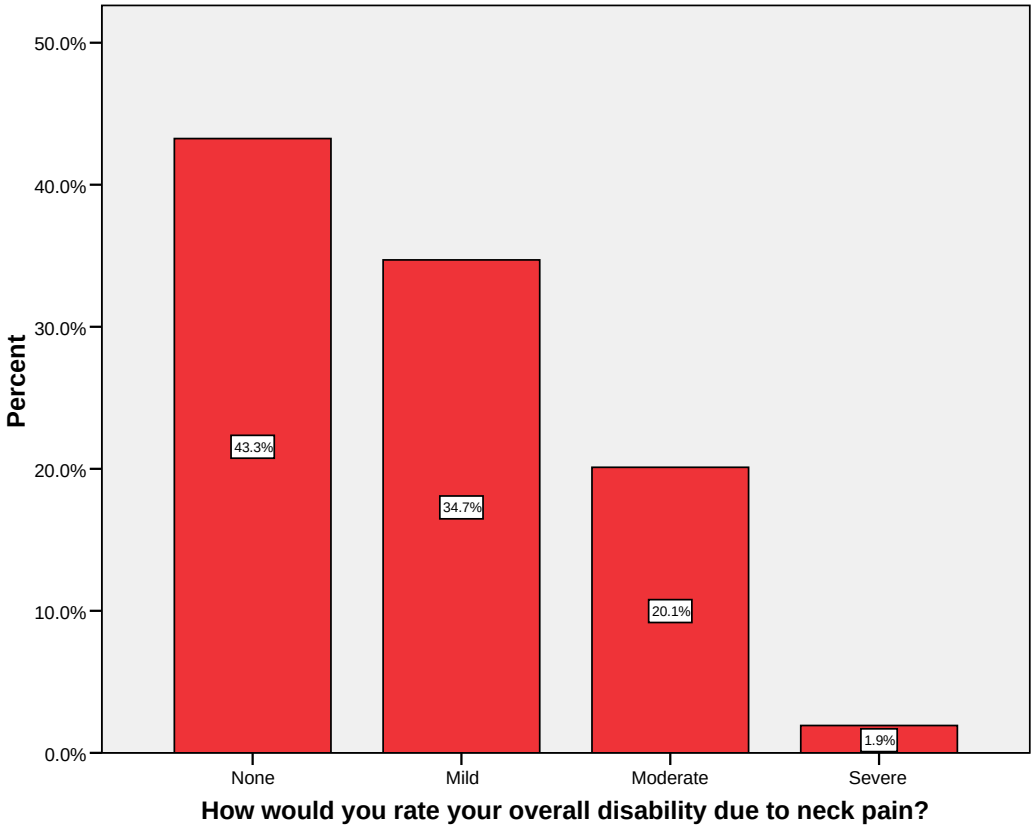

Figure 4.7: Participants rating of their overall disability due to neck pain (n=363)

4.4.3.9 Absenteeism and career impact caused by neck pain

There were 66 participants (16.3%) with neck pain who had to stay away from work due to their neck pain for a median of 2 days (range 1 to 120 days) while 32 participants (8%) were bedridden for a median of 3 days (range 1 to 120 days). These results indicated that most people's neck pain does not affect them enough to keep them away from work and the 16.3% that did, is similar to the 14.6% (Figure 4.6) that said that their work activities were negatively impacted by neck pain.

When looking at neck pain impacting on the participant's careers the results indicated that only 4% had a negative result with 3% being reconstructed and 1% not being promoted (Table 11). This shows that the neck pain of the participants did not affect their work drastically which may be because of the type of work in which they are involved or the neck pain was not severe enough to hamper them at work everyday to an extent that caused their career to be affected.

Table 11 Impact on participants career

		Frequency	Valid Percent
Valid	Yes	15	4.1
	No	348	95.9
	Total	363	100.0
Missing		42	
Total		405	

4.4.3.10 Associated symptoms

The results in Table 12 show that both headaches (70.8%) and shoulder pain (70.6%) were experienced with the neck pain and of those with headaches, 79.8% said that it was due to their neck pain and of those with shoulder pain, 78.2% said that it was due to their neck pain. There were smaller percentages that had arm pain (29.0%) and numbness (24.9%) but of those with arm pain,

70.7% said that it was due to their neck pain and of those with numbness, 71.9% said that it was due to their neck pain. This shows that the participants mostly associated their other symptoms as stemming from their neck pain.

Table 12 Associated symptoms

	Yes		No	
	Count	%	Count	%
Headaches	254	70.8%	105	29.2%
Headaches associated with neck pain	170	79.8%	43	20.2%
Shoulder pain	250	70.6%	104	29.4%
Shoulder pain associated with neck pain	158	78.2%	44	21.8%
Arm pain	102	29.0%	250	71.0%
Arm pain associated with neck pain	53	70.7%	22	29.3%
Numbness	88	24.9%	265	75.1%
Numbness associated with neck pain	46	71.9%	18	28.1%

4.4.4 To asses demographic risk factors for neck pain.

The present study observed that females were more likely than males to suffer from neck pain. Marital status was borderline significantly associated with neck pain; those with neck pain were more likely to be divorced and less likely to be single (Table 13).

Table 13 Demographic risk factors

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Gender	Male	238	48.6%	137	33.8%	375	41.9%	<0.001
	Female	252	51.4%	268	66.2%	520	58.1%	
Age (years)	Mean (SD)	41.6 (16.9)		40.6 (15.2)		41.4 (16.1)		0.352
Marital status	Married	215	44.1%	188	46.5%	403	45.2%	0.061
	Divorced	41	8.4%	53	13.1%	94	10.5%	
	Widowed	21	4.3%	24	5.9%	45	5.0%	
	Single	173	35.5%	115	28.5%	288	32.3%	
	Separated	6	1.2%	4	1.0%	10	1.1%	
	Staying together	32	6.6%	20	5.0%	52	5.8%	
Number of pregnancies	Mean (SD)	1.56 (1.5)		1.66 (1.5)		1.61 (1.5)		0.432
Twins/triplets	Yes	9	1.8%	5	1.2%	14	1.6%	0.470
	No	481	98.2%	400	98.8%	881	98.4%	
Education level	Grade 10	21	4.4%	20	5.0%	41	4.7%	0.221
	Grade 11	10	2.1%	3	.8%	13	1.5%	
	Matric	213	44.5%	178	44.7%	391	44.6%	
	Bachelor's or diploma	186	38.8%	169	42.5%	355	40.5%	
	Honour's	24	5.0%	12	3.0%	36	4.1%	
	Master's	15	3.1%	13	3.3%	28	3.2%	
	PhD	10	2.1%	3	.8%	13	1.5%	

4.4.5 To assess occupational risk factors for neck pain

4.4.5.1 Occupational status

Occupational status was significantly associated with neck pain. Those with neck pain were more likely to be self employed and less likely to be students (Table 14).

Table 14 Occupational status

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Present Occupational status	Employed	223	45.7%	184	45.4%	407	45.6%	0.024
	Employed part time	21	4.3%	29	7.2%	50	5.6%	
	Self employed	92	18.9%	93	23.0%	185	20.7%	
	Unemployed	21	4.3%	15	3.7%	36	4.0%	
	Retired	54	11.1%	29	7.2%	83	9.3%	
	Student	59	12.1%	32	7.9%	91	10.2%	
	Housewife	18	3.7%	23	5.7%	41	4.6%	

4.4.5.2 Occupation

No significant risk factors for neck pain were established (Table 15).

Table 15 Occupation

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Current occupation	Administration	75	22.5%	67	23.1%	142	22.8%	0.253
	Agriculture	6	1.8%	5	1.7%	11	1.8%	
	Applied science	15	4.5%	7	2.4%	22	3.5%	
	Arts	16	4.8%	16	5.5%	32	5.1%	
	Commerce	70	21.0%	54	18.6%	124	19.9%	
	Education	35	10.5%	24	8.3%	59	9.5%	
	Engineering	26	7.8%	27	9.3%	53	8.5%	
	Health science	8	2.4%	17	5.9%	25	4.0%	
	Manual labor	7	2.1%	1	.3%	8	1.3%	
	Medical	19	5.7%	22	7.6%	41	6.6%	
	Sports	7	2.1%	9	3.1%	16	2.6%	
	Other	50	15.0%	41	14.1%	91	14.6%	

Continued….. Table 15 Occupation

Previous occupation	Administration	25	28.7%	26	41.3%	51	34.0%	0.818
	Agriculture	2	2.3%	0	.0%	2	1.3%	
	Applied science	2	2.3%	1	1.6%	3	2.0%	
	Arts	3	3.4%	1	1.6%	4	2.7%	
	Commerce	16	18.4%	11	17.5%	27	18.0%	
	Education	12	13.8%	9	14.3%	21	14.0%	
	Engineering	4	4.6%	2	3.2%	6	4.0%	
	Health science	2	2.3%	2	3.2%	4	2.7%	
	Manual labor	1	1.1%	2	3.2%	3	2.0%	
	Medical	3	3.4%	2	3.2%	5	3.3%	
	Sports	1	1.1%	0	.0%	1	.7%	
	Other	16	18.4%	7	11.1%	23	15.3%	

4.4.5.3 Level of skill

No significant risk factors for neck pain were established (Tables 16 and 17).

