NECK PAIN
AMONGST HIGH SCHOOL LEARNERS
IN THE GAUTENG PROVINCE

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ABSTRACT

The prevalence of musculoskeletal pain is rising in adolescents and this may be due to new information technology leading to increased computer use, involving repetitive movements and static postures. Adolescent neck pain has not been identified as a widespread problem in South Africa due to limited local research, yet globally the prevalence is increasing at a rapid rate. The researcher has observed a number of school learners presenting with neck pain. The aim of the study was to determine the prevalence of and factors affecting neck pain at two conveniently selected high schools in the Gauteng Province, South Africa. A quantitative descriptive cross-sectional study was performed on a sample of 181 conveniently selected high school learners. A valid, reliable questionnaire which investigated the prevalence of neck pain as well as involvement in sports activities, recreational activities, and the use of computers was used to collect the data. . To determine neck flexor muscle endurance, the neck flexor muscle endurance test was used. SPSS version 16.0 was used to analyze the data. Contributing factors were assessed using Chi square and the Fisher's exact tests. The significance level was set at $p<0.05$. Logistic regression analysis was used to analyze the effect of the independent variables on the dependent variables, namely neck pain. The necessary ethical considerations were adhered to during the implementation of the study. Ethical clearance was obtained from the research grants and study leave committee at the University of the Western Cape. A total of 181 learners participated in the study. Of the learners who participated, 125 five used computers at school and 32% of the learners used computers at least twice per week. A total of 97(53.6%) learners reported to have experienced neck pain. In the study the following were identified as predictive factors for occurrence of neck pain: computer use at home (OR 2.30; 95CI: 1.07- 4.94), neck flexor muscle endurance (OR .79, 95 C; 0.69- 0.90) and age (OR 2.52; 95CI: 1.18- 5.40). The study is of vital importance to the learners', educators as well as health care professionals as prevention of the predisposing factors helps to lessen the number of absenteeism and improve the learner's performance.

Keywords: neck pain, prevalence, adolescents, physical activity, computer use, neck flexor muscle endurance

DECLARATION

I hereby declare that **"The Prevalence and predisposing factors of neck pain amongst high school learners in Gauteng Province"** is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources used or quoted have been indicated and acknowledged by complete references.

Signature..... May 2010

Cikizwa Mafanya

Witness: .....

Mrs Anthea Rhoda

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DEFINITIONS OF KEY TERMS

Neck Muscle Impairment : is any neck pain, loss of range of movement, or decreased strength or endurance of the neck musculature, including, but not limited to the sternocleidomastoid (SCM), trapezius, and the deep neck flexors (Harris et al, 2006).
For the purpose of this study neck pain and muscle endurance will be considered as the main components of neck muscle impairment.

Impairment : any loss or abnormality of psychological, physiological or anatomical structure or function (WHO).

Prevalence : the proportion of people who have a given disease or condition at a specific point in time (Dawson and Trapp, 2004).

Neck Pain : a subjective unpleasant sensory experience in the neck and shoulder region (Merskey, 1986).

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In this chapter the background of the study describes how adolescent neck and shoulder pain has raised concerns due to increased use of new information technology. The statement of the problem, aims and specific objectives of the study are stated. Finally the significance of the study demonstrates the need for a study on the factors influencing neck pain in this age group. The chapter ends with definition of terms used in the chapter.

1.2 BACKGROUND OF THE STUDY

In the general population neck pain is a major public health problem both in terms of personal health and overall well-being. In the results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders, states that "most people can expect to experience some degree of neck pain in their life time." The prevalence of neck pain in the adult general population, with typical 12-month prevalence estimates from 30%-50%, the 12 month prevalence activity limiting was 1.7% to 11.5%. Neck pain was more prevalent among women and the prevalence peaked in middle age. Non-modifiable risk factors for neck pain included genetics, age, gender and modifiable risk factors included exposure to tobacco and poor psychological health.

Among children and adolescents, 12-month prevalence estimates range from 21% to 42% (Bone and Joint Decade 2000-2010). Neck pain is surprisingly common in adolescents, with a life time of about 13% at 13 years of age (Balague ,Skovron , Nordin (1993). Adolescent neck, back and shoulder pain have not been defined as a widespread problem, yet with new technology and other factors relating to a changing world, the prevalence of these conditions have been affected. In a longitudinal study by Siivola, Levoska, Lavatka , Hoskio, Vanharanta, Keinanen-Kiukaanniemi (2004) the conclusion was that the incidence of neck and shoulder pain in a young population was high, and the

associated factors of neck and shoulder pain are multi-factorial in this age group. According to Hakala (2002) and Straker (2006) musculoskeletal pain prevalence is rising in adolescents and this change may be due to new information technology leading to increased computer use, involving repetitive movements and static postures.

Neck flexor muscle dysfunction in adult as a manifestation of neck pain has been investigated at by many researchers (Jull 2000; Falla, Jull , Hodges 2004). Janda (1994) suggests that neck flexor muscles become dysfunctional in the presence of pain. Both increases and decreases in muscle activity have been shown along with alterations in neuronal control mechanism, proprioception, and local muscle morphology (Sterling, Jull, Wright; 2001). In studies on whiplash-associated and idiopathic neck pain patients, the more superficial muscles in the neck-shoulder region (namely upper trapezius, sternocleidomastoid, and anterior scalene muscles) showed increased activity compared to deeper postural stabilisers like the deep cervical flexors (Falla et al 2004).

The neck flexors comprise of small stabilizing muscles located on the anterior and antero-lateral surfaces of the cervical spine deep to the scalene and sternocleidomastoid muscles. Although the muscles comprising the deep neck flexors are not clearly defined, the longus capitis, longus colli, rectus capitis anterior, and occasionally, the rectus capitis lateralis suggest that they potentially play an important role in stabilizing the cervical spine. When muscle performance is impaired, the balance between the stabilizers on the posterior aspect of the neck and the deep neck flexors will be disrupted, resulting in loss of proper alignment and posture, which is then likely to contribute to neck pain. In adult neck pain studies fatigability of the sternocleidomastoid and anterior scalene muscles during sustained cervical flexion contractions at 25% and 50% of the maximum voluntary contraction in patients with chronic neck pain were examined. Compared to controls, greater myoelectric manifestations were identified for the neck pain patient group (Falla et al 2004).

There have not been any studies that looked at neck flexor muscle endurance in adolescent's neck pain, most studies concentrated on these muscles in relation to headaches (Oksanen, Poyhonen, Metsahonkala , Antilla , Hiekkanen , Laimi , Salminen (2007).

The researcher sees 2-4 scholars complaining of neck/ shoulder or headaches on a weekly basis. The impact of the symptoms results in scholars missing days of schooling, increased stress level and poor participation in recreation and sporting activities. A need to identify and may be lessen the extent of the problem was the main motivation to conduct the study. The endurance of the neck flexor muscles has been found to be a predisposing factor to chronic neck pain (Watson and Trott, 1993) and the likelihood of symptoms in this age group, if left untreated, persist to adulthood (Siivola et al 2004).

1.3 PROBLEM STATEMENT

Neck pain in adolescents has been identified as a growing health hazard in this age group and the need to identify and understand the factors contributing to this problem may help the physiotherapy community. The researcher has observed a lot of school learners presenting with cervical pain and headaches, had forward head posture. There are however, limited studies that further explore the relationship between neck pain and the factors that contribute to its prevalence especially in high school learners. A clearer quantified understanding of the relationships between physical characteristics will enhance the effectiveness of both therapeutic and educative intervention.

1.4 RESEARCH QUESTION

What are the factors contributing to the prevalence of neck pain in school going adolescents?

1.5 AIMS OF THE STUDY

The aim of the study is to determine factors that contribute to neck pain in high school learners in selected schools in South Gauteng.

1.6 OBJECTIVES OF THE STUDY

The specific objectives of this study are:

1. To determine the prevalence of neck pain among high school learners in selected schools in South Gauteng.

2. To identify predisposing factors such as sport, computer use (both at school and at home), and neck flexor muscle endurance.

1.7 SIGNIFICANCE OF THE STUDY

There is little information documented about neck pain especially amongst the selected population, however, it has been documented in various studies that childhood neck and shoulder pain is a predictor of neck and shoulder pain in adulthood (Grimmer and Williams 2000). The literature also postulates that neck flexor muscle impairment is a major contributing factor in chronic cervicogenic headaches. As physiotherapists we need to address the risk factors at an early age in order to reduce the probability that pain and risk behaviors become permanent. All predisposing factors cannot be eliminated or prevented; however, awareness of the effects of a few might make a difference. This in turn will help to improve the physiotherapy practice in identifying factors and the implications of cervical pain and muscle impairment and may be reduce or control the prevalence of headaches amongst the identified population. The neck pain prevalence amongst high school learners has raised a lot of concerns about excessive stress, poor concentration and consequently disproportionate absences.

1.8 OUTLINE OF CHAPTERS

Chapter one includes the rationale, aims and significance of the study. The overall objective of the study was to identify the prevalence and predisposing factors of neck pain among high school learners in Gauteng.

Chapter two presents a review of relevant literature to understand the need for the study. It focuses on the prevalence of neck pain amongst this age group. Possible factors contributing to neck pain are reviewed, the factors included, computer usage amongst adolescents, participation in sport, psychosocial factors and neck flexor muscle endurance.

Chapter three considers the methodological issues relevant to the study. It also provides an overview on the study design. Other aspects discussed in this chapter include, but are not limited to, research settings, procedures, and the study sample and data analysis.

Chapter four contains the results of the statistical analysis of the data that attempt to answer the objectives stated in the chapter one.

Chapter five presents the discussion of the results presented in the chapter four.

Chapter six draws conclusions based on the study. It also attempts to make recommendations based on the study. The limitations of the study are also outlined.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews relevant literature on the prevalence of neck pain and investigate the predisposing factors that may contribute to neck pain in adolescents. The chapter concludes with a review of the literature on the role of the physiotherapist in the management of neck pain. The review of literature included population-based studies assessing the factors contributing to the prevalence of neck pain in adolescents. Only studies published in the English language were included in the review. The age of the school learners was restricted between 12-18 years. The prevalence of neck pain in this age group was the main outcome measure assessed. The factors that may possible contribute to neck pain in adolescents were also assessed, and these included age, gender, computer use both at school and at home, psychological factors, sports activities and neck flexor muscle endurance.

Prior to conducting the review, numerous key words which included neck pain, adolescents, high school learners, students, physical activity, pain, shoulder pain, low back pain, posture, computer use and neck flexor muscle endurance and psychological factors, were used to get the most appropriate information in the field. The reference lists of obtained articles were then searched for extra sources. The databases searched were: Medline via PubMed, PEDro, and Science Direct. All these databases were searched so as to include all possible literature sources.

2.2 DEFINITION OF NECK PAIN

Neck pain refers to a subjective unpleasant sensory experience in the neck. It may be manifested as fatigue, tension, or pain radiating to the upper extremities or the head (Merskey and Bogduk 2004). Diversified classifications of neck and shoulder pain have been presented. These classifications have been based on

the location of pain (cervicobrachialgia). The aetiology of pain (work related), the duration of pain (acute/chronic pain), the findings of status (tension neck), radiological findings (degenerative disc disease), or dysfunction of cervical facet joints (hypo- or hyper mobility) (Spitzer et al 1987).

The classification of neck and shoulder pain has been inconsistent, mainly due to a lack of well established clinical tests and diagnostic methods that could be used to make specific diagnoses of neck and shoulder pain (Siivola 2004). Although muscle tension often co-exists with neck pain, this classification is based on the idea of neck pain originating from tension of the neck muscles. In most cases, neck pain is mainly associated with physical (trauma and degeneration), psychological and environmental mechanical or functional disorders (Ylinen 2004; Ariens et al 2001).

Many structures in the neck are capable of inducing pain. Potential structures causing neck pain include the facet joints, ligaments, muscles, nerves, nerve roots, discs, dura, and vertebrae, or neck pain can be referred from other areas of the body (Bogduk 2004; Travell and Simons 1999). The pain can be classified as nociceptive, neuropathic, idiopathic or psychosomatic.

Most of the medical literature divides neck pain into categories determined by the duration of the symptoms. The category of neck pain will influence the choice of treatment. Sub-acute neck pain is symptoms that last from 30 days to 90 days. Chronic neck pain is pain lasting greater than 90 days (>12weeks) (Kroeling et al 2005).

2.3 PREVALENCE OF NECK PAIN IN ADOLESCENTS

The epidemiology of neck pain in adolescents has not been studied as much as that of headaches. Most studies of neck pain in this age group are cross-sectional studies relying solely on questionnaires (Laimi et al 2006). A limited number of studies exists which used experimental designs which would provide better evidence.

