WORK RELATED NECK PAIN AMONGST UNIVERSITY

ADMINISTRATIVE STAFF

BY

SHILPA PANWALKAR

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Supervisor: Prof. José Frantz

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<u>**Shilpa Panwalkar**</u>

<u>**KEYWORDS**</u>

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University administrative workers

Computer users

Neck pain

Sedentary work

Work related factors

Individual factors

Psychosocial factors

Disability

South Africa

ABSTRACT

Work related musculoskeletal injuries in computer users are an increasing concern as the use of computers proliferates throughout all levels of many organizations and institutions. Ever changing work patterns require management and professional staff to use their computers more often to perform their work efficiently. An explicit relation has been described between the development of neck pain and work related risk factors such as neck and arm postures, workplace design and nature of work involved. Psychosocial and psychological factors, such as stress, tension, depression, and job satisfaction also contribute in the development of neck pain. In turn, there exists an adverse impact on the productivity of work and employee wellbeing. This study aimed at identifying the factors contributing towards work related neck pain amongst university administrative staff, its impact on everyday life activities and in turn its prevalence. A quantitative descriptive cross sectional study design was used amongst the administrative staff at the University of The Western Cape, South Africa. Data collection was carried out with the help of a questionnaire which was administered by the researcher in person. Data was analysed with both descriptive and inferential statistics using SPSS and SAS for windows. Chi-square test and logistic regression analysis

was done. The results of this study revealed a very high prevalence of work related neck pain amongst university administrative staff. A strong association was also shown between the proposed predisposing factors and the existing work related neck pain. The results showed a definite impact on most of the activities of daily living. These results can be used as baseline to create awareness on the predisposing factors to work related neck pain and the disability caused by the same, in turn promoting a healthier quality of life amongst employees and an improved work performance profiting the employer and hopefully, a contribution to the Physiotherapy profession globally.

DECLARATION

I hereby declare that "Work related neck pain amongst university administrative staff" is my own work, that it has not been submitted for any degree or examination at any other university, and that all sources used or quoted have been indicated and acknowledged by complete references.
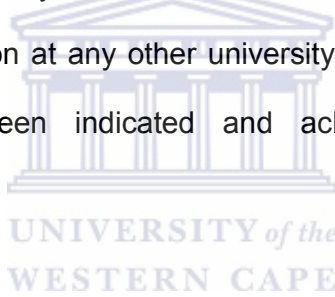
Shilpa Panwalkar

Signature..

Prof. José Frantz

Witness...

ACKNOWLEDGEMENTS

At the outset, I would like to thank God for granting me the perseverance and patience to go through with this work.

I would earnestly like to convey my gratitude to my supervisor Prof. José Frantz for her unending support, patience and faith in me. Without her guidance, this task would be unachievable.
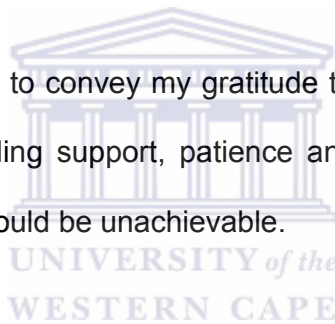
A special note of thanks and appreciation goes to my statistician Ian and the Pet project for helping me through the trying task of data analysis. A big thank you goes to all the participants of this study.

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TABLE OF CONTENTS

1.0 CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION TO THE CHAPTER

This chapter describes the relevant information related to the prevalence of work related neck pain in various parts of the world and its consequences. The chapter also includes the background and rationale for conducting this study, as well as the aim and objectives of this study. The chapter concludes with the definitions of terms used in this study and a summary of the chapters.

1.2 BACKGROUND OF THE STUDY

The past two decades showed rapid developments in technology which resulted in the increased use and requirement of computers at the workplace (James, Harburn & Kramer, 1997; Gerr, Monteilh & Marcus, 2006). Varying requirements and demands at each profession require these skilled staff to use computers more in order to be able to perform their tasks efficiently (Evans & Patterson, 2000). This frequent use and requirement of computers was associated with a substantial increase in the incidence of work related musculoskeletal disorders (WRMD'S) (James et al., 1997). Significant positive findings were established between the percentage of work done in the sitting posture and the associated neck pain, suggesting that there was an increased risk of neck

11

pain for workers who spent more than 95% of their working time in a sitting posture (Ariens, Bongers, Douwes, Miedema, Hoogendoorn, Van der Wal, Bouter &Van Mechelen, 2001).

Various studies suggested a positive finding between neck flexion and neck pain (Ariens et al., 2001; Vikaari-Juntura, Martikainen, Luukkonen, Mutanen, Takala & Riihimaki, 2001 & Hush, Maher & Refshauge, 2006). Research showed that computer users were affected most frequently by musculoskeletal disorders of the neck and lower back followed by the shoulder, wrists, hands and to a lesser extent the elbows (James et al., 1997).

As a patient aptly described: "working on a computer leads to static posturing similar to that of a duck with the neck sticking out and the arms sticking out like the wings of a chicken" (R. Ratti, personal communication, January 29, 2007). Prolonged sitting and typing activity, leads to computer users undergoing static contractions of the neck and shoulder muscles, which in turn increases the development of static posturing, eventually causing fatigue and several musculoskeletal disorders. Literature showed that immobilization and static work lead to reduced blood circulation, which prevents the proper supply of nutrients to the muscles, and an accumulation of waste products, causing fatigue and pain and that on a daily basis, persistence of these conditions could result
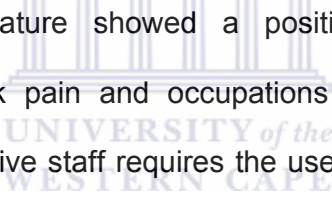
in chronic musculoskeletal disorders (James et al., 1997 & Tsauo, Lee, Hsu, Chen & Chen, 2004).

Research based evidence suggested that work related neck pain could have a multifactorial etiology and that there existed an interaction between the work related physical factors, individual factors and psychosocial factors which lead to the development of this neck pain (Evans & Patterson, 2000; Ariens et al., 2001; Korhonen, Ketola, Toivonen, Luukkonnen, Hakkanen & Vikaari-Juntura, 2003 & Wahlstrom, Hagberg, Toomingas & Tornqvist, 2004). The use of a computer at work in awkward/ abnormal postures has been recognized as a risk factor for neck pain at work. Poor workplace ergonomics leads to postural stress which has also been identified as a predisposing factor to work related neck pain (Evans & Patterson, 2000; Liao & Drury, 2000 & Korhonen et al., 2003). It was thus vital to identify the predisposing factors causing neck pain associated with computer usage to make it easier to avoid the disabilities related to work related neck pain, and in turn improve the distress caused by this work related neck pain leading to a better quality of life for both the employee and the employer.

1.3. SIGNIFICANCE OF THE STUDY

No research has been done on work related neck pain amongst university administrative staff in South Africa. This study endeavors to identify the prevalence and predisposing factors that cause work related neck pain.

13

The facts from this study will provide data on the prevalence, factors contributing to work related neck pain, as well as illustrate the impact of this prevailing neck pain on the quality of life amongst university administrative staff. This data will enable the South African physiotherapists and physiotherapists globally to go further than just treating the symptoms and develop appropriate intervention measures aimed at preventing work related neck pain. Thus the facts will serve as a valuable tool enabling health professionals to create awareness on the prevalence, predisposing factors and prevention of this work related neck pain thereby creating a healthier quality of life.

Review of the literature showed a positive relation between the development of neck pain and occupations involving computer work. University administrative staff requires the use of computers for their day to day work. Physiotherapy out patient departments where the researcher worked in Zambia and India encountered many administrators working in companies, banks, educational institutes etc complaining of work related neck pain on a regular basis.

Neck pain is believed to have a multifactorial etiology, with physical, psychosocial and individual factors interacting with the development of this disorder. Some investigators concluded that psychosocial factors are

of a greater importance than physical factors, while some concluded that the physical factors; workplace design, postures while performing tasks are of more importance (Grant, Jull & Spencer, 1997; Evans et al., 2000; Liao & Drury, 2000; Ariens et al., 2001; Korhonen et al., & Wahlstrom et al., 2004). The bottom line being, whatever the factor causing this work related neck pain, there existed an adverse impact on the outcome and productivity of work and employee wellbeing (Haartz & Sweeney, 1995; James et al., 1997; Evans & Patterson, 2000; Korhonen et al., 2003 & Wahlstrom et al., 2004). Health Policy makers can also employ the results obtained from this study to develop policies or programs aimed at improving the work productivity and quality of life of workers affected by work related neck pain.
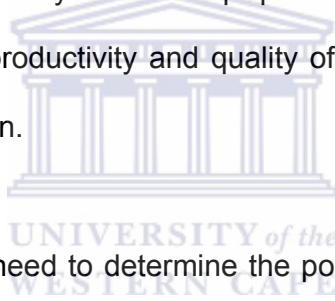
This highlighted the need to determine the possible causes and highlight the effects caused in terms of disability of this work related neck pain creating a healthier quality of life, benefiting both the employer and the employee. The physiotherapy profession believes in the familiar adage that "Prevention is better than cure" and this study will help in identifying the causes of the disorder and in turn educating people on its prevalence, causes and disability caused due to the same and in turn help in it's prevention.

1.4. STATEMENT OF THE PROBLEM

There existed a very high risk of developing work related musculoskeletal disorders, namely neck pain, amongst university administrative staff since their job involves the constant use of computers on a daily basis.

1.5 AIM OF THE STUDY

To determine the factors that contribute to work related neck pain amongst the administrative staff at the University of the Western Cape and to show the impact of this work related neck pain on everyday life

1.6 OBJECTIVES

1. To identify the prevalence of work related neck pain among the University of the Western Cape administrative staff (UWC administrative staff).

2. To identify the predisposing factors to work related neck pain among the UWC administrative staff.

3. To determine the impact of work related neck pain on the everyday life of the UWC administrative staff.
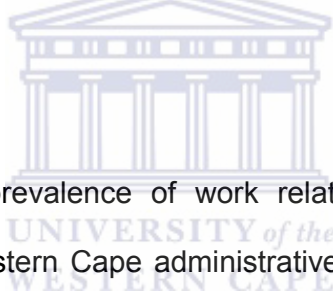
1.7   DEFINITION OF TERMS-

1.7.1 Work related neck pain:

Intermittent pain or stiffness extending from the base of the skull along the neck and to the shoulders, associated with static postures and repetitive movements of the neck or forceful continuous movements of the arm in a sitting posture work (Ariens et al., 2001).

1.7.2 Repetitive strain injuries:

These injuries consist of a variety of musculoskeletal disorders, mostly related to tendons, muscles and joints. These disorders mostly affect the neck, back and upper limbs and are mostly caused by repetitive and forceful motions, awkward postures, work related conditions and ergonomic risks (Yassi, 1997).

1.8   OUTLINE OF CHAPTERS-

Chapter one describes the background of the study. The association between the development of neck pain related to work has been described. The significance of the study has been highlighted and the aims and objectives of the study have been stated.

Chapter two presents the review of literature that is applicable to this

study. The chapter illustrates the world wide prevalence of work related neck pain. The possible predisposing factors have also been highlighted. Associations between these possible predisposing factors and the development of work related neck pain have been demonstrated. The impact of this work related neck pain on the activities of daily living has been highlighted. The statistics of individuals suffering with work related neck pain have also been discussed.

Chapter three describes the methodology followed in this study. It highlights the research setting and design used in this study. The population and sampling techniques have been described in this chapter. Details on the pilot study conducted addressing issues of validity and reliability have also been described in this chapter. The instrument used in this study has been explained in detail in this chapter along with a report on ethical considerations.

Chapter four presents the results of the study. The results are pertinent to the objectives of this study and are presented in accordance with the objectives of this study. Detailed statistics of this study have been reported in a tabulated format.

Chapter five summarizes the major findings of this study. This is further discussed in relation to previous studies conducted in the same area. An

effort is made to highlight the significance of the findings of this study in this chapter. The chapter also highlights the relevance of the results obtained in this study to rehabilitation professionals globally and within South Africa.

Chapter six presents the summary and conclusion of the study. It ends with a few recommendations. The chapter also describes the limitations encountered during the course of the study.

CHAPTER 2.0

LITERATURE REVIEW

2.1   INTRODUCTION

This chapter highlights the varying prevalence of work related neck pain globally. It also discusses the pathophysiology of neck pain and the predisposing factors contributing to work related neck pain. The chapter also stresses on the impact of work related neck pain on the quality of life of the people affected by it and concludes with illustrating the benefits of intervention to minimize the occurrence of this work related neck pain.

2.2   PREVALENCE OF WORK RELATED NECK PAIN

Work related neck pain in computer users, has become an increasing concern today because of the widespread use of computers at all levels in several companies, businesses and professional institutions, for simplification of work and faster completion of tasks (James et al., 1997; Gerr et al., 2006 & Hush, Maher & Refshauge, 2006). According to research done by Haartz and Sweeney (1995) work related musculoskeletal disorders (WMD's) had been an identified problem since the 17th century and that Bernardo Ramazzini was the first person to describe these discomforts caused due to violent and irregular motions and abnormal body postures. Their study showed that towards the end of

the 19th century, similar conditions and symptoms were noted in other occupations such as shoemakers, milkmaids and seamstresses. They also reported that during the 20th century, the incidence of WMD's escalated dramatically in the United States and in the other industrial countries incurring immense economic and human costs in conjunction with lost work days and reduced productivity.