Table 16 Level of skill for current occupation

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Level of skill	Unskilled	10	4.6%	11	6.0%	21	5.2%	0.562
	Skilled	84	38.4%	76	41.8%	160	39.9%	
	Professional	70	32.0%	47	25.8%	117	29.2%	
	Manager	55	25.1%	48	26.4%	103	25.7%	

Table 17 Level of skill for previous occupation

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Level of skill	Unskilled	7	14.0%	8	21.6%	15	17.2%	0.727
	Skilled	25	50.0%	19	51.4%	44	50.6%	
	Professional	10	20.0%	5	13.5%	15	17.2%	
	Manager	8	16.0%	5	13.5%	13	14.9%	

4.4.5.4 Occupational tasks

Work that causes your neck to turn, working with arms overhead, working on a computer, lifting heavy objects, and working in an air-conditioned room were found to be associated with neck pain (Table 18 and Figure 4.8).

Table 18 Occupational tasks associated with neck pain

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Causes your neck to turn	No	417	85.1%	286	70.6%	703	78.5%	<0.001
	Yes	73	14.9%	119	29.4%	192	21.5%	
Working with arms overhead	No	455	92.9%	353	87.2%	808	90.3%	0.004
	Yes	35	7.1%	52	12.8%	87	9.7%	
Working on a computer	No	231	47.1%	155	38.3%	386	43.1%	0.008
	Yes	259	52.9%	250	61.7%	509	56.9%	
Lifting heavy objects	No	409	83.5%	310	76.5%	719	80.3%	0.009
	Yes	81	16.5%	95	23.5%	176	19.7%	
Working in an air conditioned room	No	312	63.7%	224	55.3%	536	59.9%	0.011
	Yes	178	36.3%	181	44.7%	359	40.1%	

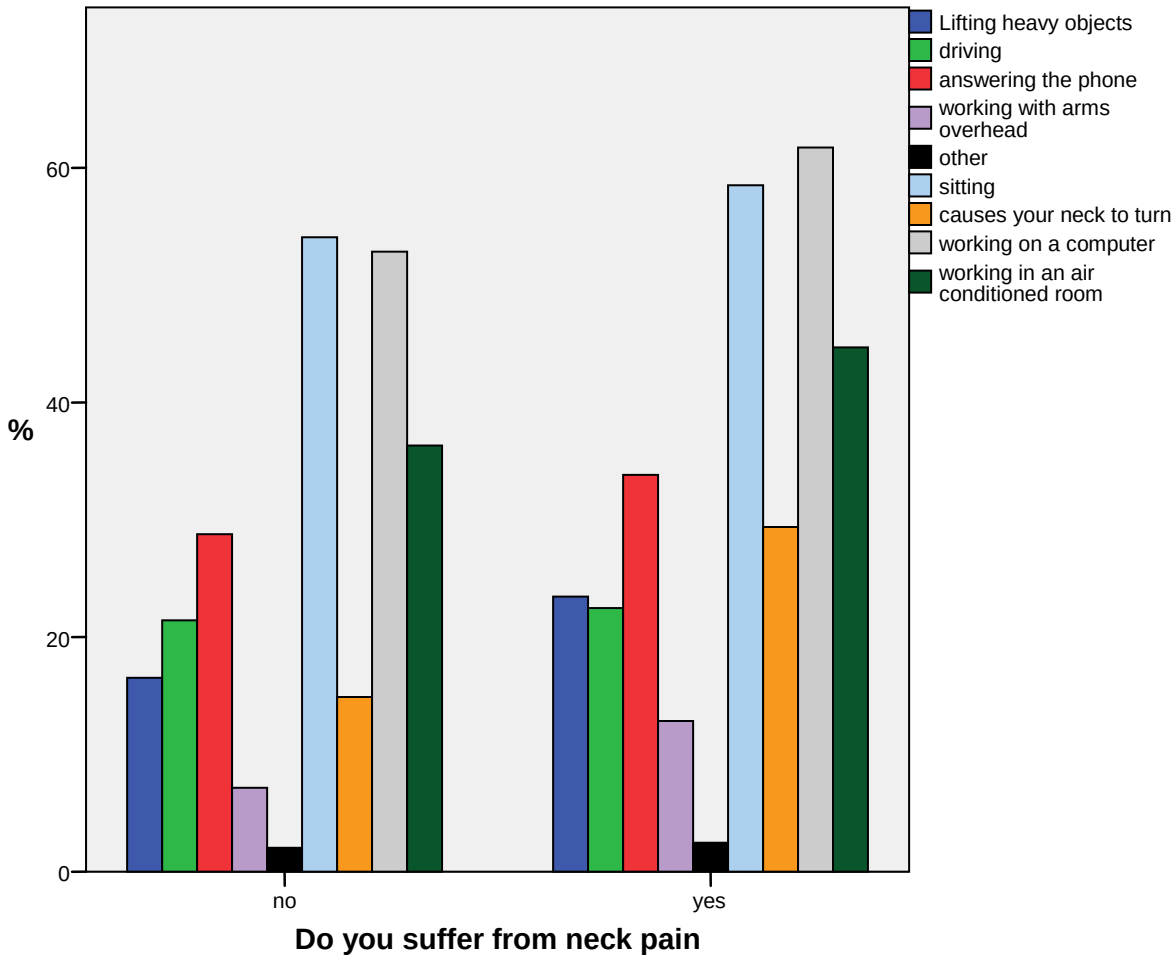

Figure 4.8: Percentage of occupational task performance by neck pain

Table 19 Occupational tasks not associated with neck pain

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Answering the phone	No	349	71.2%	268	66.2%	617	68.9%	0.104
	Yes	141	28.8%	137	33.8%	278	31.1%	
Sitting	No	225	45.9%	168	41.5%	393	43.9%	0.183
	Yes	265	54.1%	237	58.5%	502	56.1%	
Driving	No	385	78.6%	314	77.5%	699	78.1%	0.708
	Yes	105	21.4%	91	22.5%	196	21.9%	
Other	No	480	98.0%	395	97.5%	875	97.8%	0.666
	Yes	10	2.0%	10	2.5%	20	2.2%	

4.4.5.5 Income

No significant risk factors for neck pain were established (Table 20).

Table 20 Income

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Income	<=R4800	4	.9%	3	.8%	7	.9%	0.261
	R4801-9600	6	1.4%	4	1.1%	10	1.2%	
	R9601-R19200	15	3.4%	18	4.9%	33	4.1%	
	R19201-R38400	20	4.5%	7	1.9%	27	3.3%	
	R38401-R76800	31	7.0%	40	11.0%	71	8.8%	
	R76801-153000	62	14.0%	64	17.5%	126	15.6%	
	R153001-R307200	78	17.6%	65	17.8%	143	17.7%	
	R307201-R614400	71	16.0%	49	13.4%	120	14.9%	
	R614401-R1208800	33	7.4%	24	6.6%	57	7.1%	
	R1208801-R2457600	30	6.8%	25	6.8%	55	6.8%	
	>R2457601	20	4.5%	10	2.7%	30	3.7%	
	N/A	73	16.5%	56	15.3%	129	16.0%	

4.4.5.6 Computer tasks

The computer not being at eye level was found to be associated with neck pain (Table 21).

Table 21 Computer tasks

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Is the middle of the computer at eye level	Yes	297	60.6%	207	51.1%	504	56.3%	0.013
	No	126	25.7%	136	33.6%	262	29.3%	
	Do not work on computer	67	13.7%	62	15.3%	129	14.4%	
Do you sit directly in front of the computer	Yes	307	62.7%	223	55.1%	530	59.2%	0.066
	No	67	13.7%	70	17.3%	137	15.3%	
	Do not work on computer	116	23.7%	112	27.7%	228	25.5%	
Do you use a laptop?	Yes	238	48.6%	192	47.4%	430	48.0%	0.730
	No	221	45.1%	182	44.9%	403	45.0%	
	Do not work on computer	31	6.3%	31	7.7%	62	6.9%	
Is the laptop raised	Yes	70	14.3%	49	12.1%	119	13.3%	0.627
	No	174	35.5%	149	36.8%	323	36.1%	
	Do not work on computer	246	50.2%	207	51.1%	453	50.6%	

4.4.5.7 Transport to work

No significant risk factors for neck pain were established (Table 22).

Table 22 Transport to work

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Transport	Own car	423	90.0%	342	87.7%	765	89.0%	0.845
	Bicycle	3	.6%	4	1.0%	7	.8%	
	Walking	14	3.0%	15	3.8%	29	3.4%	
	Bus	10	2.1%	10	2.6%	20	2.3%	
	Taxi	4	.9%	2	.5%	6	.7%	
	Carpool	16	3.4%	17	4.4%	33	3.8%	

4.4.6 To assess other risk factors for neck pain

4.4.6.1 Lifestyle factors

Table 23 shows the significant risk factors, Table 24 the borderline risk factors and Table 25 the factors not significant for neck pain. Table 26 shows the results of those factors that could be quantified by time.