The prevalence of neck pain in adolescence has increased from 1991 to 2001, suggesting a new disease burden of musculoskeletal disorders in future adults (Hakala et al 2002). In adolescents, the prevalence of neck pain in the preceding 1-12 months has been 27-72% (Straker et al 2007; Hakala et al 2006; and Murphy et al 2006). In a study done in the Netherlands by Diepenmaat et al (2006) which surveyed 3485 adolescents aged between 12-16 years, the overall neck/shoulder pain was 11.5%. Vikat et al (2000) conducted a large population study based study which included Finnish adolescent school children (n=11,276), found that neck pain was experienced about once a week or more frequently by 15% of 12- to 18-year-old adolescents. Feldman (2002) in Canada conducted a study which included 7^{th}-9^{th} grade high school learners (n= 502) and the prevalence for neck pain was 28.4%. In 2008, Smith et al in South Africa conducted a study on high school students (n=1073) and the neck pain was found to be more than 20%. Chopra (2002) in an Indian study of adolescents more than the age of 15 years (n=4092) reported that the prevalence was 6(5.3-6.7, 95% CI).

The results reported in the above mentioned studies therefore indicate that the mean prevalence estimates from different geographical regions is higher in Scandinavian countries than in the rest of Europe, Asia and Africa. From these studies it also becomes clear that the prevalence of neck pain therefore varies between 11.5% and 72%, the vast differences in prevalence rates recorded could be as a result of the different definitions of neck pain or the differences in recall period used in the studies. Hakala et al (2002) defined neck pain as pain in the neck and back during the previous six months while Kroeling et al, (2005), defined neck pain according to the time since pain onset.

2.4 FACTORS ASSOCIATED WITH NECK PAIN

A number of factors are known to contribute to neck pain in adolescents. These factors include demographic information such as age, gender and participation in sport activities; psychological factors, neck muscle endurance and strength, and the introduction of information technology which lead to an increase in computer usage in this age group.

2.4.1 Socio-Demographic Factors

2.4.1.1 Age

In both cross-sectional and longitudinal studies, the prevalence of neck and shoulder pain has been shown to increase with age. In a 1-year follow up of Canadian adults neck pain persisted in 47% of sufferers and one third of these patients still had severe to moderate symptoms ten years later (Cote et al 2000). The prevalence of neck pain seems to be highest at the age of 40-49 years. Miranda et al (2001a) and Palmer et al (2001) have also indicated that neck and shoulder pain increases with age in their studies. Neck symptoms in earlier life have been shown to predict later symptoms in adult populations (Frederickson et al., 1999) and this phenomenon has been shown to exist in adolescents already.

A similar finding was noted in adolescents. In the study conducted by Stahl et al (2004) the authors reported that neck pain increased with age as the occurrence of neck was greater in the 13-16 year old group. Siivola et al (2004) also reported a similar result in a follow up study of 15-18 year olds and 22-25 year olds the prevalence of weekly neck and shoulder pain increased from 17% to 28% respectively.

2.4.1.2 Gender

In both cross-sectional and longitudinal studies, the prevalence of neck and shoulder pain is higher among females than in males (Cote et al 2000, Miranda et al 2001a; Palmer et al 2000). In a prospective follow-up study of pain free adolescents by Stahl et al (2004) the authors reported that 21% of the baseline pain-free preadolescents reported neck pain at the 1 year follow-up. In this study neck pain was significantly more common in girls ($p < 0.001$) than boys.An increased occurrence of neck pain in girls when compared with boys have been reported in several studies of neck and low back pain (Smith et al 2008; Hakala et al 2002; and Vikat et al, 2000), thus strengthening the evidence that girls are generally more prone to any pain in adolescence. In females, neck and shoulder pain in adolescence was associated with prevalent neck and shoulder pain in adulthood.

The increased occurrence of neck pain in girls when compared with boys could be related to puberty. During puberty, girls commence their growth spurt about two years earlier than boys (12-13 years versus 13-15 years) (Neinstein 1996).Pubertal status of girls and the timing of puberty onset have been closely associated with various symptoms, such as headaches and musculoskeletal pain (Rhee 2004). The increased musculoskeletal pain amongst the female gender continues to adulthood (Szeto and Lee 2002).

2.4.2 Computer Usage among Adolescents

The exposure to computers at schools benefits learners as they become computer literate at an early age and gain valuable skills that they can use later in life (Becker 2000). Children gain access to a large resource of information via the computer and the internet that can serve as reference tools (Smith et al 2008). One of the main reasons parents acquire home computers, is for the enhancement of their children's education (Subrahmanyam et al 2001). It has been reported that learners who have access to home computers, obtain better overall grades at school (Subrahmanyam et al 2001). With the growing increase in children's use of computers there is a concern about how little consideration is given to the ergonomic factors associated with computer installation and use (Bennet et al 2002). Lai (2000) conducted a study relating to the awareness of health risks of computer use among administrators, principals, and teachers in primary and secondary schools in New Zealand. Most of the respondents (between 69%and 91%) were aware of possible risks, but the study highlighted the lack of implementation of any preventative strategies to avoid the identified risks related to computer use. The lack of continuing professional development related to health issues associated with computer use for school staff was also commented on. Sotoyama et al (2002) examined student education in computer ergonomics. Over 60% of both elementary and high schools and 30% of junior high schools did not give any ergonomic information to their students. Approximately 30% of elementary and high schools and 60% of junior high schools included limited ergonomic education. Overall less than 10% of schools were 'actively' incorporating ergonomic information into the computer education of the pupils.

Hakala et al (2010) conducted a study investigating computer related health complaints and sources of ergonomic instructions among Finnish adolescents aged 12-18 year olds (n= 7292). The predictor variables were time spent while using the computer and instructions received on ergonomics and the outcome variable was computer related health complaints. The results of the study revealed that 61.2% of the participants reported having received instructions on ergonomics while using the computer, 71.5% reported having been instructed to take rest breaks. The 16-18 year olds reported receiving instructions more often than the 12-14 year olds ($p<0.001$). The conclusion of the study was that receiving instructions was not related to lower prevalence of computer associated health complaints. This study shows that so far ergonomic instructions may not be associated with reduced levels of computer related symptoms.

There has been little work linking specific cervical postures and neck pain in adolescents. Adolescents have been reported to perceive posture as the major contributor to neck pain (Cho et al 2003) but this may simply reflect lay beliefs. Although fixed sitting postures have been associated with neck pain in 11-14 year olds, no such information was found in a study of 8-year olds (Murphy et al, 2004). Neck and shoulder pain has however, been associated with certain neck postures in adults (Ariens et al 2001; McAviney et al 2005). It is believed that certain postures may provoke pain through higher neck muscle forces (Schuldt et al 1986).

There have also been concerns raised that the increasing use of computers may put children at higher risk of neck or shoulder pain problems – such as those commonly seen in adult computer users (Straker et al 2006). Computer use may have a direct link to increased risk for neck and shoulder pain problems, or an indirect link via changes in habitual postures (Straker 2006). In 2006 Straker et al conducted a cross sectional survey on computer use and neck and shoulder pain and photographic assessment of usual sitting posture. Eight hundred and eighty four adolescents with a mean age of 14.01 years were included in the

study. The results of the study revealed that adolescents who used computers more had greater head flexion and neck flexion postures. In the same study (Straker et al 2006) the authors also found that gender differences are associated with computer use and adolescent habitual postures. The results found that, in males increased computer use was associated with increased head flexion and neck flexion. In females, increased computer use was associated with increased lumbar lordosis. The results found that, the amount of computer use was associated with changes in habitual spinal postures, and these depended on gender.

Niemi et al (1997) observed that activities involving static loading of the upper extremities, such as computer use, were associated with neck pain in children and Ramos et al (2005) demonstrated a positive link between neck pain and the amount of computer use at school. Moreover, Hakala et al (2002) argued that the increase in adolescence neck prevalence rates between 1991 and 2001 was due to the increased use of computers.

Computer use and pain relationship was associated with ever having neck/shoulder pain (Chi square = 12.6, p=.002). Computer use and posture was related to greater head flexion, neck flexion, cervicothoracic angle and thoracic flexion though not to cranio-cervical angle. In the study conducted by Straker 2006, the high use of computer has also been associated with increased flexion posture of the head, neck and thorax in usual sitting position suggesting that temporary postural changes lead to changes in habitual postures.

Prolonged sitting postures while using the computer, on the other hand, have been associated with neck pain in school children (Murphy et al 2006, and Dockerell et al 2007). However, in 2006 Diepenmaat et al (2006) had contradicting results in a school based questionnaire of neck or shoulder, low back and arm pain, computer use physical activity, depression and stress survey of 3485 adolescence aged 12 to 16 years who attended secondary school in Amsterdam, Netherlands. The objective of the study was to examine the 1) prevalence of neck or shoulder, low back, and arm pain within different socio-

demographic groups and 2) the association of neck or shoulder, low back, and arm pain with computer use, physical activity depression, and stress The prevalence of neck or shoulder, low back, and arm pain was 11.5%, 7.5%, and 3.9% respectively. The prevalence of neck or shoulder pain was higher among girls and adolescents not living with_both parents. The prevalence of low back pain also was higher among girls. Depressive symptoms were associated with neck or shoulder pain, low back, and arm pain. The stress experienced was associated with neck or shoulder pain and low back pain. The conclusion was that musculoskeletal pain is common among adolescents and is associated with depression and stress but not with computer use and physical activity.

Adolescence is also a time associated with other factors which may cause postural changes including increased studying from paper sources, psychosocial issues associated with general maturity and participation in competitive sports.

2.4.3 **Participation in Sport**

Participation in sport have been found to have a positive effect on the occurance of neck pain.

In clinical trials, muscle strength and endurance training (Hagberg et al 2000) and concurrent coordinating training (Wahling et al 2000; Ahlgren et al 2001), have been compared in subjects with neck and shoulder pain. According to the consistent results, pain decreased in all exercise groups, and there were no significant differences in pain alleviation between the groups. Although the results on the positive effects of exercise in decreasing neck and shoulder pain are promising, there has been the problem that the symptoms recur shortly after the end of the exercise trial (Levoska et al 1993; Waling et al 2002). The finding emphasizes the significance of the motivation to engage in optional physical activities in leisure time, to gain some benefit from exercise for neck and shoulder pain.

In epidemiological studies on leisure time activities, physical activity has been measured in various ways. The frequency and intensity of exercise or different types of sports have commonly been used as variables. According to a review

by Hildebrandt (2000), most studies failed to show any effect on muscular skeletal symptoms, whereas some
studies indicated favourable effects of physical activity. In large population-based studies by Cote et al (2000), no association between the frequency of exercise and neck and shoulder pain was found.

In the survey by Vikat et al (2000) in 11,276 schoolchildren of 12-18 years of age, frequency and intensity of physical exercise were measured. According to the results, only moderate intensity of physical exercise was significantly associated with low prevalence of non-specific neck pain. Adolescents who reported either not to exercise or a lot of panting and sweating in connection with physical exercise had suffered weekly neck pain more often than those who were exercised less intensively. The finding disagrees with the result of Salmien (1984), who found no association between the frequency of leisure time physical activity and neck and /or back pain in the study of 370 schoolchildren with 11-17 years of age. However, in this study, intensity of physical activity was not measured.

Pietri-Taleb et al (1994) presented in a longitudinal study of 1.015 working men, that physical exercise more than once a week protected from severe neck trouble. The result is consistent with findings of Miranda et al (2001a), who reported moderate physical exercise more than 52 times a year to decrease the risk of severe shoulder pain. In the same study on Finnish forest workers, jogging decreased the risk of neck and shoulder pain and cross country skiing decreased the risk of persistent severe shoulder pain. Unexceptionally, in the 1-year follow-up by Miranda et al (2001b), different types of sports as risk factors for musculoskeletal pain were investigated among Finnish forest industry workers. Of the specific types of sports, playing actively volley ball proved to be a risk factor for shoulder pain.

Some other studies have found no association of physical activity with neck pain (Murphy et al 2006; and van Gent et al 2003; Feldman et al 2002). In a cross-sectional study of 643 Australian adolescents by Briggs et al (2009) physical

activity was measured using a detailed diary requiring participants to record details of all physical activities for a day in segments of five minutes for a one week period. Females reported a higher prevalence of lifetime, 1 month and chronic neck and shoulder pain than males (50.9 vs. 41.7%, 34.1 vs. 23.5%, and 9.2 vs. 6.2% respectively). The conclusion was that, self reported one month and lifetime neck and shoulder pain was not related to the level or intensity of physical activity or the type or sedentary activity over a one week period. Although participation in physical activity has been found to be advantageous its effect on neck pain still needs further investigation. Auvinen et al (2007) associated high levels of physical activity with an increased prevalence of both severe neck or occipital pain and severe shoulder pain in girls, but not in boys.