According to Gerr et al., (2006) the earliest citation on the associations between computer use and musculoskeletal disorder outcomes was in 1983. The past 2 decades showed an escalating rise in work related musculoskeletal disorders. This was due to the increase in computer usage for enhanced work performance and better productivity to keep in pace with the rapidly advancing lifestyle. This went hand in hand with decreased work performance and an increase in sick leave applications due to these disorders (Grant et al., 1997; Evans & Patterson, 2000; Liao & Drury, 2000; Ariens et al., 2001; Korhonen et al., 2003 & Wahlstrom et al., 2004;).

Globally, millions of professional workers require the use of the computer for enhanced work performance (Gerr et al., 2006). Reports of adverse health effects by this computer use had been elicited in previous research done. In the United Kingdom, 1 in 50 of all workers reported a work related disorder resulting in 5.4 million working days lost in sick leave, due

to the disorder, while 60 % of Australian children using laptops in school experienced discomfort. Among Dutch university students, 40% reported neck pain associated with computer usage (www.rsi.org.uk, 2003). WMD's have been seen for years in telegraphers, employers in the meat and poultry industries, journalists, surgeons, dentists, etc (Pascarelli & Hsu, 2001).

In their study to determine the prevalence of neck pain in the world population, Feger, Kyvik & Hartvigsen (2006) reported that neck pain was a serious global public health issue affecting the quality of life of the individuals affected by neck pain. In a study done by Chiu & Lam (2007) it was reported that there existed a 69.3 % lifetime prevalence of neck pain and a one year prevalence of 66.7% of neck pain amongst secondary school teachers in Hong Kong. While the prevalence appeared varied among different nations, the situation was essentially similar amongst industrialized countries (Jensen & Harms-Ringdahl, 2007). According to the study by Jensen & Harms-Ringdahl (2007) neck disorders were one of the most common reasons for both short term and long term sick leaves and disability pensions.

Higher prevalence of work related neck pain was seen in the female gender and older age. Smoking was found to be a health behavioral factor contributing to the presence of work related neck pain (James et al., 1997

& Vikaari-Juntura, Martikainen, Luukkonnen, Mutanen, Takala, Riihimaki, 2001). Individuals suffering from high job strain and high perceived muscular tension also showed a prevalence of work related neck pain (Wahlstrom et al., 2004). The study done by Evans and Patterson (2000) showed higher incidences of neck and shoulder pain exhibited amongst non-secretarial computer users with 65 % of non-secretarial computer users experiencing neck pain.

On the basis of a population-based epidemiological study conducted by Jensen & Harms-Ringdahl (2007) it was illustrated that there existed a life time prevalence of neck pain of approximately 67% in the Canadian population and 71% prevalence of neck pain in the Finnish population. The study also stated that there existed a 7% prevalence of work related neck pain in a Danish survey of workers performing monotonous repetitive work as opposed to 3.8% of the population considered in the study conducted. According to the study conducted by Guez, Hildingsson, Nilsson & Toolanen (2002), in the (WHO) MONICA project held in the northernmost countries of Sweden, 43% of the population reported neck pain with a higher prevalence seen in females over males.

Lau, Sham & Wong (1996) reported that there was a higher prevalence of work related neck pain seen amongst occupational groups which consisted of secretaries and office workers and their study revealed a

28% lifetime prevalence rate of work related neck pain and a 16% one year prevalence rate of neck pain amongst the Hong Kong Chinese. It was also revealed that neck pain appeared to be more common among the populations of the higher levels of society and was found that managers and professionals were at a higher risk of developing work related neck pain (Lau et al 1996 & Chiu & Lam, 2007).

From the review of literature, it was evident that no such study was conducted in Africa. Thus, the need was created to conduct this study in Africa and establish the prevalence of work related neck pain in Africa. South Africa being an industrialized country, the researcher felt it appropriate to conduct this study in this country. Also, very little research was actually done on the prevalence of work related neck pain amongst university administrative staff as compared to the other occupations discussed in the review of literature. The alarming prevalence of this disorder associated with computer usage thus created the need for further research to be conducted in order to understand the actual cause-effect relationship associated with computer work.

2.3   PATHOPHYSIOLOGY OF WORK RELATED NECK PAIN

Work related neck pain is classified under overuse syndromes which are also commonly referred to as Cumulative trauma disorders or Repetitive strain injuries (Tulder, Malmivaara & Koes, 2007). Quite a few

propositions subsist for the pathophysiology of these disorders, however these propositions lack scientific evidence (Tulder et al., 2007). Persistent work related musculoskeletal disorders are described differently in diverse parts of the world. Yassi (1997) reported that persistent work related musculoskeletal disorders were referred to as Repetitive Stress Injuries in Canada and the UK. These injuries were referred to as Occupational overuse syndromes in Australia and were referred to as Cervicobrachial syndrome or occupational cervicobrachial syndromes in Japan and Sweden. Whereas, in the United States, work related occupational disorders were referred to as Cumulative Trauma disorders. Yassi (1997) described another term for work related neck pain as "Cervical Syndrome which included symptoms of a stiff neck, pain, headaches, numbness and tingling pain radiating down either upper extremity".
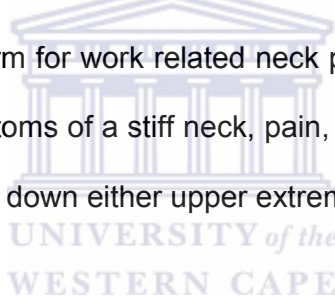
These injuries are caused by repeated sub maximal overload and friction wear to a muscle or tendon resulting in inflammation and pain (Yassi 1997 & Tulder et al., 2007). This repetitive strain commonly leads to muscular dysfunction resulting in loss of normal mobility or painful mobility in the area or then the strain causes reflex muscle guarding of the involved muscle. The precipitating event causes repetitive micro trauma or repeated strain overload over time resulting in structural weakening or fatigue breakdown of the connective tissue with collagen fiber cross link breakdown and inflammation. This eventually leads to dysfunction of the

muscle involved (Kisner, C & Colby, L (4th ed.). (2002). Therapeutic Exercise, Foundations and Techniques: Jaypee Brothers Medical Publishers (P) Ltd).

Cagnie, Danneels, Van Tiggelen , De Loose & Cambier, (2007) stated that there existed innumerable pathophysiological mechanisms of neck pain disorders. Their study illustrated the Cinderella hypothesis to be the pathophysiology behind work related neck pain. This hypothesis showed a selective and sustained activation of type 1 motor units to be the most influential factor towards the development of muscle damage caused by sustained low-intensity activities. They also hypothesized that this lead to the accumulation of calcium in the active motor units accompanied by supplementary homeostatic disturbances caused by decreased blood supply and lack of waste metabolite removals in the affected muscles with larger numbers of active motor units. They also suggested the existence of additional mechanisms contributing to work related neck pain in the form of nociceptor sensitization caused by intra-muscular shear forces (Cagnie et al., 2007).

In several cases, arriving to a specific diagnosis is impossible and often the complaints are labeled as non-specific in nature. This is because repetitive strain injuries are not a single diagnosis on its own but are

caused by a number of repetitive movements, prolonged awkward positions, sustained force and other risk factors such as workplace factors, individual factors and psychosocial factors (Tulder et al; 2007).

The prolonged use of the computer is associated with static loads placed on the musculoskeletal system, particularly on the neck and the shoulders leading to a poor sustained posture. Repetitive and static activity of the muscles of the neck, shoulder girdle and the upper limb in these poor postures are considered to be a provoking factor to the development of work related neck pain (James et al., 1997; Grant et al., 1997; Pascarelli & Hsu, 2001 & Falla, Jull, Russell, Vicenzino & Hodges, 2007;). In a seminar conducted by Tulder et al (2007) they made evident that although repetitive strain injuries was a common disorder seen amongst individuals who worked, and that occupational factors played a major contributing role in the development of these disorders, non-occupational factors could also cause these injuries.

It therefore can be summed that work related neck pain can be caused as follows-

Muscle Tension + Repetitive motion + Over Use + Incorrect or Static Posture = Work related neck pain.

SCHEMATIC REPRESENTATION OF THE SELF-PERPETUATING CYCLE OF MUSCLE SPASM COMMONLY SEEN IN WORK RELATED MUSCULOSKELETAL DISORDERS (Kisner, C & Colby, L (4th ed.). (2002). Therapeutic Exercise, Foundations and Techniques: Jaypee Brothers Medical Publishers (P) Ltd).

TRAUMA (Direct/indirect) OR INFLAMMATION OR EMOTIONAL TENSION OR PROLONGED IMMOBILIZATION

REFLEX MUSCLE CONTRACTION

RESTRICTED MOVEMENT

CIRCULATORY STASIS

PAIN AND MUSCLE SPASM
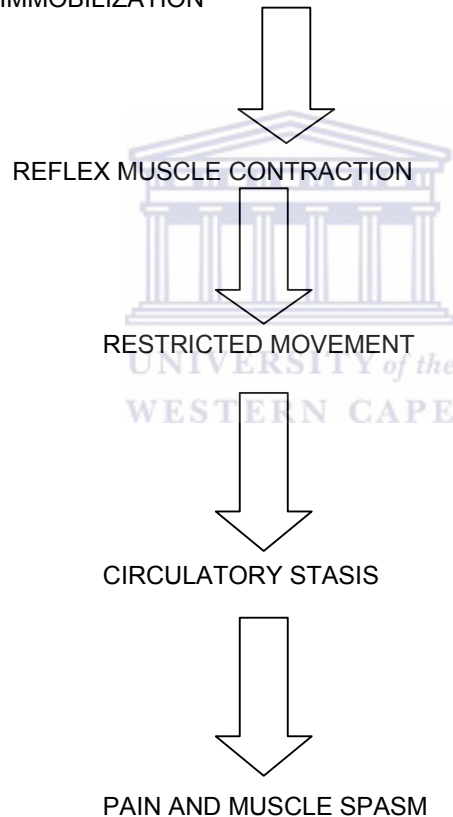
2.4   FACTORS CONTRIBUTING TO WORK RELATED NECK PAIN

According to literature based evidence, perceived muscular tension, job

strain and physical exposure were identified and linked with the presence of work related musculoskeletal disorders, namely neck pain, amongst computer users. Psychosocial factors, individual factors and physical work load factors were also considered contributing factors to neck pain (Li & Buckle, 1999; Chiu et al., 2002; Korhonen et al., 2003 & Wahlstrom et al., 2004). Jensen (2007) reported high prevalence ratios seen associated to high job demands, neck/shoulder injury and the female gender and low pain thresholds. Thus suggesting that work related neck pain was of a multi-factorial nature. For more clarity on the multifactorial nature of work related neck pain, these predisposing factors are divided into work related, individual and work stress related factors.

2.4.1 Work related factors

Poor workplace design caused increases in physical stress as well as decreases in work performances thereby showing an association between sitting posture and development of neck pain (Grant et al., 1997; Evans & Patterson, 2000; Liao & Drury, 2000; Ariens et al., 2001; Korhonen et al., 2003 & Wahlstrom et al., 2004). Evans & Patterson (2000) suggested that poor typing skills coupled with long periods spent in faulty postures and work related tension had also been established as a predisposing factor to work related neck pain. The placement of the computer monitor with reference to the horizontal eye level was also a provocative factor to the development of neck pain as demonstrated by Limerick, Plooy, Fraser

29

& Ankrum (1999) in their study to identify the influence of computer monitor height on head and neck posture. Prolonged neck holding in the forward bent posture while working at the computer was also proven to be a contributory factor to work related neck pain (Chiu, Ku, Lee, Sum, Wan, Wong & Yuen, 2002 & Cagnie, Danneels, Van Tiggelen, De Loose & Cambier, 2007). Sustained poor postures while performing work on the computer along with static loading of the associated muscles of the neck, shoulder and the upper limb were all considered as predisposing factors to work related neck pain (Grant et al., 1997).

Chiu et al., (2002) stated that "the load on the neck is correlated to the trunk and head position" and that an exaggeration of one spinal curve led to either a compensatory increase or reduction in the next spinal curve. They reported that an increased cervical lordosis accompanied by the contraction of the cervical extensor muscles led to an increased pressure posteriorly on the intervertebral disks and a decrease in the spinal foramen leading to a possible compression of the nerves, resulting in the development of neck pain.

The researcher as an Indian and Zambian Physiotherapist came across large numbers of patients with complaints of work related neck pain with a higher prevalence amongst people from the administrative occupations; accountants, bankers, administrative personnel and basically people

engaged with desk jobs and with computer usage for over 2 hours daily. There was enough evidence present showing the relationship between neck pain and computer usage (Korhonen et al., 2003).