Leading a stressful life, being emotional, having bad posture, trauma, leaning or bending over a desk or work station, sleeping in awkward positions, carrying heavy loads on one shoulder, cradling the phone between your shoulder and ear, lack of support while sleeping, wearing glasses or contact lenses, surgery, MVA (motor vehicle accident), and sleeping on the tummy were all found in this study to be risk factors for neck pain (Table 23).

Table 23 Lifestyle factors associated with neck pain

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Stressful life	Yes	218	44.7%	269	66.4%	487	54.5%	<0.001
	No	270	55.3%	136	33.6%	406	45.5%	
Emotional	Yes	212	43.7%	268	66.5%	480	54.1%	<0.001
	No	273	56.3%	135	33.5%	408	45.9%	
Bad posture	Yes	166	33.9%	243	60.3%	409	45.8%	<0.001
	No	324	66.1%	160	39.7%	484	54.2%	
Trauma	Yes	78	16.0%	125	31.3%	203	22.9%	<0.001
	No	409	84.0%	275	68.8%	684	77.1%	
Lean or bend over a desk or work station	Yes	214	44.2%	243	60.6%	457	51.6%	<0.001
	No	270	55.8%	158	39.4%	428	48.4%	
Sleep in awkward positions	Yes	59	12.4%	102	25.8%	161	18.5%	<0.001
	No	417	87.6%	294	74.2%	711	81.5%	
Carry objects on one shoulder	Yes	265	54.4%	267	66.3%	532	59.8%	<0.001
	No	222	45.6%	136	33.7%	358	40.2%	
Phone receiver	Yes	129	26.7%	150	37.5%	279	31.6%	0.001
	No	354	73.3%	250	62.5%	604	68.4%	
Lack of support while sleeping	Yes	424	86.7%	321	80.0%	745	83.7%	0.007
	No	65	13.3%	80	20.0%	145	16.3%	
Glasses or contacts	Yes	276	56.6%	264	65.3%	540	60.5%	0.008
	No	212	43.4%	140	34.7%	352	39.5%	
Surgery	Yes	7	1.5%	17	4.2%	24	2.8%	0.017
	No	452	98.5%	388	95.8%	840	97.2%	
MVA	Yes	175	36.4%	175	43.4%	350	39.6%	0.033
	No	306	63.6%	228	56.6%	534	60.4%	
Sleeping on tummy	Yes	168	34.6%	166	41.4%	334	37.7%	0.037
	No	318	65.4%	235	58.6%	553	62.3%	

Sitting without arm support and watching TV were borderline risk factors for neck pain (Table 24).

Table 24 Lifestyle factors that were borderline associated risk factors

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Sit without arm support	Yes	272	56.0%	252	62.4%	524	58.9%	0.053
	No	214	44.0%	152	37.6%	366	41.1%	
Watch television	Yes	447	91.2%	381	94.3%	828	92.6%	0.079
	No	43	8.8%	23	5.7%	66	7.4%	

Table 25 Lifestyle factors not associated with neck pain

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Access to health services	Yes	398	81.4%	335	82.9%	733	82.1%	0.553
	No	91	18.6%	69	17.1%	160	17.9%	
Arms out when reading	Yes	148	30.6%	127	31.8%	275	31.2%	0.705
	No	335	69.4%	272	68.2%	607	68.8%	
Read in bed	Yes	305	62.9%	272	67.3%	577	64.9%	0.167
	No	180	37.1%	132	32.7%	312	35.1%	
Sit without back support	Yes	178	36.3%	162	40.2%	340	38.1%	0.236
	No	312	63.7%	241	59.8%	553	61.9%	
Bifocals	Yes	100	20.5%	82	20.3%	182	20.4%	0.958
	No	388	79.5%	321	79.7%	709	79.6%	
Exercise	Yes	413	84.3%	330	81.5%	743	83.0%	0.266
	No	77	15.7%	75	18.5%	152	17.0%	
Pillows	0	8	1.7%	7	1.8%	15	1.7%	0.675
	1	192	40.4%	152	39.2%	344	39.9%	
	2	249	52.4%	196	50.5%	445	51.6%	
	3	20	4.2%	26	6.7%	46	5.3%	
	4	5	1.1%	6	1.5%	11	1.3%	
	5	1	.2%	1	.3%	2	.2%	

Table 26 Group statistics for lifestyle factors

	Do you suffer from neck pain	N	Mean	Std. Deviation	Std. Error Mean	p value
How long using the same pillows	Yes	340	4.22	5.741	.311	0.937
	No	434	4.26	6.921	.332	
Hours bending or leaning over desk	Yes	237	5.40	2.559	.166	0.003
	No	198	4.67	2.566	.182	
Hours watching TV	Yes	372	2.35	1.178	.061	0.752
	No	446	2.38	1.335	.063	

4.4.6.2 Exercise

Participating in aerobics was found to be not significantly associated with neck pain and playing squash was significantly protective for neck pain (Table 27).

Table 27 Exercise

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Squash	No	454	92.7%	391	96.5%	845	94.4%	0.012
	Yes	36	7.3%	14	3.5%	50	5.6%	
Aerobics	No	459	93.7%	366	90.4%	825	92.2%	0.067
	Yes	31	6.3%	39	9.6%	70	7.8%	
Running	No	361	73.7%	319	78.8%	680	76.0%	0.076
	Yes	129	26.3%	86	21.2%	215	24.0%	
Cricket	No	472	96.3%	396	97.8%	868	97.0%	0.206
	Yes	18	3.7%	9	2.2%	27	3.0%	
Yoga	No	459	93.7%	379	93.6%	838	93.6%	0.985
	Yes	31	6.3%	26	6.4%	57	6.4%	
Boxing	No	484	98.8%	400	98.8%	884	98.8%	0.989
	Yes	6	1.2%	5	1.2%	11	1.2%	
Weight training	No	375	76.5%	314	77.5%	689	77.0%	0.723
	Yes	115	23.5%	91	22.5%	206	23.0%	
Swimming	No	407	83.1%	338	83.5%	745	83.2%	0.875
	Yes	83	16.9%	67	16.5%	150	16.8%	

Continued….. Table 27 Exercise

Fishing	No	472	96.3%	388	95.8%	860	96.1%	0.687
	Yes	18	3.7%	17	4.2%	35	3.9%	
Martial arts	No	480	98.0%	390	96.3%	870	97.2%	0.133
	Yes	10	2.0%	15	3.7%	25	2.8%	
Rugby	No	470	95.9%	392	96.8%	862	96.3%	0.490
	Yes	20	4.1%	13	3.2%	33	3.7%	
Cycling	No	434	88.6%	353	87.2%	787	87.9%	0.519
	Yes	56	11.4%	52	12.8%	108	12.1%	
Walking	No	300	61.2%	235	58.0%	535	59.8%	0.331
	Yes	190	38.8%	170	42.0%	360	40.2%	
Soccer	No	467	95.3%	392	96.8%	859	96.0%	0.261
	Yes	23	4.7%	13	3.2%	36	4.0%	
Tennis	No	470	95.9%	392	96.8%	862	96.3%	0.491
	Yes	20	4.1%	13	3.2%	33	3.7%	
Gymnastics	No	482	98.4%	401	99.0%	883	98.7%	0.404
	Yes	8	1.6%	4	1.0%	12	1.3%	
Badminton	No	487	99.4%	404	99.8%	891	99.6%	0.415
	Yes	3	.6%	1	.2%	4	.4%	
Other	No	406	82.9%	327	80.7%	733	81.9%	0.413
	Yes	84	17.1%	78	19.3%	162	18.1%	
Time spent exercising each week		5.22 (3.8)		5.08 (3.9)		5.16 (3.9)		0.629

4.4.6.3 Medical aid

No significant risk factors for neck pain were established (Table 28).

Table 28 Medical aid

		Do you suffer from neck pain						p value
		No		Yes		Total		
		Count	%	Count	%	Count	%	
Medical aid	Yes	408	83.6%	334	82.7%	742	83.2%	0.711
	No	80	16.4%	70	17.3%	150	16.8%	

4.4.7 To assess the independent effects of demographic, occupational and other risk factors for neck pain.

Table 29 Binary logistic regression analysis of factors associated with neck pain

		p value	OR	95.0% C.I. for OR	
				Lower	Upper
Step 25(a)	Age	.009	.980	.965	.995
	Female	.003	1.674	1.185	2.366
	Marital status-reference = married	.081			
	divorced	.713	1.111	.635	1.942
	widowed	.060	2.211	.966	5.059
	single	.023	.590	.374	.929
	separated	.388	.522	.119	2.283
	staying together	.178	.612	.299	1.251
	Working with arms overhead	.038	1.876	1.037	3.395
	Work that causes your neck to turn	.012	1.713	1.128	2.602
	Stressful life style	.036	1.443	1.025	2.031
	Emotional person	.000	1.895	1.355	2.652
	Bad posture	.000	2.328	1.668	3.250
	Head or neck trauma	.000	2.214	1.502	3.264
	Sleeping in an awkward position	.084	1.472	.950	2.281
	watching television	.084	1.767	.927	3.370
	Require glasses or contacts	.009	1.645	1.134	2.388
	Not playing squash	.097	1.892	.890	4.022
	Constant	.000	.063		

a Variable(s) entered on step 1: a1, a2, a3, a4.2, Education level, a14.1, a14.2, a14.3, a14.4, a14.5, a14.6, a14.7, a14.8, a14.9, a15.1, a15.2, a18.1, a18.2, a18.3, a18.5, a18.6, a18.7, a18.8, a18.10, a18.12, a18.13, a18.14, a18.15, a18.16, a18.19, a18.20, a18.21, a18.23, a18.25, a19.1, a19.7, a19.11.