2.4.4 Psychosocial Factors

Strong evidence exists for the association between psychosocial factors (e.g. stress and depression) and general musculoskeletal pain among international child and adolescent samples (Diepenmaat et al 2006; Siivola et al 2004; and Jones et al 2004). The prevalence of psychosomatic complaints in adolescents has been reported to be between 10 and 25% (Brill et al, 2001). These symptoms are theorised to be related to stress. In large epidemiological studies, stress and depressive symptoms, have been associated with general musculoskeletal dysfunction, as well as dysfunction in specific body areas. Common body areas related to psychosocial factors include the neck, shoulders and low back (Diepenmaat et al 2006). In a prospective longitudinal study, Siivola et al (2004) reported that stress- related neck and shoulder pain, experienced during childhood, persisted into adulthood.

In adult populations, the relationship between psychosocial stress at work and neck and shoulder pain in different occupational groups has been well documented (Hagen et al., 1998; Westgaard et al 1993; Linton 1990),. The variables investigated in the different studies have been diverse, including work content, social support and psychological work load (Linton 1990), authority over decisions, intellectual discretion and psychological demands (Hagen et al., 1998), psychological problems at work (Westgaard et al 1993) and mental stress

at work. In these studies the association between work psychological stress and neck and shoulder pain has been consistently found. The tendency has been similar when the target population has included young adults. Palmer et al (2001) also found an association between frequent tiredness and stress and neck and shoulder pain in a large general population (n = 21.201) aged 16-64 years. Although the scientific evidence of psychological factors relating to neck shoulder pain is strong, few studies have aimed to explain why these variables might be important (Linton 1990), and situation is still the same.

In adolescents, the association between psychosomatic symptoms and neck and shoulder pain was demonstrated by Vikat et al (2000) among 11.276 school children aged 12-18 years old. The number of psychosomatic symptoms perceived at least once a week was asked in the survey. The more symptoms a subject reported, the more likely one was to suffer from neck and shoulder pain. If the subject reported weekly psychosomatic symptom, the risk of neck and shoulder pain was 1.9 while with more than three weekly psychosomatic symptoms, the risk was 4.4, the difference being significant at the 95% confidence level.

Psychological factors have also proved consistently to predict musculoskeletal symptoms (Leino 1989) or neck pain (Torp et al 2001) in adults. In the ten year follow up by Leino and Magni (1993) of 2.653 Finnish metal workers, psychosomatic stress symptoms were measured by an 18-item questionnaire. The location and frequency of musculoskeletal symptoms during the past year was inquired, and the subjects were clinically examined at each stage of the study. According to the results, psychosomatic stress symptoms predicted non specific neck pain. In the study of Finnish forest workers, mental stress shown to predict radiating and local neck pain (Miranda et al 2001b) and shoulder pain (Miranda et al 2001a).

2.5 MUSCULAR DYSFUNCTION AND NECK PAIN

Most studies reporting an association between muscular dysfunction and the pain disorders of the musculoskeletal system have been performed in adult

subjects. In neck pain patients, decreased neck flexor or extensor muscle strength (Barton and Hayes 1996; Jordan et al 1997; Chiu and Lo 2002; Ylinen et al 2004) and decreased isometric extension and abduction strength of the shoulder muscles have been reported to be linked with non-traumatic neck pain (Kvarnstom 1983). In addition, increased fatigability of both anterior and posterior neck muscle (Gogia and Sabbahi 1994) and increased neck flexion muscle fatigue in chronic neck pain patients (Falla et al 2003, 2004) have been reported. In addition, limited neck rotation and neck retraction (Olson et al 2000) and small size of suboccipital muscles (Hallgren et al 1994; Partland et al 1997) have been associated with chronic pain. Increased muscle strength and neck pain reduction as an effect of training have been reported in controlled studies (Taimela et al 2000, Ylinen et al 2003).

A reduction in the muscle activity of the deep cervical flexors, coupled with an increase in activity of the superficial flexor, has been demonstrated during the performance of a graded, low-load test of craniocervical flexion in chronic neck pain and whiplash patients (Falla et al 2003; Jull 2000). In chronic whiplash disorders, an increased EMG activity of upper trapezius muscles has also been shown (Nederhand et al 2002). This means that there is a link between chronic neck pain and decreased endurance of these muscles.

Many studies have reported decreases in cervical kinaesthetic sense and repositioning ability in subjects with neck pain (Revel et al 1994; Loudon et al 1997; Heikkila and Wennegren 1998), as well as decrease in repositioning ability also in patients with low back pain (Brumagne et al 1998; Taimela 1999). In the above mentioned studies, the researchers concluded that precise muscle spindle input is essential for accurate positioning of the pelvis and lumbo-sacral spine. The proprioception from muscles may serve as a pain gate that blocks or inhibits nociceptor transmission into the spinal cord and higher centres of the central nervous system (Woolf and Decosterd 1999, Mense et al 2001). The case might be the same in the neck as it has to balance the head in an upright position.

2.6 MUSCLE STRENGTH AND ENDURANCE

It is known that the capacity to develop neck force is related to the cross-sectional area of the neck muscles (Mayoux-Benhamou et al 1989). There is evidence of increased atrophy in the suboccipital muscles in persons with chronic neck pain and headache (Hallgren et al 1994), as well as increased atrophy in both rectus capitis muscles in adults with chronic tension type headache (Fernandes-de-las-Penas et al 2007c).

In adults, some studies on the association between neck shoulder muscle strength and headache have reported lower neck shoulder muscle strength in headache subjects compared to healthy subjects. In a study by Watson and Trott (1993), adults with headache have been shown to have decreased isometric strength and endurance of the upper cervical flexor muscles compared to non-headache subjects. Barton and Hayes (1996) have found sternocleidomastoid muscle weakness in adults with unilateral neck pain with headache. Decreased neck flexor contraction has been reported not only in cervical headache subjects (Jull et al 1999) but also, currently, in chronic tension-type headache subjects (Fernandes-de-las-Penas et al 2007b). In an adult study by Peolsson (2007) investigating neck muscle endurance in nonspecific patients with neck pain (n = 78) and controls (n =116). The neck muscle endurance of the neck pain group was significantly decreased ($p = < .01$) compared to control subjects.

The clinical-based studies in adults show that there is a connection between muscle weakness and primary headaches, for which there are tentative results in adults (Levoska et al 1993) showing that active dynamic muscular training of the neck shoulder muscles creates a protective effect against headaches. However, there are no studies concerning the association between neck flexor muscle endurance and prevalence of neck pain in adolescents.

2.7 SUMMARY

The literature shows that there is a growing burden of neck pain amongst high school learners as revealed by the international studies and the prevalence in South Africa as shown by Smith et al (2009) is the same as international prevalence. In both cross-sectional and longitudinal studies the prevalence of neck shoulder pain has been shown to increase with age and higher among females than in males.

The predisposing factors that have been associated with neck pain in adolescents computer use is one of the major factors. This was related to posture while sitting in front of the computer, the number of hours and the workstation design. Psychosocial were associated with the development of musculoskeletal pain and this was theorized to be related to stress. Neck flexor muscle endurance in adult studies and adolescents studies has been shown to be lower in people suffering from chronic neck pain and headaches and a need to retrain these muscles has been emphasized.

The association of physical activity which includes participation in sport with adolescent neck pain is controversial. The studies concerning neck pain and physical activities have mainly focused on the positive effects of physical activities. The most common study designs have been either epidemiologic cross sectional surveys or clinical trials of supervised exercise programmes. In both cross-sectional and longitudinal studies, the results concerning the association of neck and shoulder pain and participation in sport have been inconsistent.

CHAPTER 3

.METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the methods and procedures used in the study. Other aspects discussed in this chapter includes, research setting, study design used and the study sample.

3.2 RESEARCH SETTING

The study was conducted during 2009 in Mondeor and Glen Vista high schools in the southern suburbs of Johannesburg in Gauteng Province of South Africa. The Department of Education in the Gauteng province is divided into fifteen districts. Mondeor high school falls under the Johannesburg central district whilst Glen Vista is part of the Johannesburg south district. Both schools are public schools. In each class there are 35 learners and each grade has 5-7 classes. There are therefore approximately 330 learners per grade. Mondeor high school had a total population of 1607 registered scholars in 2009, consisting of 326 Grade 8 learners (143 males and 183 females), 328 Grade 9 learners (151 males and 177 females), 322 Grade 10 learners (159 males and 163 females), 327 Grade 11 learners (163 males and 164 females) and 304 Grade 12 learners (140 males and 164 females). In Glen Vista high school the total population is 1315 learners registered for 2009, consisting of 269 Grade 8 learners (133 males and 139 females), 288 Grade 9 learners (151 males and 177 females), 251 Grade 10 learners (159 males and 1163 females), 246 Grade 11 learners 9163 males and 164 females), and 261 Grade 12 learners (140 males and 121 females). The majority of the learners are involved in the following sports: soccer, rugby, squash, badminton, netball, tennis, swimming, water polo and rowing.

3.3 STUDY DESIGN

A quantitative descriptive cross-sectional study was used. A quantitative research method is used to gather facts which can be captured in a numerical format and analyzed with statistical methods. Katzellenborgen and Joubert (2002) speculated that descriptive quantitative design is preferred because it sets out to quantify the extent or prevalence of a problem. This is probably the best method available for social scientists interested in collecting original data for describing a population too large to observe directly (Mouton 2001). Sarantakos (2000) clearly states that the quantitative study design has advantages of using high levels of measurements which gives high levels of representativeness and generalisablity of findings; it explains the social life of the participants and theory testing. Moreover, it is very effective and response rate may be high for a target population that has a strong interest in the topic or survey organization (Neumann, 2000). In this study, the design was used to quantify and describe the predisposing factors contributing to the prevalence of neck pain among high school learners in the Gauteng Province. A cross-sectional study was chosen as it is appropriate for describing the relationship of a phenomenon at one point in time and it is economical and easy to manage within a limited time frame (Polit, Beck, Hungler (2001). It also provides information about a population within that time frame period (Bless and Higson-Smith 2000). The research design was therefore appropriate for this study as it explored the necessary information with regard to the study objectives that were stated.

3.4 POPULATION AND SAMPLING

3.4.1 Population

The study sample included all learners from both schools currently in Grades 8-11. The grade 12 learners were not included due to the policy of the education department whereby grade 12 learners cannot partake in research activities. A convenient sampling technique was used to select the participants from the two schools. In order to minimize disruption in the school academic programme, the researcher decided to include all the learners that were attending the physical re-education class in both schools in physical education.

3.5 DATA COLLECTION

3.5.1 Instrument

The data in the present study was collected by means of a questionnaire and neck flexor muscle endurance test.

3.5.2 Questionnaire

A structured self administered questionnaire was used to collect data (Appendix 4). Questionnaires allow one to be able to reach large groups of respondents at a time and it is one way of obtaining data relatively quick (Romaine, 1995). The use of questionnaire was supported by Burns (2000) as appropriate when dealing with many respondents. This type of survey offers respondents anonymity and avoids the interview biasness. This type of survey is less expensive and it is very effective because response rate is higher for a target population that has the same interest in the topic (Neumann, 2000). In this study a questionnaire was used, it has been found that health questionnaires are frequently used in secondary schools for monitoring the health and socials problems of adolescents (Mangunkusumo et al, 2005).

A questionnaire from Smith et al (2009) was used to collect data in the present study. The questionnaire was piloted before the final version was adopted for use in the study. It was piloted at one high school that was selected conveniently, and did not participate in the study, but the learners had similar characteristics as those which participated in the study (for example, same age group, and public school). The participants in the study included twenty learners who volunteered to participate. Questionnaires were distributed to learners and verbal instructions were given on how to complete the forms. Participants were allowed to ask questions concerning filling in the questionnaire. They were asked to fill the questionnaire during the computer literacy class. The purpose of the study was to obtain clarity and find out its appropriateness, understanding and reliability of the instrument. The questionnaire was administered in English as it is the language of instruction in these schools.

The results from the pilot study indicated that were under stood and understood by the learners. All participants stated that it took about twelve minutes to complete the questionnaire. The results from the pilot study indicated that the questionnaire can be used to measure the prevalence of neck pain in high school learners. The repeatability co-relation percentage for the different sections of the questionnaire ranged from 58-100%. To determine face and content validity of the questionnaire it was reviewed by experts in the field (Smith et al 2009).