2.4.2 Individual factors

Cagnie et al; (2007) suggested that because of the smaller stature and lesser strength in the shoulder muscles seen in women, there exists a higher prevalence of work related neck pain amongst the female gender. Physical inactivity and lower levels of exercise frequency were also demonstrated to be predisposing factors contributing to work related neck pain. However, Chiu, Ku, Lee, Sum, Wan, Wong & Yuen (2002) reported that even after the ergonomic factors were adjusted to suit the smaller female stature, the female gender was still prone to developing work related neck pain.

Palmer, Syddall, Cooper & Coggon (2003) reported associations between smoking and the occurrence of neck pain. They reported that smokers cough led to an increase in the pressure of the intervertebral disc making the inter vertebral disc susceptible to herniation and that smoking caused abnormal changes in the discs nutrition, pH and mineral content. They hypothesized that smoking had a pharmacological effect on the perception of pain. Higher prevalence of work related neck pain has been seen in the female gender and older age. Smoking was found to be a

31

health behavioral factor contributing to the presence of work related neck pain (James et al., 1997 & Vikaari-Juntura, Martikainen, Luukkonnen, Mutanen, Takala, Riihimaki, 2001).

2.4.3 Work stress related factors

Individuals suffering from high job strain and high perceived muscular tension also showed a prevalence of work related neck pain (Wahlstrom et al., 2004). Chiu et al., (2002) suggested that "among the men, self-employment and worry were associated with neck-shoulder symptoms; among the women, monotonous work and high decision latitude were associated with neck-shoulder symptoms."

Cagnie et al., (2007) reported that work related neck pain was caused by a multifaceted range of individual, physical and psychosocial factors, amongst which they found the work related psychosocial factors such as work content, organization, interpersonal relationships at work, finances and economics to be the major contributing factor to the origin of work related neck pain. Dry air and temperature fluctuations experienced at the working environment also served to be as predictors for work related neck pain in their study (Cagnie et al., 2007).

 Thus from the above literature it can be seen that unlike any traditional

occupational disease which is generally caused due to a single pathological cause, work related neck pain is multi factorial in nature. Yassi (1997) reported that work related injuries presented a progressively increasing challenge to health practitioners and that not all work related injuries possessed distinct International Classification of Diseases (ICD) codes and in fact there were more than 165 ICD codes being used by clinicians for work related injuries. This contradictory terminology and the lacunae of clinical clear case definitions hampered clinical scientific interchange amongst the medical community. It was thus vital to identify the predisposing factors causing neck pain associated with computer usage to make it easier to avoid the disabilities related to work related neck pain, and in turn improve the distress caused by this work related neck pain leading to a better quality of life for both the employee and the employer since the affected persons livelihood and physical well being depended upon the clinicians ability to clearly diagnose the disorder and effectively treat it.

2.5   IMPACT OF WORK RELATED NECK PAIN-

Work related neck pain has been found to have a tremendous impact on either the economy of a nation or the individual's life.

2.5.1 Cost of WRNP

Larsson, Sogaard & Rosendal (2007) reported that work related disorders

are the most common and account for the costliest public issues in North America and Europe. They illustrated that the cost of these conditions was judged to embrace 0.5%-2% of the GNP in the Nordic countries and Holland. Dealing with this impact of work related disorders accounted for between 0.5% and 2% of the gross national income of the UK (www.rsi.org.uk, 2003).

In the state of Queensland, Australia, payments towards workers compensation caused due to work related neck and upper limb disorders alone, constitutes 17% of all claims made at a cost of $30 million per year (As quoted by Ergeskow, 1996 in the research done by Grant et al., 1997).
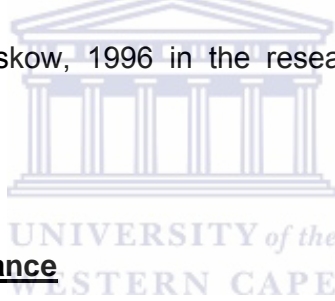
2.5.2 Work Performance

In a study done by Evans & Patterson (2000) higher incidences of neck and shoulder pain were exhibited amongst non-secretarial computer users and that 65 % of non-secretarial computer users experienced neck pain, impacting the quality and outcome of the work performed.

1 in 50 (half a million) of all workers in the UK reported a work related disorder resulting in 5.4 million working days lost in sick leave, due to the disorder, while 60 % of Australian children using laptops in school experienced discomfort (www.rsi.org.uk, 2003). 40% of Dutch university

students reported neck pain associated with computer usage.

WMD's have been seen for years in telegraphers, employers in the meat and poultry industries, journalists, surgeons, dentists, etc (Pascarelli & Hsu, 2001). Very little research has been done on the prevalence of work related neck pain amongst university administrative staff as compared to the other professions described.

University administrative staff also requires the constant use of the computer to improve work efficiency. The alarming prevalence of this disorder associated with computer usage creates the need for further research to be conducted to understand the actual cause-effect relationship associated with computer work
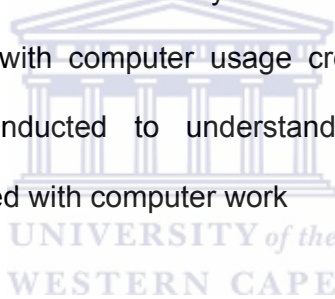
2.6   BENEFITS OF INTERVENTION

Various intervention strategies may be used to treat WRNP. These include strategies aimed at addressing predisposing factors, ergonomics, postural correction etc. Reports of adverse health effects by this computer use have been elicited in the research done by Ijmker, Huysmans, Blatter, Van der beek, Van Mechelen & Bongers (2006).

Further studies are needed to improve our understanding of safe levels of computer use by measuring the duration of computer use in a more

objective way, differentiating between total computer use, mouse use and keyboard use, attaining sufficient exposure contrast, and collecting data on disability caused by the symptoms (Ijmker et al., 2006). Identifying the predisposing factors to neck pain associated with computer usage will make it easier to avoid the disabilities associated with work related neck pain, and in turn improve the distress caused by the same leading to a better quality of life for both the employee and the employer.

Rehabilitation specialists have to give a good reason for suggested improvements in the workplace, in terms of both improved posture and comfort of the person affected and in terms of improved performance at work. Hence clear interrelationships between posture, comfort and performance need to be made (Liao & Drury, 2000).
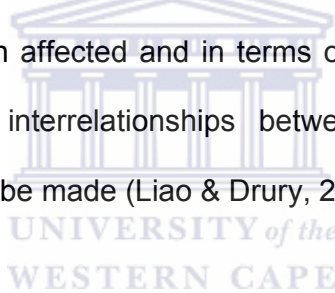
Research done in the US shows that for every dollar invested in an ergonomic intervention strategy, in an office environment, a return of $17.80 is seen. Organisations which use strategies to improve work-place ergonomics have seen that disorders resulting in lost work time were 3 times less likely to occur. (www.rsi.org.uk, 2003). Intervention strategies should be aimed more on the individual, than only on the workplace modifications, thereby enabling better performance of work (Haartz & Sweeney, 1995; Korhonen et al., 2003 & Wahlstrom et al., 2004).

According to Grant et al., (1997), appropriate preventive management should be sought at an earlier stage to minimize the occurrence of work related neck pain. Studies have shown that improving the endurance of the muscles that control the postural position of the neck during activity can decrease the onset of work related neck pain (Falla et al., 2007).

Weigl, Cieza, Cantista & Stucki (2007) suggested that prevention strategies should be targeted at the individuals who are at risk of developing this disorder and at those who have already developed this disorder. They recommended the introduction of Health education right from the primary school level which dealt with issues promoting healthier lifestyles concerning smoking, physical activity and diet. Their study also recommended ergonomic office changes and rehabilitative interventions to minimize the occurrence of work related neck pain.

Bongers, Ijmker, Van den Heuvel & Blatter (2006) stated that if work related neck disorders had to be prevented, both the employer and the employee need to be made aware of which interventional approach would be effective. In their study they categorized their interventions into 5 categories based on the symptoms experienced by the individuals. "Primary/secondary interventions aimed at the work organization, primary/secondary interventions aimed at the individual, primary/secondary interventions combining different approaches,

secondary/tertiary interventions aimed at the work organizations and secondary/tertiary interventions aimed at the individual." After implementation of these strategies, they illustrated a possible reduction in the levels of perceived stress thereby reducing the occurrence of work related neck pain. They also stated that interventions targeted at increasing the employer engagement delivered promising outcomes in the reduction of work related neck pain.

In accordance with the WHO Health For all program, Woolf & Akesson (2007) stated that "the program called for people with disabilities to have substantially improved opportunities for health, requiring health promotion and protection at earlier ages to achieve their target." Thus, appropriate and timely intervention can help minimize the occurrence of work related musculoskeletal injuries. Creating awareness on these injuries and how they are caused, can also serve to act as a preventive measure.

2.7 SUMMARY

The literature reviewed highlighted the need to create awareness on the prevalence, predisposing factors and prevention of this work related neck pain to create a healthier quality of life, benefiting both the employer and the employee. The physiotherapy profession and the researcher as a physiotherapist believe in the familiar adage that "Prevention is better

than cure" and thus realize the benefits of intervention at an earlier stage to prevent the disability caused due to work related neck pain and in turn help in it's prevention. On the basis of this foundation, Chapter three shall discuss the methodology employed in this study.

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CHAPTER 3.0

METHODOLOGY

3.1   INTRODUCTION TO THE CHAPTER

The chapter briefly highlights the research setting, procedure, statement of ethics and discussion on the analysis of data.

3.2   RESEARCH SETTING

The study was conducted amongst the administrative staff at the University of the Western Cape, South Africa (UWC). The University of the Western Cape is located in the northern suburbs of Cape Town, in Bellville. The university is home to 7 academic faculties; the Faculty of Arts, Community and Health Sciences, Dentistry, Economic and Management Sciences, Education, Law and the Faculty of Natural Sciences. Each Faculty comprises several academic departments and schools. The university also has 4 Academic Institutes, 6 Academic Centers and 12 Academic Units. Each faculty, department, school, institute, center and unit includes administrators working either on a part time or full time basis.

3.3   POPULATION AND SAMPLING

For this study, all administrators, working full time and part were included.

As per the information received from the human resources department at UWC, as of May 7, 2007 there was 410 administrative staff working at UWC. This was considered as the total study population. There was a difference of 109 people between the actual head count and the figure given by the human resources department. Since the researcher targeted all the individuals in the sample size personally, this difference was brought to light. The study population was used as the study sample, thus the sample size was 301 and not 410. Administrators targeted were those working in the Grades 1-12 as per the work levels set by the Human Resources Department at UWC, since their work involved the use of the computer on a regular and daily basis.

3.3.1 EXCLUSION CRITERIA

The exclusion criteria were any individuals with an existing diagnosed neck condition such as Cervical Spondylosis, Cervical Radiculopathy, Prolapsed intervertebral disk and Cervical Spondilolysthesis.

3.4 RESEARCH DESIGN

The study was a quantitative descriptive cross-sectional study.

3.5 PILOT STUDY-

A pilot study was conducted on 10 randomly selected respondents of the sample who did not participate in the final study. Individual consent was

obtained by the respondents signing the consent letter giving due permission to participate in the study. The researcher distributed the questionnaires to each respondent and timed the duration taken to complete the questionnaire. Any doubts related to the questions being asked by the respondents pertaining to the questionnaire were answered by the researcher. The data obtained from these 10 questionnaires was analysed with the SPSS software.

3.5.1   VALIDITY AND RELIABILITY

The instrument used in this study was adapted from questionnaires used in previous studies (Melzack, 1975, Vernon& Moir, 1991, Evans & Patterson, 2000 & Korhonen et al., 2003).

The instrument used in this study was tested for its reliability by test-retest reliability by redistributing the questionnaire amongst the same 10 respondents who participated in the pilot study. The gathered data was again analysed with the SPSS software to test for internal consistency and to determine if any of the questions were misleading and required changing. Reliability on questions with the likert scale format was tested with the Cronbach's Alpha test application present on the SPSS software and was found reliable with a score of 0.769. A score higher than 0.7 on the Cronbach's Alpha test indicates that the questions are reliable.

The content validity was tested by a group of experts in the respective

fields. The face validity was determined by the participants in the pilot group and the questionnaire was found to be valid and reliable.

3.6   PROCEDURE-

The researcher sought due permission from the UWC Higher Degrees Committee and Ethical clearance was obtained from the Senate research Committee. The researcher also obtained permission from the university registrar in order to conduct research and access information pertaining to the study at UWC. In addition to this, written consent was obtained from each participant prior to proceeding with the study (Appendix 2).

The researcher individually targeted every faculty, department, school, institute, center and unit present at UWC and each participant was informed about the study in person by the researcher while taking their consent to participate in the study on consent forms provided.

Data was collected via questionnaires that were distributed among the study sample by the researcher after written consent had been obtained. Instructions on how to fill in data were present on the questionnaire and if additional help was required, it was explained in person. The researcher was responsible for distributing the questionnaires and explaining queries related to the questionnaire, either in person or by phone. Certain questions requiring interventional measures were also personally carried

out by the researcher in order to obtain accurate data pertinent to the questions present in the questionnaire. The questionnaire was then left with each participant and collected a day later.

 The handing back of completed questionnaires did not ensue as planned. This required the researcher to go repeatedly for reminders and eventually getting back most of the completed questionnaires. This turned out to be a time consuming process. Some respondents either lost the questionnaires distributed or never returned them despite frequent reminders.