The logistic regression analysis was completed in 25 steps with the following variables remaining in the model as risk factors for having neck pain after controlling for all other factors. Demographics: age (risk decreased by 2% with every one year increase in age), gender (females were 1.7 times more at risk than males), marital status (single people were 41% less at risk than those who were married). Occupational: working with arms overhead (1.9 times increased risk), causing your neck to turn (1.7 times increased risk). Lifestyle: having bad posture (2.3 times increased risk), head or neck trauma (2.2 times

increased risk), being emotional (1.9 times increased risk), not playing squash (1.9 times increased risk), watching TV (1.8 times increased risk), requiring glasses or contacts (1.6 times increased risk), sleeping in an awkward position (1.5 times increased risk), and leading a stressful life (1.4 times increased risk).

Chapter 5
Discussion and Limitations

5.1 Introduction

Included in this chapter will be the discussion as well as the comparison with other studies. Limitations of the study will also be discussed.

5.2 Prevalence

The prevalence of neck pain at all shopping centres was 45% (n=405) (Table 2). This exact prevalence of the three centres was not expected in the study. The level of prevalence however does seem to be similar to other studies such as Guez *et al.,* (2002) who observed in their study that the prevalence for all kinds of neck pain was 43%. The results were higher than in the studies done by Lau, Sham and Wong (1996) who's life long prevalence for neck pain in their study was 28%, whereas Cote *et al.,* (2004) stated a prevalence of 14.6% and Croft *et al.,* (2001) a prevalence of 16% indicated even lower percentages.

The demographics at each shopping centre was investigated to compare the types of people that were at each centre and therefore the different risk factors (Table 3). This table indicates that demographically the shopping centres were different. In so far as gender, marital status and employment status, La Lucia Centre had more females (risk factor), Musgrave Centre had more single people (preventative factor) and more self employed and employed people (risk factor), and Pick and Pay Centre had more divorced participants (risk factor).

From these, the study indicated that there were different types of people with different types of risk factors at each shopping centre, which probably contributed to the reason why the prevalence numbers were more or less the same for each shopping centre.

5.3 Demographic risk factors for neck pain

When looking at the demographic risk factors for neck pain (Table 13), it was noted that being female was the only significant risk factor (*p*=<0,001). This was true for other studies done on neck pain, which also stated that being female was significant. Such observations included Chiu *et al.,* (2004) whose percentages in their study carried out in Hong Kong were similar to these findings, 62% for females and 38% for males respectfully. The higher female percentages were also found in studies (Croft *et al.,* 2001; Guez *et al*., 2002; Ndlovu, 2006 and Larsson, Sogaard and Rosendal, 2007). These results do not support Walker-Bone *et al.,* (2004) study who observed that gender had a weak association to neck pain.

Marital status had a borderline significance (*p*=0,061) as a risk factor for neck pain. It was observed under marital status that being divorced increased a person's chances of developing neck pain while being single decreased the chances. Linton (2000) in his study on psychological aspects does mention that family stresses play a role in neck pain development, which would support the results that this study has observed. Similar to the results of this study Croft *et al.,* (2001) also stated in their study on risk factors for neck pain that previously married adults were at a higher risk for neck pain.

Age, number of pregnancies, including if they have had twins or triplets and the education level of the participants, were not observed to be significant in terms of risk factors for neck pain. These observations agree with Edmondston *et al.,* (2007) who observed in their study that age did not have a significant influence on neck pain. These observations differed from those of Croft *et al.,* (2001) who observed that number of children was a significant risk factor although they agreed that age did not have a significant influence on neck pain.

5.4 Occupational risk factors for neck pain

When looking at occupational status (Table 14), it was observed that it was a significant neck pain risk factor. Those participants who had neck pain were more likely to be self employed and less likely to be students. This may be a result of the high level of stresses that were experienced when owning a business. Psychological stress in the form of work stress has been stated by Guez *et al.,* (2002); Croft *et al.,* (2001) and Linton (2000) to be a risk factor for neck pain. This is in contrast to Walker-Bone *et al.,* (2004) who observed in their epidemiological study on the determinants of neck pain that employment status was a weak risk factor.

Some specific occupational tasks carried out at work are shown in Table 18. The following were observed to be significant for neck pain: work that causes your neck to turn, working with arms overhead, working on a computer, lifting heavy objects, and working in an air-conditioned room. Larsson, Sogaard and Rosendal (2007) stated in their study that repetitive work, forceful exertions, high level of static contractions, prolonged static loads, and extreme postures are related to neck pain, which most of the above tasks incorporate. Walker-Bone *et al.,* (2004) stated that blue collar workers were more at risk for neck pain probably since these workers normally indulge in physical work such as lifting heavy objects.

Computer tasks (Table 21) were looked at and not having the computer at eye level and not sitting directly in front of the computer were observed to be risk factors for neck pain. Cote *et al.,* (2008) from the Bone and Joint Task Force observed in their study that computer workstation design was a risk factor for neck pain.

Current and previous occupation (Table 15) had no significant influence on neck pain. This points to the fact that the actual activities that people perform at work have more of an affect on their neck pain rather than their specific occupation. This statement is supported by Ariens *et al.,* (2001) who observed that high quantitative job demands and low co-worker support were risk

factors for neck pain, which are components of employment not related to any specific job.

Level of skill (Table 16 and 17) was not a significant risk factor for neck pain. This contradicted the results from Lau, Sham and Wong (1996) study who stated that they observed that professionals and managers were at a significant risk for neck pain due to the increased stress of their jobs. In addition, Chiu *et al.,* (2004) found that neck pain is more common in secondary school teachers. This could once again show that there are other risk factors at work that have a larger affect on neck pain development.

When looking at income (Table 20), this study found that it was not a significant risk factor for neck pain. In Ndlovu's (2006) study, income was relevant and seen as a risk factor but in her study there were more people in the lower income bracket whereas in this study in general there were more middle-to-high income participants so level of income was not as significant.

There was no significant influence on neck pain by the type of transport used to get to work (Table 22). Here 89% of the people drove their own car to work making it difficult to find a significant risk factor for neck pain. These findings support those by Leinonen *et al.,* (2005) who found in their study on bus drivers that activation of the trapezius was minimal and so neck pain was not generally experienced by drivers.

5.5 Other risk factors for neck pain

5.5.1 Lifestyle risk factors

Stressful and emotional participants were found to be more prone to neck pain (Table 23). These fall under psychological risk factors for neck pain. Linton (2000) stated that psychological risk factors such as distress, depression and anxiety had an affect on neck pain. Carroll, Cassidy and Cote (2004) in their study on depression observed that it was a significant and

independent risk factor for neck pain. Croft *et al.,* (2001) also stated that psychological distress as a risk factor for neck pain.

The following were also observed to be significant risk factors for neck pain: perceived bad posture and posture related activities such as leaning or bending over a desk or work station, sleeping in awkward positions, carrying heavy loads on one shoulder, cradling the phone between the shoulder and ear, lack of support while sleeping, wearing glasses or contacts, and sleeping on your stomach (Table 23). Croft *et al.,* (2001) in their study observed that poor perceived health was a risk factor for neck pain, which is supported by the findings in the present study that perceived bad posture will have an effect on neck pain. Hogg-Johnson *et al.,* (2008) also showed that poorer self rated health was a risk factor for neck pain. Further, Lau, Sham and Wong (1996) stated that in their study, there is a relationship between neck pain and posture.

Possible influences from previous sources such as trauma, surgery and motor vehicle accidents (MVA) were found to be risk factors for neck pain (Table 22). This supports Guez *et al.,* (2002) who stated that a previous history of neck trauma is a risk factor for neck pain and this includes all kinds of trauma e.g. not only whiplash injuries. Croft *et al.,* (2001) also stated that a history of neck injury is an independent risk factor for neck pain.

There were only two factors found to have a borderline effect on neck pain, namely sitting without any arm support and watching television (Table 24). These factors have to do with ones posture which will be different for each person.

Factors such as access to health services, arms out stretched when reading, reading in bed, sitting without back support, wearing bifocals, exercise and number of pillows were found to be non significant factors for neck pain (Table 25). Lau, Sham and Wong (1996) however stated that reading was a risk factor for neck pain but watching television was not, but the opposite was found in this study. Although exercise has been shown to be a good influence

on health, Croft *et al.,* (2001) stated that poor health is a risk factor for neck pain. However, exercise was not found to be significant in this study.

The group statistics in Table 26 are factors from the Tables 23-25 that could be quantified by using a time factor. Only the number of hours during a day that the participants spent leaning or bending over a desk or work station had a significant influence on neck pain.