The questionnaire consists of five sections:

1. Section one gathers information about computer use at school.

2. Section two gathers information about computer use elsewhere outside of school premises.

3. Section three gathers information about the learners body aches and pain. A body chart is also included where the learners can indicate the area of his or her pain. In the present study neck pain will be diagnosed if located within the defined area see (Appendix 1). This section also gathers information relating to the intensity, frequency and behaviour of the pain.

4. The fourth section gathers information regarding psychological factors experienced by the participants.

5. The fifth section of the questionnaire gathers information relating to the learners' participation in sport and/or physical activities as well as their participation in any cultural activities and any hobbies they might be practicing.

3.5.3 **Assessment of Neck Flexor Muscle Endurance**

The neck flexor muscle endurance test was used to assess the endurance of the neck flexor muscles (Harris, Heer, Roy, Santos, Whitman, Wainner (2005). When executing the neck flexor endurance test the researcher observes the

ability of the subject to maintain the chin retracted, while lifting the head and neck off the supporting surface for a specific period of time The subject reclined on a plinth in a sagittal symmetrical supine position . Both shoulders and thorax were against the plinth. The knees were at 60 degrees angle and supported with a roll pad under the knees, both upper extremities being straight at the sides: with the chin maximally retracted and maintained isometrically, the subject lifted the head and neck until the head was approximately 2.5 cm above the plinth while keeping the chin retracted to the chest. Once in position, a fine line was drawn across two approximated skin folds along the subject's neck, and the examiner placed her left hand on the table just below the occipital bone of the subject's head. Verbal commands (i.e., "Tuck your chin" or "Hold your head up".) were given when either the line edges began to separate or the subject's head touched the examiner's hand. The test was terminated if the edges of the lines no longer approximated each other due to loss of chin tuck or the subject's head touched the examiner's hand for more than 1 second. The intra-rater reliability of the test is good to excellent with intra-class correlation coefficient .82-.91 and interrater reliability is moderate to good with intra-class correlation co-efficient of .67-.78 (Harris et al ,2005).

3.6 PROCEDURE

Permission from the Gauteng Department of Education (Appendix 2) to conduct this study in schools was obtained prior to contacting schools to participate in this study. Two high schools that were closer to the researcher's area of work were selected.

The principals of these schools were then approached so as to consent the study. The principals decided to assign one teacher from the Physical Education subject to help the researcher with coordinating the recruitment of learners. The assessment for the occurred in the school premises in a building dedicated for physical education equipment.

Permission to conduct the study was firstly obtained from the senate higher degrees committee and the ethical permission from the research and study grant committee at the University of the Western Cape (Appendix 5). Once this was granted consent (Appendix 3) was then obtained from the parents of the learners and the learners (Appendix 3) themselves. Appointments were made via the class teacher for specific learners, who have consented to partake in the study, to complete the questionnaires and be assessed. The research was conducted in the physical education classroom. The researcher was available if the participants require assistance to complete the questionnaire. Once the learners have completed the questionnaires they were all be assessed by the researcher to collect the data relating to the neck flexor muscle endurance.

3.7 DATA ANALYSIS

Data was analyzed using descriptive and inferential statistical procedures. Data was captured on Excel and the Statistical Package for social sciences (SPSS) version 16.0. Contributing factors were assessed individually using the Chi square test, the Fisher's exact test, and crude odds ratios with a 95% confidence interval. Logistic regression analysis was used to analyze the effect of the independent variables on the dependent variable neck pain.

3.8 ETHICAL CONSIDERATION

Approval from the Higher Degrees Committee and senate research and study grant committee of the University of the Western Cape was obtained. Permission and written consent was also obtained from the Gauteng Department of Education (Appendix 2), the principals of the selected schools and the parents of the learners that were involved in the study (Appendix 3) and an information sheet about what the study entails (Appendix 1). An informed consent letter (Appendix 3) accompanied the questionnaire to the learners stating that they have the right to withdraw from the study at any time. The letter stated that every precaution was taken to maintain confidentiality and that the participants' health and human rights were safeguarded at all times. Anonymity was ensured during the capturing and analysis of the data. The information obtained will be made

available to the learners, their parents, the principals and the Gauteng Province education department. Lastly, data was collected from those learners whose informed consent was obtained and were ready to participate in the study.

3.9 SUMMARY

In chapter three, the research setting, study population, study design and sampling procedure are described. The chapter also explains relevant methodological issues as methods of data collection, reliability and validity of the study and study procedure. A self-administered questionnaire and neck flexor muscle endurance test were used in data collection. Data collection and ethical consideration that the study was conducted was conducted in an ethical manner were also explained. The results of the study are presented in the next chapter.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

This chapter describes the results of the statistical analysis that attempted to answer the research objectives stated in chapter one. Section 4.2 describes the response rate, 4.3 demographic statuses, 4.4 prevalence of neck pain so that the predisposing factors will be presented for the total population. The association between the learners who reported neck pain and the risk factors are also presented.

4.2 RESPONSE RATE

One hundred and eight`y one questionnaires were distributed and completed. The response rate was thus 100%.

4.3 DEMOGRAPHIC DETAILS

4.3.1 Age and Gender

From a total of 181 learners that agreed to participate in the study 97 (53.59%) were males and 84 (46.41%) were females. The mean age of study sample was 16 (SD=1.10) with ages ranging from 14 - 17 years. The distribution of the study sample by gender is presented in Figure 4.1.

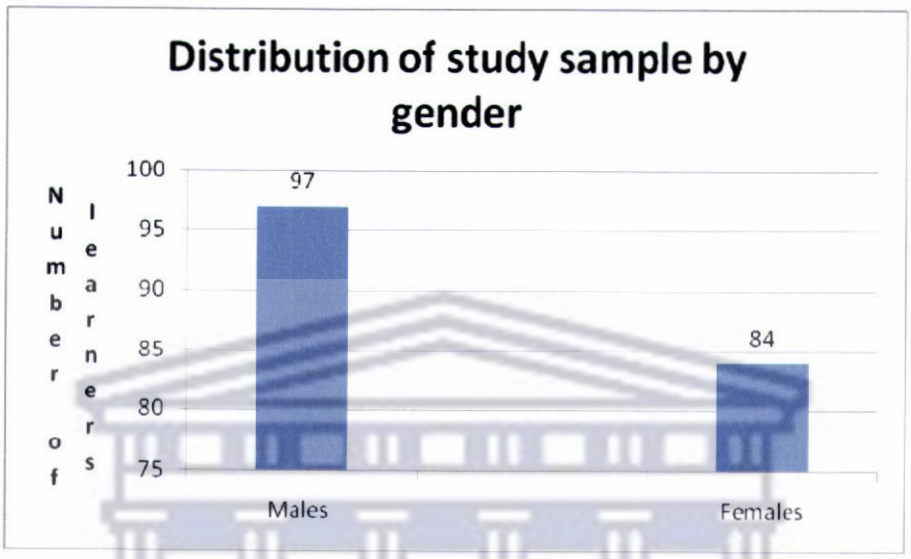


Figure 4.1: The Distribution of the Study Sample by Gender (n= 181)

4.3.2 Distribution of study sample by grade.

The distribution of the study participants according to their school grades is presented in Table 4.1. There were fewer learners from grade 8 and 9 in comparison to learners from grade 10 and 11. Of the population size, 45.9% were grade 11 learners.

Table 4.1: The distribution of the study sample by grade (n = 181)

Grade	n (%)
8	26(14.4)
9	33(18.2)
10	39(21.6)
11	83(45.9)

4.4 PREVALENCE OF NECK PAIN

A total of 97(53.6%) of the learners reported experiencing neck pain. Of the 53.6%, 96(99%) reported experiencd slight pain whilst 1(1%) experienced severe pain.

4.4.1 Prevalence of neck pain per age group

In order to determine the association between neck pain and age the Fisher's exact test was used. The results from the analysis revealed astrong association between the neck pain and age (p = 0.017). Table 4.2 shows prevalence of neck pain according to age groups.

Table 4.2: Prevalence of Neck Pain According to Age Group(n=97)

Age (years)	Number (%)
14	13/26 (50.00)
15	17/33 (51.51)
16	19/40 (47.50)
17	48/82 (58.53)

Of the participants who experienced neck pain the 17 year olds group had the highest prevalence (48/82, 59%).

4.4.2 Prevalence of neck pain per gender group

Of the participants (97/181) that indicated as having neck pain 50(51.5%) were boys and 47(48.5%) were girls. The Fisher's exact test was then used to determine the associations and p = 0.218, there was no significance between the two variables.

4.4.3 Activities that the learners were engaged in when experiencing pain

The distribution of the activities that learners were engaged in when they experienced pain is presented in Table 4.3.

Table 4.3: The distribution of activities when learners experienced pain (n = 97).

Activity	n (%)
Sitting at a school desk	35 (36.1)
Working on the computer elsewhere	21 (21.7)
Writing on a book at school	16 (16.5)
During or after sports	13 (13.4)
Working on school computer	12 (12.4)

The highest category where learners experienced neck pain was that whilst "sitting in front of a desk at school".

4.5 COMPUTER USE AT SCHOOL

This section explores the learner's computer usage at school. It is divided into the number of years the learners have been using the computer at school, the frequency per week and the amount of time they spend in one session.

4.5.1 Duration of computer use at school by learners

From the overall population of 181 learners interviewed for the study, only 125 used computers at school; therefore the sample size for this section is 125. On average learners used computers at school for 2-3 years with a standard deviation of ±1.8. On a weekly basis, learners revealed to use computers as per the details in Table 4.4. Of the observed population (n=125), 67.2% used computers once a week at school.

Table 4.4: The distribution of computer use at school (n = 125)

Times per week	Male n(%)	Female n(%)	Total n(%)
Once	47(69.1)	37(64.9)	84(67.2)
Two times	10(14.7)	15(26.3)	25(20.0)
Three times	4(5.9)	2(3.5)	6(4.8)
Four times	5(7.4)	3(5.3)	8(6.4)
Five times	2(2.9)	0(0.0)	2(1.6)

With regards to computer use per session, the details are indicated in Table 4.5. Of the observed population 60% used computers for 45 minutes in one session. According to the school rules 45minutes session is the maximum time allocated for computer use.

Table 4.5:The Distribution of the Length of Computer Use by Learners per Session

(n = 125)

Duration	Frequency	Percentage
30 minutes	22	17.6
45 minutes	75	60
One hour	26	20.8
One and half hours	1	0.8
Two hours/more	1	0.8
Total	125	100

4.5.2 Number of Hours Spent on School Computer per Week

The distribution of the number of hours spent by learners per week is shown in Figure 4.2 below.

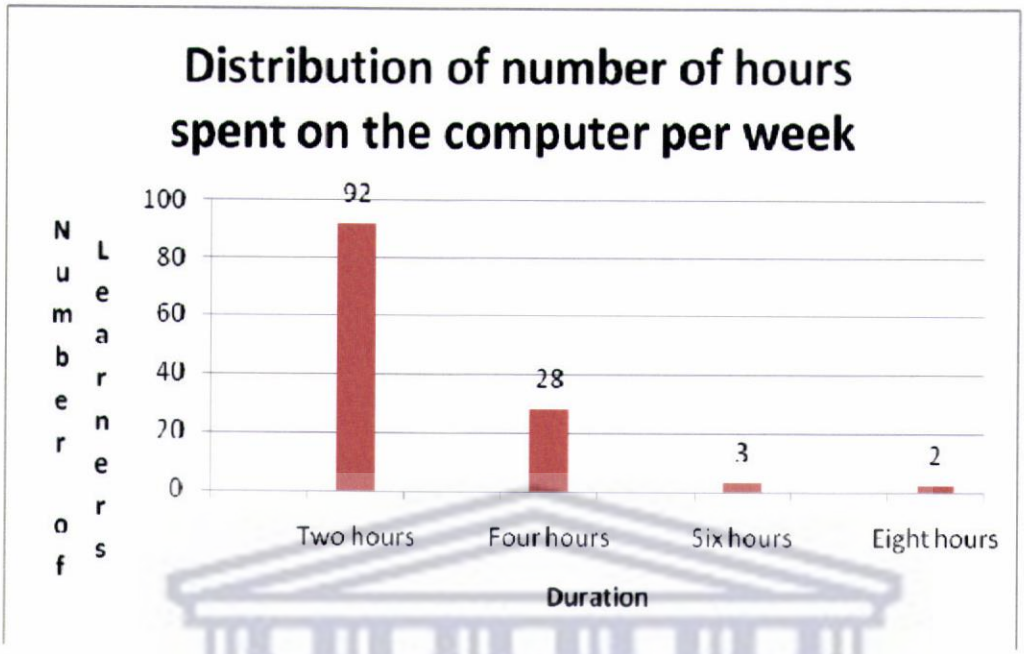


Figure 4.2: The Distribution of the Number of Hours Spent by Learners per Week (n=125)

Most of the learners spent (92) spent two hours per week on the computer.

4.5.3 Association between Neck Pain and School Computer Use

Fisher's exact test was used to determine the association between neck pain and school computer use, no significant association was found (p=0.4).

4.5.4 Computer use elsewhere

This section explores the learner's computer use outside of school. The venues where the learners use the computer elsewhere and the duration of computer use in one session are presented.

4.5.4.1 Places of using the computer elsewhere

The participants were asked to indicate where they used the computer outside of school by choosing one or more options. A total of 158 responses were obtained from the learners and Figure 4.3 illustrates the different venues where participants used the computer outside of school.

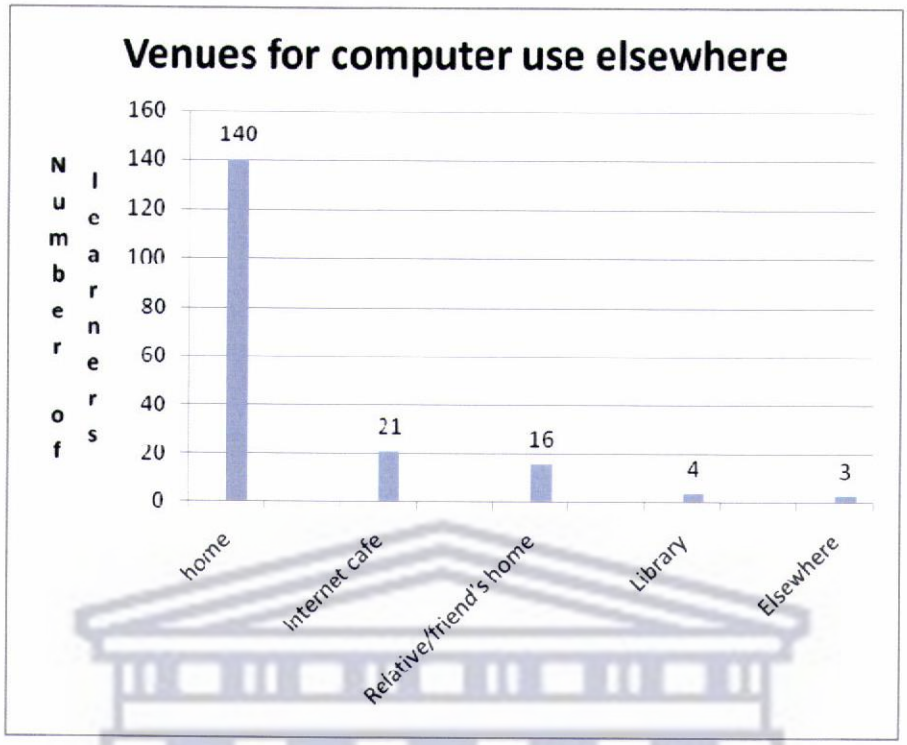


Figure 4.3: Places of Computer Use Elsewhere (n=158)

Most of the learners (140) used the computer at home.

4.5.4.2 Duration of computer use elsewhere

Learners were asked to indicate how long they used computers outside of school. One hundred and fifty eight responses were obtained from the learners. Twenty five percent (39/158) of the learners used the computer elsewhere for more than 2-3 hours per day as per the indication in Figure 4.4.

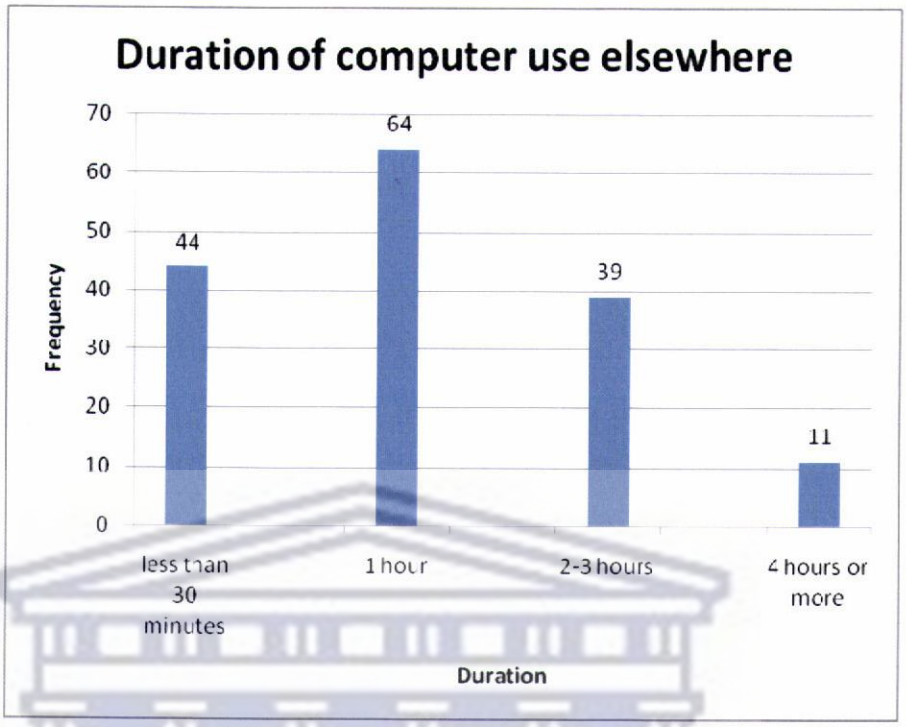


Figure 4.4: Number of hours per day that the scholars are using computer outside of school

4.5.4.3 **Association between neck pain and computer use elsewhere**

Fisher's exact test was used to determine the association between neck pain and computer use elsewhere. A strong correlation was found (p=0.03).

4.6 PARTICIPATION IN SPORT

In this section the learners were asked if they participated in sport or not. The different sport categories, number of times per week and the duration (in hours) are presented.

4.6.1 Participation in Sport

A total of 181 learners responded to the question on sport participation, with 74.59% (135/181) participating in sport and 25.41 %(46/181) that did not participate in sport. Seventy five percent (135/181) of the learners indicated that they participated in sport.

4.6.2 Sport Categories

The learners had to indicate which sport activities they were involved in at school. Table 4.6: shows the distribution of different sport categories as indicated by the learners (n=135).

Table 4.6: Participation of learners in different sport categories at school (n=135)

Sport	n (%)
Rugby	37 (20.44)
Soccer	72 (39.78)
Athletics	26 (37.02)
Hockey	30 (22.22)
Netball	24 (13.26)
Tennis	26 (14.36)
Cricket	13 (7.18)

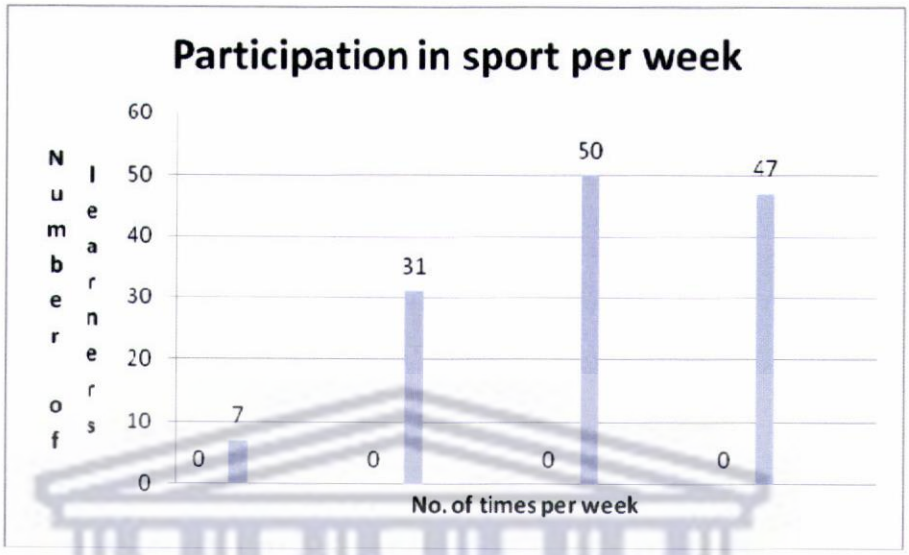
Soccer (53.33%, 72/135) and athletics (49.63%, 67/135) were the most common sporting types indicated by the learners.

4.6.3 Participation in Sport per Week

The learners were then asked to indicate how many times per week they participated in sport.

Figure 4.5: Distribution of Participation in Sport per Week (n=135)

Thirty seven percent (50/135) of the learners participated in sport twice a week.



4.6.4 Duration of Sporting Activity

The learners had to indicate how long they participated in sport per week.

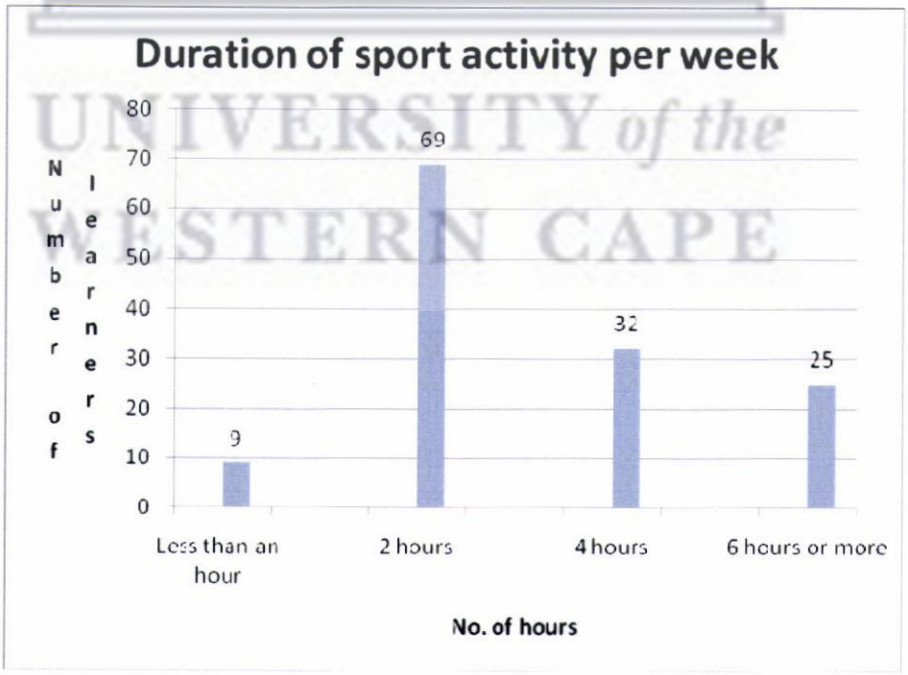


Figure 4.6: Illustrates the Duration of Sport Activity per Week (n=135)

Sixty nine (38.12%), of the learners participated in sport for 2 hours per week.

Fisher's exact test was used to determine the association between neck pain and participation in sport. There was no significant association (p =0.09) between neck pain and participation in sport.

4.7 NECK FLEXOR MUSCLE ENDURANCE

This section explores the distribution of neck flexor muscle endurance for the study sample, age and gender.

4.7.1 Distribution of Neck Flexor Muscle Endurance for the Study Sample

The researcher tested all the learners for neck flexor muscle endurance as described in chapter 3.

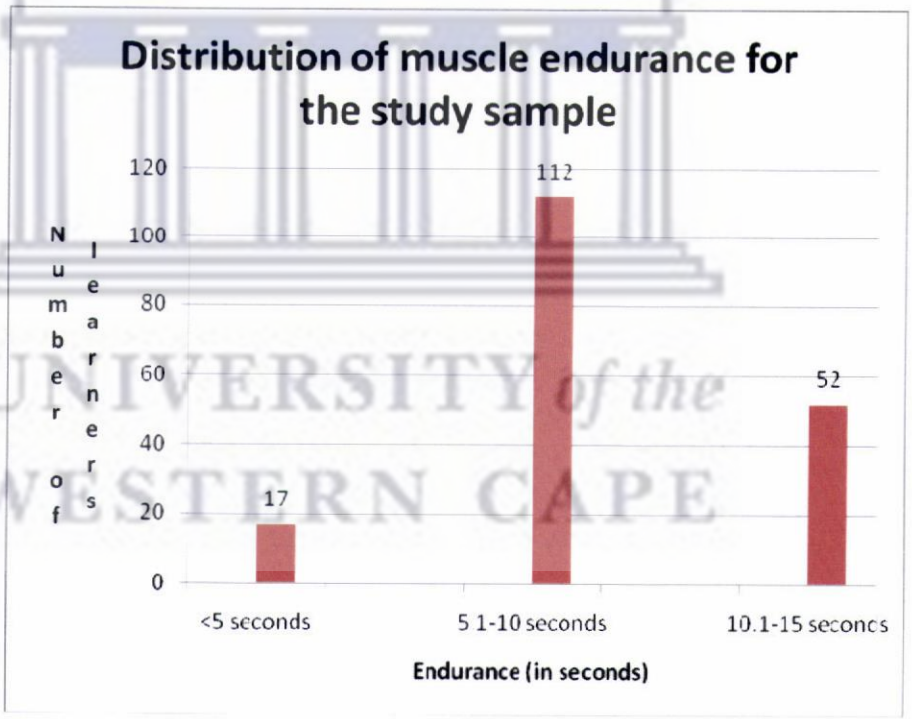


Figure 4.7: Distribution of Muscle Endurance for the Study Sample (n=81)

Sixty two percent of the learners' neck flexor muscle endurance averaged between 5.1 and 10 seconds.

4.7.2 Distribution of neck flexor muscle endurance according to gender

The mean distribution of muscle endurance according to gender is shown in the diagram below.

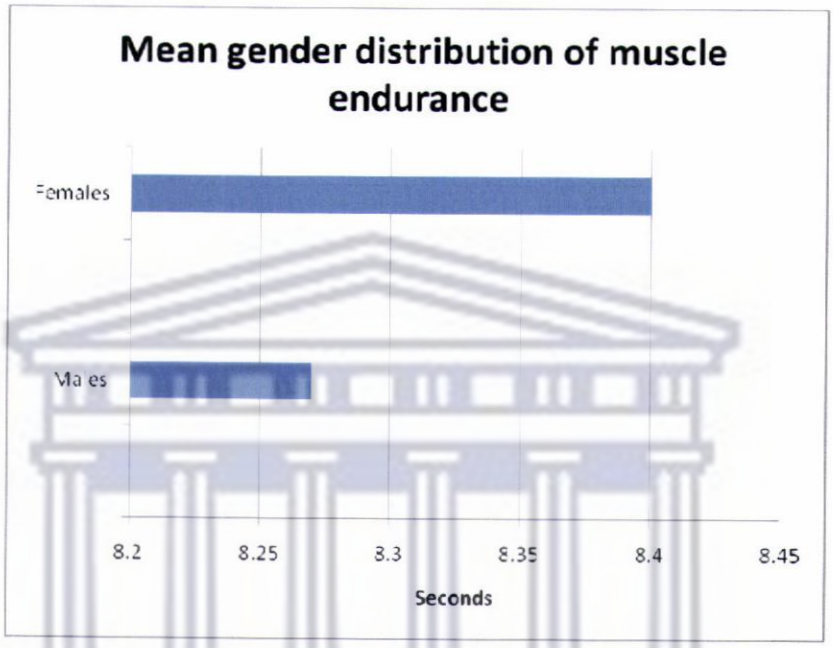


Figure 4.8: The Mean Gender Distribution of Muscle Endurance (n=181)

Females had more muscle endurance time (8.4s) compared to males.

4.7.3 Mean Age Distribution of Muscle Endurance

The mean age distribution of neck flexor muscle endurance for the study sample is shown in the table below.

Table 4.7: The Mean Age Distribution of Muscle Endurance (n=181)

Age (years)	Mean (in seconds)
14	7.11
15	6.78
16	8.06
17	9.36

The 15 year olds had the lowest score (6.78s) for muscle endurance.

Fisher's exact test was used to determine the association between neck pain and neck flexor muscle endurance. There was a significant association (p =0.00) between neck pain and neck flexor muscle endurance.

4.8 PSYCHOLOGICAL FACTORS

This section explores how the learners felt about themselves, other people and situations in the last month.

4.8.1 Distribution of Psychological Factors

The learners had to indicate how they felt about themselves, other people and situations in the last month.

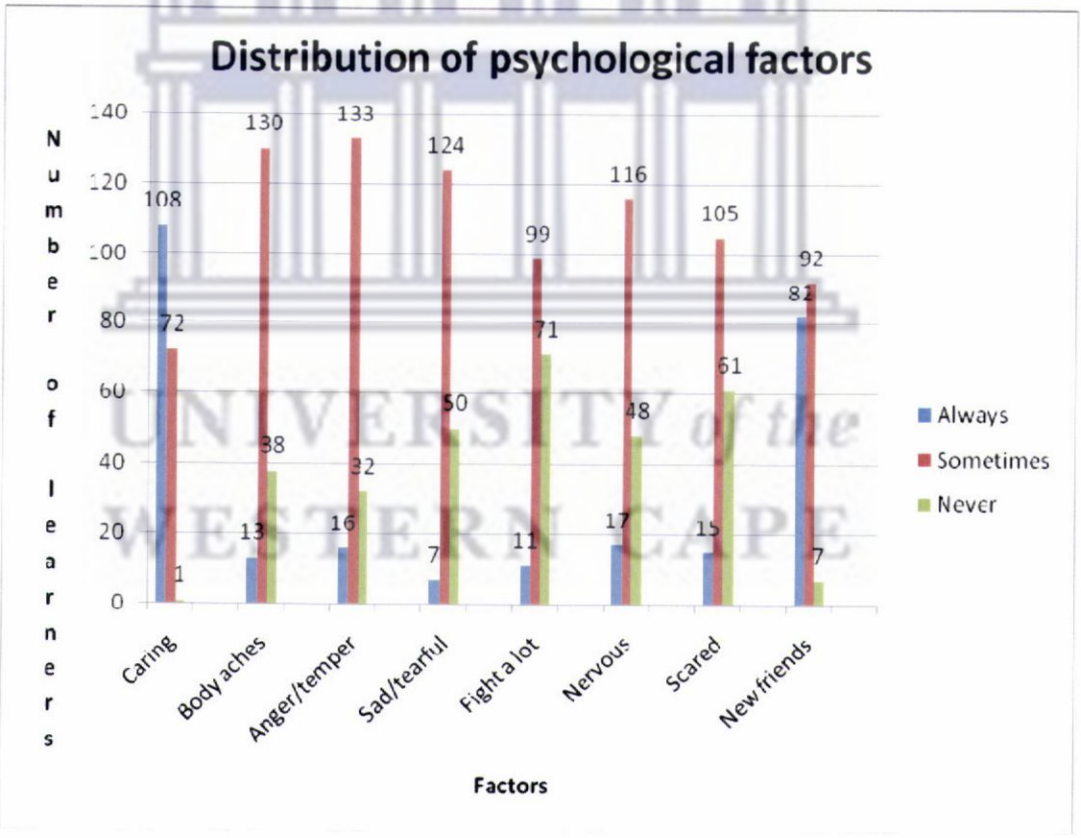


Figure 4.9: Distribution of how the Learners Felt about Themselves, Other People and Situations in the Last Month (n=181)

One hundred and thirty three of the learners indicated that they sometimes get angry or lose temper.

4.9 ODDS RATIO FOR PREDISPOSING FACTORS OF NECK PAIN

Among this sample, computer use at home, age and neck flexor muscle endurance were associated with neck pain. Computer use at school and participation in sport was not associated with neck pain in this study sample. Table 4.8 illustrates the odds ratios and upper and lower confidence intervals obtained for each assessed variable.

Table 4.8: Odds Ratios for Predisposing Factors to Neck Pain

	OR	UL 95%CI	LL 95%CI
School computer	1.17	.56	2.45
Home computer	2.30	1.07	4.94*
Neck flexor muscle endurance	.79	.69	.90*
Age	2.52	1.18	5.40*
Sport participation	.51	.24	1.11

* indicate significant values

4.10 SUMMARY OF RESULTS

- A total sample of 181 learners participated in the study; with a mean age of 16±1.1 years completed the questionnaire and neck flexor muscle endurance test.
- There were more males (97/181) than females in the study sample.
- Of the learners who participated, one hundred and twenty five used computer at school and 32% of the learners used computer at least two times per week at school.
- One hundred and fifty eight of the learners indicated that they used computer outside of school and 140 of those learners used computer at home.
- Twenty four percent of the learners that used computer at home, the time they spent while working on the computer were 2-3 hours or even more.
- Seventy four percent of the learners participated in sport and 53% participated at least two to three times per week.

- Sixty two percent of the learners' neck flexor muscle endurance averaged between 5.1 and 10 seconds.
- Females had more muscle endurance time (8.4s) compared to males.
- The 15 year olds had the lowest score (6.78s) for muscle endurance.
- One hundred and thirty three of the learners indicated that they sometimes get angry or lose temper.
- A total of 97(53.6%) of the learners reported experiencing neck pain and the 95% confidence for prevalence was (46.0%, 61.0%).
- Logistic regression analysis was done to determine predictive factors for neck pain in this study sample. Computer use at home, neck flexor muscle endurance and age were predictive in this high school learner sample.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter presents a discussion of the results presented in the previous chapter. The chapter is organized so that the objectives outlined in chapter one are outlined.

5.2 PREVALENCE OF NECK PAIN

Statistics on the prevalence of neck pain among high school learners is very important so as to determine the associated risk factors (Burke and Peper 2002). The prevalence of neck pain among this sample of learners was 53.6%. The prevalence of neck pain found in this study was higher than what was found in studies conducted internationally as well as locally. In a South African study conducted by Smith et al (2009) the neck pain prevalence was less (35%) compared to the present study.

In a study of 3485 adolescents aged 12 to 16 years conducted by Diepenmaat et al (2006) in Netherlands the prevalence for neck/shoulder pain was 11.5%. Hakala et al (2002) recorded a prevalence of 36% in a group of adolescence aged between 12-18 years. In a Malaysian study by Mohd , Zailina, Shamsul, Nurul Asyigin, Mohd, Syazwan (2010) the prevalence of neck pain was 33% in a study population of 100 primary school children with age ranging from 8-12 years.

The high prevalence of neck pain in the study raises concerns as learners lose a number of days in attending school due to depressive moods because of pain (Mikkelson, Salminen, Kautlanen (1997). As the adolescents will be the future working force, it is very important to promote healthy musculoskeletal system by means of education and preventative measures. The first would be to prevent the onset of neck pain or general musculoskeletal dysfunction among

adolescents which in turn would prevent chronic manifestations of musculoskeletal conditions (Boden and Galizzi 1999).

5.3 PREDISPOSING FACTORS

In order to address the high prevalence of neck pain amongst adolescents, it is essential to address the predisposing factors (Burke and Peper 2002; and Barrero and Hedge 2002).These predisposing factors include gender and age, computer use both at school and at home, participation in sport and neck flexor muscle endurance.

5.3.1 GENDER AND AGE

Gender has been associated with the development of neck pain in adolescents. Vikat et al (2000) found that girls between the ages of 16-18 years had frequent complaints of neck pain than boys of the same age. However, in the present study gender was not significant for the development of neck pain ($p = 0.218$). This might be due to the fact that there were (76%) boys that indicated to have experienced neck pain than girls (60%), compared to other studies (Smith et al 2009; Siivola et al 2004; and Diepenmaat et al 2006). Age was related to the development of neck shoulder symptoms in the studies by Vikat et al (2000) and Siivola (2003). In the present study age was significant for the development of neck pain ($p = 0.017$) with 59% prevalence amongst 17 year olds. Palmer et al (2001) has indicated that neck and shoulder symptoms increase with age. In adults, previous episodes of neck pain were shown to increase the likelihood of future episodes of neck pain (Miranda et al 2001a, Palmer et al 2001).

5.3.2 Computer Use

Computer exposure by the learners was evaluated at school and at other locations e.g. at home, a friend's/relative's home, library, or internet café. Several authors have also investigated learners' computer exposure both at school and elsewhere (Ramos et al 2005; Burke and Peper 2002). In the present study 69% of the learners used computer at school and 87% used computer outside of school.

School lessons lasted for approximately 45 minutes and 67% of the learners used computer once a week at school. The duration of learners' computer exposure corresponds to international learner samples' weekly computer exposure (Hakala 2006; Harris and Straker 2000). In the present study computer use at school as a risk factor was not significant p = 0.4. The learners used computer mostly at home for 2-3 hours and more daily , and this proved to be a high risk factor for development of neck pain (p = 0.03).

Hakala et al (2006) also concluded that daily use of computers exceeding 2-3 hours seemed to be a trigger for neck shoulder pain. Gillepsie (2006) also found that daily home computer users were at odds of reporting neck pain symptoms compared to less frequent users (OR=1.7, P=0.008). In the same study, school computer use was not associated with the development of neck pain.

In one Australian study of laptop use, average daily use in the past month was 3.2 hours with the highest daily use recorded to be 15 hours; with a mean longest single period of use of 102 minutes (Harris and Straker 2000). The time spent sitting while working on the computer was associated to risk of developing musculoskeletal pain. Musculoskeletal pain has been shown to have a negative impact on computer usage (Smith et al 2009), sport participation (Diepenmaat et al 2006) as learners are reluctant to participate because of the pain.

Neck pain associated with computer use among the adult work force has been identified as one of the main causes of work related health problems among adults (Hagen 2002; Fejer 2006). These disorders lead to reduced worker productivity and increased financial strain due to medical expenses and disability claims (European Labor Force Survey 1999). The high computer exposure of learners in the current study may lead to similar patterns of dysfunction and disability as noted among the adult population (Sjolie 2004; and Barrero and Hedge 2002). Early identification of risk factors among the learner population, coupled with treatment and rehabilitation by medical professionals is crucial in

preventing chronic disabling musculoskeletal disorders in adult hood (Kyvik 1998).

It has been stated that musculoskeletal pain experienced during adolescence is the most important predictor of chronic musculoskeletal pain during adulthood (Brattberg 2004; Stahl et al 2004). Early identification of risk factors and implementation of intervention strategies may prevent the progression of adolescent musculoskeletal dysfunction into chronic musculoskeletal disorders in adulthood (Trevelyan and Legg 2006).

Education on the amount time that the learners spend while using the computer can be of value for the learners (Cardon, De Clercq, De Bourdeaudhuij (2002). In the present study, using the computer for more than three hours has shown to be one of the major risk factors for the development of neck pain. This might be due to lack of parental guidance at home where there is no monitoring of the exact exercises that are performed on the computer. It has been shown that it is not only school work that the learners use the computer for, but, also games listening to music and chatting with friends. This can result to a prolonged length of time sitting in one position, and in this case pause exercises are advised to minimize the slow creep of soft tissue.

5.3.3 Participation in Sport

Studies that investigated participation in sport focused on musculoskeletal pain and very few studies looked at neck pain.

However, Vikat (2000) found that moderate intensity was significantly associated with non specific neck pain. In a study by Feldman et al (2002) found that the cumulative annual incidence of neck and upper limb pain was 28.4%. Sports involvement and music participation were not risk factors for the development of neck and shoulder pain in adolescents. In a study by Niemi et al (1997) in high school students, physical activity involving upper extremities had a protective effect from neck shoulder symptoms among girls. In a local study by Smith et al (2009) found that playing sport for more than once a week was associated with musculoskeletal pain and no participation in sport was protective for general musculoskeletal pain.

In the present study participation in sport was evaluated by asking the learners how many times per week they were involved in sport (figure 4.6). There was no association between sporting activity and the prevalence of neck pain (p =0.09). Lack of participation in sport has been associated with decreased physical activity and this could lead to chronic diseases of lifestyle (Frantz 2005). Some studies have looked at the association of physical activity with low back pain.

Sjolie (2004) found that low back pain was inversely proportional to time spent on physical activity in particular with regular activity like walking or cycling.

There has been a lot of debate in literature whether sport activity is a risk factor for the development of musculoskeletal pain. This could be most of the studies did not look at the intensity or the duration of sport participation or the results were vague without any specificity. Sport activities have been seen to have a preventative effect in the development of general musculoskeletal pain. This should be emphasized both at school and at home where learners should at least be involved in sport activities. Exercise builds muscle endurance in the body and promotes the well being of the individual doing the exercise; this could in turn minimize the onset of general musculoskeletal pain in the body. Therefore we need to look at the duration and may the manner in which the exercises are performed like stretching before and after the activity (Brukner and Khan 2008).

5.3.4 Psychosocial Factors

In the present study the impact of psychosocial factors such as stress, depression and anxiety on the prevalence of neck pain were assessed as frequencies (Table 4.8). International child and adolescent studies have shown a strong association between psychosocial factors and general musculoskeletal pain (Diepenmaat et al 2006, Siivola et al 2004). Common body areas related to psychosocial factors include the neck, shoulders and low back. Siivola et al (2004) reported that stress related neck and shoulder pain, experienced during adolescence, persisted into adulthood.

Although international studies found that psychosocial factors are predictive for musculoskeletal pain among children and adolescents in the present study the frequencies were different. This correlates with the findings by Smith et al (2009). This may be linked to differences in sporting participation and computer exposure including the ergonomics while sitting in front of the computer.

5.3.5 Neck Flexor Muscle Endurance

The neck flexor muscles are the stabilizers and movers of the neck and it is imperative to have good muscle endurance as this can lead to forward head posture(Watson et al 1993) if one of the muscle systems fail (Janda 1996) especially while working on the computer. Many studies have reported that there is the link between abnormal patterns of muscle recruitment, an imbalance between agonist and antagonist muscles, and different types of pain symptoms (Janda 1996; Kankaanpää et al 1998; Lee et al 1999; Jull et al 1999; Ludewig and Cook 2000). Some of the above factors may further lead to avoidance of physical activity (Mense et al 2001). Musculoskeletal pain has been shown to induce changes in motor system function, such as alteration of spinal motor reflexes, effect on the gamma motor system, altered motor recruitment patterns, and effects on supraspinal neurones (Madeleine et al 1999; Thunberg et al. 2001; Mense et al 2001).

The endurance of the neck flexor muscles has been found to be a predisposing factor to chronic neck pain (Watson et al 1993). In the present study the neck flexor muscle endurance of the adolescents was found to be highly significant as a predisposing factor to neck pain ($p = 0.00$). There are no other studies that have looked at neck flexor muscle endurance and its association to neck pain amongst this age group. In adult studies, increased neck flexor muscle fatigue has been implicated in chronic neck pain patients (Falla 2003, 2004).

In a population -based study by Oksannen et al (2007) of 17 year olds with headache found that increased neck flexor muscle fatigue was associated with tension type headache. It has been documented that childhood neck and shoulder pain is a predictor of neck and shoulder pain in adulthood (Grimmer et al 2000). The clinical-based studies in adults show that there is a connection between muscle weakness and primary headaches, for which there are tentative results in adults (Levoska et al 1993) showing that active dynamic muscular training of the neck shoulder muscles creates a protective effect against headaches.

The increase in the prevalence of neck pain in the present study, suggests that there is a growing health burden amongst this age group (Stahl et al 2004; Miranda et al 2001a; Palmer et al 2001).Therefore, preventative measures need to be implemented to decrease the likelihood of symptoms persisting to adulthood (Siivola et al 2004).

CHAPTER 6

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

In this final chapter, a brief summary of the study is provided, as well as the researcher's conclusions on the results. This is followed by recommendations and the limitations of the study.

6.2 SUMMARY

6.2.1 Neck Pain Prevalence and its Predisposing Factors in High School Learners

A sample representative of the population of two high schools in Gauteng Province participated in the study. The learners were using computers at school and some were using computers outside of school. More than two thirds of the representative sample was using computers at home. Most of the learners used computer once a week at school for a duration of about forty five minutes. Outside of school twenty five percent of the learners used the computer between two to three hours per day. Seventy five percent of the learners participated in sport at least twice a week for about two hours. The neck flexor muscle endurance of this sample averaged between five and ten seconds. The neck pain prevalence of this sample was 53.6%.

The most predominant predisposing factor was computer use at home for more than one hour and neck flexor muscle endurance time of less than ten seconds. Gender in this study was not a predictive factor as was shown by previous studies. Sport participation two times a week for about two hours proved to be preventative of neck pain onset. The seventeen year olds had more neck pain complaints compared to all the other age groups.

6.3 CONCLUSION

The main aim and objectives of this study were achieved. The results of the study highlight the need for intervention mainly focusing on education of both

parents and teachers on how to use the computer safely at home and ergonomics.

6.4 LIMITATIONS OF THE STUDY

- The researcher was only allowed access to the learners who were attending the physical education class. The negatively impacted on the distribution and size of the sample.
-
- The method of convenient sample selection could have affected the results as all the learners did not have an equal opportunity to participate in the study. Stratified random sampling could have provided a different result and would have added greater rigour to the study.

6.5 RECOMMENDATIONS

Based on the findings of this study, a number of recommendations are made:

- Engaging learners to participate in some form of physical activity in their school programme. Physical activity may facilitate mechanical and metabolic processes that are health enhancing or healing for musculoskeletal tissues.

- Ensuring that computer workstations are arranged to improve good posture and reduce neck flexion (use of document stands, screen height etc.), use of height adjustable chairs, and using rest break to reduce the adverse effects of prolonged sitting may help to prevent neck pain.

- Further, while merely providing ergonomic work station may not reduce the prevalence of neck pain in adolescents, providing ergonomic education in

both learners and teachers at school and parents at home may reduce neck pain in this age group and may be a useful primary prevention strategy.

- Endurance training of the neck flexor muscles, which has been shown to decrease pain and disability in women with chronic neck pain, may be helpful for adolescent neck pain sufferers and would be an interesting area for further investigation (Ylinen et al 2003). To support this argument, it is well known that neck pain precedes headaches (Stahl et al 2004) and Oksanen (2007) showed that neck flexor muscle fatigue is one of the factors in adolescent's headaches. Thus, the use of neck flexor muscle exercises may be a useful prevention approach to reduce morbidity and to rehabilitate adolescent neck pain sufferers.

- The onus of the responsibility lies with the Gauteng Department of Education to obtain appropriate training from professionals experienced in ergonomics and exercise prescription.

- Future longitudinal studies should investigate whether local adolescents are showing similar tendencies as international learner samples, e.g. increasing severity of disability.

This study served to identify the prevalence of neck pain and its predisposing factors in high school learners that need to be addressed to prevent the onset or progression to chronic neck pain in adulthood.

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APPENDIX 1

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH
DEVELOPMENT

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1 June 2010

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and the ethics of the following research project by:
Ms C Mafanya (Physiotherapy)

Research Project:	Neck pain amongst high school learners in the Gauteng Province
Registration no:	07/7/4

Peter Syster
Manager: Research Development Office
University of the Western Cape

UNIVERSITY of the
WESTERN CAPE
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APPENDIX 2

UMnyango WezeMfundo
Department of Education

Lefapha la Thuto
Departement van Onderwys

Date:	08 April 2008
Name of Researcher:	Mafanya Cikizwa
Address of Researcher:	107 Petullas Place
	Grasveld Crescent
	Liefde en Vrede
Telephone Number:	0114323470/0834964095
Fax Number:	0116822707
Research Topic:	Neck pain amongst high school learners in the Gauteng Province
Number and type of schools:	3 Secondary schools
District/s/HO	Johannesburg South

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The researcher to make appointments with the principals of the schools and offices involved to conduct the research. A copy of this letter must be presented to both the School Youth Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

Permission has been granted to proceed with the above study subject to the conditions listed below being met, and may be withdrawn should any of these conditions be flouted:

1. The District/Head Office Senior Managers concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.
2. The District/Head Office Senior Managers must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.
3. A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.

Office of the Chief Director: Information and Knowledge Management
Room 5/01, 111 Commissioner Street, Johannesburg, 2001 P.O. Box 7710, Johannesburg, 2000
Tel: (011) 355 0000 Fax: 011 355 0734

4. A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.
5. The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.
6. Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researchers may carry out their research at the sites that they manage.
7. Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year.
8. Items 5 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.
9. It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.
10. The researcher is responsible for supplying and utilizing his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the officials visited for supplying such resources.
11. The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.
12. On completion of the study the researcher must supply the Director: Knowledge Management & Research with one Hard Cover bound and one Ring bound copy of the final, approved research report. The researcher would also provide the said manager with an electronic copy of the research abstract/summary and/or annotation.
13. The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.
14. Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

CHIEF DIRECTOR: INFORMATION & KNOWLEDGE MANAGEMENT

The contents of this letter has been read and understood by the researcher.

Signature of Researcher

Date

APPENDIX 3

DEPARTMENT OF PHYSIOTHERAPY

Private Bag X17, Belville, 7535
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INFORMATION SHEET

PROJECT TITLE: **NECK PAIN AMONGST HIGH SCHOOL LEARNERS IN THE GAUTENG PROVINCE**

What is this study about?

The research will aim to determine the factors that contribute to neck pain and in high school learners.

This research project will be conducted in the Gauteng Province by Cikizwa Mafanya. She is currently registered for a Master's degree in Physiotherapy at the University of the Western Cape. Information gained from the study should assist physiotherapists to treat learners with neck pain more effectively.

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

You will be asked to complete a questionnaire indicating whether you experience neck pain and if so, the intensity, and approximate frequency date of commencement of the symptoms. Questions relating to your computer usage are also included in the questionnaire.

To test the strength of your neck muscles you will be requested to lie on your back on an examination couch and lift up your head. The researcher will time how long you can hold this position.

An appointment will be made via your class teacher to conduct the study.

These appointments will be held after school and should take between 30 and 45 minutes.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, your name will not be used on the questionnaire and other collected data. Each participant will receive a code which will be placed on the questionnaire and other collected data.

Are there any risks involved in participating in this research project?

There are no known risks associated with participating in this research project.

What are the benefits of conducting this research?

This research is not designed to help you personally. The researcher hopes that by gaining a better understanding of the causes of neck pain in high school learners other people may benefit in the future.

Do I have to be in this research and may I withdraw from the study?

Your participation in this research is voluntary. You may choose not to take part. If you decide to participate in this research, you may withdraw at any time. You will not be penalized by your school or educators in any way should you decide not to participate or should you withdraw from the study.

Is any assistance available if I am negatively affected by participating in this study?

If you are negatively affected by the research you will be referred to the appropriate health professionals.

What if I have questions?

If you have any questions about the research study please contact ***Cikizwa Mafanya*** on 083 486 4095

Should you have any further questions in regards to the study, your rights as a research participant or if you wish to report any problems you have experienced related to the study please contact:

Study Coordinator's Name: A Rhoda
University of the Western Cape
Private Bag X17, Belville 7535
Email: arhoda@uwc.ac.za

Telephone: (021) 959-3936
Cell: 082 775 7748
Fax: (021) 959-1217

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

APPENDIX 4

DEPARTMENT OF PHYSIOTHERAPY

Private Bag X17, Belville, 7535
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CONSENT FORM

TITLE OF RESEARCH PROJECT: THE PREVALENCE AND PREDISPOSING FACTORS OF NECK PAIN AMONGST HIGH SCHOOL LEARNERS IN THE GAUTENG PROVINCE

The study has been described to me in English and I voluntarily agree to participate.

My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature .....

Date.....

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Study Coordinator's Name: A. Rhoda
University of the Western Cape
Private Bag X17, Bellville 7535
Email: arhoda@uwc.ac.za

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APPENDIX 5

DEPARTMENT OF PHYSIOTHERAPY

Private Bag X17, Bellville 7535
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INFORMED CONSENT FORM

To: The parent / guardian of a high school learner

When a learner participates in research, formal permission from a parent or guardian is required. The parent or guardian must confirm that the learner understands the reason for the research and that participation is voluntary.

Please sign this form if you have read the Participation Information Sheet and give permission for the learner to participate in this research study.

I ..... the parent/guardian hereby give consent that the learner ..... may participate in the research study investigating the prevalence and predisposing factors of neck pain in high school learners in the Gauteng Province.

Parent / Guardian signature ..... Date .....

APPENDIX 6

COMPUTER USAGE QUESTIONNAIRE for SCHOOL LEARNERS

COMPUTER USE AT SCHOOL.....

*If you **don't** use a computer at **school**, go to page **3**. Mark your answer with a cross (X).*

1. How long have you been using a computer during **lessons at school**?
   - ☐ Less than 1 year ☐ 2 years ☐ 3 years ☐ 4 years or more

2. Do you **use the computer** for any of the following **subjects**? Mark as many as you want.
   - ☐ Mathematics ☐ Computer Studies ☐ Languages ☐ Compu-Typing
   - ☐ Others, please list: ______________________

3. What do you **use the computer** for at **school**? Mark as many as you want.
   - ☐ Typing ☐ View lessons ☐ Experiments ☐ Internet and e-mail
   - ☐ Use educational programmes ☐ Other, please list: ______________________

4. How many **times per week** do you use the **computer at school**?
   - ☐ Once or less per week ☐ Twice per week ☐ Three times per week ☐ Four times per week
   - ☐ Five times or more per week

5. During **one session** at school, **how long** do you spend using the computer?
   - ☐ Less than 30 minutes ☐ About 45 minutes ☐ 1 Hour ☐ 1 ½ Hours ☐ 2 Hours or more

6. How many **hours per week** do you spend working on the **school computer**?
   - ☐ About 2 Hours per week ☐ About 4 Hours per week ☐ About 6 Hours per week ☐ 8 Hours or more per week

7. Did you receive any **instruction** on **how to sit** in front of the **computer**?
   - ☐ Yes ☐ No

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Please turn the page.....

2

7.1. If **"Yes"**, who **instructed** you?____________________

8. 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.)
☐ Yes ☐ No

9. Have you received any information on **stretches/ exercises** you can do during the above-mentioned short breaks?
☐ Yes ☐ No

9.1 If **"Yes"**, who provided the information?____________________

9.2 Please describe the type of **stretches** or **exercises** that you do?
____

COMPUTER USE ELSEWHERE....

If you don't use a computer ***outside school****, go to page 5. Mark your answer with a* ***cross*** *(X).*

1. **Where** do you use a computer **outside school?** Mark as many as you want.
☐ At your home ☐ Internet Café ☐ Relative/ friend's home ☐ Library
☐ Elsewhere (state where)____________________

2. Roughly, **how long** have you been using the computer **outside** school?
☐ Less than a year ☐ 2-3 Years ☐ 4 Years ☐ 5 years or more

3. On average, how many **times per week** do you use the computer?
☐ Less than once a week ☐ 2 times per week ☐ 3 times per week ☐ 4 times per week
☐ Five times or more per week

Please turn the page....

4. On average, how many **hours per day** do you spend working on the computer **outside of school**?
☐ Less than 30 minutes ☐ 1 Hour ☐ 2-3 Hours ☐ 4 Hours or more

5. What **type of computer** do you use most of the time?
☐ Desktop computer ☐ Laptop computer ☐ Both

6. Where is the computer **positioned** when you are using it? *Mark as many as you want.*
☐ On a desk/ table ☐ On your lap ☐ On the floor ☐ On a chair
☐ Other, please list__________

7. Do you participate in any **other activity** whilst simultaneously working on the computer? *Mark as many as you want.*
☐ Talk to a friend ☐ Listen to music ☐ Talk on the phone ☐ Writing on a page
☐ Other, please list__________

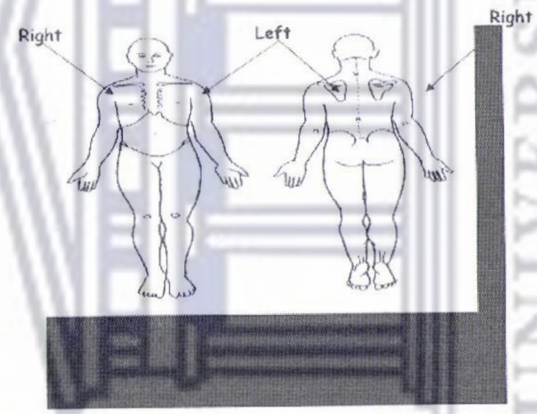
Please turn the page...

TELL US ABOUT YOUR ACHES and PAINS...

Mark your answer with a cross (X).

1. Have you experienced any **headaches**, **discomfort**, **stiffness**, **pain**, or **tingling** in your **muscles** or **joints** in the **last month?**
   ☐ Yes ☐ No **If "No", go to page 8.**

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



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Please turn the page....

3. Tell us **how bad** these feelings of **discomfort**, **stiffness**, **pain** or **tingling** has been in the **last month**

If you had **SLIGHT discomfort, stiffness, pain,** or **tingling**, mark (X):

If you had **A LOT** of **discomfort, stiffness, pain,** or **tingling**, mark (X):

This is an example of how you should do it... Neck X

Body Area	Slight Discomfort, Pain, etc	A lot of discomfort, pain, etc
Head		
Neck		
Upper Back		
Mid-Back		
Lower Back		
Right Shoulder		
Left Shoulder		
Right Elbow		
Left Elbow		
Right Wrist and Hand		
Left Wrist and Hand		

Please turn the page....

4. **When** did you feel the **headaches**, discomfort, **stiffness**, **pain** or **tingling** of your **muscles and joints**? Mark as many as you want.

- ☐ Sitting in front of your school desk
- ☐ During or after sports.
- ☐ Working on the computer at school.
- ☐ Writing in a book at school desk
- ☐ Working on the computer elsewhere
- ☐ Other (please list):________________

5. Have you **ever felt like not** using the computer because of **headaches**, **discomfort**, **stiffness**, **pain**, or **tingling** of your **muscles** and **joints**?

- ☐ Yes
- ☐ No

6. Have you **stopped** any of the following **activities** because of the **headaches**, discomfort, **stiffness**, **pain**, or **tingling** of your **muscles** and **joints** in the **last 3 months**? Mark as many as you want.

- ☐ Playing sports
- ☐ Working on the computer
- ☐ Writing in a book
- ☐ Playing a musical instrument
- ☐ List any other________________

7. In the **last month**, have you seen a **Doctor** or any other **medical professional** for any of your muscle and joint **complaints** mentioned above?

- ☐ Yes
- ☐ No

Please turn the page....

HOW DO YOU FEEL?

*Tell us how you have **felt** about **yourself**, other **people** and **situations** in the **last month**. Mark each answer with a **cross** (X)*

1. Do you **care** about **other people** and try to be **nice** to them?
   ☐ Always ☐ Sometimes ☐ Never

2. Do you get a lot of **headaches** and **stomach** aches?
   ☐ Always ☐ Sometimes ☐ Never

3. Do you get very **angry** and loose your **temper**?
   ☐ Always ☐ Sometimes ☐ Never

4. Do you feel **sad** and **tearful**?
   ☐ Always ☐ Sometimes ☐ Never

5. Do you **fight** a lot?
   ☐ Always ☐ Sometimes ☐ Never

6. Do you feel **nervous** when meeting **new** people and going to **new** places?
   ☐ Always ☐ Sometimes ☐ Never

7. Do you get **scared** easily?
   ☐ Always ☐ Sometimes ☐ Never

8. Do you make **new friends** easily?
   ☐ Always ☐ Sometimes ☐ Never

Please turn the page.....

YOUR SPORTS and MUSIC....

Mark your answer with a cross (X)

1. Do you participate in **sports**?
   ☐ Yes ☐ No..... **If "No", go to question 5.**

2. If **"Yes", which sports** do you participate in? Mark as many as you want.
   ☐ Rugby ☐ Soccer ☐ Tennis ☐ Cricket ☐ Netball
   ☐ Athletics ☐ Hockey ☐ Other, please list ____________________

3. How many **times per week** do you participate in your combined sporting activities?
   ☐ Less than once a week ☐ Once a week ☐ Twice a week ☐ Three times or more per week

4. On average, how many **hours per week** do you participate in all your sports?
   ☐ Less than an hour ☐ About 2 Hours ☐ About 4 Hours ☐ 6 Hours or more

5. Do you play a **musical** instrument?
   ☐ Yes ☐ No **If "No", go to page 10.**

6. If **"Yes"**, what **type** of musical instrument/ s do you play?
   ____

7. On average, how many **hours per week** do you play your musical instrument?
   ☐ Less than 1 hour ☐ About 2 Hours ☐ About 4 Hours ☐ Six Hours or more

Please turn the page....

TELL US ABOUT YOURSELF… 

1. What is your **school's** name?________________________________

2. What is **your name**?____________________________________

3. What is your **date of birth** (day, month, year)?______________________

4. In which **grade** are you?________________

5. Are you: ☐ A **boy** ☐ A girl

6. Are you: ☐ **Mainly right handed** ☐ **Mainly left handed**

7. Do you wear: ☐ **Spectacles** ☐ **Contact Lenses** ☐ **None**

8. Do you suffer from any **medical condition/s**, e.g. Epilepsy, Diabetes, Asthma?
   ☐ Yes ☐ No **If "No", go to question 10**

9. If **"Yes"**, do you use any **medication** for this condition?
   ☐ Yes ☐ No

10. Have you ever been involved in an **accident or sporting injury** where you injured your **back** or **neck**?
    ☐ Yes ☐ No

11. Have you had any **surgery** involving your **muscles** or **joints** done?
    ☐ Yes ☐ No

Please turn the page….

11.1. If "**Yes**", please list the type of **surgery** and when it was done.

Year: _____ Surgery: ____________________________

Year: _____ Surgery: ____________________________

Year: _____ Surgery: ____________________________

THANK YOU FOR COMPLETING THIS QUESTIONNAIRE!!!

The End.