3.7 **INSTRUMENTATION**

The instrument used in this study was a questionnaire which was divided into 6 parts (Refer to APPENDIX 1). The first part was dealing with demographic details such as the date of enquiry, gender and age.

The second part was based on the 1st objective of the study which was to determine the prevalence of neck pain amongst university administrative staff. Questions relevant to obtaining information related to the prevalence of neck pain were included. A modified body chart including only the head, neck, right and left shoulder and upper back regions of the body, both in the front and back views was included enabling the respondents to mark exactly on the body where their pain was located. This body chart

44

was adapted and modified to only the upper body region from the body chart appearing in the McGill's Pain questionnaire (Melzack, 1975).

The third, fourth and fifth part of the questionnaire used in this study was in accordance with the 2nd objective of this study which was to identify the predisposing factors contributing to this work related neck pain. These factors were divided in to 3 parts which were categorized under work related factors, individual factors and work tension factors.

Work related factors included questions obtaining information on the physical working environment, questions on the ergonomics of the work station, questions on the time spent at work on the computer, years of computer usage and whether or not the respondent had received instruction on correct postures or any exercises to do during the breaks taken at work. This part also included interventional questions where the researcher took measurements individually in order to obtain data on the viewing distances, distances of the keyboards from the midline of the body, deviance of the keyboard from the midpoint of the body and the distance of the computer mouse from the keyboard (Korhonen et al., 2003).

Information on the individual factors contributing to neck pain included factors such as frequency of physical exercise, smoking, depression,

health status, mental strain, job satisfaction and the time used for domestic activities and/or hobbies performed by the respondent on a daily basis, which could contribute to increasing the static work load on the neck (Korhonen et al., 2003).

Questions pertaining to work tension factors focused on possible set of job-stressors contributing to work related neck pain (Evans & Patterson, 2000).

The 6th and final part of the questionnaire was in accordance with the final objective of the study which was to show the impact of work related neck pain amongst the university administrative staff. The Neck Disability Index which gives information on how an individual's neck pain can affect the ability to manage in everyday life was used. Questions covering activities likely to be affected by neck pain such as, sleeping, carrying of objects, reading and watching TV, working/housework, driving etc were included. The Neck Disability Index has already been validated and tested for reliability relating to identifying the disability caused due to neck pain (Vernon & Moir, 1991).

3.8   DATA ANALYSIS

For the purpose of collecting data, the questionnaire was designed on the SPSS software and a data capture sheet was formed. Data was collected

on this capture sheet. Both SPSS (version15) and the SAS System for Windows (version 9.1) were used for the statistical analysis. Both descriptive and inferential statistics was done.

The predisposing factors were divided in to 3 parts which were categorized under work related factors, individual factors and work tension factors. Work related factors included questions obtaining information on the physical working environment; lighting conditions, temperature of the room, quality of air, size of the working room, noise level in the working environment, ergonomics of the work station; work chair, work desk, screen, keyboard and mouse. The respondents rated each of these variables on a scale of 1 to 5 where, 1 was very poor and 5 was very good. In view of the fact that all the variables were positively associated with the dependant variable; neck pain, the mean of 1 to 5 was calculated to represent both the physical working environment and ergonomics of the workstation respectively. In the analysis, a dichotomous variable was used, with mean values less than 3 being poor and the mean values of 3 or greater than 3 being good.

The viewing distance; distance from the mid-point of the screen and the middle of the eyes in cm was measured by the researcher. Based on the ISO recommendations, 2 categories were used, where distances between 50 and 70 were considered good and other measures were poor

(Korhonen et., al 2003). Distance of the keyboard; distance between the g-h point of the keyboard and the sternum of the subject was measured by the researcher and distances > or = 15cm were good and <15 cm were poor. Deviance of the keyboard from the midpoint; deviance between the g-h points of the keyboard and the sternum of the body were measured by the researcher and deviances of 0+/-2 cm was considered good and any other deviances were considered poor. Distance of the computer mouse; distance from the edge of the mouse and the computer keyboard were measured by the researcher and 2 categories were used for calculations, with distances >/=15 cm were good and distances <15 were poor.

The possible predisposing individual factors included frequency of physical exercise, which was categorized into 2 categories (times/week). Smoking was put into 2 categories, never smoker and current smoker/ex smoker. Depression was tagged into never/very occasionally and sometimes/often and always as the other category. Health status was labeled into very poor/poor/average and good/very good. Mental strain was tagged into none/little and some/fairly much/very much. Job satisfaction was labeled into 2 categories; never satisfied/satisfied at times satisfied/often satisfied/very dissatisfied. The time used for domestic activities and/or hobbies performed by the respondent on a daily basis, which could contribute to increasing the static work load on the neck were classified into 2 categories; <1 hour and >/= 1 hour.

Work tension factors included questions on possible set of job-stressors contributing to work related neck pain. The respondents rated each of these variables on a scale of 1 to 5 where, 1 was never and 5 was always. In view of the fact that all the variables were positively associated with the dependant variable; neck pain, the mean of 1 to 5 was calculated to represent the work tension factors. In the analysis, a dichotomous variable was used, with mean values less than 3 being good and the mean values of 3 or greater than 3 being poor.

Data obtained from these questions was analysed with cross-tabulations and Logistic regression analysis as the main methods for associations between the outcome variable; neck pain and the prospective risk factors. The results were tabulated as the P-values, odds ratios (OR) and 95% confidence intervals (CI). The significance of the model used for analysis was evaluated by AIC and -2log L values, while the goodness-of-fit test of the model was tested by the Hosmer and Lemeshow method.

All the data analysed was part of a forward selection multi-variable model. The significance of this model was evaluated by AIC & -2Log L values and the goodness-of-fit of the model was tested by the Hosmer and Lemeshow method. The model was found to be of statistical significance with a Likelihood ratio of 0.0003.

All these proposed factors were further analysed with logistic regression analysis. The table included all these variables as possible confounders. Due to missing values in certain explanatory variables, the final forward selection model was based on 242 observations. The forward selection option used in this model filtered out the effects of the variables which were non significant. Significant interactions were then tested amongst these variables. The results were tabulated as the P-values, odds ratios (OR) and 95% confidence intervals (CI). The significance of the model used for analysis was evaluated by AIC and -2log L values, while the goodness-of-fit test of the model was tested by the Hosmer and Lemeshow method.
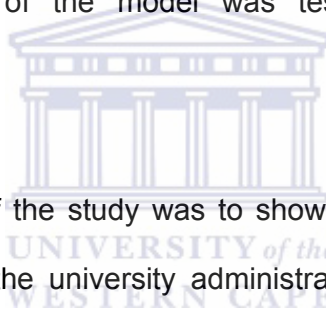
The final objective of the study was to show the impact of work related neck pain amongst the university administrative staff. This was met in term with the use of the Neck Disability Index. Questions covering activities likely to be affected by neck pain such as, sleeping, carrying of objects, reading and watching TV, working/housework, driving etc were included. Each of the items in this index is scored from 0-5; therefore the maximum score is 50. The obtained score was then multiplied by 2 to produce a percentage score. The scores of this index were interpreted as 0-4 = no disability, 5-14= mild disability, 15-24= moderate disability, above 34= complete disability (11th May 2007. http://www.chiro.org/LINKS/OUTCOME/Painter_1.shtml).

3.9   ETHICAL CONSIDERATIONS

The researcher sought due permission from the UWC Higher Degrees Committee to conduct this study. The researcher also obtained ethical clearance from the Senate research Committee. Permission was also obtained from the university registrar in order to conduct research and access information pertaining to the study at UWC. Additional to this, written consent was taken from each participant prior to proceeding with the study (Appendix 2).

The consent letter clearly mentioned that the study being conducted was in no way harmful to the person involved, it was not time consuming, and neither would it hamper the normal daily activities of the persons involved.
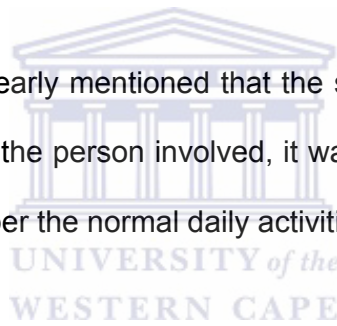
It mentioned that there were no foreseen risks for the participants and that the participants could withdraw from the study at any time and were not be obliged to answer any question they did not want to answer without any impending consequences. The participants could also withdraw information submitted by them at any point of the study.

The letter also mentioned that every precaution would be taken to maintain the confidentiality of personal information, anonymity and that the participant's health and human rights would be safeguarded at all

times.

3.10 SUMMARY

This chapter has described the methodology employed in this study. A quantitative approach for data collection was used in this study. The chapter ends with an explanation of the ethical considerations.

4.0 CHAPTER FOUR

RESULTS

4.1   INTRODUCTION

The chapter presents the results of the study. Adhering to the objectives of this study, the results are presented under, prevalence of neck pain and predisposing factors contributing to work related neck pain. The effects of work related neck pain on the activities of daily living have also been described in the last section of the chapter.

4.2   DEMOGRAPHIC DATA

4.2.1 Response Rates

The study population was all the administrators, working either full time or part time at the University of the Western Cape. Three hundred and one (301) questionnaires were administered, out of which 253 were correctly and completely filled in yielding a response rate of 84.1%. 48 questionnaires were either misplaced or not handed in.

4.2.2 Demographics of the study sample

The demographic data of the respondents relating to gender and age is presented in Table 4.1 below.

Table 4.1 Neck pain prevalence according to gender and age (N=253)

Gender	Yes n (%)	No n (%)	Total (%) N
Male	54 (58.7)	38 (41.3)	92 (100)
Female	128 (79.5)	33 (20.5)	161 (100)
Age			
23-37years	77 (71.3)	31 (28.7)	108 (100)
38-52years	77 (70.6)	32 (29.4)	109 (100)
53-65years	22 (75.9)	7 (24.1)	29 (100)

Of the 253 participants, 161 were female and 92 were male. In addition to this, of those who had neck pain; N=182, 54 (29.7%) were male and 128 (70.3%) were female, thus showing a higher proportion of females who had work related neck pain compared to the males. The highest prevalence of work related neck pain was seen in the oldest age group, 53-65 years.

4.3   Prevalence of neck pain

4.3.1 General areas in the neck and shoulder region of the body where pain was felt

The highest prevalence of work related pain was seen in the neck followed by the left shoulder. Participants who experienced pain in more than one region marked the presence of pain in more than one region and therefore the totals do not add up to 100%. Table 4.2 below highlights the main areas where pain was experienced by the respondents.

Table 4.2 General areas in the neck and shoulder region of the body where pain was felt

BODY AREA	SLIGHT DISCOMFORT	% of total (n=182)	ALOT OF DISCOMFORT	% of total (n=182)
Neck	84	46.1	71	39
Upper Back	74	40.6	46	25.2
Right shoulder	66	36.2	66	36.2
Left shoulder	81	44.5	49	26.9

4.3.2 Specific areas in the neck and shoulder region of the body where pain was felt

The specific areas where symptoms of neck pain experienced are indicated in the Table 4.3 below.

Table 4.3 Specific areas of the neck and shoulder region of the body where neck pain was experienced

BODY AREA	PAIN experienced	% of Total (n=182)
Back left	169	92.8
Back left centre	161	88.4
Back right	161	88.4
Back right centre	159	87.3
Front right	27	14.8
Front left	26	14.2
Front left centre	22	12
Front right centre	8	4.3

Out of the 182 participants, most of the participants reported the presence of work related pain in more than one of the areas mentioned above. The highest prevalence of work related neck pain was seen in the back left area of the neck and shoulder region.

4.4 Computer usage

The following table gives information on computer usage. It provides information on the duration of computer usage in years. Information on what particular activity the computer was used for at work is also made available. Data on the frequency of computer usage per week and the duration of 1 session at work using a computer is also highlighted.

Table 4.4 Computer Usage by participants N = 253

A- Duration in years	n	%
1 to 11 years	142	56.1
10 to 20 years	77	30.4
21 years or more	26	10.3
B- Activity computer was used for	N	%
Typing	1	0.4
Internet and email	2	0.8
Work related programs	27	10.7
All of the above	222	87.7
Other	1	0.4
C- Times/week of computer usage	n	%
Less than thrice	4	1.6
Thrice or more	249	98.4
D- Duration of 1 session at work spent on the computer	N	%
Less than an hour	30	11.9
One hour or more	223	88.1
Total	253	100

10.3% of the total study population has been using a computer at work for more than 21 years. 87.7% of the participants used the computer for typing, internet and email and for work related programs on a daily basis during normal working hours. Out of 253 participants, 98.4% used the computer at work more than thrice a week. 8 entries on duration of using the computer at work were missing. This was probably due to the fact that participants forgot to enter this information.

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TABLE 4.4.1 INSTRUCTIONS ON HOW TO SIT WHILE AT WORK

This table provides data on whether formal ergonomic advice was provided to the participants at work. It also includes information on whether the participants took a short break of few minutes while at work.