5.5.2 Exercise

The majority of specific exercises/sports (Table 27) that the participants in this study performed appeared to have no effect on neck pain with the exception of squash which was found to be preventative for neck pain and aerobics which was borderline in significance for neck pain. Larsson, Sogaard and Rosendal (2007) however stated that in their review study, strength training was found to decrease the number of neck pain cases and an increase in physical activity was found to prevent neck pain. Croft *et al.,* (2001) also mentioned in their study that poor physical fitness is a risk factor for neck pain.

5.5.3 Medical aid

The amount of people in this study that had medical aid greatly out numbered the people that did not have it making it difficult to establish a significant risk factor (Table 28).

5.6 Summary

From the results in Table 29, it can be stated that the people most at risk for neck pain would be females that were married or previously married, had a job that caused their heads to turn or worked with their arms above their heads, lived a lifestyle that had one or a combination of the following: lead a stressful lifestyle, they were emotional, had perceived bad posture, had had

neck or head trauma, slept in awkward positions, watched television, required glasses and did not play squash.

The demographics of the participants with neck pain had a mean age of 41, they were mainly married (47%) or single (30%), the average number of pregnancies was 1.7, education was high with 45% having matric and 43% with a diploma or a bachelors degree, and occupations were mainly employed (45%) and self employed (23%).

Clinically, the neck pain of the participants in this study started at a mean age of 28, was mostly intermediate (51%) in severity and pain was worst and least in the mornings with the pain also being present in the evenings. The frequency was intermittent (43%) or the pain was felt often (32%), the onset was mostly gradual without injury (48%) although 22% said they were unsure of the onset and the progression was not changing as 70% of the people said their neck pain stayed the same. Sleeping was by far the most affected activity at 28% and 43% said they had no disability with 35% saying their disability was mild. Absenteeism because of neck pain was minimal at 16% with career impact at only 4%. Associated symptoms were mainly headaches (71%) and shoulder pain (71%) with a majority of neck pain sufferers that had associated symptoms did say that neck pain was the root cause of these symptoms (>70%).

5.7 Limitations

The limitations of this study were related to the fact that the study was limited to the shopping centres at which it was conducted therefore it did not allow for certain percentages of the white population i.e. those people that do not use shopping centres. The amount of adequate space, table room and clip boards to aid the participants in filling in the questionnaire was insufficient for the amount of participants wanting to fill in questionnaires. The study also did not incorporate a statistically significant number of people from each occupation/income group to observe the occupational/income risk factors properly, therefore borderline risk factors were observed.

Chapter 6
Conclusion and Recommendations

6.1 Conclusion

The objectives that were outlined in Chapter 1 will be revisited in this chapter now that the results of the study have been recorded and discussed.

Objective 1: To determine the demographic profile of white people with neck pain.

When looking at this objective, it was noted that the participants with neck pain had a mean age of 41, were mainly female (66%), were married (46.5%) or single (28.5%), were mainly well educated with 45% having a matric and 43% having a tertiary education of either a diploma or bachelors degree, were employed (45.4%) or were self employed (23%), and of those that were female their average number of pregnancies was 1.7.

Clinically neck pain, started at the mean age of 28, was mainly moderate (51%) and mild (39.5%), was both least and most painful in the morning, was both intermittent (43.4%) and often (32%) with regards to frequency, began gradually without injury (47.6%) or the participants were unsure (22.3%) of the onset, was said to be the same (70%) with no progression, affected mostly sleeping (28%), concentrating (16%) and work (15%), had no disability (45%) but 35% of the participants had a mild disability, caused only 16.3% of the participants to be absent from their work, and was associated mostly with headaches and shoulder pain.

Objective 2: To identify factors that influence neck pain in white people

When looking at the factors that could have an influence on neck pain, specific demographic, occupational and other (lifestyle, exercise and medical cover) factors were investigated.

Of the demographic factors the only significant factor that had an increase on neck pain was gender. Being single was also borderline significant but was shown to probably decrease the chances of developing neck pain while being divorced was a borderline causative factor.

When the occupational factors for neck pain were considered, the participants that were self employed had a higher chance of having neck pain. Students had a decreased chance of having neck pain. Specific work tasks were investigated and the following were found to be causes of neck pain: work that causes the neck to turn, working with arms overhead, working on a computer, lifting heavy objects, and working in an air-conditioned room. Not having the computer at eye level and not sitting in front of the computer were also associated with neck pain.

Other risk factors that this study explored included certain lifestyle factors that were found to be relevant. These included: stress and being an emotional person, perceived bad posture and posture related activities such as leaning or bending over a desk or work station, sleeping in awkward positions, carrying heavy loads on one shoulder, cradling the phone between the shoulder and ear, lack of support while sleeping, wearing glasses or contacts, sleeping on the stomach, previous neck or head trauma, previous neck surgery and involvement in motor vehicle accidents. There were also borderline lifestyle factors. These included: sitting without any arm support and watching television. Exercises/sports were mainly non-significant except for squash and aerobics (borderline) which were preventative of neck pain.

Objective 3: To determine a correlation of risk factors and development of neck pain

Risk factors for neck pain after controlling all other factors were found to be demographics: gender, marital status, occupation: working with arms overhead, causing the neck to turn, and lifestyle: having bad posture, head or neck trauma, being emotional, not playing squash, watching TV, requiring glasses or contacts, sleeping in an awkward position, and leading a stressful life.

6.2 Recommendations

- There are still other population groups that need to be looked at from an epidemiological point of view in South Africa and these should be addressed so that further studies can compare the findings from these studies on population groups and find norms and differences within the different population groups.

- The relationship between neck and back pain needs to be addressed.

- If the questionnaire is used in further research, questions need to include N/A (not applicable) where appropriate, current occupation must come before previous occupation, and specificity of questions should be looked and modified where applicable.

- Point prevalence, period prevalence and lifetime incidence should be observed and discussed separately in future studies of this nature.

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Appendix A

CODED QUESTIONNAIRE

A clinical cohort study investigating factors associated with neck pain in the Caucasian population.

BACKGROUND INFORMATION
IDENTIFYING INFORMATION

Questionnaire Number_____

Date of Interview (____/____/____)

(A) DEMOGRAPHICS

1. How old are you? (Years)

18-20	(_1_)	21-25	(_2_)	26-30	(_3_)	31-35	(_4_)
36-40	(_5_)	41-45	(_6_)	46-50	(_7_)	51-55	(_8_)
56-60	(_9_)						

2. Gender Male (_1_) Female (_2_)

3. Marital status

Married	(_1_)	Single	(_2_)	Divorced	(_3_)
Separated	(_4_)	Widowed	(_5_)	Staying together	(_6_)

4. Number of children

N/A	(_1_)	1	(_2_)	2	(_3_)	3	(_4_)
4	(_5_)	5	(_6_)	6	(_7_)	7	(_8_)
8	(_9_)	9	(_10_)	10	(_11_)	>10	(_12_)

Twins (_13_) (***Not sure how a person would answer this one if they had 3 kids, two of which were twins.)***

5. Number of pregnancies

N/A	(_1_)	1	(_2_)	2	(_3_)	3	(_4_)
4	(_5_)	5	(_6_)	6	(_7_)	7	(_8_)
8	(_9_)	9	(_10_)	10	(_11_)	>10	(_12_)

Twins (_13_) (***Not sure how a person would answer this one if they had 3 kids, two of which were twins.)***

6. Highest level of education

Primary school	(_1_)	High school	(_2_)	Matriculated (_3_)
No formal education	(_4_)	Tertiary	(_5_)	Other (_6_) _____

7. Present occupational status

Self -employed (_1_) Unemployed (_2_) Retired (_3_)
Housewife (_4_) Employed (full-time) (_5_) Employed (part-time) (_6_)
Student (_7_)

8. If unemployed or retired, what occupation were you in for the longest period previously?

Liberal profession (_1_)	Businessman (_2_)	Artisan (_3_)
Farmer (_4_)	Unskilled worker (_5_)	Housewife (_6_)
Salesman (_7_)	Managerial (_8_)	Clerical (_9_)
Labourer (_10_)	Skilled worker (_11_)	Student (_12_)
Educator (_13_)	other (_14_) _____	

9. What was the duration of the above occupation? (years_)
0-5 (_1_) 6-10 (_2_) 11-15 (_3_) 16-20 (_4_)
2 1-25 (_5_) 26-30 (_6_) >30 (_7_)

10. If employed what type of occupation do you do?

Liberal profession (_1_)	Businessman (_2_)	Artisan (_3_)
Farmer (_4_)	Unskilled worker (_5_)	Housewife (_6_)
Salesman (_7_)	Managerial (_8_)	Clerical (_9_)
Labourer (_10_)	Skilled worker (_11_)	Student (_12_)
Educator (_13_)	other (_14_) _____	

11. For how long have you been in this occupation? (years_)
0-5 (_1_) 6-10 (_2_) 11-15 (_3_) 16-20 (_4_)
2 1-25 (_5_) 26-30 (_6_) >30 (_7_)