Table 4.4.1 Instructions on how to sit while at work

Instructions received on how to sit while at work	N	%
Yes	50	19.8
No	203	80.2
Total	253	100
Short break of few minutes/hour	N	%
Yes	152	60.1
No	101	39.9
Total	253	100
Information received on stretches or exercises	N	%
Yes	48	19
No	205	81
Total	253	100

Of the total study population, 80.2% reported that they had not received any formal instruction on how to sit at the computer while working on it. 60.1% reported that they took short breaks when they used the computer at work. 81% gave an account of not having received any information on

stretches or exercises that could have been done in the above mentioned breaks that they took.

4.5 POSSIBLE FACTORS CONTRIBUTING TO NECK PAIN

Table 4.5 provides information on the activities performed that led to the development of work related neck pain.

Table 4.5 Pain producing activity

Activity performed	N	%
Sitting in front of your desk at work	30	16.5
Working on comp at work	132	72.5
Working on computer elsewhere	1	0.5
Other	19	10.4
Total	182	100

The highest prevalence of work related neck pain was experienced by the participants while working on the computer at work.

Table 4.5.1 Stoppage of computer usage due to pain

This table gives information on the number of participants who stopped using the computer at work as a result of persisting neck pain

Stopped computer usage	N	%
Yes	97	53.2
No	87	47.8
Total	182	100

97 participants preferred not using the computer because of the work related neck pain experienced by them.

4.6 FACTORS CONTRIBUTING TO WORK RELATED NECK PAIN

The proposed predisposing factors were divided in to 3, which were categorized under work related factors, individual factors and work tension factors. Work related factors are described in the following table.

Table 4.6 Physical work environment and ergonomics of the workstation

Physical work environment	n (neck pain)	%	n (no neck pain)	%	OR	95% CI	P-value
mean score < 3	50	82	11	18	1		
mean score ≥ 3	132	68.8	60	31.3	0.495	0.217-1.127	0.45
Ergonomics of workstation							
mean score < 3	53	74.6	18	25.4	1		
mean score ≥ 3	129	70.9	53	29.1	0.902	0.217-1.127	0.54

This table shows the distribution of participants with neck pain and without neck pain to the two pre disposing factors; physical work environment and the ergonomics of the workstation. (Refer to section 3.8; Data analysis, page 45 for further explanation on the dichotomous variable used).

From the above table it can be said that both the physical work environment (OR=0.495 95%CI= 0.217-1.127) and the ergonomics of the work station (OR=0.902, 95%CI=0.217-1.127) in this study were not much of risk factors contributing to work related neck pain.

TABLE 4.6.1 Specific ergonomics of the workstation

This table shows the distribution of participants with neck pain and without neck pain to the specific ergonomics of the workstation, which was considered a work related predisposing factor to work related neck pain.

Viewing distance	n (neck pain)	%	n (no neck pain)	%	OR	CI	p-value
Good (50-70cm)	118	73.8	42	26.3	1		
Poor (<50 or >70)	64	68.8	29	31.2	0.784	0.398-1.544	0.4
Distance of the keyboard							
Good (≥ 15cm)	167	70.5	70	29.5	1		
Poor (< 15cm)	64	68.8	29	31.2	4.969	0.598-41.285	0.04
Deviance of the keyboard							
Good (0+/- 2)	72	81.8	16	18.2	1		
Poor (> +/-2)	110	66.7	55	33.3	0.424	0.201-0.896	0.01
Distance of the computer mouse							
Good (≥ 15cm)	35	74.5	12	25.5	1		
Poor (< 15cm)	146	71.6	58	28.4	0.694	0.281-1.715	0.68

The above table shows the risk off neck pain to be about four fold for those rating the placement of the keyboard; distance of the keyboard as poor. Although the deviance of the keyboard was significant; p-value=0.01, it exhibited a lower risk of neck pain as a contributing factor.

Table 4.6.2 Gender and Age as risk factors to developing neck pain

Gender	n (neck pain)	%	n (no neck pain)	%	OR	95%CI	p-value
Male	54	58.7	38	41.3	1		
Female	128	79.5	33	20.5	2.545	1.314-4.931	0.00
Age							
23-37	77	71.3	31	28.7	1		
38-52	77	70.6	32	29.4	0.875	0.444-1.721	2
53-65	22	75.9	7	24.1	1.608	0.531-4.867	

This table shows the distribution of participants with neck pain and without neck pain to gender and age as the possible individual predisposing factors to neck pain. The risk of neck pain was about 2 fold for females in comparison to males. Although not significant, the risk of neck pain was

also about 2 fold in the higher age group of 53-65years in comparison to the younger age groups.

Table 4.6.3 Frequency of physical exercises (times/week) as a possible individual factor contributing to neck pain

Frequency of Physical exercise (times/week)	n (neck pain)	%	n (no neck pain)	%	OR	95%CI	p-value
2 times or less	150	75.4	49	24.6	1		
3times or more	32	59.3	22	40.7	0.395	0.187-0.837	0.019

This table shows the distribution of participants with neck pain and without neck pain to the frequency of physical exercise performed per week as a possible individual contributing factor to neck pain. Although the explanatory variable frequency of physical exercise was significant with a p-value of 0.019 it was not seen as a risk factor to the presence of neck pain.

Table 4.6.4 Smoking as an individual predisposing factor

Smoking	n (neck pain)	%	n (no neck pain)	%	OR	95%CI	p-value
Never smoker	97	69.8	42	30.2	1		
Current smoker/ex smoker	85	74.6	29	25.4	1.155	0.598-2.231	0.4

Current/ex-smokers had almost a twofold risk in comparison to the participants who had never smoked.
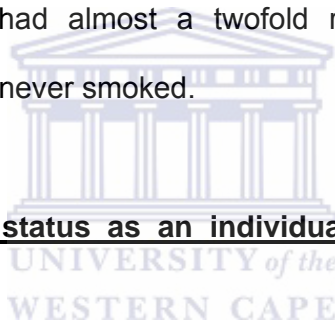
Table 4.6.5 Health status as an individual predisposing factor to neck pain

Health status	n (neck pain)	%	n (no neck pain)	%	OR	95% CI	p-value
Very good/good	103	70.1	44	29.9	1		
Average/poor/very poor	79	74.4	27	25.5	1.030	0.518-2.045	0.436

Those who self-rated their health status as average/poor/very poor had a higher risk (OR=1.030, 95%CI= 0.518-2.045) as opposed to those who

rated their health status as very good/good. Although, this was not seen as a significant predisposing factor since it had a p-value of 0.436.

Table 4.6.6 Mental stress as a predisposing factor to neck pain

Mental Stress	n (neck pain)	%	n (no neck pain)	%	OR	95%CI	p-value
none/little	63	63.6	36	36.4	1		
some/fairly much/very much	119	77.3	35	22.7	2.433	1.207-4.908	0.018

This table shows the distribution of participants with neck pain and without neck pain to the amount of mental stress experienced. There was a significant risk of those who rated their mental stress as some/fairly much/very much to about two and a half fold more (OR= 2.433, 95%CI=1.207-4.908, p-value=0.018) than those who rated mental stress as none/little.

value of 0.091, associations with the risks for neck pain were not present.

Table 4.6.9 Distribution of participants with neck pain and without neck pain to time used for domestic activities and hobbies

Time used for domestic activities (hours/day)	n (neck pain)	%	n (no neck pain)	%	OR	95%CI	p-value
<1 hour	78	72.2	30	27.8	1		
≥1 hour	103	71.5	41	28.5	0.966	0.501-1.862	0.903
Time used for hobbies (hours/day)	n (neck pain +)	%	n (neck pain -)	%	OR	95%CI	p-value
<1 hour	112	69.6	49	30.4	1		
≥1 hour	70	76.9	21	23.1	1.618	0.795-3.294	0.210

This table shows the association between the development of work related neck pain and the amount of time spent on domestic activities and hobbies daily as a possible contributing factor to work related neck pain. Those participants who spent ≥ 1 hour on hobbies that increased the static load on the neck and shoulder muscles were at a higher risk

(OR=1.618, 95%CI=0.795-3.294) than those who spent < 1 hour on hobbies daily. Time spent on domestic activities daily did not seem to show an association with the risk for neck pain.

Table 4.6.10 Distribution of participants with neck pain and without neck pain to work tension factors

Work tension factors	n (neck pain)	%	n (no neck pain)	%	OR	95%CI	p-value
mean score 3 or less	123	68.0	58	32.0	1		
mean score > 3	59	81.9	13	18.1	1.704	0.758-3.826	0.025

All those participants who rated their work tension factors >3 were significantly at about two fold risk (OR= 1.704, 95%CI=0.758-3.826, p-value= 0.025) as compared to those who rated it as 3 or less.

Table 4.6.11 Significance of the above tables

AIC = 279.012
-2LogL = 241.012
LIKELIHOOD RATIO; p = 0.0003
HOSMER AND LEMESHOW GOODNESS-OF-FIT TEST; p= 0.8937

The statistical significance of the data analysed was indicated by the above values. The scores indicated that the data analysed in this study was statistically significant.

Table 4.6.12 Odds ratios for predictors of work related neck pain amongst university administrative staff in 2007

Gender	OR	95% CI	p-value
Male	1		
Female	2.601	1.393-4.858	0.0012
Mental stress	OR	95% CI	p-value
none/little	1		
some/fairly much/very much	2.491	1.341-4.628	0.0039
Deviance of keyboard	OR	95% CI	p-value
Good (0+/- 2)	1		
Poor (> +/-2)	0.461	0.230-0.924	0.0318
Frequency of physical exercise (times/week)	OR	95% CI	p-value
2 times or less	1		
3times or more	0.428	0.213-0.859	0.0213

Further analysis was done on the variables that were found to be statistically significant in order to establish the association between the causative factors and work related neck pain.

The significance of the above table was found to be -2logL=254.970,

AIC=266.970 and Hosmer and Lemeshow goodness of fit test of model: p=0.6377. Gender, mental stress, deviance of the keyboard and the frequency of physical exercise done showed an association to the development of work related neck pain.

Table 4.6.13 Odds ratios for predictors of work related neck pain amongst university administrative staff

Physical work environment	OR	95% CI	p-value
mean score <3	1		
mean score ≥3	0.456	0.217-0.0957	0.0350
Distance of the keyboard	OR	95% CI	p-value
Good ≥15	1		
Poor<15	7.296	0.928-57.381	0.0297
Gender	OR	95% CI	p-value
Male	1		
Female	2.904	1.628-5.180	0.0350

The table above describes the association seen between the physical work environment, distance of the keyboard and gender to the dependant

variable; neck pain.

The significance of the above table was found to be -2LogL= 277.309, AIC=285.309 and Hosmer and Lemeshow goodness of fit test of model: p=0.9967.

The results of the study suggested that amongst the proposed work related factors, the physical work environment along with the specific ergonomics like, distance of the keyboard and deviance of the keyboard were predictors for work related neck pain.

Amongst the individual factors, gender, lack of physical exercise, mental stress, lack of job satisfaction, smoking, health status and time spent on hobbies were the predictors of work related neck pain.

The presence of the work tension factors were a very significant predictor for work related neck pain.
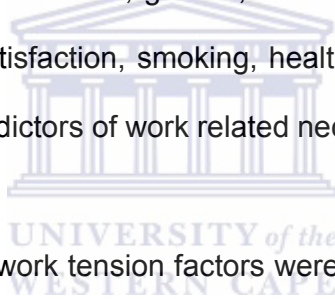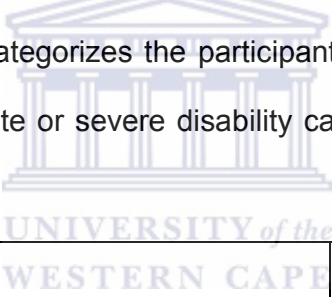
4.7 IMPACT OF WORK RELATED NECK PAIN

The final objective of the study was to show the impact of work related neck pain amongst the university administrative staff. This was met in term with the use of the Neck Disability Index which determines the impact of work related neck pain on the activities of daily living. Questions covering activities likely to be affected by neck pain such as, sleeping, carrying of objects, reading and watching TV, working/housework, driving etc were included.

Table 4.7.1 Neck disability index percentage score

The following table categorizes the participants into those suffering from either a mild, moderate or severe disability caused by work related neck pain.

Variable	n	%
No disability	22	12.1
Mild disability	54	29.6
Moderate disability	58	31.8
Severe disability	36	19.8
Complete disability	12	6.5
Total	182	100.0

The results revealed that 31.8% of those suffering with work related neck pain suffered a moderate disability, which meant that most of the activities

of daily living were affected due to this work related neck pain. 19.5% of the study population was severely disabled due to the presence of work related neck pain, which meant that they could not perform certain relevant activities in their daily life because of this neck pain, while 6.5% of those suffering from work related neck pain were completely disabled. The results of this study showed a significant impact of work related neck pain on the relevant daily activities of living of the participants.

Table 4.7.2 Gender distribution and the presence of disability

This table shows the presence of disability according to the gender of the participant.

Gender	No disability	Mild disability	Moderate disability	Severe disability	Complete disability	Total N=182
Male n (%)	2 (3.9)	21 (41.1)	20 (39.2)	7 (13.7)	1 (1.9)	51(28)
Female n (%)	20 (15.2)	33 (25.1)	38 (29)	29 (22.1)	11 (8.3)	131 (71.9)

On the whole, it can be said that the impact of work related neck pain amongst university administrative staff was higher amongst the female gender with 71.9% suffering disability due to work related neck pain.

Table 4.7.3 Age distribution and the presence of disability

This table shows the presence of disability caused due to work related neck pain to the age of the participants.

Age	No disability	Mild disability	Moderate disability	Severe Disability	Complete disability	Total N=182
23-37 yrs n (%)	11 (13.7)	22 (27.5)	22 (27.5)	22 (27.5)	3 (3.7)	80 (43.9)
38-52 yrs n (%)	10 (12.9)	25 (32.4)	24 (31.1)	12 (15.5)	6 (7.7)	77 (42.3)
53-65 yrs n (%)	0 (0)	7 (31.8)	10 (45.4)	1 (4.5)	3 (13.6)	21 (11.5)

Amongst the age group of 23-37, 27.5% suffered all mild, moderate and severe disability due to work related neck pain while only 3.7% in this age group suffered a complete disability. Amongst the age group of 38-52, 32.4% suffered a mild disability, 31.1% suffered a moderate disability, and 15.5% suffered a severe disability while 7.7% suffered a complete disability due to work related neck pain. In the oldest age group, 45.4% suffered a moderate disability, 31.8% suffered a mild disability, and 4.5% suffered a severe disability while 13.6% suffered a complete disability due

76

to work related neck pain. This showed that the oldest age group suffered the largest impact on their activities of daily living due to work related neck pain. The results of this study showed that the presence of work related neck pain has a significant impact on the activities of daily living of the participants who suffered from work related neck pain.

4.8 SUMMARY

In this chapter, the findings of the data analysis are presented. They are in accordance with the three objectives of this study. The results are categorically highlighted under the prevalence of work related neck pain, the factors contributing to work related neck pain and the impact of work related neck pain. The significant findings observed from this study are described in detail with a comparison to previous research in the same area in the following chapter.
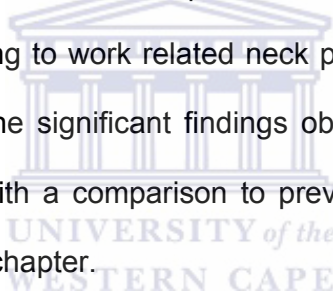
5.0 CHAPTER FIVE
DISCUSSION

5.1 INTRODUCTION

This chapter highlights the issues that were observed from the results of this study. The chapter also presents the findings in accordance with the objectives of this study.

The findings will be discussed under the following headings-

- ▪ PREVALENCE OF NECK PAIN

- ▪ FACTORS CONTRIBUTING TO WORK RELATED NECK PAIN

- ▪ IMPACT OF WORK RELATED NECK PAIN
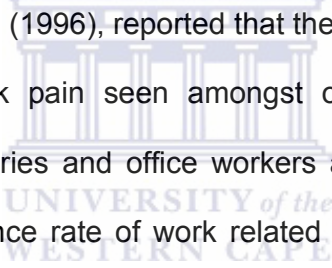
5.2 PREVALENCE OF NECK PAIN

The results of this study demonstrated a 71.9% prevalence of work related neck pain amongst university administrative staff. From which, 54 (29.7%) were male and 128 (70.3%) were female, thus showing a higher proportion of females who had work related neck pain compared to the males. This is similar to the findings of other studies which reported a higher prevalence of work related neck pain was also seen in the female gender and older age (James et al., 1997; Vikaari-Juntura, Martikainen, Luukkonnen, Mutanen, Takala, Riihimaki, 2001). According to the study conducted by Guez, Hildingsson, Nilsson and Toolanen (2002), in the (WHO) MONICA project held in the northernmost countries of Sweden,

78

43% of the population reported neck pain with a higher prevalence seen in females over males, with a higher incidence seen in the female working population. Cagnie et al; 2007 also suggested that because of the smaller stature and lesser strength in the shoulder muscles seen in women, there existed a higher prevalence of work related neck pain amongst the female gender. The results of this study also brought to light the positive association of the female gender and work related neck pain and the higher prevalence of the female gender with work related neck pain amongst the university administrative staff at The University of the Western Cape. The highest prevalence of work related neck pain was seen in the oldest age group; 53-65 years with 75.9% of the participants complaining of work related neck pain. Woolf & Akesson (2007) reported that the prevalence of work related musculoskeletal conditions increased with age and are affected by different lifestyle factors. The findings of our study were in harmony with this, showing an increased prevalence of work related neck pain in the oldest age group.

The results of this study showed a 66.8% prevalence of work related neck pain in the back left area of the neck and shoulder region, followed by the back left centre and back right regions of the neck and shoulder area. This suggested a higher prevalence of work related neck pain felt experienced in the posterior part of the neck and shoulder regions. This probably could be because of the high levels of static load caused in the

neck and shoulder region while working long hours on the computer.

The study done by Evans and Patterson (2000), showed higher incidences of neck and shoulder pain exhibited amongst non-secretarial computer users with 65 % of non-secretarial computer users experiencing neck pain. University administrative staff includes secretarial as well as non-secretarial computer users. What was common to all university administrative staff was the use of the computer more than five times per week, with each session at work being more than two hours.

Lau, Sham and Wong (1996), reported that there was a higher prevalence of work related neck pain seen amongst occupational groups which consisted of secretaries and office workers and their study revealed a 28% lifetime prevalence rate of work related neck pain and a 16% one year prevalence rate of neck pain amongst the Hong Kong Chinese. It was also revealed that neck pain appeared to be more common among the populations of the higher levels of society and was found that managers and professionals were at a higher risk of developing work related neck pain (Lau, Sham and Wong 1996; Chiu and Lam, 2007). The findings of the study reported a 71.9% prevalence of work related neck pain amongst university administrative staff in South Africa.

1 in 50 (half a million) of all workers in the UK reported a work related

disorder resulting in 5.4 million working days lost in sick leave, due to the disorder, while 60 % of Australian children using laptops in school experienced discomfort (www.rsi.org.uk, 2003). 40% of Dutch university students reported neck pain associated with computer usage. Dealing with this impact of work related disorders accounted for between 0.5% and 2% of the gross national income of the UK (www.rsi.org.uk, 2003). WMD's have been seen for years in telegraphers, employers in the meat and poultry industries, journalists, surgeons, dentists, etc (Pascarelli & Hsu, 2001). No data was available on the presence of work related disorders in South Africa. On gauging the severe and significantly large impact of these disorders on those affected world over, it became essential to determine the prevalence of work related disorders in South Africa.
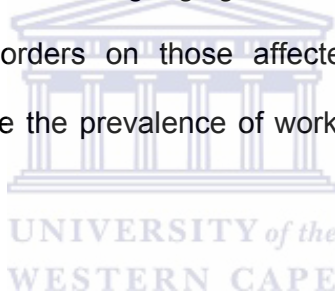
This study revealed that 72.5% of work related neck pain was experienced by the participants while working on the computer. 16.5 % of the participants complained of work related neck pain while sitting at their desk. This data answered our hypothesis on the presence of work related neck pain associated with computer usage. As a result of pain experienced, 97 participants (52.7%) preferred not using the computer because of the work related neck pain experienced by them.

87.7% of the participants used the computer for typing, internet and email

and for work related programs on a daily basis during normal working hours. This data showed the significance of the usage of computers at all stages of work by the university administrative staff.

98.4% used the computer at work more than thrice a week. 88.1% spent an hour or more on the computer at one session of work. This data revealed very high exposure levels amongst university administrative staff to the use of computers.
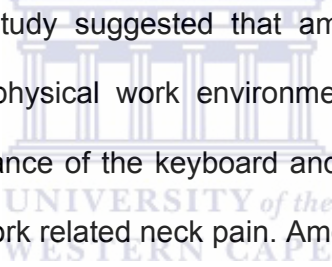
80.2% of the total study population reported that they had not received any formal instruction on how to sit at the computer while working on it81% of the total study population gave an account of not having received any information on stretches or exercises that could have been done in the above mentioned breaks that they took.

In their study to determine the prevalence neck pain in the world population Feger, Kyvik and Hartvigsen, 2006 reported that neck pain was a serious global public health issue affecting the quality of life of the individuals affected by neck pain

5.3   FACTORS CONTRIBUTING TO WORK RELATED NECK PAIN

The possible predisposing factors in this study were divided in to three parts which were categorized under work related factors, individual factors

and work tension factors. Work related factors were further classified into the physical work environment, ergonomics of the workstation and specific ergonomics. As opposed to most of the cross sectional studies done on work related neck pain, this study took into consideration all the 3 possible contributing factors; work related, individual and work tension related factors. Bongers, Ijmker, Van den Heuvel and Blatter (2006), reported that work related neck and upper extremity disorders were of multi factorial origin. They claimed these contributing factors to be of physical, psychosocial and personal origin.

The results of the study suggested that amongst the proposed work related factors, the physical work environment along with the specific ergonomics like, distance of the keyboard and deviance of the keyboard were predictors for work related neck pain. Amongst the individual factors, gender, lack of physical exercise, mental stress, lack of job satisfaction, smoking, health status and time spent on hobbies were the predictors of work related neck pain. The presence of the work tension factors were a very significant predictor for work related neck pain.

Amongst the variables of specific ergonomics, the risk of neck pain was about four fold for the participants rating the placement of the keyboard; distance of the keyboard (OR=4.969, 95%CI=0.598-41.285, p-value= 0.04) as poor. Although the deviance of the keyboard was a significant
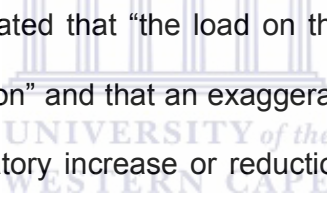
contributing factor, the variable exhibited a lower risk of neck pain amongst the study sample. After summarizing recent longitudinal studies, Bongers et al., (2006) reported that the usage of the mouse for over 10-20 hours per week was a risk factor for the work related upper extremity symptoms as opposed to work related neck and shoulder pain.

Various authors (Ariens et al., 2001; Evans & Patterson, 2000; Grant et al., 1997; Korhonen et al., 2003; Liao & Drury, 2000; Wahlstrom et al., 2004) in their respective studies reported that poor workplace design caused increases in physical stress as well as decreases in performances and a positive effect was shown between sitting posture and neck pain. Also Grant et al., 1997 highlighted that sustained poor postures while performing work on the computer along with static loading of the associated muscles of the neck, shoulder and the upper limb were all considered as predisposing factors to work related neck pain. Evans & Patterson (2000) suggested that poor typing skills coupled with long periods spent in faulty postures and work related tension had also been established as a predisposing factor to work related neck pain.

 The placement of the computer monitor with reference to the horizontal eye level was also a provocative factor to the development of neck pain as demonstrated by Limerick, Plooy, Fraser & Ankrum (1999) in their study to identify the influence of computer monitor height on head and

neck posture. Prolonged Neck holding in the forward bent posture while working at the computer was also proven to be a contributory factor to work related neck pain (Chiu et al., 2002 & Cagnie et al., 2007).

However, Chiu, Ku, Lee, Sum, Wan, Wong and Yuen (2002) reported that even after the ergonomic factors were adjusted to suit the smaller female stature, the female gender was still prone to developing work related neck pain. Dry air and temperature fluctuations experienced at the working environment also served to be as predictors for work related neck pain in their study (Cagnie et al;2007).

Chiu et al., (2002) stated that "the load on the neck is correlated to the trunk and head position" and that an exaggeration of one spinal curve led to either a compensatory increase or reduction in the next spinal curve. They reported that an increased cervical lordosis accompanied by the contraction of the cervical extensor muscles led to an increased pressure posteriorly on the intervertebral disks and a decrease in the spinal foramen leading to a possible compression of the nerves, resulting in the development of neck pain. Thus, it was essential to determine the pre disposing factors contributing towards work related neck pain and in turn educate those affected and also those at risk on the debilitating effects of work related neck pain.

From the findings of this study, both the physical working environment as well as the ergonomics of the work station was not significantly associated with the presence of neck pain. This was probably due to the fact that most of the respondents scored above average on the scale provided to them and also due to the fact that this study was carried out under a different research setting. Since, various studies show these factors to be amongst the major contributing factors to work related neck pain, further longitudinal studies must be carried out in order to establish this relation.

Amongst the proposed individual pre disposing factors considered in this study, frequency of physical exercise was significant but was not a risk factor to the presence of neck pain. This suggested that lack of physical activity can be considered as a risk factor for the development of work related neck pain. Current/ex-smokers had almost a twofold risk in comparison to the participants who had never smoked. The respondents who self-rated their health status as average/poor/very poor had a higher risk as opposed to the respondents who rated their health status as very good/good, suggesting an overall below average health status of this sample. This could be because of the long hours spent at work, leading to tremendous end of day fatigue preventing the participants from engaging in any physical activity. According to the study conducted by Woolf & Akesson (2007), the prevalence of work related musculoskeletal disorders are associated with individual lifestyle factors like obesity, smoking and

86

the lack of physical activity.