(B) RISK FACTORS

12. Does your occupation involve any of the following?

Lifting heavy objects (_1_)	Sitting for long periods (_2_)
Driving for long hours (_3_)	Causes your neck to turn (_4_)
Answering telephone (_5_)	Working on a computer (_6_)
Working with arms overhead (_7_)	Working in an air-conditioned room (_8_)

13. If you use a computer, is the monitor in line with eye level?
Yes (_1_) No (_2_)

14. Do you feel that your job makes you vulnerable in any way to get neck pain?
Yes (_1_) No (_2_) Unsure (_3_)

15. Total annual income of interviewee alone?
R1 -R5000 (_1_) R5000 - R15000 (_2_)
R15000 - R25000 (_3_) R25001-R35000 (_4_)

R35001 -R45000 (_5_) R45001 –R55000 (_6_)
R55001 –R65000 (_7_) R66001 –R75000 (_8_)
R75001 – R85000 (_9_) R85001 - R95000 (_10_)
>R95000 (_11_) N/A (_12_)

16. Do you worry a lot? Yes (_1_) No (_2_)
(Stress??)
17 What type of transport do you utilize most often to get to and from work?
Own Car (_1_) Bus (_3_) Bicycle (_4_)
Taxi (_2_) Walking more than 5 km (_5_)

18. Have you been involved in a motor vehicle accident? Yes (_1_) No (_2_)

19. Have you had any head or neck trauma? Yes (_1_) No (_2_)

20. Do you lean or bend over a desk? Yes (_1_) No (_2_)
(Take into consideration other jobs that require bending e.g. motor mechanic etc.)
21. If yes for how many hours?
0-2 (_1_) 2-4 (_2_) 4-6 (_3_) 6-8 (_4_) 8-10 (_5_) >10 (_6_)

21. How many pillows do you use?
None (_1_) One (_2_)
Two (_3_) Three (_4_)
>3 (_5_)

22. For how long have you been using the same pillow/s?
0-1 year (_1_) 1-2 years (_2_) 2-3 years (_3_) 3-4 years (_4_)
4-5 years (_5_) >5 years (_6_)

23. Do you normally carry items on one shoulder? Yes (_1_) No (_2_)

24. Do you hold the receiver between your shoulder and neck?
Yes (_1_) No (_2_)

25. Do you usually fall asleep in an awkward position? Yes (_1_) No (_2_)

26. Does your bed offer enough support? Yes (_1_) No (_2_)

27. Do you sleep on your tummy? Yes (_1_) No (_2_)

28. Do you hold your arms out to support a book? Yes (_1_) No (_2_)

29. Do you read in bed? Yes (_1_) No (_2_)

29. Do you sit without back support? Yes (_1_) No (_2_)

30. Do you sit without arm support? Yes (_1_) No (_2_)

31. Do you watch television? Yes (_1_) No (_2_)

32. If yes then how many hours per day?
0-1 (_1_) 1-2 (_2_) 2-3 (_3_) 3-4 (_4_) 4-5 (_5_) >5 (_6_)

33. Do you consider yourself an emotional person? Yes (_1_) No (_2_)

33. Do you do any exercise? Yes (_1_) No (_2_)

34. What type of exercise do you do most of the time?

Running	(_1_)	Swimming	(_7_)	Squash	(_13_)
Soccer	(_2_)	Cricket	(_8_)	Aerobics	(_14_)
Rugby	(_3_)	Tennis	(_9_)	Yoga	(_15_)
Fishing	(_4_)	Cycling	(_10_)	Gymnastics	(_16_)
Boxing	(_5_)	Martial arts	(_11_)	Walking	(_17_)
Badminton	(_6_)	Weight training	(_12_)	other (_18_)	

_____

35. Number of exercise sessions per week/ combined if more than one sport is played.

1	(_1_)	2	(_2_)	3	(_3_)	4	(_4_)
5	(_5_)	6	(_6_)	7	(_7_)	>7	(_8_)

36. What is the total amount of time spent each week doing exercise? (Hours)
<1 (_1_) 1-3 (_2_) 4-6 (_3_) 7-9 (_4_) >10 (_5_)

37. Do you have a medical cover? (_1_) Do you have a hospital scheme? (_2_) N/A (_3_)

38. Do you feel that you have sufficient access to health services?
Yes (_1_) No (_2_)

39. What was your age when you first experienced neck pain? (Years)

0-10	(_1_)	11-15	(_2_)	16-20	(_3_)	21-25	(_4_)
26-30	(_5_)	31-35	(_6_)	36-40	(_7_)	41-45	(_8_)
46-50	(_9_)	51-55	(_10_)	56-60	(_11_)	61-65	(_12_)
66-70	(_13_)						

<u>(C) CLINICAL:</u> only participants with neck pain can answer this section.

40. How long have you had neck pain? (Recent episode)
1 month (_1_) 1-6 months (_2_) 6-12 months (_3_) 1-2 yrs (_4_)
2-3 yrs (_5_) 3-4 yrs (_6_) 4-5 yrs (_7_) 5-10 yrs (_8_)

11-15 yrs (_9_) 16-20 yrs (_10_) 20 yrs (_11_)

41. How severe is the pain? Mild (_1_) Moderate (_2_) Severe (_3_)

42. At what time of the day is the pain worst?

Morning	(_1_)	Afternoon	(_2_)	Evening	(_3_)
Night	(_4_)	Activity related	(_5_)	N/A	(_6_)

43. At what time of the day is the pain at its least?
Morning (_1_) Afternoon (_2_) Evening (_3_) Night (_4_)
N/A (_5_)

44. How often do you experience neck pain?
Seldom (_1_) Frequently (_2_) Constantly (_3_) Intermittently (_4_)

45. How did your neck pain begin?

Gradually without injury	(_1_)	Gradually after injury	(_2_)
Abruptly without injury	(_3_)	Abruptly after injury	(_4_)
Unsure	(_5_)		

46. Progression of neck pain?

Getting worse	(_1_)	Getting better	(_2_)
Staying the same	(_3_)	Unsure	(_4_)

47. Do you have trouble in doing any of the following things because of neck pain?

Dressing	(_1_)	Washing	(_2_)
Lifting	(_3_)	Reading	(_4_)
Concentration	(_5_)	Work	(_6_)
Driving	(_7_)	Sleeping	(_8_)
Recreation	(_9_)		

48. How would you rate your overall disability because of your neck pain?

None	(_1_)	Mild	(_2_)
Moderate	(_3_)	Severe	(_4_)

49. Have you ever had to stay away from work because of your neck pain?
Yes (_1_) No (_2_)

50. If 'Yes', for how long?

0-1 week	(_1_)	>1-2 weeks	(_2_)
>2-3 weeks	(_3_)	>3- 4 weeks	(_4_)
>4 weeks	(_5_)		

51. Have you ever been bed ridden because of neck pain? Yes (_1_) No (_2_)

52. If ‘Yes’, for how long?
0-1 week (_1_) >1-weeks (_2_)
>2-3 weeks (_3_) >3- weeks (_4_)
>4 weeks (_5_)

53. Have you ever been demoted (_1_), medically boarded (_2_), fired (_3_) because of neck pain?

54. Do you suffer from headaches? Yes (_1_) No (_2_)

55. Do you suffer from shoulder pain? Yes (_1_) No (_2_)

55. Do you associate your neck pain with any other activities (e.g. customs, social activities etc?)

Appendix B

By answering the questionnaire you are consenting to be apart of my research. Please answer this questionnaire as truthfully and honestly as possible thank you.

Shopping centre: La Lucia ☐ Musgrave ☐ Pick and pay centre ☐

Date of Interview (____/____/____)

(A) DEMOGRAPHICS

1. How old are you? (Years) _____

2. Gender? Male ☐ Female ☐

3. Marital status?

Married	☐	Single	☐
Divorced	☐	Separated	☐
Widowed	☐	Staying together	☐

4.1 Number of Pregnancies? _____

4.2 Do you have twins/triplets etc? Yes ☐ No ☐

5. Highest level of education? _____

6. Present occupational status?

Self -employed	☐	Unemployed	☐
Retired	☐	Housewife	☐
Employed (full-time)	☐	Employed (part-time)	☐
Student	☐		

7. If unemployed or retired, what occupation were you in for the longest period previously?

Field of occupation		Classification of level of skill	
Administration	☐	Unskilled	☐
Agricultural	☐	Skilled	☐
Applied science	☐	Professional	☐
Arts	☐	Manager	☐
Commerce/Management	☐		

Education ☐	
Engineering ☐	
Health science ☐	
Manual Labour ☐	
Medical (includes alternative) ☐	
Sports ☐	
Other _____	

8. What was the duration of the above occupation? (years) _____

9. If employed what type of occupation are you currently involved in?

Field of occupation	Classification of level of skill
Administration ☐	Unskilled ☐
Agricultural ☐	Skilled ☐
Applied science ☐	Professional ☐
Arts ☐	Manager ☐
Commerce/Management ☐	
Education ☐	
Engineering ☐	
Health science ☐	
Manual Labour ☐	
Medical (includes alternative) ☐	
Sports ☐	
Other _____	

10. For how long have you been in this occupation? (years) _____

11. Total annual income of household?

R1 - R4800	☐	R4801 – R9600	☐
R9601 – R19200	☐	R19201-R38400	☐
R38401 –R76800	☐	R76801 –R153000	☐
R153001 –R307200	☐	R307201 –R614400	☐
R614401 – R1208800	☐	R1208801 – R2457600	☐
>R 2457601	☐	N/A	☐

12. Do you suffer from neck pain? Yes ☐ No ☐

13. Do you perceive your job as a cause or contributor of your neck pain?

Yes ☐ No ☐ Unsure ☐ N/A ☐

14. Does your occupation involve any repetition of the following?

Lifting heavy objects	☐	Sitting	☐
Driving	☐	Causes your neck to turn	☐
Answering the telephone	☐	Working on a computer	☐
Working with arms overhead	☐	Working in an air-conditioned room	☐

Other _____

15.1 If you use a computer, is the middle of the monitor at eye level?

Yes ☐ No ☐

15.2 If yes do you sit directly in front of the computer?

Yes ☐ No ☐

16.1 Do you use a laptop? Yes ☐ No ☐

16.2 If yes is the laptop raised? Yes ☐ No ☐

17. What type of transport do you utilize most often to get to and from work?

Own Car	☐	Bus	☐
Bicycle	☐	Taxi	☐
Walking	☐	Carpool	☐

18. Please answer the following table of questions:

Do you lead a stressful life style?	Yes☐	No ☐
Do you consider yourself an emotional person?	Yes☐	No ☐
Do you think that you have bad posture?	Yes☐	No ☐
Do you feel that you have sufficient access to health services?	Yes☐	No ☐

Has surgery contributed to your neck pain?	Yes☐	No ☐
Have you been involved in a motor vehicle accident?	Yes☐	No ☐
Have you had any head or neck trauma?	Yes☐	No ☐
Do you lean or bend over a desk or work station?	Yes☐	No ☐
If yes for how many hours in a day?	_____	
How many pillows do you use?	_____	
For how long have you been using the same pillow/s	_____	
Do you usually fall asleep in an awkward position?	Yes☐	No ☐
Does your bed offer enough support?	Yes☐	No ☐
Do you sleep on your tummy?	Yes☐	No ☐
Do you normally carry items on one shoulder?	Yes☐	No ☐
Do you hold the receiver between your shoulder and neck?	Yes☐	No ☐
Do you hold your arms out to support a book?	Yes☐	No ☐
Do you read in bed?	Yes☐	No ☐
Do you sit without back support?	Yes☐	No ☐
Do you sit without arm support?	Yes☐	No ☐
Do you watch television?	Yes☐	No ☐
If yes then how many hours per day?	_____	
Do you require glasses or contacts?	Yes☐	No ☐
Do you wear bifocals?	Yes☐	No ☐
Do you do any exercise?	Yes☐	No ☐

19. What type of exercise do you do most of the time?

Running	☐	Swimming	☐	Squash	☐
Soccer	☐	Cricket	☐	Aerobics	☐
Rugby	☐	Tennis	☐	Yoga	☐
Fishing	☐	Cycling	☐	Gymnastics	☐
Boxing	☐	Martial arts	☐	Walking	☐
Badminton	☐	Weight training	☐		

Other ☐ _____

20. What is the total amount of time spent each week doing exercise?
(Hours) _____

21. Do you have medical cover? Yes ☐ No ☐

only participants with neck pain should answer the following.

22. What was your age when you first experienced neck pain? (Years)
____

23. How long have you had your current episode of neck pain?
Years___Months___Days___

24. How severe is the pain? Mild ☐ Moderate ☐ Severe ☐

25. At what time of the day is the pain worst and least?

	Worst	**Least**
Morning	☐	☐
Afternoon	☐	☐
Evening	☐	☐
Night	☐	☐
Activity related	☐	☐
N/A	☐	☐

26. How often do you experience neck pain?

Seldom ☐ Intermittently ☐ Often ☐ Constantly ☐

27. How did your neck pain begin?

Gradually without injury ☐ Gradually after injury ☐
Abruptly without injury ☐ Abruptly after injury ☐
Unsure ☐

28. Is your neck pain…..?

Getting worse ☐ Getting better ☐
Staying the same ☐ Unsure ☐

29. Do you have trouble doing any of the following because of neck pain?

Dressing ☐ Washing ☐

Lifting	☐	Reading	☐
Concentration	☐	Work	☐
Driving	☐	Sleeping	☐
Recreation	☐	Exercise	☐
Other	☐		

30. How would you rate your overall disability because of your neck pain?

None	☐	Mild	☐
Moderate	☐	Severe	☐

31. Have you ever had to stay away from work because of your neck pain?

Yes ☐ No ☐

32. If 'Yes', for how long? Years___Months___days___**,** Medically boarded ☐

33. Have you ever been bedridden because of neck pain? Yes ☐ No ☐

34. If 'Yes', for how long? Years___months___days___

35.1 Has your neck pain had a negative impact on your career?

Yes ☐ No ☐

35.2 If yes were you…	demoted	☐	fired	☐
	not promoted	☐	restructured	☐

36.

Do you suffer from….			**Is it Associated with your neck pain**	
Headaches	Yes ☐	No ☐	Yes ☐	No ☐
Shoulder pain	Yes ☐	No ☐	Yes ☐	No ☐
Arm pain	Yes ☐	No ☐	Yes ☐	No ☐
Numbness	Yes ☐	No ☐	Yes ☐	No ☐

Appendix C

DURBAN
UNIVERSITY of
TECHNOLOGY

Questionnaire

Warren Neville Slabbert

By answering the questionnaire you are consenting to be apart of my research. Please answer this questionnaire as truthfully and honestly as possible thank you.

Shopping centre: La Lucia ☐

Musgrave Park ☐

Pick and pay centre ☐

Date of Interview (_____/_____/_____)

1. How old are you? (Years) _____

2. Gender? Male ☐ Female ☐

3. Marital status?

Married		Single	
Divorced		Separated	
Widowed		Staying together	

4.1 Number of Pregnancies? _____

4.2 Do you have twins/triplets etc? Yes ☐ No ☐

5. Highest level of education? _____

_____

6. Present occupational status?

Self -employed		Unemployed	
Retired		Housewife	
Employed (full-time)		Employed (part-time)	
Student			

7. If unemployed or retired, what occupation were you in for the longest period previously?

Field of occupation		Classification of level of skill	
Administration		Unskilled	
Agricultural		Skilled	
Applied science		Professional	
Arts		Manager	
Commerce/Management			
Education			
Engineering			
Health science			
Manual Labour			
Medical (includes alternative)			
Sports			
Other			

8. What was the duration of the above occupation? (years) _____

9. If employed what type of occupation are you currently involved in?

Field of occupation		Classification of level of skill	
Administration		Unskilled	
Agricultural		Skilled	
Applied science		Professional	
Arts		Manager	
Commerce/Management			
Education			
Engineering			
Health science			
Manual Labour			
Medical (includes alternative)			
Sports			
Other			

10. For how long have you been in this occupation? _____(years)

11. Total annual income of household?

R1 - R4800			R4801 - R9600		
R9601 - R19200			R19201 - R38400		
R38401 - R76800			R76801 - R153000		
R153001 - R307200			R307201 - R614400		
R614401 - R1208800			R1208801 - R2457600		
>R 2457601			N/A		

12. Do you suffer from neck pain?

Yes ☐ **No** ☐

13. Do you perceive your job as a cause or contributor of your neck pain?

Yes ☐ No ☐ Unsure ☐ N/A ☐

14. Does your occupation involve any repetition of the following?

Lifting heavy objects		Sitting	
Driving		Causes your neck to turn	
Answering the telephone		Working on a computer	
Working with arms overhead		Working in an air-conditioned room	
Other:			

15.1 If you use a computer, is the middle of the monitor at eye level?

Yes ☐ No ☐

15.2 If yes do you sit directly in front of the computer?

Yes ☐ No ☐

16.1 Do you use a laptop?

Yes ☐ No ☐

16.2 If yes is the laptop raised?

Yes ☐ No ☐

17. What type of transport do you utilize most often to get to and from work?

Own Car		Bus	
Bicycle		Taxi	
Walking		Carpool	

18. Please answer the following table of qu

Yes	No

Do you lead a stressful life style?		
Do you consider yourself an emotional person?		
Do you think that you have bad posture?		
Do you feel that you have sufficient access to health services?		
Has surgery contributed to your neck pain?		
Have you been involved in a motor vehicle accident?		
Have you had any head or neck trauma?		
Do you lean or bend over a desk or work station?		
If yes for how many hours in a day?		
How many pillows do you use?		
For how long have you been using the same pillow/s		
Do you usually fall asleep in an awkward position?		
Does your bed offer enough support?		
Do you sleep on your tummy?		
Do you normally carry items on one shoulder?		
Do you hold the receiver between your shoulder and neck?		
Do you hold your arms out to support a book?		
Do you read in bed?		
Do you sit without back support?		
Do you sit without arm support?		
Do you watch television?		
If yes then how many hours per day?		
Do you require glasses or contacts?		
Do you wear bifocals?		
Do you do any exercise?		

19. What type of exercise do you do most of the time?

Running		Swimming		Squash		Soccer	
Cricket		Aerobics		Rugby		Tennis	
Yoga		Fishing		Cycling		Gymnastics	
Boxing		Martial arts		Walking		Badminton	

Weight training		Other		

20. What is the total amount of time spent each week doing exercise?

(Hours) _____

21. Do you have medical cover? Yes ☐ No ☐

ONLY PARTICIPANTS WITH NECK PAIN SHOULD ANSWER THE FOLLOWING.

22. What was your age when you first experienced neck pain?_____ (Years)

23. How long have you had your current episode of neck pain?

Years:_____Months:_____Days:_____

24. How severe is the pain? Mild ☐ Moderate ☐ Severe ☐

25. At what time of the day is the pain worst and least?

	Worst	**Least**
Morning		
Afternoon		
Evening		
Night		
Activity related		
N/A		

26. How often do you experience neck pain?

Seldom ☐ Intermittently ☐ Often ☐ Constantly ☐

27. How did your neck pain begin?

Gradually without injury ☐ Gradually after injury ☐

Abruptly without injury ☐ Abruptly after injury ☐

Unsure ☐

28. Is your neck pain…..?

Getting worse ☐ Getting better ☐

Staying the same ☐ Unsure ☐

29. Do you have trouble doing any of the following because of neck pain?

Dressing		Washing	
Lifting		Reading	
Concentration		Work	
Driving		Sleeping	
Recreation		Exercise	
Other			

30. How would you rate your overall disability because of your neck pain?

None ☐ Mild ☐

Moderate ☐ Severe ☐

31. Have you ever had to stay away from work because of your neck pain?

Yes ☐ No ☐

32. If 'Yes', for how long?

Years:_____Months:_____Days:_____Medically boarded ☐

33. Have you ever been bedridden because of neck pain?

Yes ☐ No ☐

34. If 'Yes', for how long? Years:_____Months:_____Days:_____

35.1 Has your neck pain had a negative impact on your career?

Yes ☐ No ☐

35.2 If yes were you…

Demoted ☐ Fired ☐ Not promoted ☐ Restructured ☐

36.

Do you suffer from….			**Is it Associated with your neck pain**	
	Yes	No	Yes	No
Headaches				

Shoulder pain				
Arm pain				
Numbness				

Appendix D

LETTER OF INFORMATION

Dear Participant,

I would like to welcome you and thank you for participating in my study.

The title of my research project is:

An epidemiological investigation of neck pain in the white population in the greater Durban area.

Name of Supervisor: Dr Vilash Boodhoo; M.Tech Chiropractic
Name of Researcher: Warren Neville Slabbert
Name of Institution: Durban University of Technology

To understand my study I have listed the aim and objectives below.
The aim of this investigation is to determine the prevalence of and risk factors for neck pain in the white population.

The following are the objectives for the study:

- To determine the demographic profile of white people with neck pain.
- To identify factors that influence neck pain in white people.
- To determine a correlation of risk factors and development of neck pain.

For this study you will be required to complete a questionnaire that will look at certain demographical and clinical information as well as factors that will affect neck pain. This questionnaire will be completed in my presence so if there are any misunderstandings you can consult me on the issue.

Your participation in this study is much appreciated. Your comments and contributions will be kept confidential. The results of this study will be used for research purposes only.

If you have any further questions please contact me on 0313732205 or my supervisor on 0837877086.

Yours sincerely,

Warren Slabbert
Researcher

Dr Vilash Boodhoo
Supervisor

Appendix E

LETTER OF INFORMATION FOR THE SHOPPING CENTRES MANAGER

Dear Madam/Sir

RE: Permission for the use of your premises on Saturdays, Sundays and one day during the week to complete my masters research.

The title of my research project is:

An epidemiological investigation of neck pain in the white population in the greater Durban area.

To understand my study I have listed the aim and objectives below.
The aim of this investigation is to determine the prevalence of and risk factors for neck pain in the white population.

The following are the objectives for the study:

- To determine the demographic profile of white people with neck pain.
- To identify factors that influence neck pain in white people.
- To determine a correlation of risk factors and development of neck pain.

For this study I will be requiring the use of your premises to distribute my questionnaire to the participants that agree to participate. I will only need to be on the outside at the entrance of the supermarkets (eg. Pick and Pay) from 8am to 5pm on Saturdays, Sundays and one day during the week. The participants will complete a questionnaire that will look at certain demographical and clinical information as well as factors that will affect neck pain. This questionnaire will be completed in my presence and should take no longer then 6 minutes per participant to complete.

The use of your premises for this study will be much appreciated.

If you have any further questions please contact me on 0828278753 or my supervisor on 0837877086.

Yours sincerely,

Warren Slabbert
Researcher

Dr Vilash Boodhoo
Supervisor

Appendix F

CONFIDENTIALITY STATEMENT – FOCUS GROUP DECLARATION

IMPORTANT NOTICE:
THIS FORM IS TO BE READ AND FILLED IN BY EVERY MEMBER PARTICIPATING IN THE FOCUS GROUP, BEFORE THE FOCUS GROUP MEETING CONVENES.

1. All information contained in the research documents and any information discussed during the focus group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. The returned questionnaires will be coded and kept anonymous in the research process.
3. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
4. The information from this focus group will be made public in terms of a journal publication, which will in no way identify any participants of this research.
5. Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Member represents	Member's Name	Signature	Contact Details

Appendix G

INFORMED CONSENT FORM

(TO BE COMPLETED BY THE PARTICIPANTS OF THE FOCUS GROUP)

DATE:

TITLE OF RESEARCH PROJECT:

An epidemiological investigation on neck pain in the South African Caucasian population of the greater Durban area

NAME OF SUPERVISOR:

Dr Vilash Boodhoo; M.Tech Chiropractic.

NAME OF RESEARCH STUDENT:

Warren Slabbert

Please circle the appropriate answer	**YES /NO**	
1. Have you read the research information sheet?	Yes	No
2. Have you had an opportunity to ask questions regarding this study?	Yes	No
3. Have you received satisfactory answers to your questions?	Yes	No
4. Have you had an opportunity to discuss this study?	Yes	No
5. Have you received enough information about this study?	Yes	No
6. Do you understand the implications of your involvement in this study?	Yes	No
7. Do you understand that you are free to:		
a) Withdraw from this study at any time?	Yes	No
b) Withdraw from the study at any time, without reasons given.	Yes	No
c) Withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban University of Technology.	Yes	No
8. Do you agree to voluntarily participate in this study?	Yes	No
9. Who have you spoken to regarding this study?		

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature: _____

Researcher's Name: _____ Signature: _____

Supervisor's Name: _____ Signature: _____

Co-Supervisor's Name: _____ Signature: _____

Appendix H

LETTER OF INFORMATION – FOCUS GROUP

Dear Participant,

I would like to welcome you and thank you for participating in the focus group of my study.

The title of my research project is:

An epidemiological investigation on neck pain in the South African white population of the greater Durban area.

Name of Supervisor: Dr Vilash Boodhoo; M.Tech Chiropractic
Name of Assistant Supervisor: Dr Charmaine Korporaal; M.Tech Chiropractic
Name of Researcher: Warren Neville Slabbert
Name of Institution: Durban University of Technology

The purpose of the focus group is to validate the coded Questionnaire. As members of the focus group, you will be required to review and discuss the questionnaire in terms of gathering information from the participants, with respect to factors influencing neck pain.

In this Focus group the process of validation of a Questionnaire will be done by a critical analysis of the Questionnaire, focusing on the factors that influence neck pain and the clinical presentation of the neck pain. Thus with the experience (by you) our discussions will focus on these points.

If at any time during the discussions you disagree with a suggestion/finding please voice your disagreement and your reasons as this will aid in the reaserch process.

Your participation in this study is much appreciated. Your comments and contributions will be kept confidential. The results of this focus group will be used for research purposes only.

If you have any further questions please contact me or my supervisor.

Yours sincerely,

Warren Slabbert
(Researcher)

Dr Vilash Boodhoo
(Supervisor)

Appendix I

Code of conduct

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

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

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

2. Due respect to be given to every suggestion and comment by any member of the focus group and be debated with reference to the outcomes of the research.

3. The information gathered from this focus group by the researcher will be made public in terms of a mini dissertation and journal publication. The researcher will ensure that any participants in the focus group and research remain anonymous and confidential.

Member represents	**Members name**	**Signature**	**Contact details**

Appendix J

ETHICS CLEARANCE CERTIFICATE

Student Name	**Warren Slabbert**	Student No.	**20300563**
Ethics	FHSEC 003/09	Date of FRC Approval	23/3/2009
Research Title:	An epidemiological investigation of neck pain in the White population in the greater Durban area.		

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

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

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

SIGNATURE OF STUDENT/RESEARCHER — 24/02/2009 DATE

SIGNATURE OF SUPERVISOR/S — 2009-02-24 DATE

SIGNATURE OF HEAD OF DEPARTMENT — 24/2/09 DATE

SIGNATURE: CHAIRPERSON OF RESEARCH ETHICS COMMITTEE — 24-02-09 DATE