The study revealed a significant risk of neck pain for the participants who rated their mental stress as some/fairly much/very much to about two and a half fold more than those who rated mental stress as none/little. Depression was not much of a risk factor to neck pain. Although Job satisfaction was a significant contributing factor, the risks for neck pain were not present in this sample. All those participants who rated their work tension factors greater than 3 were significantly at about two fold risk as compared to those who rated it as 3 or less, revealing that most of the participants were stressed at work or that they performed their tasks under a great deal of tension.
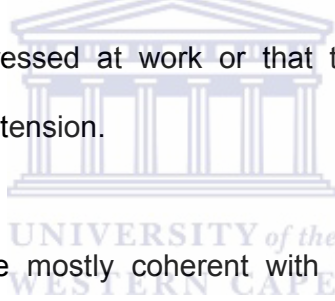
These findings were mostly coherent with most of the other studies conducted on work related neck pain. Wahlstrom et al., 2004 reported that individuals suffering from high job strain and high perceived muscular tension also showed a prevalence of work related neck pain. Bongers et al., 2006 also reported hat non work related stress and high perceived job stress were coherent with all work related upper extremity disorders.

This study also revealed that participants who spent an hour or more on hobbies that increased the static load on the neck and shoulder muscles were at a higher risk to developing neck pain. There was a positive

association seen between the time spent on hobbies on a daily basis and neck pain.

Most of the findings in this study related to the proposed individual pre disposing factors were analogous with similar studies revolving around work related neck pain. According to literature based evidence, perceived muscular tension, job strain and physical exposure were identified and linked with the presence of work related musculoskeletal disorders, namely neck pain, amongst computer users. Psychosocial factors, individual factors and physical work load factors were also considered contributing factors (Wahlstrom et al., 2004; Li & Buckle, 1999; Korhonen et al., 2003; Chiu et al., 2002).

Cagnie et al., 2007 reported that work related neck pain was caused by a multifaceted range of individual, physical and psychosocial factors, amongst which they found the work related psychosocial factors such as work content, organization, interpersonal relationships at work, finances and economics to be the major contributing factor to the origin of work related neck pain. Palmer, Syddall, Cooper and Coggon (2003) reported associations between smoking and the occurrence of neck pain. They reported that smokers cough led to an increase in the pressure of the intervertebral disc making the inter vertebral disc susceptible to herniation and that smoking caused abnormal changes in the discs nutrition, pH and

mineral content. This study also revealed a positive outcome between smoking and neck pain.

Higher prevalence of work related neck pain has been seen in the female gender and older age. Smoking was found to be a health behavioral factor contributing to the presence of work related neck pain (James et al., 1997; Vikaari-Juntura, Martikainen, Luukkonnen, Mutanen, Takala, Riihimaki, 2001).

This study revealed several positive associations between work related neck pain and the work related, individual and work tension related factors. The results of this study highlight the impending need to create awareness on the sources of work related neck pain. Thereby, hoping to reduce the effects of work related neck pain and in turn improving the quality of lives of those suffering.

5.4 IMPACT OF WORK RELATED NECK PAIN

The final objective of determining the impact of work related neck pain amongst the university administrative staff was met in term with the use of the Neck Disability Index which gives information on how an individual's neck pain can affect the ability to manage in everyday life.

The results of this study showed that the presence of work related neck

pain has a significant impact on the activities of daily living of the participants who suffered from work related neck pain. The results revealed that 31.8% of those suffering with work related neck pain suffered a moderate disability, which meant that most of the activities of daily living were affected due to this work related neck pain. This was followed by 29.6% suffering a mild disability. 19.7% of the study population was severely disabled due to the presence of work related neck pain, which meant that they could not perform certain relevant activities in their daily life because of this neck pain, while 6.5% of those suffering from work related neck pain were completely disabled. Only 12% of those experiencing work related neck pain suffered from no disability.

1 in 50 (half a million) of all workers in the UK reported a work related disorder resulting in 5.4 million working days lost in sick leave, due to the disorder, while 60 % of Australian children using laptops in school experienced discomfort (www.rsi.org.uk, 2003). 40% of Dutch university students reported neck pain associated with computer usage. Dealing with this impact of work related disorders accounted for between 0.5% and 2% of the gross national income of the UK (www.rsi.org.uk, 2003). WMD's have been seen for years in telegraphers, employers in the meat and poultry industries, journalists, surgeons, dentists, etc (Pascarelli & Hsu, 2001).

The association between gender and the NDI % score showed 71.9% of females affected with neck disability due to work related neck pain. On the whole, it can be said that the impact of work related neck pain amongst university administrative staff was higher amongst the female gender.

Amongst the age group of 23-37, 27.5% suffered all mild, moderate and severe disability due to work related neck pain while only 3.7% in this age group suffered a complete disability. Amongst the age group of 38-52, 32.4% suffered a mild disability, 31.1% suffered a moderate disability, and 15.5% suffered a severe disability while 7.7% suffered a complete disability due to work related neck pain. In the oldest age group, 45.4% suffered a moderate disability, 31.8% suffered a mild disability, and 4.5% suffered a severe disability while 13.6% suffered a complete disability due to work related neck pain. This showed that the oldest age group suffered the largest impact on their activities of daily living due to work related neck pain.

5.5   RELEVANCE   TO   OTHER   PHYSIOTHERAPISTS   AND REHABILITATION PROFESSIONALS

This study exposed an alarmingly high prevalence of work related neck pain amongst university administrative staff. The study also brought to light the disability experienced by individuals suffering from work related neck pain. A negative impact was seen on the activities of everyday life of

the individuals affected, thus hampering their productivity at work.

The findings of this study should hopefully make a contribution to the rehabilitation profession as a whole. According to research done by Ariens et al., (2001), work related neck pain has a multi factorial aetiology. The findings of this study highlighted the association between the predisposing factors; work related factors, individual factors and work tension factors and the development of work related neck pain. It is therefore very clear that any complaint of work related neck pain should be dealt with on a broader perspective and all possible causes should be considered.

It is important for physiotherapists as well as other rehabilitation professionals to broaden their services to include health promotion interventions tailored to suit every individuals needs. Physiotherapists and other rehabilitation professionals should also work at creating awareness on work related neck pain, thereby enabling any individual to recognize the signs and symptoms of work related neck pain at the earliest and reduce the detrimental effects caused by work related neck pain.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter provides a brief summary of this study. Recommendations arising from this study are also put forward. The chapter ends with a brief discussion on the study's limitations.

6.2 SUMMARY

This study aimed at identifying the factors contributing towards work related neck pain amongst university administrative staff, its impact on everyday life activities and in turn its prevalence. The study specifically examined the relation between the development of work related neck pain and the pre disposing factors contributing to work related neck pain.

This study was carried out on the basis that there existed a lack of data on the prevalence of work related neck pain in South Africa and as such the awareness of the impact of work related neck pain on everyday life has not been explored. In addition to this, research conducted in other parts of the world indicates the strong association between the possible predisposing factors and the development of work related neck pain.

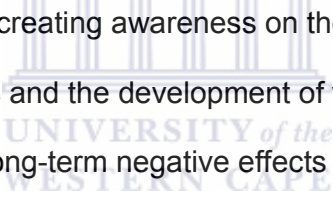Changing work patterns require management and professional staff to use their computers more often to perform their work efficiently. Research suggests an explicit relation between the development of neck pain and work related risk factors such as neck and arm postures, workplace design and nature of work involved. Psychosocial and psychological factors, such as stress, tension, depression, and job satisfaction also contribute in the development of neck pain. In turn, there exists an adverse impact on the productivity of work and employee wellbeing.

The review of literature also revealed the disability caused by the presence of work related neck pain and in turn an adverse impact on the productivity of work and employee wellbeing. A quantitative descriptive cross sectional study design was used to channel the study.

The results of this study indeed revealed a very high prevalence of work related neck pain amongst university administrative staff. A strong association was also shown between the proposed predisposing factors and the existing work related neck pain. The results showed a definite impact on most of the activities of daily living.

6.3 CONCLUSION

In totality, this study revealed an alarmingly high prevalence of work related   neck pain amongst university administrative staff. The findings of this study   highlighted the relation between the predisposing factors; work related factors, individual factors and work tension factors and the development of work related neck pain. The study also brought to light the disability experienced by individuals suffering from work related neck pain. A negative impact was seen on the activities of everyday life of the individuals affected, thus hampering their productivity at work.

Hence the need for creating awareness on the association between the predisposing factors and the development of work related neck pain exists to avoid the long-term negative effects of work related neck pain, in turn promoting a healthier quality of life amongst employees and an improved work performance profiting the employer.

6.4 RECOMMENDATIONS

On the basis of the findings of this study, several recommendations are made. Short term recommendations specific to the study are as follows: It is recommended that there be a half yearly or quarterly specific ergonomic examination at the university , encompassing the examination of the work station and environment and making the environment more

user-friendly, thereby ensuring greater work productivity and wellbeing of the employees

Long term recommendations:

6.4.1 After an individual suffering from work related neck pain undergoes rehabilitation, it is recommended that the physiotherapist incorporates a follow up session to determine the nature and extent of any residual neck pain, making it easier to track the exact cause and prevent further injury. Ergonomic advice should also be implemented in the treatment goals.

6.4.2 It is recommended that rehabilitation professionals work together at creating awareness on the predisposing factors contributing to work related disorders. In particular physiotherapists have a window of opportunity to create awareness early in the rehabilitation and treatment programs.

6.4.3 The exact definition of work related neck pain being controversial in nature, it is recommended that high quality trials be conducted providing clear definition of work related neck pain and evidence of effective treatments.

6.4.5 Since the prevalence and impact of work related neck pain is alarmingly high amongst the world population, it is recommended that further research be carried out using a larger sample size.
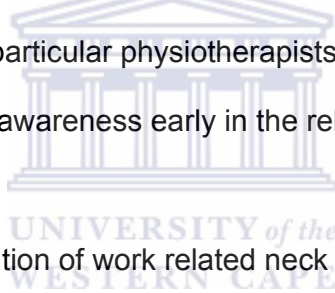
6.5 LIMITATIONS OF THE STUDY

Not many difficulties were encountered while carrying out this study. The biggest limitation was the incongruity of figures of the study population provided by various departments of the university.

The misplacing of completed questionnaires as well as late return of completed questionnaires, despite repeated reminders served to be the other limitation.

Despite these limitations, the study revealed some interesting facts on the prevalence and impact of work related neck pain amongst university administrative staff at the University of the Western Cape, South Africa.

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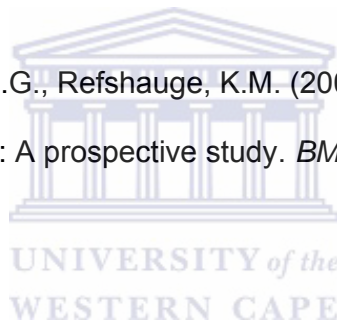
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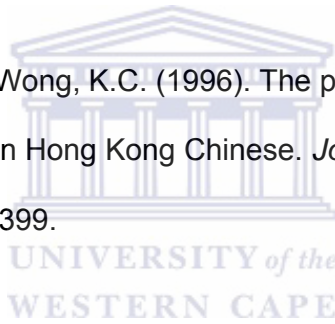
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103

APPENDIX 1

ID …………

COMPUTER USAGE QUESTIONNAIRE

FOR UNIVERSITY ADMINISTRATIVE WORKERS

INSTRUCTIONS:

    i.   Please answer the questions with either of the following choices; 1,2,3,4 or 5 depending upon the choice that suits you the most.

    ii.   We realize you may consider that two of the statements in any one question relate to you, but please just tick one choice.

    iii.   If you have an existing diagnosed neck condition such as Cervical Spondylosis, Cervical Radiculopathy, Prolapsed Intervertebral Disk, or Cervical Spondilolysthesis please do not continue with this questionnaire.

1-DEMOGRAPHIC DATA:

1. Date of enquiry

DD	MM	YY

2. Gender

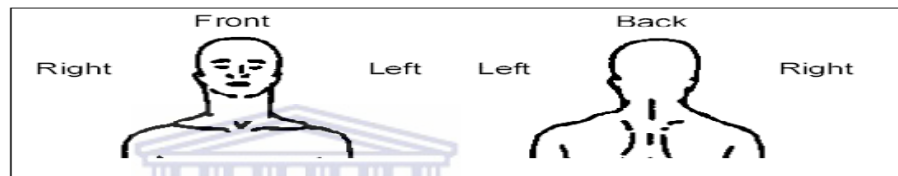|	
1	MALE
2	FEMALE

3. Age _____

2- PREVALENCE OF NECK PAIN:

1. Have you experienced any discomfort, stiffness, pain or tingling in your neck or shoulder muscles in the last month.

	1.	Yes
	2.	No

2. If "Yes", in which areas of the body did you experience these feelings in the last month? Mark the area where you felt your symptoms with an "X".

Tell us how bad these feelings of discomfort, stiffness, pain or tingling have been in the last one month by marking "X" in the relevant box:

Body Area	Slight Discomfort	A lot of discomfort
Neck		
Upper Back		
Right Shoulder		
Left Shoulder		

3. When did you feel the discomfort, stiffness, pain or tingling in your neck/ shoulder muscles?

    1. Sitting in front of your office desk
    2. Working on the computer at work
    3. Working on the computer elsewhere
    4. Other (please list):

    _____

_____

_____

4. Have you ever felt like not using the computer because of the discomfort, stiffness, pain or tingling in your neck/ shoulder muscles?

    1. Yes
    2. No

5. Have you stopped any of the following activities because of the discomfort, stiffness, pain or tingling in your neck/ shoulder muscles in the last 3 months?

    1. Playing sports
    2. Working on the computer
    3. Playing a musical instrument
    4. Other(please list):

    _____
    _____
    _____
    _____

6. In the last 1 month, have you seen a doctor or any other medical professional for any of your neck or shoulder complaints mentioned above?

    1. Yes
    2. No

3. WORK RELATED FACTORS:

1.   Physical work environment

    1. Lighting conditions

        1. Very poor
        2. Poor
        3. Average
        4. Good

5. Very good

2. Temperature of the room

   1. Very poor
   2. Poor
   3. Average
   4. Good
   5. Very good

3. Quality of air

   1. Very poor
   2. Poor
   3. Average
   4. Good
   5. Very good

4. Size of the working room

   1. Very poor
   2. Poor
   3. Average
   4. Good
   5. Very good

5. Noise level in the working environment

   1. Very poor
   2. Poor
   3. Average
   4. Good
   5. Very good

2. Ergonomics of the workstation

   1. Work chair

      1. Very poor
      2. Poor
      3. Average
      4. Good
      5. Very good

   2. Work desk

       1. Very poor
       2. Poor
       3. Average
       4. Good
       5. Very good

3. Screen
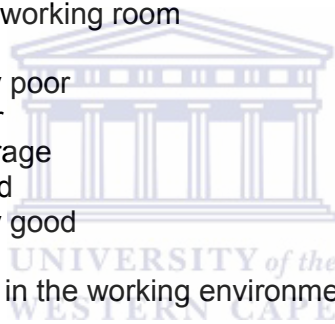
       1. Very poor
       2. Poor
       3. Average
       4. Good
       5. Very good

4. Keyboard

       1. Very poor
       2. Poor
       3. Average
       4. Good
       5. Very good

5. Mouse

       1. Very poor
       2. Poor
       3. Average
       4. Good
       5. Very good

3. How many years have you been using a computer at work?

_____
_

4. What do you use the computer for at work?

       1. Typing
       2. Internet and email
       3. Work related programs

4. All of the above
5. Other, (Please list):

_____
_____
_____
_____

5.   How many times per week do you use the computer at work?

1. Once or less per week
2. Twice per week
3. Thrice per week
4. Four times per week
5. Five times or more per week

6.   During one session at work, how long do you spend using the computer?

1. Less than 30 minutes
2. About 45 minutes
3. 1 hour
4. 2 hours or more

7.   Have you received any instruction on how to sit in front of the computer?

1. Yes
2. No

8.   If "Yes", who instructed you?
_____

9.   Do you take a short break of a few minutes at least once an hour, when using   the computer? (A short computer break, means to stop using your hands at the keyboard/mouse, e.g. to stand up, stretch out, use the bathroom, etc)?

1. Yes
2. No

10.   Have you received any information on stretches/exercises you can do during   the above mentioned short breaks?

1. Yes
2. No

11.   If "Yes", who provided the information?

_____
_____

12.   Please describe the type of stretches or exercises that you do

_____
_____
_____
_____

13.   The following questions require the researcher to take
measurements in order to obtain the data required.

     1. Viewing distance (distance between the eyes and the midpoint
of the computer screen) _____

     2. Distance of the computer keyboard (distance between the g & h
points of the keyboard and the sternum of the subject)
_____

     3. Deviance of the computer keyboard from the midpoint (deviance
between the g & h points of the keyboard and the midline of the
body of the subject)
_____
_____

     4. Distance of the computer mouse (distance between the edge of
the mouse and the computer keyboard)
_____

4. INDIVIDUAL FACTORS:

    1. Frequency of physical exercise; times/week

        1. 0-2/week
        2. 3/week
        3. 7/week

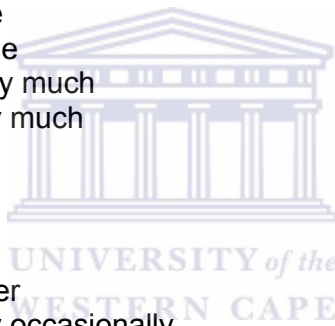2. Smoking

1. Never smoker
2. Current smoker
3. Ex-smoker

3. Health status

   1. Very poor
   2. Poor
   3. Average
   4. Good
   5. Very good

4. Mental stress

   1. None
   2. Little
   3. Some
   4. Fairly much
   5. Very much

5. Depression

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

6. Job satisfaction

   1. Never Satisfied
   2. Satisfied at times
   3. Satisfied
   4. Often dissatisfied
   5. Very dissatisfied

7. Time used for domestics activities like, cleaning, child care, cooking, gardening, and home repairs.
   Hours spent on average during working days-

112

1. ‹ 1 hour
2. ≥ 1 hour

8. Time used for hobbies including static load on neck and shoulder area like, handicrafts, music instrument playing, computer games.

   Hours spent on average during working days-
   1. ‹ 1 hour
   2. ≥ 1 hour

5. WORK TENSION FACTORS:

1. How often do you work under a great deal of tension?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

2. How often does the job make you feel fidgety or nervous?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

3. How often do you get irritated or annoyed over the way things are?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

4. How often do job worries get you down physically?

1. Never
2. Very occasionally
3. Sometimes
4. Often
5. Always

5. How often do problems associated with the job keep you awake at
   night?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

6. How often do you worry after making a decision whether you did
   the right thing?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

7. How often do you breathe a sigh of relief when you finish work
   for the day?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often
   5. Always

8. How often do you wonder if what you are doing is worthwhile?

   1. Never
   2. Very occasionally
   3. Sometimes
   4. Often

114

5. Always

_NOTE__:_ If your answer to question 2.1 (PREVALENCE OF NECK PAIN) was "Yes", you are requested to complete the attached supplement.

NECK DISABILITY INDEX

The questionnaire has been designed to give the doctor information as to how your neck pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the **ONE** box which applies to you. We realize you may consider that two of the statements in any one section relate to you, but please just mark the box which most closely describes your problem.

Section 1 – Pain Intensity
☐ I have no pain at the moment. (0)
☐ The pain is very mild at the moment. (1)
☐ The pain is moderate at the moment. (2)
☐ The pain is fairly severe at the moment. (3)
☐ The pain is very severe at the moment. (4)
☐ The pain is the worst imaginable at the moment. (5)

Section 2 – Personal Care (Washing, Dressing, etc.)
☐ I can look after myself normally without causing extra pain. (0)
☐ I can look after myself normally but it causes extra pain. (1)
☐ It is painful to look after myself and I am slow and careful. (2)
☐ I need some help but manage most of my personal care. (3)
☐ I need help every day in most aspects of self-care. (4)
☐ I do not get dressed; I wash with difficulty and stay in bed. (5)

Section 3 – Lifting
☐ I can lift heavy weights without extra pain. (0)
☐ I can lift heavy weights but it gives extra pain. (1)
☐ Pain prevents me from lifting heavy weights off the floor, but I can

115

manage if they are conveniently positioned, for example on a table. (2)
☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned. (3)
☐ I can lift very light weights. (4)
☐ I cannot lift or carry anything at all. (5)

Section 4 – Reading
☐ I can read as much as I want to with no pain in my neck. (0)
☐ I can read as much as I want to with slight pain in my neck. (1)
☐ I can read as much as I want with moderate pain in my neck. (2)
☐ I cannot read as much as I want because of moderate pain in my neck. (3)
☐ I can hardly read at all because of severe pain in my neck. (4)
☐ I cannot read at all. (5)

Section 5 – Headaches
☐ I have no headaches at all. (0)
☐ I have slight headaches that come infrequently. (1)
☐ I have moderate headaches which come infrequently. (2)
☐ I have moderate headaches which come frequently. (3)
☐ I have severe headaches which come frequently. (4)
☐ I have headaches almost all the time. (5)

Section 6 – Concentration
☐ I can concentrate fully when I want to with no difficulty. (0)
☐ I can concentrate fully when I want to with slight difficulty. (1)
☐ I have a fair degree of difficulty in concentrating when I want to. (2)
☐ I have a lot of difficulty in concentrating when I want to. (3)
☐ I have a great deal of difficulty in concentrating when I want to. (4)
☐ I cannot concentrate at all. (5)

Section 7 – Work
☐ I can do as much work as I want to. (0)
☐ I can do my usual work, but no more. (1)
☐ I can do most of my usual work, but no more. (2)
☐ I cannot do my usual work. (3)
☐ I can hardly do any work at all. (4)
☐ I cannot do any work at all. (5)

Section 8 – Driving
☐ I can drive my car without any neck pain. (0)

☐ I can drive my car as long as I want with slight pain in my neck. (1)
☐ I can drive my car as long as I want with moderate pain in my neck. (2)
☐ I cannot drive my car as long as I want because of moderate pain in my neck. (3)
☐ I can hardly drive at all because of severe pain in my neck. (4)
☐ I cannot drive my car at all. (5)

Section 9 – Sleeping

☐ I have no trouble sleeping. (0)
☐ My sleep is slightly disturbed (less than1 hr sleepless). (1)
☐ My sleep is mildly disturbed (1-2 hrs sleepless). (2)
☐ My sleep is moderately disturbed (2-3 hrs sleepless). (3)
☐ My sleep is greatly disturbed (3-5 hrs sleepless). (4)
☐My sleep is completely disturbed (5-7 hrs sleepless). (5)

Section 10 – Recreation

☐ I am able to engage in all my recreation activities with no neck pain at all. (0)
☐ I am able to engage in all my recreation activities with some pain in my neck. (1)
☐ I am able to engage in most, but not all, of my usual recreation activities because of pain in my neck. (2)
☐ I am able to engage in a few of my usual recreation activities because of pain in my neck. (3)
☐ I can hardly do any recreation activities because of pain in my neck. (4)
☐ I cannot do any recreation activities at all. (5)

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE

APPENDIX 2

RESEARCH STUDY

TITLE: Work related neck pain amongst university administrative staff

PARTICIPANT INFORMATION AND CONSENT LETTER

August 2007

Dear Participant,

I am writing to request you for your help and permission to participate in

my research study as a requirement to the fulfillment of my Masters

Degree in Physiotherapy. You have been identified as a potential

research participant since your occupation and nature of work directly

suits the description of my research. I sincerely hope that you will read

more about the study below, and then complete the form on the last page.

Whether or not you decide to participate, I request that this form be

returned as soon as possible.

NATURE OF THIS STUDY:

This study aims at identifying the factors contributing towards work related

neck pain amongst university administrative staff, its' impact on the

everyday life and in turn its' prevalence. Work related musculoskeletal

injuries in computer users are an increasing concern as the use of

computers proliferates throughout all levels of many organizations.

Changing work patterns require professional staff to use their computers

more often to perform their work efficiently. An explicit relation has been

described between the development of neck pain and work related risk factors such as neck and arm postures, workplace design and nature of work involved. Psychosocial and psychological factors, such as stress, tension, depression, and job satisfaction also contribute in the development of neck pain. Thus the need to identify the predisposing causes and create a healthier quality of life for those affected.

PROTOCOL:

You will be given a questionnaire which you will be expected to duly fill in, either in the presence of the researcher or later at your convenience. This should take about 30 minutes of your time at a stretch. Certain questions requiring the researchers' intervention will be dealt with at first and the other questions will be expected to be answered by you.

The study being conducted will in no way be harmful to you, nor will it hamper your normal daily activities. There are no foreseen risks seen for the participants.

CONFIDENTIALITY:

Only the researcher and the research supervisor will know that you participated in this study. Your answers will be kept strictly private and confidential and anonymity will be maintained.

PARTICIPATION RIGHTS:

Taking part in this study is completely voluntary. You may chose to withdraw from the study at any time without any consequence and are not obliged to answer any question you would not want to answer. You can

also withdraw your submitted information at any point of the study without being penalized.

RESULTS OF THIS STUDY:

If you desire, results on this study will be reported to you after completed data analysis of the results.

QUERIES RELATED TO THIS STUDY:

If you have any questions pertaining to this study, please feel free to contact the researcher between 8am and 17pm daily.

Shilpa Panwalkar, Researcher

Prof. José Frantz, Supervisor

Physiotherapy Department

University of the Western Cape

Private Bag X17

Bellville, 7535

Tel. 0795531595 S

If you wish to participate in this study, please complete the enclosed form and return it to the researcher at the earliest.

Thank you for your interest and support!

****

- o Please shade this circle if you GIVE PERMISSION to participate in this research study.

- o Please shade this circle if you DO NOT GIVE PERMISSION to participate in this research study.

****

Signature:

Participants' name:

Date:

Contact number:

Researcher's name: Shilpa Panwalkar

Researcher's Signature:

Supervisor's name: Prof. José Frantz

Supervisors Signature:

Date: