THE EFFECT OF A KNOWLEDGE-BASED ERGONOMIC INTERVENTION AMONGST ADMINISTRATORS AT AGA KHAN UNIVERSITY HOSPITAL, NAIROBI

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A thesis submitted in partial fulfilment of the requirements for a Masters Degree in the Department of Physiotherapy, University of the Western Cape.

November 2012

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KEYWORDS

Ergonomics

WRMDs

Prevalence

Low back pain

Neck pain

Administrators

Physiotherapists

Knowledge

Posture

Exercises

ABSTRACT

Lack of adherence to the correct working conditions exposes workers to ergonomics-related hazards and eventually work-related musculoskeletal disorders (WRMDs) which are estimated at 160 million per year globally. Literature shows that with modernization by use of computers, administrators are exposed to prolonged sitting and long working hours which predisposes them to ergonomic hazards. Low back pain and neck pain are the leading work-related musculoskeletal disorders with a lifetime prevalence of 70 - 80% and 50 - 60% respectively. Both low back pain and neck pain have a multifactorial aetiology that includes work-related and individual related factors. Lack of reporting of work-related injuries has led to paucity of statistical literature with regards to work-related low back pain and neck pain, especially in the developing countries. The aim of this study was to determine the prevalence of ergonomics related low back pain and neck pain, and describe the effect of a knowledge-based ergonomic intervention among administrators in Aga Khan University Hospital, Nairobi (AKUH, N). A mixed method design was used in this study using a survey and two focus group discussions (FGD).

A self-administered questionnaire that is in four sections was administered to 208 participants. The questionnaire sought the prevalence of musculoskeletal disorders, the knowledge of participants with regards to low back pain and neck pain as well as the work-related and individual risk factors related to the same. The dissemination of the study results involved a one hour knowledge-based ergonomic session given to all interested participants, based on the information from the survey. Two FGD with purposive selection of eight participants were held to explore their experience on the value of the information provided.

The statistical package for social sciences (SPSS) version 20 was used to capture and analyze the quantitative data. Descriptive statistics was used to summarize the study findings in the form of means, frequencies, standard deviations and percentages. Inferential statistics (chi-square) was used to test the associations between different categorical variables ($p<0.05$). For the qualitative data, the tape recorded interviews were transcribed verbatim, field notes typed, sorting and arranging data was done and themes were generated. Thematic content analysis was used to generate the themes. The aim of the study, confidentiality and the participants' freedom to withdraw from the study were explained. Informed consent was also obtained before the survey and FGD and referral was made where necessary.

The findings of the current study revealed that the study participants were knowledgeable about ergonomics-related low back pain and neck pain however this knowledge was not directly translated into behaviour. Low back pain (LBP) had the highest twelve month prevalence at 75.5% followed by neck pain at 67.8%, and LBP showed significant associations at $p< 0.05$ with some work-related and individual risk factors. The results of the FGDs showed that most participants had positive behavioural and attitudinal change post the knowledge-based ergonomic intervention despite the challenges they met in implementing the behavioural change. These results therefore show the need for continual education about ergonomics to create awareness on the predisposing factors to work-related LBP and neck pain, hence promoting a healthier quality of life amongst employees through adherence to healthy work behavioural practice.

DECLARATION

I hereby declare that "**The effect of a knowledge-based ergonomic intervention amongst administrators at Aga Khan University Hospital, Nairobi**" is my own work, that it has not been submitted for any degree of examination in any other university and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Nancy E. N. Wanyonyi

Signature..... November, 2012

Witness:

.....

Professor Jose Frantz

DEDICATION

To my dear parents Mr. Caleb and Mrs. Florence Wanyonyi for the unwavering support that they have given me towards my education and their constant encouragement in my career path.

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ACKNOWLEDGEMENTS

My first gratitude goes to our Almighty God for enabling me to achieve my long desire to further my studies. I wish to sincerely thank my supervisor Prof Jose Frantz for your constant guidance in this research journey. Many are the lessons that I have learnt and thank you for always giving me hope in times when I was uncertain of the direction that I was taking. To my assistant supervisor Prof Saidi Hassan, you agreed to guide me with my research with no second thoughts despite the kind of workload that it involved. I will be forever grateful for the contribution that you have made to my career.

To the UWC fraternity, in particular the Physiotherapy Department for the support you accorded me during my duration of studies. Sincere thanks goes to Prof Julie Philips, Prof Anthea Rhoda, Ms. Tanya Steyl, Dr Ina Diener, Dr Ruth Stern and Prof Trish Struthers. The success I have today is attributed to the knowledge you imparted in me. I also wish to thank my fellow colleagues Naomi, Lameck, Christine, Micah, Nicole, Anderson, Viateur and Tunde for the support we gave to each other. Sincere thanks goes to my senior colleagues in the Physiotherapy Statistics, PET departments and other close friends within UWC for your academic advice and social support. Wallace, Mukadas, Philomene, Siaka, Innocent, Grace, Fred and Violet; you all made it possible for me to still press on when times were hard and I am indebted to your constant encouragement and friendship.

I wish to thank my employer The Aga Khan University Hospital, Nairobi for granting me the opportunity to further my studies as well as conduct my research study in our institution. To my fellow employees thank you for the support you gave me by participating in my research study. To Mr. Suleiman Kweyu, Mr. Samuel Muema, my research assistants Rajinder and Eva and my

other colleagues in the Physiotherapy department, I sincerely wish to thank you all for the contribution you made towards my educational path. May our Almighty God bless you all richly. My sincere gratitude also goes to the Government of Kenya through the National Council for Science and Technology for allowing me to conduct my research in Kenya.

I finally wish to thank my entire family for the support you gave me for the two years I was away studying. It was not easy being away from home but your constant communication and prayers made the distance a lesser burden to bear. To my parents, Mr Caleb and Mrs Florence Wanyonyi thank you for your love and guidance. My grandparents, the late Rtd. Majors Samson and Selina Were, as well as Rtd. Majors Nathan and Irene Misango, the thoughts of your advice and prayers always made me to be strong. Mr and Mrs Justus Wafula, Mr and Mrs Wiseman Misango, Mr and Mrs Geoffrey Misango, my sister Caro Simekha and brother Masibo Wamalwa, Mr and Mrs Silas Omenda, please receive my sincere thanks on the special contribution that you made to my education on behalf of the entire family and friends. To Mr and Mrs Michael Ngetich you were my second family in Cape Town and I really appreciate all the support that you accorded me. My sisters and special friends, Irene Kasoha for your support and taking charge of everything in my absence, June Adembesa thank you for always being in touch despite the distance, it really meant a lot to me. To Winnie Mumbua, Cathy, Winnie Kinaro, Miriam and Peggy words just cannot explain it all. To the Salvation Army Goodwood Corps, I found a second home in you and sincere thanks to Major Booth and the whole team for your assistance to help me settle down. Thank you for your prayers and support and may God's favour be upon you all always.

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CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION TO CHAPTER

This chapter presents the background of the study, the statement of problem, the aim of the study, the objectives, the significance of the study, the definition of terms and the general outline of the entire thesis.

1.1 BACKGROUND

Low back pain is a leading musculoskeletal disorder with a lifetime prevalence of 60-85% (Hoy *et al*., 2012; Krismer & Van Tulder, 2007). Despite having methodological differences in comparing populations, a global systematic review estimated the one year prevalence of low back pain within the ranges of 18.6% - 57.4% (mean-38%), one month prevalence at 18.1% - 43.5% (mean-30.8%) and a point prevalence of 6.6% - 30% (mean-18.3%) (Hoy *et al*., 2012). Low back pain can have debilitating effects if not addressed early and is a common reason why people claim disability pensions (National Insurance Administration, 1998). Neck pain is equally a major cause of activity limitation among workers (Collins, Janse Van Rensburg & Patricios, 2011; Côté *et al*., 2008a; Ferrari & Russell, 2003). Despite having the same methodological differences in determining their epidemiology as LBP, Fejer, Kyvik and Hartvigsen (2006) estimated the lifetime neck pain prevalence of the world population as being between 14.2%-71.0% (mean-48.5%), one year prevalence as between 16.7%-75.1% (mean-37.2%) and the point prevalence as between 5.9%-22% (mean-7.6%). A most recent study has estimated the overall prevalence as between 0.4%-86.8% (mean-23.1%), one year prevalence as between 4.8%-79.5%

(mean-25.8%) and a point prevalence as being between 0.4%-41.5% (mean-14.4%) thus showing an increase in the latest point prevalence (Hoy, Protani, De & Buchbinder, 2010b).

Although both low back pain and neck pain have a multifactorial etiology, several factors in the work environment have been implicated as being important determinants of these pain (Bejia *et al*., 2005). These include physical factors, such as workplace design, forceful or sustained exertion, frequent bending and twisting, awkward postures and prolonged sitting; environmental factors, such as increased stress and pressure at work with regard to performance, monotonous work and a lack of job satisfaction; as well as individual factors, such as age, body size, exercises and smoking (Chetty, 2010b; Fisher & Gibson, 2008; Naidoo & Haq, 2008). Dahl (2000, as cited in Fisher & Gibson, 2008) observes that prolonged sitting in administrative and computer tasks exposes the neck, shoulder and low back muscles to sustained postures and static muscle contractions that could eventually lead to muscle strains. With the spine suffering the greatest impact of work related musculoskeletal disorders (WRMDs), administrators usually benefit from several physiotherapy treatments and the relevance of good working posture, in addition to exercises, cannot be overemphasized by physiotherapists during these sessions (Collins *et al*., 2011; Bot *et al*., 2007 as cited by Chetty, 2010b; Naidoo & Haq, 2008; Punnet & Wegman, 2004). Addressing these risk factors could assist in preventing chronicity of neck pain and low back pain.

A common cliché goes like this "*A working nation is a thriving nation*". WRMDs have a high impact on the occupational behaviour of the affected person, often leading to low productivity (Chetty, 2010b; Niu, 2010; Fisher & Gibson, 2008; Krismer & Van Tulder, 2007). Absenteeism from work is a major disabling effect of WRMDs. This affects the employers and the general country economically due to a failure of its citizens to produce the necessary income so that

companies and the country may thrive (Chetty, 2010a; Takala, Urrutia, Hämäläinen & Saarela, 2009). Besides affecting the employers and the country, Chetty (2010a) adds that sickness absence also has financial implications for the families dependent on affected workers, lowering their living standards as well.

The numbers of WRMDs globally is alarming. Musculoskeletal diseases in general have already been seen to form an increased burden of disease globally (Prosser & Webb, 2010; Woolf & Akesson, 2007), thus calling for even further preventative measures to be taken for WRMDs. A report on global work-related diseases estimated the prevalence of such disorders at 160 million per year (ILO, 2003) however, Niu (2010) and Punnet and Wegman (2004) reported that accurate data on the global prevalence of WRMDs are difficult to obtain. They further state that it is difficult to compare official statistics across countries because of the lack of reporting of new cases as well as the multifactorial aetiology of WRMDs, including non-occupational factors. In developed countries like Europe, WRMDs and psychosocial disorders form the majority of reported occupational illnesses (Takala *et al*., 2009). In the USA, WRMDs comprise over half of all reported occupational illnesses (Occupational Safety and Health Association [OSHA], 2002). In Sweden, 60% of early retirement cases and the incidence of prolonged sick leave are attributed to WRMDs (Swedish National Board on Health and Welfare, 2001 as cited in Niu, 2010). Jones and Barham (2009) predict that, by the year 2030, there will be a 9% increase in the incidence of WRMDs in the United Kingdom. In developing countries, prevalence of WRMDs ranges from 37% among a general population-based sample of workers to 92% among nurses (Naidoo & Haq, 2008). In Kenya, a developing country, the Ministry of Labour in 2004 estimated the number of occupational fatalities and injuries as 1387 (Nyakango, 2005). This represented an estimated 0.0043% of the country's population (32,021,856) in that year, (2004)

(Kenya Profile, 2004-2005). However, more than half of these occupational injuries would go unreported and this is partly because the majority of Kenya's workforce is in the informal sector, as well as the lack of the provision of the necessary infrastructure by the Occupational Health and Safety (OHS), in terms of understaffing and finance (Muigua, 2011; Nyakango, 2005). Since the 2004 statistical report on occupational injuries, no other similar report has been found issued by the Ministry of Labour or the Occupational Health and Safety, indicating a possible lack of reporting.

WRMDs can be avoidable and it is with this regard that Mwanthi (2009) states that more research needs to be carried out in developing countries so as to establish preventative measures regarding the neglected ergonomics-related hazards. According to Collins *et al*. (2011), the successful treatment of and preventive strategies for work related low back pain and neck pain do not include exercise therapy alone. These authors state that the incorporation of workplace ergonomics in exercise therapy and other relevant treatment has proved to be effective in return-to-work outcomes. Ergonomics has thus been described as the science of fitting workplace conditions and job demands to the capabilities of the working population (OSHA, 2007). This Association states that, with the correct working conditions, increased productivity would follow and ergonomics-related hazards eventually leading to WRMDs would be avoided. However, the question arises how much knowledge do people have about ergonomics related low back pain and neck pain. Makhonge (2009) of the Occupational Safety and Health Association (OSHA) in Kenya states that experts in this field have observed that it is the failure to use already existing knowledge that exposes us to ergonomics-related hazards and ultimately to work-related musculoskeletal disorders.

Chetty (2010b) a physiotherapist in the United Kingdom states that there is a gap in literature between physiotherapy and occupational illnesses which can probably be attributed to under researching in this area. In the developing countries, physiotherapists and occupational managers in institutions which are privileged to have the latter, often try to bridge this knowledge gap by providing information about ergonomic related hazards. In addition to lack of reporting of occupational disorders, lack of specialized expertise between occupational health and physiotherapy in Kenya can also be seen to further widening this gap. The Kenyan Director of Occupational Health and Safety with this regard stated that "plans are already underway as from March 2010 for construction of the Occupational Health & Safety Institute to undertake special research in occupational health and safety and also training of personnel on the same" (Makhonge, 2011). However, since knowledge acquired is not directly translated to behaviour people's attitudes will thus influence their receptivity to this knowledge (Ibrahim, Noor, Nasirun & Ahmad, 2012; Robertson *et al*., 2009; Woodcock, 2007). The availability of training in Occupational Health and Safety will help in reinforcing educational based ergonomic interventions so as to decrease the prevalence and adverse effects of WRMDs amongst workers (Korunka, Dudak, Molna & Hoonakker, 2010; Amick *et al*., 2003). This study therefore sought to determine the effect of a knowledge-based ergonomic intervention on the knowledge of administrators regarding the effect of ergonomics on low back pain and neck pain at the Aga Khan University Hospital, Nairobi.

1.2 PROBLEM STATEMENT

Low back pain and neck pain constitute a majority of the day-to-day musculoskeletal physiotherapy treatments. Lack of knowledge or ignorance of the impact of the day-to-day activities on these pains by individuals is deemed to be major contributing factor to both low back pain and neck pain thus needing preventive action. In as much as the presence of knowledge does not necessarily translate into behavior, the Health Belief Model still supposes that individuals perceived susceptibility to their surrounding risk factors would prompt them to take action in improving their health (Rosenstock, 1974). In the researcher's experience, an increased number of administrators that consult physiotherapy services suffer from low back pain and neck pain. Often times the physiotherapist has to educate patients on the risk factors involved with neck pain and low back pain, especially with regard to their working environment and at home. A review of the literature shows a paucity of knowledge-based ergonomic interventions in Kenya. In addition, no data has been found on the reporting of WRMDs and the prevalence of work-related low back pain and neck pain. It is for this reason that the researcher believes that an ergonomic education programme in the work place will minimise occurrences of work-related low back pain and neck pain.

1.3 AIM

To determine the prevalence of ergonomics related low back pain and neck pain, and describe the effect of a knowledge-based ergonomic intervention among administrators in Aga Khan University Hospital, Nairobi and the prevention strategies.

1.4 OBJECTIVES

- To determine the knowledge that the administrators have on ergonomics and the prevention of work-related musculoskeletal disorders
- To determine the prevalence of work-related musculoskeletal disorders among administrators at the Aga Khan University Hospital, Nairobi.
- To determine the common work-related musculoskeletal disorders among administrators at the Aga Khan University Hospital, Nairobi based on the survey carried out.
- To design and implement an ergonomics programme that will address the common work-related musculoskeletal disorders.
- To explore and describe the concepts that participants valued from the ergonomics programme.

1.5 SIGNIFICANCE OF STUDY

Literature reveals that behavioural change is at times difficult when the negative outcomes of these behaviours manifest much later in life (Lupton, 1995 & Graham, 1987 as cited in Naidoo & Wills, 1998). The above construct borrowed from health promotion with regards to behaviours such as smoking cessation can be seen to have the same impact in a majority of preventive programmes. In Kenya, Makhonge (2009, p. 27) states that "occupational safety is hardly mentioned in the strategic plans of most firms and organizations thus leading to a fire-fighting type of management when dealing with ergonomic hazard". People are therefore generally not keen to adopt the advised behavioural modifications. This lack of keenness can be an inferred

cause of making preventative actions for WRMDs unfruitful. Consequentially, the cost of treating these ergonomic hazards is more hefty, both financially and productivity wise, compared to the preventative structures that would have been put in place to avert the same. This study therefore sought to fill in the existing knowledge gap by evaluating the knowledge of administrators regarding ergonomics related low back pain and neck pain. The results of this study shall therefore provide a snapshot of the prevalence of work-related low back pain and neck pain amongst administrators in Kenya and hopefully help in enforcing policies aimed at designing and carrying out ergonomic-based interventions in institutions (Kenya, 2010/09; Mwanthi, 2009; Muchiri, 2003). In addition, this study proposes to help in improving the quality of life of administrators with regard to ergonomic safety at the workplace, thus increasing their longevity by preventing disability brought about by the WRMDs.

1.6 DEFINITION OF KEY TERMS

Administrators: These are all people working in any office related job within Aga Khan University Hospital, Nairobi (AKUH, N). The nature of their work should mostly involve computer use. Administrators constituted managers, supervisory level staff, and all other administrative staff in all departments, including front-office workers, e.g. secretaries, patient services coordinators, unit coordinators, debtors and finance departments. Information Technology personnel, human resource staff, medical records clerks and stock controllers were also included in this category.

Work-related musculoskeletal disorders: These are inflammatory and degenerative disorders of muscle, tendons, ligaments, joints, peripheral nerves and/or supporting blood vessels caused or aggravated by work (Punnet & Wegman, 2004).

Low back pain: This is defined as pain localized between the 12th rib and the inferior gluteal folds, with or without leg pain (Krismer & Van Tulder, 2007).

Neck pain: Neck pain is generally defined as stiffness and/or pain felt dorsally in the cervical region somewhere between the occipital condyles and the C7 vertebral prominence (Ferrari & Russell, 2003).

1.7 ABBREVIATIONS

WRMDS: Work-related musculoskeletal diseases

LBP: Low back pain

OHS: Occupational Health and Safety

PHOs: Public Health Officers

ILO: International Labour Organization

OSHA: Occupational Safety and Health Association

FGD: Focus group discussions

AKUH,N: Aga Khan University Hospital, Nairobi

NCST: National Council for Science and Technology

WHO: World Health Organization

1.8 THESIS OUTLINE

Chapter One: This includes the background of study, statement of the problem, aims and objectives and significance of the study. It thereafter ends with defining the key terms used in the study.

Chapter Two: This chapter presents a review of the literature as to better understand the need for the study. It begins with a definition of ergonomics and importance of ergonomics in the workplace. It further talks about the prevalence of work-related musculoskeletal diseases, both in developed and developing countries, and in particular work-related low back pain and neck pain. It explores the impact of these disorders on the lives of the affected and finally concludes with information on ergonomics and the role it plays in reducing and preventing neck and low back pain in office-going individuals.

Chapter Three: The chapter describes the methodology used in the current study. The study setting is fully described. The study design, study population and sample for both the quantitative and qualitative phases of the study phases are also explained. Furthermore, the procedures followed in both quantitative and qualitative data collection, the instrument for quantitative data collection and an analysis of the study are presented. Finally, the ethical considerations followed in this study are explained.

Chapter Four: In this chapter, the results of both quantitative and qualitative phases of the study are presented. The quantitative results are presented as descriptive statistics in form of means, frequencies SD and percentages. The chi-square test is used to test the relationships between

different variables. The qualitative results are also presented in form of themes, supported by quotations from the interviews with respondents.

Chapter Five: This chapter discusses the findings of the quantitative and qualitative results in relation to other studies. It further seeks to identify the gaps within the study and find solutions for the problems.

Chapter Six: This chapter summarises and concludes the findings of the study. Recommendations based on the study are outlined, as well the study's strengths and limitation.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter presents an overview of the literature with regard to work-related low back pain and neck pain. It explores the prevalence of low back pain and neck pain both globally and within Africa, the pathophysiology behind its pain causing mechanisms, the ergonomic contributory factors and the impact of these disorders. Finally, health promotion interventions to reduce the impact of neck pain and low back pain are also reviewed.

2.1 PREVALENCE OF WORK RELATED MUSCULOSKELETAL DISORDERS

The numbers of work-related musculoskeletal disorders globally is alarming. However, there is conflicting information about this due to the non–reporting of these cases especially with regard to comparisons between developed and developing countries. Work-related musculoskeletal disorders (WRMDs) are inflammatory and degenerative disorders of muscle, tendons, ligaments, joints, peripheral nerves and/or supporting blood vessels caused or aggravated by work (Naidoo & Haq, 2008, p. 677). WRMDs are exacerbated by akward postures, prolonged sitting, repetitive movements and many other individual and psychosocial factors in the work environment (Corlette, 2009; Fisher & Gibson, 2008).

In developed countries, WRMDs are the most common occupational health problems, accounting for over 50% of all occupational diseases, with peaks of 85% and 80% in Spain and

France respectively (Zhang, Alvarez-Casado, Occhipinti & Mondelo, 2010). In the Netherlands, the statistics have been stable for quite a while, with an average of 6,000 occupational diseases being reported per year, with 42% accounting for WRMDs (Netherlands Centre for Occupational Diseases, 2009). The report further indicated that WRMDS increased significantly by 30% between the years 2006 and 2008, particularly in the low back and lower limbs. However, a decrease in repetitive strain injuries was recorded from 3,000 in the year 2000 to 1,1061 in the year 2008 (Netherlands Centre for Occupational Diseases, 2009). Statistics in Great Britain from a comparative study conducted between 2001 and 2011 showed a decreased trend in WRMDs prevalence to 1,700,000 from 2,200,000, while the incidence of WRMDs was 158,000, down from 190,000 in the year 2009/10 (Health and Safety Executive, 2010/2011). Postal and courier services, specialised construction work and agriculture were the industries with the highest reported cases of MSDs between the years 2009/2011 in Great Britain.

There is a paucity of literature on WRMDs statistics in developing countries. Naidoo and Haq (2008) state that the prevalence of any WRMDs in developing countries ranges from 37% among a general population of workers, to 92% among nurses and that the most documented work activities in these countries relate to agricultural work. Low back pain still had a higher prevalence in agricultural set ups, followed by neck pain, especially due to the carrying of loads on the heads. In a study done in Korea, blue collar workers carried a greater risk for WRMDs than the white collar workers (Won, Ahn, Song & Roh, 2007). Besides agriculture, activities such as coal mining have been seen to cause WMRDs and due to limited resources, developing countries are thus at more risk of developing WRMDS. In a study done of the prevalence of musculoskeletal pain patterns in a rural community in South western Nigeria, LBP formed the majority of the reported pain sites (47%), while 63.9% of the study participants believed that

their symptoms were work-related (Akinpelu, Odole & Odejide, 2010). It would therefore be relevant to determine if this is similar among office workers.

2.1.1 Prevalence of low back and neck pain among office workers

Administrators are exposed to prolonged sitting and long working hours, which in combination with the use of computers predisposes them to ergonomic hazards (Cagnie *et al*., 2007). The spine is affected when office ergonomics are not adhered to, leading to the development of most work-related neck pain and low back pain (Chetty, 2010a; Corlette, 2009; Janwantanakul, Pensri, Jiamjarasrangsri & Sinsongsook, 2008; David, Woods, Li & Buckle, 2008). However, it is difficult to differentiate neck pain and low back pain (LBP) brought about by work factors from other self-inflicted and enviromental factors thus leading to a general acceptance of their multifactorial etiology (Hincapie, Cassidy & Cote, 2008; Cagnie *et al*., 2007; Bejia *et al*., 2005).

The general lifetime prevalence of neck pain has been recorded as at 70%, with a one year prevalence of neck pain varying from 45.5% among Belgian office workers, 17.7% among Norwegian administrative workers and among 43.2% in Brazilian Call Centre operators, to 63.0% among Swedish secretaries (Côté *et al*., 2008a; Cagnie *et al*., 2007). Despite having difficulties in determining the epidemiology of neck pain through methodological differences, one year incidence of neck pain was estimated between 10.4% and 21.3% which was most common in office and computer workers (Hoy *et al*., 2010b). A one-year incidence of neck pain in Australian office workers was established at 49%, but it was difficult to differentiate between work related pain and hobbies relating to prolonged sitting and computer use (Hush, Michaleff, Maher & Refshauge, 2009). In Finland, the one-year incidence of neck pain amongst office employees working with video display units was 34.4% (Korhonen *et al*., 2003). In Sri Lanka, a developing country, the one year prevalence of neck pain among computer office workers was

established as 36.7% whereas a point prevalence of neck pain among computer users in Nigeria was 73% (Ranasinghe *et al*., 2011; Adedoyin, Idowu, Adagunodo & Idowu, 2005).

Low back pain, on the other hand, has shown a lifetime prevalence of 60-85% and is associated with individual, occupational, psychological, as well as lifestyle risk characteristics (Hincapie *et al*., 2008; Krismer & Van Tulder, 2007). Among Greek public office workers, the point, one-year, two-year, and lifetime prevalence of low back pain was 33%, 37.8%, 41.8%, and 61.6% respectively (Spyropoulos *et al*., 2007). A systematic review of the prevalence of low back pain in Africa showed a lifetime prevalence range of 28%-74%, while that of one-year prevalence was 14%-72% (Louw, Morris & Grimmer-Somers, 2007). Two studies conducted among Nigerian computer and office workers established the point prevalence of LBP as 74% and the 12-month's prevalence as 38% (Adedoyin *et al*., 2005; Omokhodion & Sanya, 2003). The prevalence of chronic low back pain among sedentary office workers in a study conducted in Kenya was established as 76.53% (Mukandoli, 2004). It is therefore evident that the prevalence of both neck pain and LBP is high among administrators and that there is a need for prevention programmes.

2.2 PATHOPHYSIOLOGY OF LOW BACK AND NECK PAIN AMONG ADMINISTRATORS

The cervical (neck) and the lumbo-sacral (low back) spines consists of seven vertebrae, five vertebrae and five vertebrae respectively. The vertebrae are joined together by intervertebral discs, and anterior and posterior longitudinal ligaments. The cervical and the lumbar region have

lordosis curves, which need to be maintained in a neutral position (McMinn, 1990). Prolonged sitting without breaks in-between, awkward postures and the heavy workload common in administrative jobs predispose workers to a static posture of the back, neck and arms while at work (Cagnie *et al.*, 2007). Despite the fact that computer work has been described as a low intensity task, these fixed postures introduce muscle loads that can be exacerbated by the limitations on movement imposed by the furniture (Corlett, 2009; Visser & Van Dieen, 2006). Dahl (2000, as cited in Fisher & Gibson, 2008) has demonstrated that these sustained postures and muscle contractions cause the neck and shoulder muscles to perform static contraction. This prolonged tension in muscle groups leads to strain of the muscles, causing pain. Literature indicates that the low continuous static muscle contractions could lead to ischemia and pain as a result of muscle fatigue, especially the Type 1 muscle fibres, also due to the accumulation of metabolites such as lactate (Cram & Durie, 2010; Visser & Van Dieen, 2006; Wahlstrom, 2005; Hagberg, 1984). Repetitive movement on the other hand, causes micro trauma in tissues and ligaments, which could result in inflammation, giving rise to pain (Armiger & Martyn, 2009). Properly adjustable chairs and the specific positioning of the computer screen, mouse and keyboard, would allow proper support of the upper arms and neck in a vertical and neutral position, so as to avoid this constant loading of muscles (Collins *et al.*, 2011; Armiger & Martyn, 2009; Corlett, 2009).

Prolonged sitting position as an inferred cause of low back pain has been the subject of considerable debate. In in-vitro and in-vivo review studies conducted over the past thirty years by Claus, Hides, Moseley and Hodges (2008), no significant difference could be seen in the intradiscal pressure of participants with sound intervertebral discs, when it came to sitting and standing positions, as earlier presumed. Compression loading of the spine alone has been

established as insufficient to cause LBP, and thus requiring a combination with shearing, twisting forces or bending. However, Westgaard and Aaras (1984) and Carter and Banister (1994), (as cited in David *et al*., 2008), have established that static postural loading, especially when combined with extended work, is a risk factor for LBP.

In addition to sitting placing increased stress on the lower back and hips, as well as the neck and shoulders, these strained muscles succumb to the pull of gravity by allowing the head to move forward, the shoulders to round and the cervical, thoracic and lumbar spine to bend. This results in chronic lengthening of the lower cervical, thoracic and lumbar extensors and the supporting ligaments, and places more tension on the posterior structures of the spine. As a result, the anterior muscles and the posterior upper cervical extensor muscles, the anterior chest and shoulder muscles, abdominals and hip flexors shorten (Cram & Durie, 2010; Armiger & Martyn, 2009; Janwantanakul *et al*., 2008, 2009). Corlett (2009) advocates for exercise breaks in-between work, as well as a proper adjustable seat with a back rest to help maintain the lumbar curve while working. This is because a flattening of the lumbar curve causes changes in the pressure distribution on the lumbar discs and stretches the muscles at the back of the lumbar, causing increased loads on these discs, leading to muscle strains.

2.3 ERGONOMICS AND ITS IMPLICATIONS TO LOW BACK PAIN AND NECK PAIN

Bernardino Ramazzini, the so-called Father of Occupational Medicine used the all too familiar adage "*Nothing to excess*" (2001, p. 1381). He said this with reference to the impact of

demanding work; moderation, as he advised, would protect workers from WRMDs. As Ramazzini discovered the negative musculoskeletal impact of work in individuals, it consequently became necessary to find measures of preventing the development and progression of WRMDs. Ergonomics has been defined as the manner in which workplace items are designed so that they contribute to the performance of a task (Corlett, 2009). The ergonomic improvement of a workplace should therefore merge the works' objectives, equipment and work environment, making the individual the central focus and creating an environment that allows safe, efficient and satisfactory work (Armiger & Martyn, 2009; Corlett, 2009; Da Costa & Vieira, 2008; Wahlstrom, 2005).

Given the prevalence of WRMDs and the pathophysiology behind these disorders, it is important to understand the role of ergonomics in occupational health. According to Rosenstock, Cullen and Fingerhut (2006, p. 1140) in their discussion of occupational health in developing countries, "Globalization has brought work-related hazards that developing countries lack the infrastructure and professional capacity to handle adequately." With the introduction of computers, workers are exposed to more sedentary jobs, as they no longer have to leave their desks to retrieve documents and files (Green, 2008; Maria Lis, Black, Korn & Nordin, 2007). Such physical work factors have been known to contribute to the multifactorial etiology of WRMDs (Widanarko *et al*., 2012; Takala *et al*., 2009). Given these work factors in mind, it became imperative to introduce preventative measures at worksites.

2.3.1 Occupational Safety and Health Association

The Occupational Safety and Health Association safeguards the safety of employees and attempts to ensure safe working environments and has established requirements to eliminate

working risk factors (Mwanthi, 2009; OSHA, 2007). This Association falls under the International Labor Organisation (ILO) which, since its inception in 1919 has introduced a range of policies and regulations to which member countries need to conform (ILO, Origins and history, 1996-2012). In Kenya, occupational health and safety training was introduced in 1989 with the aim of training public health officers (PHOs), clinical officers as well as nurses in this field (Afubwa, 2004). However, as of 2004, only PHOs have received this education and despite the ratification of the ILO policies, OHS practice is still wanting to date (Nzuve & Lawrence, 2012; Afubwa, 2004). Lack of research, education and training facilities has been seen to affect OHS in developing countries; however, the building of new training institutions will hopefully see trainees' equipped to curb the current trend of modernization and its effect on workers (Makhonge, 2011; Rantanen, Lehtinen, Savolainen & Kai, 2004).

With regard to workers' safety in administrative work, which requires extensive sitting and working in front of the computer, the **figure 2.1** below addresses the physical ergonomic requirements of the prolonged sitting so as to minimise the negative musculoskeletal effects (Collins *et al.*, 2011; Armiger & Martyn, 2009; Corlett, 2009; OSHA, 2007). Proper posture, as seen under the pathophysiology of low back pain and neck pain development, was an important contributory risk factor. With regard to the issue of armrests, OSHA (http://www.osha.gov/SLTC/etools/computerworkstations/components_chair.html, 2012) and Amick *et al*. (2003) have stipulated that they need to be adjustable, failing which it is better to have none, as it could lead to awkward postures. Some studies indicated that arm rests decrease the risk of developing neck pain, while other studies indicate no significant association between arm rests and neck pain (Côté *et al.*, 2008a). A review by Waddell and Burton (2001) on occupational health management of LBP in the workplace has indicated strong epidemiological

evidence that prolonged exposure to risk factors, as well as the physical demands of work such as bending, lifting and twisting, can be associated with an increased incidence of back symptoms. Other authors state that several components need to be in play, as there is strong evidence that exercises alone cannot serve to manage LBP and prevent chronicity; neither will education by itself (Driessen, Proper, Anema, Bongers & Van der Beek, 2010; Waddell & Burton, 2001).

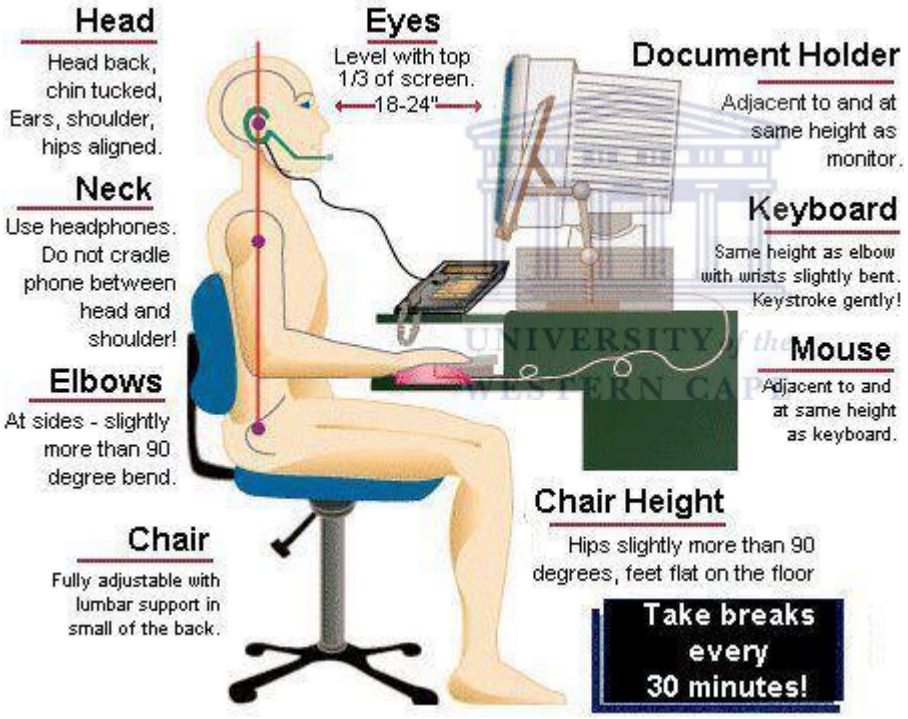


FIGURE 2.1: ***Office ergonomics image*** **(California Human Resources, 2012).**

Having studied individual and work-related factors for neck pain among office workers, Cagnie *et al.* (2007) suggests that effective intervention strategies aimed at reducing the occurrence of neck pain would have to take into account both ergonomic improvements and cognitive behavioral aspects. Intervention is needed to reduce computer exposure and improve ergonomic

conditions. This would be achieved by the use of dynamic and adjustable sit/stand chairs to reduce the neck load; document holders; and the correct placement of screens; accompanied by compulsory rest breaks. A sedentary lifestyle must be replaced by the concept of health-related exercise threshold. According to the American College of Sports Medicine (ACSM) and Center for Disease Control and Prevention (CDC), in order to assume health benefits, one is expected to engage in moderate intensity physical activity resulting in a daily expenditure of ~900kJ.d^{-1} (Chakravarthy, 2008). This energy expenditure would require an accumulation of at least ~30min.d^{-1} brisk walking or indulgence in at least some form of leisure time physical activity (Van Der Ploeg & Bauman, 2008). The 21st century has been seen to advocate a sedentary lifestyle due to modernisation, leading to loss of skeletal muscle strength as well as early fatigue. One therefore has to schedule time for physical activity as part of one's daily life so as to enable one's genes to adapt to the genetic discordance that has developed with time due to changes in lifestyle activity (Chakravarthy, 2008).

Psychosocial factors, also referred to as "yellow flags", have been seen to take centre stage in work risk factors and have been termed as being more deadly than the biomechanical factors (Takala *et al.*, 2009; Moffett & McLean, 2006). Psychosocial factors, according to the New Zealand Guidelines Group, (2004, p. 49) refer to the interaction between people and their social environment and the influences on their behaviour, whereas yellow flags have been described as "factors that increase the risk of developing or perpetuating long-term disability and work loss associated with LBP (New Zealand Guidelines Group, 2004, p. 26)." Waddell and Burton (2001) note that people with physically or psychologically demanding jobs may have more difficulty working when they have LBP and will therefore take off more time from work, but this could be the effect rather than the cause of their LBP. It would also be important to note that in the

presence of pain, both cognitive and affective factors may either facilitate or inhibit the pain process (Fillingim, King, Ribeiro-Dasilva, Rahim-Williams & Rilley III, 2009; Bongers, Ijmker, Van Den Heuvel & Blatter, 2006). These authors further state that cognitive factors could originate from one's thoughts and the kind of support one receives, whereas affective factors, such as anxiety could also lead to increased pain. Therefore, employees working in an institution in which they are supported by their supervisors and there is a good working relationship will tend to recover faster than those who are not in such an environment (Ibrahim, Noor, Nasirun & Ahmad, 2012). Therefore, both social and emotional support helps those in pain.

In a study on the European work environment, work-related stress was identified as one of the biggest occupational safety and health challenges, affecting an estimated 22% of European workers in 2005 (Takala *et al*., 2009). The study further stated that the number was expected to increase as other studies conducted already showed that 50-60 % of all lost working days were related to stress. With this in mind, it is imperative that all stakeholders involved, starting with the workers themselves, the employer, health professional and occupational health personnel, not only look at biomechanical factors, but instead address the individual and psychosocial factors that could act as barriers to decreasing pain and an early return to work (Driessen *et al*., 2010; Giri, Nightingale & Robertson, 2009; Bongers *et al*., 2006; Moffett & McLean, 2006).

2.4 IMPACT OF WORK-RELATED MUSCULOSKELETAL DISORDERS

Between 1997 and 2005, there were 336, 608 Washington State fund claims for WRMDs of the neck, back and upper extremity, resulting in an average of 37, 401 claims per year (Silverstein &

Adams, 2007). The back constituted 51% of the claims, upper extremities 37%, and the neck 12%, with an average direct cost of USD 12, 377 per claim. However, these authors claim that, due to underreporting, the lower extremities as well as the indirect costs of WRMDs incurred by the employer, employee and society, were excluded in the WRMDs counts. The cost of LBP in the USA and internationally was calculated in terms of direct cost (medical and non-medical costs such as transport) and other indirect costs, such as human capital, household productivity and employer insurance (Dagenais, Caro & Haldeman, 2008). In-as-much as these authors could not come up with an exact monetary figure for these regions due to differences in methodological approaches; they state that the direct medical cost represents only a small portion of the full medical costs of treating LBP. In New Zealand, the health care cost of neck and LBP was 769 million Euros in 2003. Morales (2005, as cited by Chetty, 2010a), has come up with an estimated cost of £300 per day for treating WRMDs. In Norway, LBP is the most common reason why people claim disability pensions (National Insurance Administration, 1998). In a study conducted among New Zealand workers (n=3003), the prevalence of reduced activities and absenteeism due to LBP was recorded at 18% and 9% respectively (Widanarko *et al*., 2012). In the USA, during a 12's month study period, 5% of office workers employed at a newspaper reported missing work because of neck pain (Rosecrance, Cook & Zimmermann (1994), as cited by Côté *et al*., 2008a). In a subsequent study by Côté *et al*. (2008b), the estimated percentage of lost-time claimants with neck pain in 1998 in Ontario ranged from 2.8% to 11.3%.

Literature has it that the longer a person stays away from work, the higher his/her chances of sickness absence and non-return (Moffett & McLean, 2006). This has led to advocacy for physiotherapists and other health professionals to strive to allow patients return to work even if

they have residual pain (Waddell, Feder & Lewis, 1997). This is because absenteeism not only interferes with individuals' health and renders them workless, but also affects the employer and society at large, due to interference with productivity thus ultimately affecting the country's economy (Mostert-Wentzel *et al*., 2010; Niu, 2010; Driessen, Anema, Proper, Bongers & Van Der Beek, 2008; Fisher & Gibson, 2008; Krismer & Van Tulder, 2007). Chetty (2010a, p.87) therefore concludes that "early identification of risk factors is crucial in order to reduce the financial burden of sickness absence and to reduce the resource burden placed on healthcare professionals due to increasing the need for longer term management."

Further studies have confirmed that WRMDs could be temporary and may disappear if the individual either receives early diagnosis, is removed from work, given an opportunity to rest at work, or when the working conditions are improved (Collins *et al*., 2011; Niu, 2010). Moffett and McLean (2006) in their review of the physiotherapy management of LBP and neck pain stated that diagnostic triage, patient education and advice would be the best first approach in dealing with musculoskeletal disorders. All the above factors constitute efforts to reduce the disease burden of musculoskeletal disorders in both the developed and developing worlds as common sources of serious long-term pain and physical disability (Prosser & Webb, 2010; Woolf & Akesson, 2007). An early return to work, especially with provision for light duties for some time, has been seen to enhance recovery (Moffett & McLean, 2006; Waddell *et al*., 1997). Patients' perception and attitude to their illness are major determinants of the length of their sickness absence. Health professionals should therefore explain the mechanism behind their pain, while being careful not to catastrophise their patients' feelings, as this could lead to prolonged leave from work (Giri *et al*., 2009; Woby, Roach, Urmston & Watson, 2008; Moffett & McLean,

2006). Since the occupational physician's perception of illness greatly differed from that of the affected patients in a study by Giri *et al.* (2009), these authors added that the incorporation of clinical psychologists in the treatment programme, would serve to help ensure an early return to work as they would be able to recognize and address the negative perceptions that patients carried towards their illnesses.

2.5 HEALTH PROMOTION THROUGH KNOWLEDGE OF ERGONOMICS

Besides providing knowledge to individuals on the ergonomic risk factors and the impact they have in the body, physiotherapists advocate for good working posture, stretch exercises, incorporated with both environmental and individual behavioural change, which in combination, have been noted to prevent WRMDs (Driessen *et al.*, 2010; Corlette, 2009; Williams, Westmoreland, Lin, Schmuck & Creen, 2007; Lühmann, Stoll, Burkhardt-Hammer & Raspe, 2006; Kilbolm, 1998). The theory of change of Amick *et al.* (2003) which fits with Rosenstock's (1974) health belief model, contends that an increase in ergonomics knowledge motivates workers to modify their working postures and behaviours like taking rest breaks, thereby improving their health and work performance. In their one year longitudinal study by use of a randomized control trial, Amick *et al.* (2003) ascribed to the theory of change in not only training the workers on office ergonomics, but further providing high adjustable chairs. This saw a decrease in symptoms in those who had receieved both the training and the chair.

With a number of risk factors having been identified to contribute to the onset, recurrence and chronification of LBP and neck pain, Lühmann *et al*. (2006) further explains it through the bio-psychosocial model. The bio-psychosocial model not only seeks to address a patient's illness from a biological perspective, but also encompasses the psychological and social aspects as people exist in an environment and not in isolation (Adler, 2009; Havelka, Lucanin & Lucanin, 2009; New Zealand Guidelines Group, 2004). With this in mind, people-centered health educational programmes should be initiated to curb WRMDs, which have become a common health problem and a major cause of disability (Collins *et al*., 2011; Prosser & Webb, 2010; David *et al*., 2008; Woolf & Akesson, 2007).

Health promotion is the process of enabling people to increase control over and improve their health (Ottawa Charter for Health Promotion, 1986). This is done through advocacy for health so as to enable society to achieve equitable information on how to safeguard their own health status. Besides doctors, orthopaedic and neurosurgeon professionals, physiotherapists as allied health professionals often treat patients with musculoskeletal injuries, and studies have confirmed that patients record significant improvements with this treatment (Metcalfe & Moffett 2005, as cited in Chetty, 2010b). Physiotherapists, who are fast becoming first-line practitioners, can therefore be seen to act as mediators through their understanding of the patient or public's perception of the musculoskeletal problems faced, and thus be able to persuade or rather motivate them to avoid the risk factors involved (Diener, 2012; Moffett & McLean, 2006).

According to Lühmann *et al*. (2006) and Moffett and McLean (2006), applying preventive interventions in the workplace setting seems attractive, for two reasons: first, a large proportion of the population can be reached, and secondly, many risk factors for back problems are

associated with working conditions. This echoes the targeting and setting approach described by Tones and Tilford (2001) and Naidoo and Wills (1998) as a useful strategy in health promotion that will enable one to reach a broad variety of people that are faced with the most identifiable risks in our population. Primary prevention therefore aims to avoid the development of disease and would be the most effective way of preventing musculoskeletal conditions (Ranasinghe *et al*., 2011; Green, 2008). However, Lühmann *et al.* (2006), in their systematic review of the prevention of relapsing backache, fear that primary prevention will soon not be possible in adults, as a lifetime prevalence of 80% has already been recorded in young adult-hood. This is due to the fact that young adults are exposed to the risk factors of WRMDs by virtue of their hobbies, predominantly computer use for school and leisure purposes (Dockrella, Earleb & Galvina, 2010; Wedderkopp, Kjaer, Hestbaek, Korsholm & Leboeuf-Yde, 2009; Green, 2008; Adedoyin *et al*., 2005). In their intervention study, Dockrella *et al.* (2010) cited mild musculoskeletal discomfort in primary schoolchildren who used computers for an average of twenty minutes per session. However, their study showed an increase in knowledge of ergonomics following the education given, and primary prevention could therefore be advocated even for children of that tender age (Dockrella *et al*., 2010; Wedderkopp *et al*., 2009). Further to that, environmental changes to support the new knowledge acquired would also be beneficial (Amick *et al*., 2003).

Ibrahim *et al*. (2012), Makhonge (2009) and Woodcock (2007) observe that ergonomics is seen as a costly and constraining activity; such attitudes provide evidence of both an individual and organisational failure to support user-centered design when faced with deadlines and financial constraints. This is also evident from the researcher's experience, where physiotherapists would prescribe the use of lumbar rolls in cases where ergonomic chairs were difficult to get due to the

protocols involved in their purchase at workplaces. The choice to prioritise and implement individual ergonomic measures seems more realistic because of the low initial costs, less complexity and feasibility within a short duration of time in contrast to the implementation of physical or organisational measures (Driessen *et al*., 2010). This has seen highest individual ergonomic measures at a rate of 53% and organisational ergonomic measures at 28%. Besides financial problems hampering implementation problems, other factors, such as hierarchy and poor management support, could prevent physical ergonomic organisational measures (Ranasinghe *et al*., 2011; Koppelaar, Knibbe, Miedema & Burdorf, 2009). It would therefore be vital to secure the all-round support of management, as organisational changes to workplaces have proved fruitful in cases reflecting financial constraints (Ibrahim *et al*., 2012; Goldgruber & Ahrens, 2010; Dockrella *et al*., 2010).

In addressing the organisational changes to a workplace, the Social Consensus model, as described by Romer and Hornick (1992) would be appropriate to help decrease both the prevalence and incidence of WRMDs. This would see that educational programs are directed to both the workers and the managers for effective addressing of these ergonomic factors (Ibrahim *et al*., 2012; Zhang *et al*., 2010; Green, 2008; Bongers *et al*., 2006). Communication between the stakeholders, including workers, supervisors, occupational health practitioners and ergonomists during the implementation process will also help address occupational factors, including the yellow flags, minimize sickness absence, and the disease itself (Driessen *et al*., 2011; David *et al*., 2008; Bongers *et al*., 2006; Waddell & Burton, 2001).

Besides using the primary prevention of WRMDs, which has also been termed as health promotion, secondary and tertiary prevention seems to play a major role in modern society, due to the already increased prevalence of WRMDs. Secondary prevention has been described as the

early detection and intervention of asymptomatic diseases, whereas tertiary prevention has been described as the prevention of disability and progression in those with symptomatic diseases (Green, 2008). In cases where primary prevention is not possible, it would be necessary to have these measures in place to curb the progression of WRMDs. In-as-much as there is vague scientific evidence for back schools and neck schools, they have nevertheless been seen to be effective on a short-term basis (Lühmann *et al*., 2006; Moffett & McLean, 2006). These authors further state that these schools are subjective, as there is no guided protocol of exercises that suits all kinds of back pain and neck pain. Lumbar and cervical spine stabilisation exercises have however been seen to reduce both low back pain and neck pain, and would thus be helpful as part of the rehabilitation (Armiger & Martyn, 2009; Green, 2008).

A review of the association between physical activity and low back and neck pain established some limited evidence of association between neck pain and activities, especially among sedentary office workers who would assume awkward postures (Sitthipornvorakul, Janwantanakul, Purepong, Pensri & Van Der Beek, 2011). The review further pointed to some inconclusive association between LBP and physical activity due to methodological exposure; most reported studies measure physical activity subjectively, thereby increasing the chance of unreliability through recall bias. Wedderkopp *et al*. (2009), in their objective measurement of physical activity in adolescents, made use of an accelerometer and established an association between increased risk of LBP and decreased levels of physical activity. These authors attribute this risk to the benefits of physical activity, which assisted in increasing flexibility of the body, muscle strength, as well as coordination. In their study, physical activity was described as one being active from 8am to 6pm in the evening. In a different study by Heneweer, Vanhees and Picavet (2009), physical activity was defined in three different categories namely, daily routine,

leisure time and sport activity. There was a significant association between sport and less chronic LBP, as well as a moderate increased risk for participants with sedentary lifestyle, as well as those involved in strenuous physical activity. Therefore, physical activity has been said to be U-shaped such that too little or too much is a risk factor (Ramazzini, 2001). This study also showed that physical activity could either have preventative measures or be a risk factor for development of LBP and this is dependent on an individual's physical fitness. In as much as there was subjective mode of information from this study (Heneweer *et al*., 2009), the information was more detailed by use of the SQUASH questionnaire that gathered the frequency, intensity, type and duration of activity that helped in the calculation of an individual's metabolic equivalent (MET).

2.6 SUMMARY OF CHAPTER

The literature reviewed, highlighted the increasing prevalence of WRMDs and particularly LBP and neck pain among administrators, which was consistent in both developed and developing countries. The role of ergonomics in administrators and the impact of lack of adherence were further highlighted, emphasizing the importance of good knowledge of ergonomics among office workers at large. The chapter ends by considering appropriate preventative measures for work-related low back pain and neck pain as a whole.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This chapter describes the research methods that were used in this study. Information on the research setting, the study design, the study population and sampling methods are firstly described, followed by the methods of data collection, procedures and data analysis. Finally, ethical considerations relating to the study are discussed.

3.1 RESEARCH SETTING

The research was conducted at the Aga Khan University Hospital in Nairobi (AKUH, N), which is the capital city of Kenya. This is a private, non-profit institution with a bed capacity of 252 (92 in private wards and 160 in general wards) that was recently upgraded to a tertiary level teaching hospital, providing both tertiary and secondary level health care services to the people of East Africa. The Hospital has earned a reputation as a health care leader thanks to its dedicated staff, modern facilities, state-of-the-art technology, commitment to quality care, and role in educating future clinicians. This growth has seen an increase in the number of administrative staff that helps in the smooth running of the hospital, making it a suitable setting for this study.

3.2 RESEARCH DESIGN

This study used a mixed methods approach, incorporating a survey and a focus group discussion (FGD). According to Tashakkori and Teddlie (2010), mixed methods design provides a better and more credible understanding of the phenomena under study, other than singly using the qualitative/quantitative approach. The specific approach used in this study was the partial mixed sequential dominant status design (Leech & Onwuegbuzie, 2009), whereby the quantitative design had dominant status.

3.3 POPULATION AND SAMPLING

The total number of employees of the Aga Khan University Hospital, Nairobi as at December 2011 was 2201 employees, including 458 administrative staff as per the description for this thesis (T. Njagi, personal communication, December 8, 2011). The sample of the study constituted administrators, whose nature of work is of a more static nature; and this included prolonged sitting, working in front of a computer, and serving and billing patients. The sample included general staff, supervisors, managers and executives from departments like Patient Services, Human Resources, Materials and Management Department (MMD) which supplies the hospital utilities inclusive of drugs and other stock items, and Finance as well as other staff whose nature of work was administrative.

3.3.1 Sampling Procedure

With the main focus of this study being on administrators, 458 became the population size. To calculate the sample size that will allow generalisability, Yamane's formula was used (Israel, 1992). It is given by

$$n = \frac{N}{1 + N(e)^2}$$ where **N** is 458 and **e** is the sampling error/precision level = 0.05

In this study, we have

$$n = \frac{458}{1 + 458(0.05)^2}$$

n = 214 participants, which is the minimum sample size that can be used.

In order to allow for a poor response or non-response, an additional 30% was added to the calculated sample size of 214 participants.

$$n = \left(\frac{30}{100} \times 214\right) + 214$$

n = 64.2 + 214

n = 278 participants

Systematic sampling was used to identify possible participants for the survey. This is a type of probability sampling, in terms of which a random number is generated and where after every Kth unit in a sampling frame is selected for inclusion in the sample; therefore most appropriate to minimize bias in this study (Babbie, 2010).

$k = \frac{N}{n}$ where **K** is the sampling interval, **N** is the population size and **n** is the sample size

$K = \frac{458}{278}$

$K = 2$

Inclusion criteria were administrative staff who had worked for more than six months. Purposive sampling was thereafter used to identify possible participants for the focus group discussion (FGD). This is a non-probability type of sampling, based on the researchers' judgment on the investigated phenomenon and was therefore considered appropriate, due to the nature of heterogeneous sample involved in this study (Brink, 1996).

3.4 DATA COLLECTION METHOD

3.4.1 Survey Questionnaire

The present study sought to determine the prevalence of WRMDs, using a questionnaire. A self-administered questionnaire that contained four sections was administered (**Appendix G**). Section one enquired about the demographic features of the participants and information on educational qualifications; Section two focused on knowledge and consisted of thirty items that sought to elicit data on biomechanical knowledge. Twenty two questions were purely knowledge

questions, whereas the remaining eight focused on behavioural information with regard to postural habits, lifting and physical activities. This section used the Likert scale of rating, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*) as well as *true*, *false* and *not sure* answers. Section three (a) sought to determine the prevalence of musculoskeletal injuries among the participants, using the adapted version of the Standardized Nordic Musculoskeletal Questionnaire (De Barros & Alexandre, 2003). The Nordic questionnaire is a standardised instrument used to analyse musculoskeletal symptoms in an ergonomic or occupational health context. Section 3 (b) contained eight non-standardised questions that sought to gather more information about the prevalence of neck and low back pain. Section 4 of the questionnaire assessed the work-related and individual predisposing factors to low back pain and neck pain. After an extensive search of the literature, no exact questionnaire could answer the objectives of this study, however, different standardised questionnaires and literature related to the topic helped the researcher in formulation of questions for sections two, three (b) and four (Maciel, Jennings, Jones & Natour, 2009, Niyobuhungiro, 2008; Korhonen *et al*., 2003; Evans & Patterson, 2000). Additional literature that assisted on the formulation of section two of the questionnaire are as presented in **Table 3.1** below.

TABLE 3.1: Additional literature for the knowledge section

Statements	Study design	Reference
Neck pain can cause pain to the shoulders and down the arm	-Examination of the cervical region -Neck pain	-Kerry (2011) -Sran (2009)
Physically active people get less back pain and recover faster if they do	-A systematic review based on a search of MEDLINE and EMBASE from 1966 to April 1996 with complete citation tracking for randomized controlled trials of bed rest or medical advice to stay active and continue ordinary daily activities. -Cross-sectional -Prospective cohort study -Musculoskeletal assessment	-Waddell *et al*. (1997) -Heneweer *et al*. (2009) -Wedderkopp *et al*. (2009) -Gaskell (2008)
Poor posture is harmful to my spine	-Cross-sectional -A quantitative, retrospective approach -Non-experimental descriptive study -Review -Textbook on flexibility and stretching -Application of a new seat design -Review of in-vitro and in-vivo study -Systematic review using MEDLINE, HEALTHSTAR, and CINAHL as the principal databases, studies published between 1990 and May of 2004 -A systematic review using Medline, Embase, CINAHL,	-Cagnie *et al*. (2007) -Chetty (2010b) -Neck-Fisher and Gibson (2008) -Naidoo and Haq (2008) -LBP-Armiger and Martyn, (2009) -Corlett (2009) -Claus *et al*. (2008) - Maria Lis *et al*. (2007) -Roffey *et al*. (2010) for LBP -Gaskell (2008) -OSHA (2007, 2012)

	Cochrane Library, and Occupational Safety and Health database, gray literature, hand-searching occupational health journals, reference lists of included studies, and experts. -Musculoskeletal assessment	
Including neck exercises in treatment reduces pain and improves function	-Neck pain -Textbook on flexibility and stretching	-Sran (2009) -Armiger and Martyn (2009)
Back pain settles quickly enough for one to get on with normal activities	-Systematic review	-Pengel et al. (2003)
Smoking is not associated with neck pain	-A longitudinal study -Systematic search and critical review of literature published between 1980 and 2006 -Review	-Korhonen *et al*. (2003) -Hogg-Johnson *et al*. (2008) -Woolf and Akesson (2007)
A neck/cervical collar is indicated for all neck pain	-Neck pain - Systematic review and evidence-based guidelines	-Sran (2009) -Moffet and McLean (2006)
Psychological factors can contribute to the development of low back pain	-An eighteen month prospective study	-Yip and Ho (2001)
Surgery is the most effective way to treat back trouble	-Delphi study	-Maciel *et al*. (2009)
After back pain recovery patient is cured and there's no risk of further crises	-Delphi study -Systematic review	-Maciel *et al*. (2009) -Pengel *et al*. (2003)
If you have backache you should avoid exercises.	-A systematic review based on a search of MEDLINE and EMBASE from 1966 to April 1996 with complete citation tracking for randomized controlled trials of bed rest or medical advice to stay active and continue ordinary daily	-Waddell *et al*. (1997) -Gaskell (2008)

	activities. -Musculoskeletal assessment	
Back pain is not usually due to any serious disease	-Orthopaedic physical assessment -Cross-sectional descriptive study -Low back pain -Systematic review and evidence-based guidelines	-Waddell (1998, as cited in Magee, 2006) - Galukande (2005) - New Zealand Guidelines Group (2004) -Moffet and McLean (2006)
People with backache often have a slipped disc or entrapped nerve	-Orthopaedic physical assessment -Cross-sectional descriptive study	Waddell (1998, as cited in Magee, 2006) - Galukande (2005) - New Zealand Guidelines Group (2004)
A bad back should be exercised	-A systematic review based on a search of MEDLINE and EMBASE from 1966 to April 1996 with complete citation tracking for randomized controlled trials of bed rest or medical advice to stay active and continue ordinary daily activities. -Stretching for functional flexibility -Musculoskeletal assessment	-Waddell *et al*. (1997) -Armiger and Marty (2009) - Gaskell (2008)
Strengthening and stretching exercises are very good for the neck	-Stretching for functional flexibility -Neck pain	-Armiger and Martyn (2009) -Sran (2009)
Bed rest for > 1 or 2 days is not a good idea if you have back ache	-A systematic review based on a search of MEDLINE and EMBASE from 1966 to April 1996 with complete citation tracking for randomized controlled trials of bed rest or medical advice to stay active and continue ordinary daily	-Waddell *et al*. (1997) -Freburger *et al*. (2009) -Moffet and McLean (2006) -Pengel *et al*. (2003) -Gaskell (2008)

	activities. -Cross-sectional telephonic survey -Systematic review and evidence-based guidelines - Systematic review -Musculoskeletal assessment	
Weakness of the arm and hands cannot be caused by neck pain	-Examination of the cervical region -Neck pain	-Kerry (2011) -Sran (2009)
Work shifts, workload and support from supervisors aren't contributing factors to neck pain	-An eighteen month prospective study -Cross-sectional study -Musculoskeletal assessment	-Yip and Ho (2001) -Ibrahim *et al*. (2012) -Gaskell (2008)
Abdominal exercises are not beneficial for my low back pain	-Delphi study	-Maciel *et al*. (2009)
Headaches can never be caused by neck pain	-Review cervicogenic headache -Cervicogenic headaches evidence –based review	-Biondi (2005) - Page (2011)
I maintain an upright posture for the whole day	-Cross-sectional --A quantitative, retrospective approach - Non-experimental descriptive study -Review -Textbook on flexibility and stretching -Application of a new seat design -Review of in-vitro and in-vivo study -Systematic review using	-Cagnie *et al*. (2007) -Chetty (2010b) -Neck-Fisher and Gibson (2008) -Naidoo and Haq (2008) -LBP-Armiger and Martyn, (2009) -Corlett (2009) -Claus *et al*. (2008) - Maria Lis *et al*. (2007) -Roffey *et al*. (2010) for

	MEDLINE, HEALTHSTAR, and CINAHL as the principal databases, studies published between 1990 and May of 2004 -A systematic review using Medline, Embase, CINAHL, Cochrane Library, and Occupational Safety and Health database, gray literature, hand-searching occupational health journals, reference lists of included studies, and experts -Musculoskeletal assessment -Prospective cohort for 22 years -Cross-sectional study	LBP -Gaskell (2008) -Lonberg, Pedersen & Siersma (2010) -Samad, Abdullah, Moin, Tamrin and Hashim (2010) -OSHA (2007, 2012)
When I pick something on the floor I bend my back fully	-Systematic and evidence-based review -A systematic review of the literature using Medline, Embase, CINAHL, Cochrane Library, and Occupational Safety and Health database, gray literature, hand-searching occupational health journals, reference lists of included studies, and experts -Review of in-vitro and in-vivo study -Delphi study	-Waddell and Burton (2001) -Wai *et al*. (2010) - Claus *et al*. (2008) - Maciel *et al.* (2009)
I seek help whenever I lift a heavy load	- Systematic and evidence-based review -Cross-sectional self-administered questionnaire survey	-Waddell and Burton (2001) -Onkuribido *et al*. (2008)
I will exercise for at least 10 minutes at least three times a week	-A systematic review based on a search of MEDLINE and EMBASE from 1966 to April	-Waddell *et al.* (1997)

	1996 with complete citation tracking for randomized controlled trials of bed rest or medical advice to stay active and continue ordinary daily activities. -Delphi study	-Maciel *et al*. (2009)
I'd expect my doctor/therapist to send me for an X-ray, MRI, C-T Scan	-Delphi study - Systematic review and evidence-based guidelines	-Maciel *et al*. (2009) -Moffet and McLean (2006)
I tend to twist my back while on my job	-A systematic review of the literature using Medline, Embase, CINAHL, Cochrane Library, and Occupational Safety and Health database, gray literature, hand-searching occupational health journals, reference lists of included studies, and experts. -Review of in-vitro and in-vivo study -Delphi study -Cross-sectional self-administered questionnaire survey	-Wai *et al*. (2010) - Claus *et al*. (2008) - Maciel *et al.* (2009) -Onkuribido *et al*. (2008)
If I have two bags, I put them together and carry on one side	-Delphi study	-Maciel *et al*. (2009)
I will walk short distances instead of using a car	-Physical activity review	-Chakravarthy, 2008

3.4.2 Intervention

A one and a half hour's knowledge-based ergonomic session was arranged for all interested parties, based on the information obtained from the survey (**Appendix H**). This session took place two weeks after the distribution and return of the survey questionnaires. Due to the complexity of gathering participants in one place at the same time, eight sessions were done at departmental level, which ran for a period of two weeks as a health education initiative. The session included a PowerPoint presentation, which lasted for 40 minutes, followed by a question and answer session **(Appendix H1)**. This was supplemented with informational material in the form of pamphlets **(Appendix H2 and H3)**. The content of the PowerPoint presentation focused on the basic anatomy, biomechanics and epidemiology of both LBP and neck pain. The risk factors for both neck and LBP were highlighted, emphasizing the relevance of good posture, safe lifting techniques and physical activity. Relevant preventive exercises were also demonstrated to the participants. A work exercise pamphlet was also distributed and it was advised that it be displayed next to the computer of the participants to serve as a reminder of the importance of taking exercise breaks at work **(Appendix H4).** Finally, there was a question and answer session, during which various questions related to the intervention as well as outside the topic were posed and answered.

3.4.3 Focus Group Discussion

According to Kitzinger (1995, p. 299), a focus group discussion in the fields of health and medicine "is particularly useful for exploring people's knowledge and experiences and can be used to examine not only what people think, but how they think and why they think that way." Following the intervention, purposive sampling was used to select the participants that would

take part in a focus group discussion (FGD) that explored their experience on the value of the information provided and how the information impacted on the participants' daily activities. The FGD sessions lasted for an average of one hour and were guided by an interview guide using semi-structured open-ended questions with probes **(Appendix K).** The discussions were audio-taped and the researcher moderated the discussions while the research assistants took notes of the proceedings during the discussions. At least three FGDs were supposed to be conducted, with at least six to eight participants per group, which is the common norm for FGDs. However, due to the inaccessibility of participants, only two FGDs were conducted, with a minimum of four participants each.

3.4.4 Validity and reliability of instruments and intervention

Validity and reliability are two of the most important criteria in terms of which a quantitative instrument's adequacy is evaluated (Polit, Beck & Hungler, 2001). Validity refers to the extent to which an instrument measures what it is supposed to be measuring, whereas reliability is the ability of an instrument to produce consistent results when the measurement is repeated on more than one occasion (Sarantakos, 2005).

The Nordic Musculoskeletal Questionnaire was validated regarding content, wording and response construction and tested for reliability. A kappa value of between 0.48 and 0.72 was reached, which demonstrated the reliability of the instrument being studied (De Barros & Alexandre, 2003). The researcher calculated the internal consistency of the remaining part of the questionnaire, using data from the test retest of the questionnaire among the same participants. A Cronbach's alpha value of 0.881 was established, which indicated that there was good internal

consistency reliability. There was a strong correlation between answers from the first round and the second round, with ranges of 0.71 - 1.00 Pearson's correlation coefficient for continuous variables, and there was no significant change ($p<0.05$) for categorical variables using Mcnemar's test.

Content validity of the questionnaire was assessed through peer reviewing, as well as by experts in the field; in this case, the supervisor of the study, to assess the adequacy of coverage of the content area being measured. Experts in the field also assessed the content validity of the intervention that was carried out as part of the survey.

3.4.4.1 Pilot Study

The eight non-standardised questions in Section 3b and adaptations of questionnaires used in Sections 2 and 4 necessitated a pilot study for face validity and test-retest reliability. The pilot study helped determine the clarity of questions, as well as the duration of time used to fill in the questionnaire. Twelve participants were randomly chosen to participate in the pilot study and were excluded from the main study. The nature of the study was explained to the participants, and they were issued with the information sheet. Those who agreed to take part in the study thereafter completed the consent form and an average time of fifteen to twenty five minutes was used to complete the questionnaire. Nine out of twelve participants were not familiar with their height in metric centimeters and it was therefore changed to feet (1ft=30.48cm), with which the participants were more conversant. Modifications were also made to questions 65 - 68 so as to enhance the clarity of the questionnaire (**Appendix G**). There was an interval of three weeks between the first and second administration of the questionnaire for the test retest reliability. The

feedback from the experts and participants in the pilot study was integrated into the questionnaire to improve the questions, format and scales used.

3.4.4.2 Trustworthiness

Trustworthiness is the ability of the researcher to ensure rigor of qualitative designs without sacrificing the relevance of the qualitative research (Guba, 1981). Four techniques, i.e. credibility, transferability, confirmability and dependability, were used to ensure the accuracy of this study's findings. Credibility, as Lincoln and Guba (1985) contend, is confidence in the 'truth' of the research findings. In this study, credibility was ensured through methods triangulation through the use of the field notes and transcripts, peer debriefing and the member checking of collected data and also by giving a rich description of the context. Direct excerpts from the participants were also used to support the description of the context, thereby enhancing credibility. To ensure transferability, a clear description of the research methodology used, must be provided to allow a study to be repeated (Lundman & Graneheim, 2004; Guba, 1981). In this study, this was also achieved by means of a thick description of the text, participants' characteristics as well as appropriate excerpts from the participants. Confirmability is the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation or interest (Lincoln & Guba, 1985). The use of probes during questioning, together with member checking, helped to ensure confirmability. In addition, reviewing of the raw record data and methods triangulation techniques was also used. Dependability is related to the consistency of findings (Guba, 1981); in this study, this was ensured by the use of an in-depth methodological description to allow the study to be repeated, as well as through open dialogue with the research team. During the analysis process, code-recoding procedure and triangulation

of the quantitative data also helped in increasing the consistency of the findings of this study (Krefting, 1990).

3.5 PROCEDURE

Permission and ethical clearance was obtained from the University of the Western Cape (UWC) Research Grant and Study Leave Committee (**Appendix A**). Ethical clearance was also obtained from the Ministry of Research and higher learning in Kenya through the Ministry of Medical Services **(Appendix D).** Permission was also obtained from the Associate Dean, Clinical Affairs and Chief of Staff AKUH, N (**Appendix B**), and the Research Committee of AKUH, N (**Appendix C**). The staff establishment was thereafter obtained from the Human Resource Department AKUH, N to enable the researcher to sample for the participants of the study. The data collection process took place in January 2012, and participation was on a voluntary basis. The flow chart at the end of this sub-section (**Figure 3.1)** further illustrates the data collection procedure.

3.5.1 Quantitative Method

To collect the data from the participants, the principal researcher trained two research assistants, who were qualified physiotherapists and therefore skilled in assisting the study professionally. In this section, the research assistants helped the researcher in identifying participants generated by systematic sampling through the sampling frame (the staff establishment) provided by the Human Resources Department of the Hospital. The purpose of the study was explained to the participants, whereafter information sheets and questionnaires were distributed to the willing participants who had to sign the consent form before participating in the survey.

The principal researcher and the assistants were available to address any questions arising from the questionnaire and also to collect the completed questionnaires. Respondents who failed to fill in their questionnaires on the same day informed the researcher when she could return to collect them. Two weeks later, a total of 200 questionnaires had been collected, which represented 93.5% of the minimum expected feedback (n=214). Descriptive analysis, using version 20 of SPSS, was done on the already collected questionnaires to determine the frequencies of occurrences of the musculoskeletal disorders among the administrative staff of Aga Khan University Hospital, Nairobi. Low back pain and neck pain were the most prevalent musculoskeletal disorders among the staff, followed by the shoulder, upper back, ankles and wrist respectively. This preliminary data enabled the researcher, to design a knowledge-based intervention programme to address these musculoskeletal problems while waiting and doing a follow-up for more questionnaires to be received.

A one hour knowledge-based ergonomic intervention was designed, and this was promoted among all interested participants, inclusive of those who had not participated in the survey. The first session was in the form of PowerPoint educative slides targeting the adjustment of work posture and preventative practices at work, including rest breaks and stretch exercises (n.d, Ergonomics Exercises, 2012; Driessen *et al*., 2010; Corlette, 2009; Da Costa & Vieira, 2008; Nelson & Kokkonen, 2007; Kilbolm, 1998; Lühmann et al., 2006; Amick et al., 2003). The second session was participatory (Wijk & Mathiassen, 2011; Armiger & Martyn, 2009; Moffett & McLean, 2006), involving the actual stretching exercises and practising of correct working posture. The final session comprised a question and answer session, as well as written information in the form of pamphlets (**Appendix H**) (n.d, 2012; n.d, Ankle Exercises, 2012; Hedenschoug, 2006).

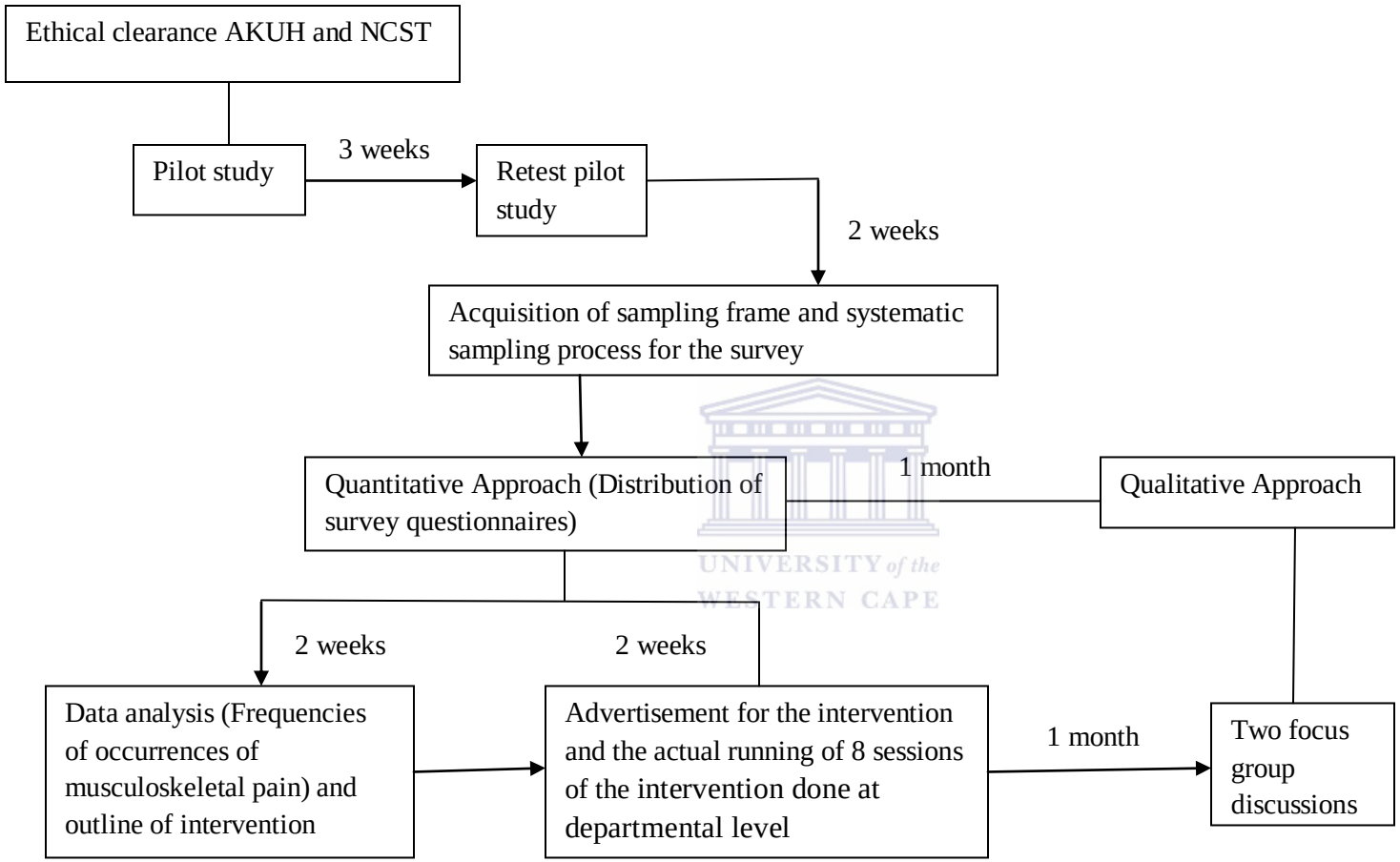
3.5.2 Qualitative Method

Two FGDs were held at the end of the month to explore the concepts that the participants valued from the ergonomics programme. The researcher arranged appointments with the participants for the interviews; the Hospital's boardroom was booked for conducting the interviews on the anticipated dates. The board room was assessed prior to commencing the FGDs to ensure that there would be no possible interruptions and distractions to the quality of recordings. The focus group discussions were held during lunch-hour breaks to ensure that they would not interfere with participants' working hours, and snacks were provided. The researcher purposively selected 15 participants and grouped them in two focus groups of seven and eight respectively, to be interviewed on different days. The invitation and information sheet regarding the focus group discussions were sent through electronic mail **(Appendix I)**. A reminder mail was sent to the participants on the morning of the day scheduled for the FGD; however, only four participants showed up for both FGDs respectively.

The FGDs took an average of forty-five minutes each. The participants were invited to partake of refreshments prior to the discussions. This enabled some interaction that served in creating a friendly and relaxed atmosphere. The researcher then welcomed the participants to the FGDs, recapping on the purpose of the discussions, as was also stated in the sent information sheet. Participants were introduced to each other, the group norms were discussed, whereafter permission was sought to use a tape recorder. The two research assistants were present; with one of them to take notes taking during the interview, while the other served as an observer. Ethical considerations were observed through the signing of the consent forms (**Appendix J**) and ensuring anonymity by identifying participants through a cryptogram during the interview

sessions. The participants were also reminded of their right to withdraw from the discussions at their own free will, without any consequences. The FGDs were thereafter conducted by the use of an interview guide, which had open-ended semi-structured questions as well as some probes that helped to obtain the necessary information required (**Appendix K**). English was the preferred language for communication. The tape-recorded interview was played back to the participants so as to confirm and obtain clarity on what was discussed in the interviews. The researcher and the assistants then met to consolidate the information from the audio-tape recorder and note taking.

FIGURE 3.1: Flow chart of data collection procedure



3.6 DATA ANALYSIS

Quantitative data was captured and analysed using the Statistical package for the social sciences (SPSS) version 20. Descriptive statistics were used for the demographic characteristics of the respondents and prevalence of WRMDs in terms of frequencies, percentages, means and standard deviations. The Chi-square test statistic was used for inferential statistics, to determine the association between categorical variables (gender and age) and ordinal variables (work-related and individual related factors to LBP and neck pain).

The knowledge section consisted of thirty items, of which twenty two items were purely knowledge questions, whereas the remaining eight were behavioural with regard to postural habits, lifting and physical activities. This section used two formats of questions, i.e. the forced Likert scale of rating, ranging from 1 "*strongly disagree*" to 6 "*strongly agree*" as well as *True, False* and *Not Sure* answers. During analysis, the forced Likert scale was summed up to represent *Agreed, Disagreed* and *Not Sure* responses so as to fit in style with the *True, False* and *Not Sure* answers. The knowledge and behaviour questions were separated during the analysis process and are presented in form of tables displaying the frequency of responses. These responses were then scored in relation to the three responses of *Agreed, Not Sure* and *Disagreed*. Each of the three responses had a score of 1; the highest score (3) meant a better self-reported knowledge; 2 meant moderate knowledge; whereas 1 represented poor knowledge. With regard to behavioural practice, a score of 3 meant good behavioural practice in association with LBP and neck pain; a score of 2 meant moderate behavioural practice whereas 1 represented poor behavioural practice. Some of the items were expressed in a negative way, like "*Weakness of the arm and hands cannot be caused by neck pain*". This kind of items includes question numbers

13, 16, 17, 21 and 34. All other items were expressed in a positive way: "*I seek help whenever I lift a heavy load.*" Therefore, in order to obtain the total score during analysis, the researcher had to reverse the rating for negative items and then add on the actual rating for the positive items.

Creswell (2003) states that the process of qualitative data analysis involves making sense of text data continually, and therefore several generic steps must be followed to warrant valid data. In this study, the FGD tape-recorded interviews were transcribed verbatim to produce a transcript and a comparison was made with the field notes taken during interviews to verify accuracy. Elements such as gestures and body language were added to the transcripts. The data was managed manually, and different highlighters were used during the coding process. Several readings of the material that helped in code-recording were done so as to create familiarisation. Thematic content analysis in the form of themes and categories was used for data analysis (Lundman & Graneheim, 2004). Categories were created from similar concepts and then classified into themes. The data was thereafter cut and pasted according to the predetermined and emerging themes and described in narrative form for the process of interpretation and analysis. During data analysis, the researcher made use of peer debriefing to ensure that the data was correctly understood and also to avoid bias. Thereafter, a comparison was made with existing literature and also with the quantitative data in order to reach the full findings of this study.

3.7 ETHICAL CONSIDERATIONS

Ethical clearance and approval was obtained from the UWC Senate Research Grants and Study Leave Committee before the study commenced **(Appendix A).** Ethical clearance was also obtained from the Ministry of Research and Higher Learning in Kenya through the Ministry of

Medical Services **(Appendix B)**. Permission was obtained from the Associate Dean, Clinical Affairs and Chief of Staff of the AKUH, Nairobi and the Head of the Research Committee prior to the commencement of the study **(Appendices C and D)**. The researcher then sought the staff establishment from the Human Resources Department that was necessary for sampling the participants of the study. The aim of the study was explained to the relevant administrative bodies and to the potential participants. The participants were assured that all the information obtained would be confidential and anonymous and that the data collected would be kept in a locked cabinet only accessible by the researcher. All the potential participants were informed that they could withdraw from the study at any time, without any consequences. All potential participants completed the informed consent forms **(Appendices E and F)** before completing the questionnaire and signing the confidentiality clause that information for the FGD would not be disclosed. Consent to audio-tape the discussions was also obtained (**Appendices I and J**). Action was taken to refer any participants requiring further attention to the relevant health professional. The researcher then made a commitment to provide the results of the research to the research institution (AKUH, N) and to submit a final copy to the University of the Western Cape.

3.8 SUMMARY OF CHAPTER

The research setting, study population, study design and sampling procedure were described in this chapter. Further methodological issues of the quantitative and qualitative study, i.e. the validity, reliability and trustworthiness of the study, were also described. The procedures of data collection and data analysis were outlined and the research findings will be presented in Chapter four.

CHAPTER FOUR

RESULTS

4.0 INTRODUCTION

This chapter comprises two sections. Section A presents the quantitative data that corresponds with the first three objectives, while Section B presents the qualitative data that corresponds with the fourth and fifth objectives. The results of the quantitative data in Section A are presented in the form of descriptive and inferential statistics (associations between variables in the study). The results are presented in tables and graphs in accordance to the following objectives.

- To determine the knowledge that the staff have on ergonomics and the prevention of work-related musculoskeletal disorders
- To determine the prevalence of work-related musculoskeletal disorders among administrators at the Aga Khan University Hospital, Nairobi.
- To determine the common work-related musculoskeletal disorders among administrative staff at the Aga Khan University Hospital, Nairobi based on the survey carried out.
- To design and implement an ergonomics programme that will address the most common work-related musculoskeletal disorders.
- To explore and describe the concepts that participants valued from the ergonomics programme.

The qualitative data in Section B is presented in the form of thematic content analysis. The researcher describes the focus group participants, and the emerged themes and categories. In the presentation of the findings, verbatim quotations from interviews were used to illustrate response themes and categories. The quotations are presented in italics, and repetitive or unnecessary material was omitted from the quotes by three ellipsis points (…). To preserve the anonymity and confidentiality of the participants, they were given cryptograms (P1 to P6). Finally, the chapter concludes by presenting the summary of the results.

SECTION A: QUANTITATIVE RESULTS

4.1 DESCRIPTION OF STUDY SAMPLE

A total of 278 questionnaires were distributed out of which 217 were received. Only 208 questionnaires were completed correctly thus accounting for a response rate of 74.8%. Females constituted the majority of the sample population 58.5% (n=121), as compared to the men who accounted for 41.5% (n=86). The majority of the population was married (57.6%), with the most common age group being 31-40 years (49.2%); while 45.6% of the participants had a college level education. The survey constituted a sample whose nature of work was heterogeneous. This was best categorized in the form of those who sat more than 80% of their working hours (Finance Department, Switchboard/telephone operators and Administrative secretaries/receptionists) and those who sat less than 80% of their working hours (Unit coordinators, Pharmacy stock and inventory controllers, Information Technology and Medical records departments). The participants who sat for more than 80% of the working time accounted for 77.4% (n=161) of the population while those who interspersed their day with walking around accounted for 22.6% (n=47). Some participants omitted some demographic questions, leaving

missing values in the gender, age, marital status and education level variables. These results are presented in **Table 4.1** below.

TABLE 4.1: Demographic Frequency Table (n=208)

Variables	Frequency (n)	Percentages (%)
Gender (n=207)		
Males	86	41.5
Females	121	58.5
Age group (n=199)		
18-25 years	19	9.5
26-30 years	56	28.1
31-40 years	98	49.2
41-50 years	23	11.6
51-60 years	3	1.5
Marital status (n=205)		
Single	77	37.6
Married	118	57.6
Divorced	1	0.5
Separated	2	1.0
Other	7	3.4
Educational Level (n=206)		
High School	7	3.4
A-Level	1	0.5
College	94	45.6
University	83	40.3
Masters	20	9.7
PHD	1	0.5
Occupation (n=208)[a]		
Sit > 80% of the day	161	77.4
Sit < 80% of the day	47	22.6

[a] – no missing values

4.2 KNOWLEDGE OF STAFF ON ERGONOMICS RELATED LOW BACK AND NECK PAIN AS WELL AS THEIR PREVENTION

The results of the Knowledge Section, which aimed to elicit biomechanical knowledge of the sample with regard to low back pain and neck pain, are presented below. These results were split into knowledge and behavioural practices separately. The entire Knowledge Section had a mean of five missing values per variable, which could mean that the participants were not knowledgeable about them.

4.2.1 Knowledge Section

The study participants were required to complete twenty two knowledge questions, which had three response alternatives i.e. *Disagreed*, *Not sure* and *Agreed* and are presented in **Table 4.2**. Those who answered the questions correctly earned the highest score of 3, whereas a score of 2 was given to those who were not sure, indicating moderate knowledge. The lowest score of 1 was given to those who were not knowledgeable about the questions asked. These scores were assigned in accordance to the highly selected response per question by the study participants. Their average knowledge score was 2.72 out of the highest possible score of 3 with a standard deviation of 0.46. Most study participants were thus seen as having good knowledge with regards to factors relating to both LBP and neck pain occurences.

TABLE 4.2: Knowledge variables frequency table (n=208)

Variables	Disagreed n (%)	Not sure n (%)	Agreed n (%)	Total score per variable
Neck pain can cause pain to the shoulders and down the arm	7 (3.4)	46 (22.4)	152 (74.1)	3
Physically active people get less back pain and recover faster if they do	11 (5.4)	56 (27.5)	137 (67.2)	3
Poor posture is harmful to my spine	12 (5.9)	8 (3.9)	183 (90.1)	3
Including neck exercises in treatment reduces pain and improves function	5 (2.4)	67 (32.7)	133 (64.9)	3
Back pain settles quickly enough for one to get on with normal activities	52 (26.3)	101 (51)	45 (22.7)	2
Smoking is not associated with neck pain	46 (22.5)	83 (40.7)	75 (36.8)	2
A neck/cervical collar is indicated for all neck pain	67 (33.7)	96 (48.2)	36 (18.1)	2
Psychological factors can contribute to the development of low back pain[a]	24 (11.5)	66 (31.7)	118 (56.7)	3
Surgery is the most effective way to treat back trouble	155 (75.6)	46 (22.4)	4 (2.0)	3
After back pain recovery patient is cured and there's no risk of further crises	110 (54.2)	75 (36.9)	18 (8.9)	3
If you have backache you should avoid exercises.	127 (61.4)	63 (30.4)	17 (8.2)	3
The spine is one of the strongest parts of the body	28 (13.7)	36 (17.6)	140 (68.6)	3
Back pain is not usually due to any serious disease	59 (29.2)	57 (28.2)	86 (42.6)	3
People with backache often have a slipped disc or entrapped nerve	54 (26.9)	96 (47.8)	51 (25.4)	2
A bad back should be exercised	23 (11.4)	53 (26.2)	126 (62.4)	3
Medication's the only way of relieving back	167 (82.7)	23 (11.4)	12 (5.9)	3

trouble				
Strengthening and stretching exercises are very good for the neck	9 (4.5)	21 (10.4)	172 (85.1)	3
Bed rest for > 1 or 2 days is not a good idea if you have back ache*	56 (28.0)	91 (45.5)	53 (26.5)	2
Weakness of the arm and hands cannot be caused by neck pain*	66 (32.0)	107 (51.9)	33 (16)	2
Work shifts, workload and support from supervisors aren't contributing factors to neck pain*	90 (44.3)	67 (33.0)	46 (22.7)	3
Abdominal exercises are not beneficial for my low back pain*	93 (45.4)	92 (44.9)	20 (9.8)	3
Headaches can never be caused by neck pain*	128 (64.3)	54 (27.1)	17 (8.5)	3

* - The reversely asked questions whose disagreed response was stated to be correct, [a] - no missing values.

4.2.2 Behaviour Section

This section consisted of eight questions, testing the participants' behavioural practice in relation to low back pain and neck pain. The scoring of this section was similar to that of the knowledge section, with the maximum score of 3 given to those who adhered to the right behaviour, indicating good behavioural practice. A score of 2 was given to '*Not Sure'* responses, indicating moderate behavioural practice, whereas a score of 1 indicated poor behaviour with regard to low back pain and neck pain. Their average behavioural practice score was 2.25 out of the highest possible score of 3 with a standard deviation of 0.89. Hence despite having good knowledge

about factors about LBP and neck pain occurrences, the participants did not have complete compliance as expected with regards to their behavioural practice. These results are as presented in **Table 4.3** below.

TABLE 4.3: Behavior practice frequency table (n=208)

Variables	**Disagreed n (%)**	**Not sure n (%)**	**Agreed n (%)**	**Maximum Score 3**
I maintain an upright posture for the whole day	49 (23.7)	134 (64.7)	24 (11.6)	2
When I pick something on the floor I bend my back fully	48 (23.9)	88 (43.8)	65 (32.3)	2
I seek help whenever I lift a heavy load	30 (14.8)	79 (38.9)	94 (46.3)	3
I will exercise for at least 10 minutes at least three times a week[a]	28 (13.5)	78 (37.5)	102 (49)	3
I'd expect my doctor/therapist to send me for an X-ray, MRI, C-T Scan	31 (15.1)	85 (41.5)	89 (43.4)	1
I tend to twist my back while on my job	42 (20.5)	49 (23.9)	114 (55.6)	1
If I have two bags, I put them together and carry on one side	139 (67.8)	18 (8.8)	48 (23.4)	3
I will walk short distances instead of using a car	24 (11.7)	3 (1.5)	178 (86.8)	3

[a] - no missing values

4.3 PREVALENCE OF MUSCULOSKELETAL COMPLAINTS AND ITS CONSEQUENCES IN PAST 12 MONTHS

This section represents the prevalence of musculoskeletal injuries among the participants, using the adapted version of the Standardised Nordic Musculoskeletal Questionnaire (De Barros & Alexandre, 2003). The Nordic questionnaire is a standardised instrument used to analyse musculoskeletal symptoms in an ergonomic or occupational health context. The 12 months' prevalence of neck pain as per **Table 4.4** below was 141 (67.8%) of the total study sample whereas the one week prevalence of those who had neck pain was 49 (34.8%). The 12 month prevalence of low back pain was 157 (75.5%) of the entire study sample (N=208), whereas the one week prevalence was 74 (47.1%). The hips and thighs (30.2%), knees (28.4%) and the low back (27.4%) were the common trouble respectively that prevented the study participants from carrying out their activities in the previous 12 months, whereas those who visited their physicians due to these problems mostly suffered from low back pain (30.6%), upper back pain (28.1%) and neck pain (23.4%).

TABLE 4.4: Prevalence of work related musculoskeletal disorders in administrative staff, AKUH (n=208)

	Have you had trouble during the last 12 months?	Has the trouble prevented you from carrying out your activities in the past 12 months?	Have you seen a physician for the trouble in the past 12 months?	Have you had the trouble in the last 7 days?
Body parts	n (%)	n (%)	n (%)	n (%)
Neck (n=141)	**141 (100)**	**24/141 (17)**	**33/141 (23.4)**	**49/141(34.8)**
Shoulders (n=119)	119 (100)	18/119 (15.1)	27/119 (22.7)	37/119 (31.1)
Upper back (n=96)	96 (100)	26/96 (27.1)	27/96 (28.1)	40/96 (41.7)
Elbows (n=37)	37 (100)	9/37 (24.3)	5/37 (13.5)	12/37 (32.4)
Wrists/Hands (n=72)	72 (100)	18/72 (25)	16/72 (22.2)	22/72 (30.5)
Lower back (n=157)	**157 (100)**	**43/157 (27.4)**	**48/157 (30.6)**	**74/157 (47.1)**
Hips/Thighs (n=53)	53 (100)	16/53 (30.2)	12/53 (22.6)	15/53 (28.3)
Knees (n=67)	67 (100)	19/67 (28.4)	12/67 (17.9)	21/67 (31.3)
Ankles/Feet (n=82)	82 (100)	18/82 (22)	17/82 (20.7)	41/82 (50)

4.3.1 Behaviour of low back pain and neck pain

This section sought to gather more information about the presentation of low back pain and neck pain. It will now be divided into two parts, focusing on the neck and the low back separately.

4.3.1.1 Neck Pain presentation in the study participants (n=141)

Discomfort was the most common complaint reported for neck pain at (78=55.3%), followed by stiffness (66=46.8%), pain (58=41.1%) and, lastly, tingling/numbness (14=9.9%). The mean VAS score for neck pain on a scale of 0-10 was 4.89. The results are as presented in **Table 4.5** below.

TABLE 4.5: Frequency table of main complaint for the participants with neck pain (n = 141)

Area	Time	Discomfort n (%)	Stiffness n (%)	Pain n (%)	Tingling/Numbness n (%)
Neck n=141	**12 months** n=90	32/90 (35.6)	27/90 (30)	24/90 (26.7)	7/90 (7.8)
	1 month n=48	16/48 (33.3)	17/48 (35.4)	14/48 (29.2)	1/48 (2.1)
	1 week n=43	16/43 (37.2)	15/43 (34.9)	9/43 (20.9)	3/43 (7)
	Current n=35	14/35 (40)	7/35 (20)	11/35 (31.4)	3/35 (8.6)

In this survey, 49.6% (70) of the study participants that had neck pain (n=141) experienced the pain while working on the computer, which prevented 9.2% (13) from using it. Altogether 22% (31) of the respondents experienced neck pain on other instances, varying from sporting activities, domestic chores or other office-related chores, e.g. filing, pain while sleeping, breast feeding or relaxing (e.g. while reading or watching the television) whereas for some it was when they were stressed or when they had not exercised. Twenty six percent (37) of the sample population with neck pain related it to a specific incident, which varied from the prolonged use of a computer, poor sitting posture while using the computer/laptop, history of an accident, pain after working or after exercises, as well as pain after working without any break.

Of the study participants with neck pain, 11.3% (16) reported being absent from work due to the pain; 81.3% (13) reported between 1-7 days of absence, while 6.3 % (1) reported an absence of between 8-14 days. The most popular course of action taken by the study participants whenever they experienced neck pain was carrying on with their activities 29.8% (42), followed by 23.4% (33) who would consult a doctor, while 22.7% (32) would do other activities, varying from massage and plenty of rest from work, neck exercises, change of position, neck stretches and the application of pain balm. Of the remaining respondents, 7.1% (10) reported consulting a physiotherapist, 11.3% (16) would buy medication at the pharmacy (without prescription), and 10.6% (15) would take some bed rest to relieve the pain.

4.3.1.2 Low Back Pain presentation among study participants (n=157)

As illustrated in **Table 4.6** below, pain was the most common complaint reported for low back problem at (139=88.5%); followed by discomfort (102=65%); stiffness (41=26.1%); and, lastly, tingling/numbness (17=10.8%). The mean VAS score for low back pain on a scale of 1-10 was 7.61.

TABLE 4.6: Frequency table of main complaint for participants with low back pain (n = 157)

Area	Time	Discomfort n (%)	Stiffness n (%)	Pain n (%)	Tingling/Numbness n (%)
Low back n=157	**12 months** n=104	41/104 (39.4	9/104 (8.7)	50/104 (48.1)	4/104 (3.8)
	1 month n=66	20/66 (30.3)	12/66 (18.2)	29/66 (43.9)	5/66 (7.6)
	1 week n=58	16/58 (27.6)	10/58 (17.2)	29/58 (50)	3/58 (5.2)
	Current n=66	25/66 (37.9)	10/66 (15.2)	31/66 (47)	5/66 (7.6)

In this survey, 48.4% (76) of the sample size that had low back pain (n=157) experienced the pain while working on computers, which resulted in 10.8% (17) not being able to use the computer because of their back pain. Thirty eight percent (60) experienced low back pain in other instances, which varied from lifting heavy objects at work, in the house or working out in the gym, bending, lying down, doing domestic chores, office duties, e.g. preparing lectures/exams and marking of exams, waking up from sleep, as well as standing for long. Pain after work, when exercising, on prolonged sitting, travelling on the road/flights as well as pain when stressed or pain without any significant cause were other instances mentioned. Thirty five percent (55) of the sample participants related their low back pain to a specific incident. Prolonged sitting especially in poor posture, lifting of heavy things, lots of workload/house chores, history of accidents, during and after pregnancy and pain after working were the reported incidents that brought on LBP.

Of those with low back pain, 19.7% (31) reported absence from work; with respectively 80.6% (25) and 12.9% (4) for between 1-7 days and 8-14 days. The course of action frequently taken by the study participants who experienced low back pain was carrying on with activities despite the pain (31.8%=50), followed by 26.8% (42) of respondents who consulted a medical doctor. Twenty four percent (37) did other activities, varying from massage with warm water and bed rest when off duty, low back exercises and stretches, walking around and taking a break from work, avoidance of excessive strain and use of prescribed medication. Only 8.9% (14) consulted a physiotherapist, 15.9% (25) bought medication at the pharmacy (without a prescription) while 22.3% (35) took bed rest when in pain.

4.4 WORK-RELATED FACTORS TO LOW BACK PAIN AND NECK PAIN.

As illustrated in **Table 4.7** below, the average number of years worked by the study participants was 9 years (SD=6.8), while the average number of hours worked per day was 9 hours (SD=1.5). The majority of the study participants (82.7%=172) used the computer for at least two hours during one session at work and 57% (118) participants had received information on how to sit in front of the computer/doing desk work. The source from which the information was received **(Figure 4.1)** varied, with the media having the highest score of 45% (53). Other reported sources of information besides the options given in the study received the second highest score at 25% (29), ranging from tertiary levels of educational training, i.e. college lecturers, at occupational

settings, i.e. ergonomist in previous jobs and other training courses; educational pamphlets; from their peers at work as well as from the occupational managers at some work settings.

FIGURE 4.1: Sources of information regarding sitting instructions in the office (n=118)

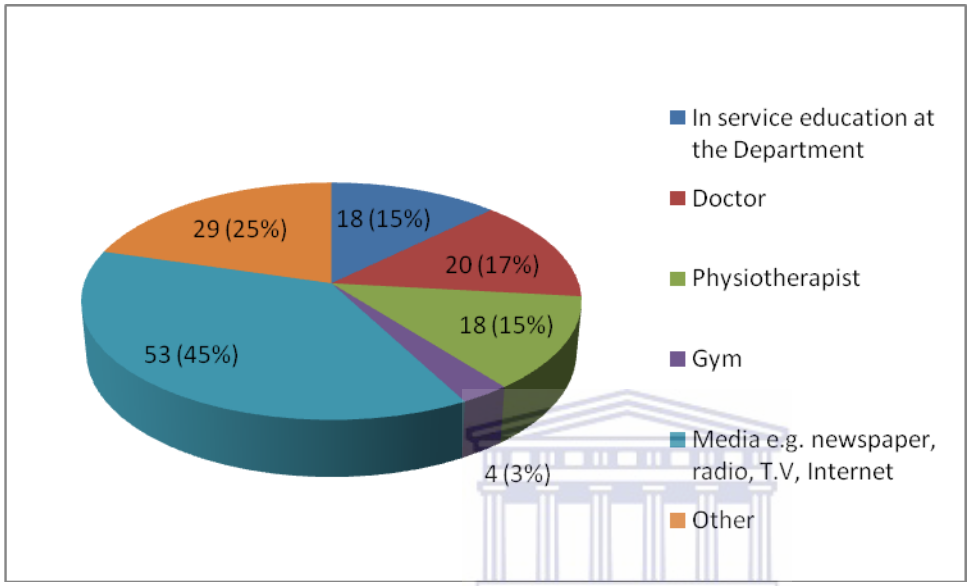


Table 4.7 further shows that 132 (65%) of the participants took short breaks for at least 10 minutes every hour in order to relieve the strain on their back or neck, with 28.9% (59) of these participants having received information on stretches/exercises that can be done during the short breaks. The most popular exercises done during breaks were sustained arms and wrist/hands stretches, neck exercises, shoulder rotation exercises and walking around in the office/on the stairs. For the low back, the study participants did several exercises, e.g. side bend stretches, sit-ups, back extension exercises, rotational exercises, bridges, straight leg raising and push-ups. Other participants also reported massaging around the neck and low back to relieve the tension in the muscles. Fifty percent (103) of the study participants reported good back support from

their office chairs. There were some missing values with these variables, which were probably erroneously omitted.

Table 4.8 shows more frequencies of work-related factors, mostly psychosocial: 55.3% (114) of the study participants reported that job worries sometimes got them down physically. Thirty four percent (71) reported to never being kept awake at night by problems associated with their work, whereas 56.3% (116) admitted that they would sometimes worry about making the right decision at work. A further 34.3% (71) of the sample distribution reported to often breathe a sigh of relief when they finished work for the day.

TABLE 4.7: Frequency table of work-related factors (n=208)

Variables	Frequency (n)	Percentages (%)
Number of years worked (n=199)		
0-3 years	49	24.6
4-7 years	47	23.6
8-11 years	42	21.1
12-15 years	31	15.6
16-19 years	12	6.0
20-23 years	9	4.5
24-27 years	4	2.0
28-31 years	5	2.5
Number of hours worked per day (n=205)		
6<9	118	57.6
9<15	87	42.4
Number of years worked using a computer (n=202)		
0-2 years	24	11.9
3-5 years	53	26.2
6-8 years	40	19.8
9-11 years	41	20.3
12-14 years	23	11.4
15-17 years	13	6.4
18-20 years	5	2.5
21-23 years	3	1.5
Hours spent using the computer during one session at work[a]		
< 30minutes	5	2.4
About 45 minutes	9	4.3
1 hour	22	10.6
≥ 2 hours	172	82.7
Instructions received while working on the computer (n=207)		
Yes	118	57.0
No	89	43.0
Taking of short breaks at work (n=203)		
Yes	132	65.0
No	71	35.0
Received instructions of stretches/exercises done during the breaks (n=204)		
Yes	59	28.9
No	145	71.1

Office chair fully supporting the back (n=205)		
Yes	103	50.2
No	102	49.8

[a] – no missing values

TABLE 4.8: Frequency table of psychosocial work factors (n=208).

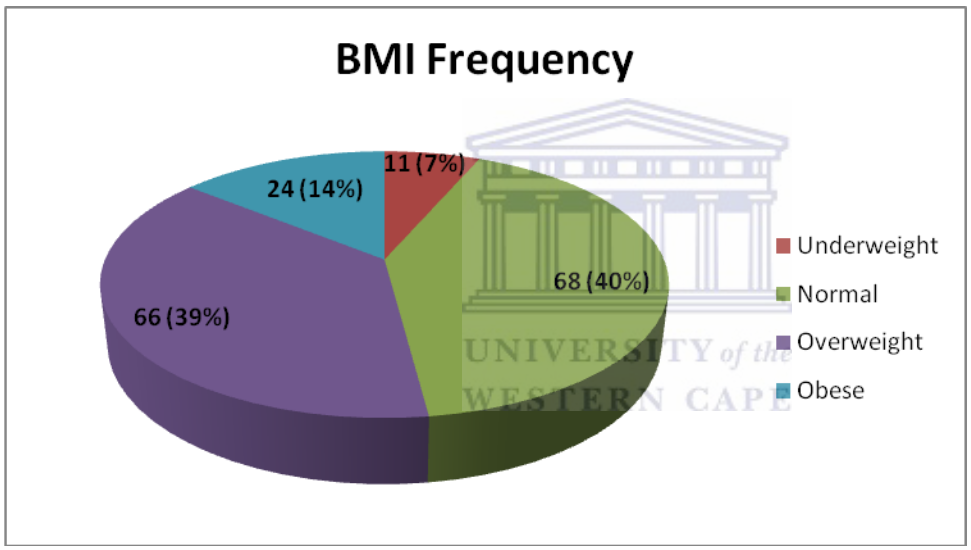
Variables	Never n (%)	Very Occasionally n (%)	Sometimes n (%)	Often n (%)	Always n (%)
Job worries get one down physically (n=206)	25 (12.1)	33 (16.0)	114 (55.3)	30 (14.6)	4 (1.9)
Problems associated with the job keep one awake at night (n=207)	71 (34.3)	59 (28.5)	65 (31.4)	11 (5.3)	1 (0.5)
Worries about making the right decision at work (n=205)	16 (7.8)	38 (18.9)	116 (56.3)	26 (12.6)	9 (4.4)
Breathes a sigh of relief when they finish work for the day (n=207)	14 (6.8)	24 (11.6)	71 (34.3)	56 (27.1)	42 (20.3)

4.5 INDIVIDUAL RELATED FACTORS TO LOW BACK PAIN AND NECK PAIN

The body weight and height of the study participants were summated to calculate their body mass index (BMI). The mean height of study participants was 1.68 metres, while their mean weight was 71.2 kg. However, there were several missing values in both the height (n=37) and weight (n=10) variables, mostly due to the fact that participants were not aware of the

dimensions despite the fact that the raw data of height was in feet (1ft=30.48cm), which was more familiar to the study participants. In order to calculate the BMI, we had to nullify the participants who had given one figure only, thereby increasing the missing values to 39 for both height and weight variables. The mean BMI of the study participants was therefore 25.5kg/m^2 (SD=5.2) which is considered as being overweight (Jenkins & Plasqui, 2008). Majority of the study participants' BMI 40% (n=68) were in the normal range as shown in **Figure 4.2** below.

FIGURE 4.2: Participants BMI (n=208, n=169)



Other individual factors, as indicated in **Table 4.9** below, showed that 91.7% (189) of the study participants had never smoked; 59.9% (124) rated their current health status as being average; 42.7% (88) rated their level of mental stress as low and 42.4% (87) reported to experience satisfaction with their jobs. Fifty five percent (113) of the study sample spent more than one hour per day on average doing domestic activities such as cleaning, child care, cooking, gardening and home repairs, whereas 41.2% (84) spent less than one hour per day on hobbies, e.g. reading, handicrafts, music instrument playing and computer games during working days.

TABLE 4.9: Frequency table for individual factors (n=208)

Variables	Frequency (n)	Percentages (%)
One's smoking status (n=206)		
- Never	189	91.7
- Current smoker	4	1.9
- Ex-smoker	13	6.3
One's current health status (n=207)		
- Very poor	0	0
- Poor	2	1.0
- Average	49	23.7
- Good	124	59.9
- Very good	32	15.5
One's level of mental stress (n=206)		
- None	20	9.7
- Little	88	42.7
- Some	63	30.6
- Fairly much	27	13.1
- Very much	8	3.9
The rate of one's job satisfaction (n=205)		
- Never satisfied	10	4.9
- Satisfied at times	72	35.1
- Satisfied	87	42.4
- Often satisfied	27	13.2
- Very satisfied	9	4.4
Hours spent on domestic activities (n=205)		
< 1 hour	74	36.1
> 1 hour	113	55.1
None	18	8.8
Hours spent on hobbies (n=204)		
< 1 hour	84	41.2
> 1 hour	78	38.2
None	42	20.6

4.6 FACTORS ASSOCIATED WITH LOW BACK PAIN AND NECK PAIN (n=208)

This section presents the results of associations of several variables in this study with regard to low back and neck pain which were the dependent variables. Chi-square test was used to determine associations between categorical variables, e.g. gender and age, as well as ordinal variables, e.g. work-related and individual factors related to low back and neck pain.

4.6.1 Associations of demographic features with the 12 month prevalence low back pain and neck pain

In terms of **Table 4.10**, only gender showed a statistically significant association with the 12 month prevalence of low back pain, at a 95% confidence interval. The chi-square test for independence (with Yates Continuity Correction) was χ^2 (1, n=208) = 5.330, p = .021, phi = .172. Despite there being only one association between LBP and neck pain with the demographic data, female respondents reported most complaints of both neck pain and low back pain, at values of 40.8% and 47.3% respectively. The age group of 31- 40 years also had the highest score of both neck (31.8%) and LBP (36.7%). Other demographic variables seen with these highest scores of both neck pain and low back pain in the study population were married people at 39.2% and 46.3% respectively; those with a College level of education at 31.7% and 34.5% respectively, as well those whose nature of work required them to sit more than 80% of their working time at 52.2% for neck and 58.7% for LBP.

TABLE 4.10: Association of demographic frequency table with the 12 month prevalence of low back pain and neck pain (n=208)

Variables	NP Yes (%)	No (%)	LBP Yes (%)	No (%)	p-value neck	p-value low back
Gender					**0.556**	**0.021***
Male	56 (27.2)	30 (14.6)	58 (28.0)	29 (14.0)		
Female	84 (40.8)	36 (17.5)	98 (47.3)	22 (10.6)		
Age groups					**0.856**	**0.736**
18-25	12 (6.1)	7 (3.5)	14 (7.0)	5 (2.5)		
26-30	41 (20.7)	15 (7.6)	41 (20.6)	15 (7.5)		
31-40	63 (31.8)	34 (17.2)	73 (36.7)	25 (12.6)		
41-50	16 (8.1)	7 (3.5)	20 (10.1)	3 (1.5)		
51-60	2 (1.0)	1 (0.5)	2 (1.0)	1 (0.5)		
Marital Status					**0.260**	**0.161**
Single	54 (26.5)	23 (11.3)	51 (24.9)	26 (12.7)		
Married	80 (39.2)	37 (18.1)	95 (46.3)	23 (11.2)		
Divorced	0 (0.0)	1 (0.5)	1 (0.5)	0 (0.0)		
Separated	2 (1.0)	0 (0.0)	2 (1.0)	0 (0.0)		
Other	3 (1.5)	4 (2.0)	6 (2.9)	1 (0.5)		
Education level					**0.737**	**0.188**
High School	6 (2.9)	1 (0.5)	7 (3.4)	0 (0.0)		
A-level	1 (0.5)	0 (0.0)	1 (0.5)	0 (0.0)		
College	65 (31.7)	29 (14.1)	71 (34.5)	23 (11.2)		
University	54 (26.3)	28 (13.7)	59 (28.6)	24 (11.7)		
Masters	12 (5.9)	8 (3.9)	17 (8.3)	3 (1.5)		
PhD	1 (0.5)	0 (0.0)	0 (0.0)	1 (0.5)		
Occupation					**0.863**	**1.000**
Sits for >80% of the day	108 (52.2)	52 (25.1)	122 (58.7)	39 (18.8)		
Sits for <80% of the day	33 (15.9)	14 (6.8)	35 (16.8)	12 (5.8)		

*** Significance level<0.05, NP- neck pain (n=141), LBP- low back pain (n=157)**

4.6.2 Associations of work-related factors with the 12 month prevalence low back pain and neck pain (n=208)

As illustrated in **Table 4.11** below, the chi-square test for independence (with Yates Continuity Correction) shows a statistical significant association at a 95% confidence interval between LBP and whether the office chair fully supports one's back, with a value of χ^2 (1, n=208) = 9.306, p = .002, phi = .224 (Pallant, 2011). The Pearson's chi-square test and the Yates continuity correction found no other statistically significant association between other work-related variables and LBP and neck pain **(p> 0.05).** However, 41.3% (85) and 43% (89) of those who received these instructions suffered from neck pain and low back pain respectively.

With regard to work psychosocial factors, as presented in **Table 4.12** below, the Pearson's chi-square test for independence showed a statistically significant association between low back pain and how often job worries got someone down physically, at a 95% confidence interval with a value of χ^2 (1, n=208) = 15.956, p = .003, Cramer's V = .278 (Pallant, 2011). The variable of how often problems associated with jobs keeps one awake at night was almost statistically significant with LBP at χ2 (1, n=208) =9.083, p=.059, Cramer's V = .209.

TABLE 4.11: Associations of work related factors to 12 month prevalence of low back pain and neck pain (n=208)

WORK-RELATED FACTORS	NP YES (%)	NO (%)	LBP YES (%)	NO (%)	SIGNIFICANCELEVEL p-neck	p-low back
Number of years worked					**.765**	**.525**
0-3years	35 (17.7)	14 (7.1)	34 (17.1)	15 (7.5)		
4-7 years	30 (15.2)	17 (8.6)	36 (18.1)	11 (5.5)		
8-11 years	26 (13.1)	15 (7.6)	34 (17.1)	8 (4.0)		
12- 15 years	21 (10.6)	10 (5.1)	21 (10.6)	10 (5.0)		
16-19 years	9 (4.5)	3 (1.5)	10 (5.0)	2 (1.0)		
20-23 years	5 (2.5)	4 (2.0)	9 (4.5)	0 (0.0)		
24-27 years	4 (2.0)	0 (0.0)	3 (1.5)	1 (0.5)		
28-31 years	4 (2.0)	1 (0.5)	4 (2.0)	1 (0.5)		
Number of hours worked					**.845**	**.572**
6<9 hours	78 (38.2)	39 (19.1)	87 (42.4)	31 (15.1)		
9>15 hours	60 (29.4)	27 (13.2)	68 (33.2)	19 (9.3)		
Number of years used computer					**.373**	**.531**
0-2 years	17 (8.5)	7 (3.5)	16 (7.9)	8 (4.0)		
3-5 years	39 (19.4)	14 (7.0)	40 (19.8)	13 (6.4)		
6-8 years	31 (15.4)	8 (4.0)	30 (14.9)	10 (5.0)		
9-11 years	22 (10.9)	19 (9.5)	33 (16.3)	8 (4.0)		
12-14 years	16 (8.0)	7 (3.5)	17 (8.4)	6 (3.0)		
15-17 years	8 (4.0)	5 (2.5)	10 (5.0)	3 (1.5)		
18-20 years	3 (1.5)	2(1.0)	5 (2.5)	0 (0.0)		
21-23 years	2 (1.0)	1 (0.5)	1 (0.5)	2 (1.0)		
Time spent on computer					**.805**	**.775**
< 30 minutes	4 (1.9)	1 (0.5)	3 (1.4)	2 (1.0)		
About 45 minutes	5 (2.4)	4 (1.9)	6 (2.9)	3 (1.4)		
1 hour	15 (7.2)	7 (3.4)	17 (8.2)	5 (2.4)		
≥ 2 hours	117 (56.5)	54 (26.1)	131 (63.0)	41 (19.7)		
Received sitting instructions					**.133**	**1.000**
	85 (41.3)	32 (15.5)	89 (43.0)	29 (14.0)		
Takes short breaks					**.459**	**.364**
	86 (42.6)	45 (22.3)	97 (47.8)	35 (17.2)		
Information for stretches on breaks					**.108**	**.789**
	46 (22.7)	13 (6.4)	43 (21.1)	16 (7.8)		
Office chair support					**.269**	**.002***
	66 (32.4)	37 (18.1)	68 (33.2)	35 (17.1)		
Job satisfaction					**.844**	**.257**
Never satisfied	6 (2.9)	4 (2.0)	8 (3.9)	2 (1.0)		
Sometimes at times	49 (24.0)	23 (11.3)	57 (27.8)	15 (7.3)		
Satisfied	61 (29.9)	26 (12.7)	65 (31.7)	22 (10.7)		
Often satisfied	19 (9.3)	7 (3.4)	20 (9.8)	7 (3.4)		
Very satisfied	5 (2.5)	4 (2.0)	4 (2.0)	5 (2.4)		

*** Significance level <0.05, NP-Neck pain (n=141), LBP-Low back pain (n=157)**

TABLE 4.12: Associations of psychosocial factors to 12 month prevalence of low back pain and neck pain (n=208)

PSYCHOSOCIAL FACTORS	NP		LBP		SIGNIFICANCE LEVEL	
	Yes (%)	No (%)	Yes (%)	No (%)	p-neck	p- low back
Job worries					**.579**	**.003***
Never	14 (6.8)	11 (5.4)	14 (6.8)	11 (5.5)		
Very occasionally	24 (11.7)	8 (3.9)	29 (14.1)	4 (1.9)		
Sometimes	77 (37.6)	37 (18.0)	80 (38.8)	34 (16.5)		
Often	22 (10.7)	8 (3.9)	28 (13.6)	2 (1.0)		
Always	3 (1.5)	1 (0.5)	4 (1.9)	0 (0.0)		
Problems associated with work					**.396**	**.059**
Never	45 (21.8)	26 (12.6)	45 (21.7)	26 (12.6)		
Very occasionally	39 (18.9)	19 (9.2)	48 (23.2)	11 (5.3)		
Sometimes	46 (22.3)	19 (9.2)	54 (26.1)	11 (5.3)		
Often	10 (4.9)	1 (0.5)	8 (3.9)	3 (1.4)		
Always	1 (0.5)	0 (0)	1 (0.5)	0 (0)		
Worry about decision making at work					**.103**	**.508**
Never	8 (3.9)	8 (3.9)	12 (5.8)	4 (1.9)		
Very occasionally	26 (12.7)	12 (5.9)	27 (13.1)	12 (5.8)		
Sometimes	76 (37.1)	40 (19.5)	86 (41.7)	30 (14.6)		
Often	23 (11.2)	3 (1.5)	23 (11.2)	3 (1.5)		
Always	6 (2.9)	3 (1.5)	7 (3.4)	2 (1)		
Relief at the end of work					**.609**	**.111**
Never	9 (4.4)	5 (2.4)	13 (6.3)	1 (0.5)		
Very occasionally	13 (6.3)	10 (4.9)	18 (8.7)	6 (2.9)		
Sometimes	52 (25.2)	19 (9.2)	52 (25.1)	19 (9.2)		
Often	37 (18.0)	19 (9.2)	37 (17.9)	19 (9.2)		
Always	30 (14.6)	12 (5.8)	36 (17.4)	6 (2.9)		

*** Significance level <0.05, NP-Neck pain (n=141), LBP-Low back pain (n=157)**

4.6.3 Association between individual related factors with the 12 month prevalence low back and neck pain (n=208)

One's health status and level of mental stress were the only individual related factors to low back and neck pain that showed significant associations. The Pearson's chi-square test for independence in **Table 4.13** below shows the statistically significant association between LBP and the current health status at a 95% confidence interval, with values of $\chi 2$ (1, n=208) = 12.326, p = .006, Cramer's V = .244 (Pallant, 2011). **Table 4.13** also shows the statistically significant association between LBP and one's mental stress level, according to the Pearson's chi-square test for independence at a 95% confidence interval with values of $\chi 2$ (1, n=208) = 11.574, p = .021, Cramer's V = .237 (Pallant, 2011).

Despite the fact that there was no statistically significant association between the BMI and LBP and neck pain, participants who were overweight (30.8%=52) recorded the greatest prevalence of LBP, in contrast to those of the normal weight (29.6%=50) who recorded the highest prevalence of neck pain. Increased neck pain (39.2%=80) and LBP (42.9%=88) prevalence were also observed in those who performed domestic duties for more than one hour on a daily basis.

TABLE 4.13: Association of individual related factors to 12 month prevalence of low back pain and neck pain (n=208)

INDIVIDUAL FACTORS	NP Yes (%)	No (%)	LBP Yes (%)	No (%)	SIGNIFICANCE LEVEL p-neck	p-low back
BMI					**.214**	**.719**
Underweight	9 (5.4)	2 (1.2)	7 (4.1)	4 (2.4)		
Normal	50 (29.6)	17 (10.1)	50 (29.6)	18 (10.7)		
Over weight	44 (26.0)	22 (13.1)	52 (30.8)	14 (8.3)		
Obesity	13 (7.7)	11 (6.5)	18 (10.7)	6 (3.6)		
Smoking status					**.620**	**.990**
Never	130 (63.4)	58 (28.3)	142 (68.9)	47 (22.8)		
Current	2 (1.0)	2 (1.0)	3 (1.5)	1 (0.5)		
Ex-smoker	8 (3.9)	5 (2.4)	10 (4.9)	3 (1.5)		
Health status					**.703**	**.006***
Poor	1 (0.5)	1 (0.5)	1 (0.5)	1 (0.5)		
Average	36 (17.5)	13 (6.3)	42 (20.3)	7 (3.4)		
Good	84 (40.8)	39 (18.9)	96 (46.4)	28 (13.5)		
Very good	20 (9.7)	12 (5.8)	17 (8.2)	15 (7.2)		
Mental stress level					**.142**	**.021***
None	11 (5.4)	9 (4.4)	10 (4.9)	10 (4.9)		
Little	64 (31.2)	24 (11.7)	63 (30.6)	25 (12.1)		
Some	37 (18.0)	25 (12.2)	53 (25.7)	10 (4.9)		
Fairly much	22 (10.7)	5 (2.4)	23 (11.2)	4 (1.9)		
Very much	6 (2.9)	2 (1.0)	6 (2.9)	2 (1.0)		
Hours on domestic activities					**.593**	**.482**
<1 hour	50 (24.5)	24 (11.8)	52 (25.4)	22 (10.7)		
>1 hour	80 (39.2)	33 (16.2)	88 (42.9)	25 (12.2)		
None	10 (4.9)	7 (3.4)	14 (6.8)	4 (2.0)		
Hours on hobbies					**.581**	**.502**
<1 hour	57 (28.1)	27 (13.3)	65 (31.9)	19 (9.3)		
>1 hour	52 (25.6)	26 (12.8)	55 (27.0)	23 (11.3)		
None	31 (15.3)	10 (4.9)	33 (16.2)	9 (4.4)		

*** Significance level <0.05, NP-Neck pain (n=141), LBP-Low back pain (n=157)**

SECTION B: QUALITATIVE RESULTS

4.7 DESCRIPTION OF FOCUS GROUP PARTICIPANTS

The researcher purposively selected 15 participants and grouped them into two focus groups of seven and eight respectively, subsequently interviewed on different days. However, only four participants showed up for both FGDs, of which 62.5% (5) were female and 37.5% (3) male. The mean age of the respondents was 37.5 years; while the mean number of years worked was 13 years. The prevalence of neck pain and low back pain amongst the FGD participants was 50% and 75% respectively. **Table 4.14** further demonstrates the demographic features of the focus group participants.

TABLE 4.14: Demographic features of focus group participants

Participants	Age	Gender	Marital status	Education level	Number of years worked	NP	LBP
G1-P1	52	Female	Married	University	30	Yes	Yes
G1-P3	37	Female	Married	College	17	Yes	Yes
G1-P4	38	Male	Married	Masters	10	No	Yes
G1-P6	42	Male	Married	University	20	Yes	No
G2-P1	36	Male	Married	University	8	Yes	Yes
G2-P2	35	Female	Married	University	9	No	Yes
G2-P3	32	Female	Single	College	7	No	No
G2-P4	28	Female	Married	Masters	4	No	Yes

G1- FGD 1, G2- FGD 2, NP- Neck pain, LBP-Low back pain

The focus group discussions sought to explore and describe the concepts that the participants valued from the ergonomics programme. Four themes and several subthemes emerged from the discussions, as stated in **Table 4.15** below.

TABLE 4.15: Emerging themes and subthemes

THEME	SUBTHEMES
EXPERIENCES OF ADMINISTRATORS WITH REGARD TO THE KNOWLEDGE-BASED ERGONOMICS PROGRAMME	- Mode of providing information - Value of information - Impact of information
KNOWLEDGE OF PARTICIPANTS WITH REGARD TO ERGONOMIC RELATED LOW BACK PAIN AND NECK PAIN	- Behaviour - Attitude
CHALLENGES FACED BY PARTICIPANTS IN IMPLEMENTING ERGONOMIC FACTORS	- Personal - Environmental - Physical - Overcoming challenges
RECOMMENDATION MADE TOWARDS ERGONOMIC INTERVENTION	- Health promotion/Public awareness - Policy enforcement

4.8 EXPERIENCES OF ADMINISTRATORS WITH REGARD TO THE KNOWLEDGE-BASED ERGONOMIC PROGRAMME

The question of "*how did the intervention impact on your day-to-day life and what the participants were doing differently than before?*" saw different responses that could best be categorized in three subthemes. This is because the participants' experiences on the ergonomic intervention were based on the mode of information provided to them, the value of this information given and finally the impact of the information in their day to day lives.

4.8.1 Mode of providing information

At the time of this study, some participants had previously received information related to ergonomics in the form of an e-mail communication. They reported that intervention-based information was the better option, as it facilitated their memory and also gave them an opportunity to interact with the facilitators and get first-hand information on their questions. Participant ***G1-P6*** expressed that:

"*Yeah, so although we've received information related to ergonomic before, previously, I think from HR and Occupational health coordinator, we've always had that information sent in the form of a mail and at times staff will not have time to read the mail or all e-mails…But in this case, we had an opportunity of interacting with a facilitator and they had first-hand information, they were able to, ummm, fill questions and they got the answers. At times we even went ahead and did a kind of a demo. Actually it was a live interaction…"*

Other participants stated:

"*I think when they send the information, personally with the kind of workload I have … I'll delete, it doesn't have weight, because by the time you begin to go through until you finish, but if you give people a session like a talk, it's more effective…"* ***(G2-P4)***

"… I always remember and you know maybe to you, you thought you are doing your study, but am telling you, you've educated many..." ***(G2-P2)***

4.8.2 Value of information

The participants were very happy with the intervention provided and regarded it as an eye opener. Some participants confessed that in-as-much as it was not their first encounter with ergonomic information, this knowledge was on a low value and was not being put to practice. The quotes below highlight some of their sentiments with regards to the ergonomic intervention that was administered.

"... that was a good reminder that one needs to take care." ***(G1-P1)***

"... I got an insight after your presentation and I think am looking at things differently, a lot differently now." ***(G1-P3)***

"... So technique it's something which I'd say the learning process is still on, it's still on-going, but it's good information that we were given. Yeah ..." ***(G2-P1)***

4.8.3 Impact of information

On further probing the impact of the information on their lives at work and home, participants expressed a better understanding of how their day-to-day actions influenced the pains they had in their bodies. This understanding had even enhanced better working relations between the employees, and the employers as well, as everyone now understood the relevance of proper seat adjustments, taking breaks in between work and also doing exercises.

"I think, uumm, on behalf of Telecommunications Department; the intervention was of help, considering that at times the operators do their work when they are sitted. At times they do long hours, considering we have even like the 8 am-8 pm shifts, and I think they already started putting in practice what they learnt and heard actually that day… it was really, aah, helpful to the department." ***(G1-P6)***

Another participant (***G1-P4)*** also referred to the intervention, stating that:

"Now, on my part, I think I just (related)? With the whole research when I just realized that what was really ailing me is something that I would have controlled. After the discussion that we had with you in the Department of Finance and Audit, so I just came to realize that there is a lot that most of us could prevent by just doing some simple exercises and, ummm, not keeping some positions which would really compromise our health. So it was big eye-opener which I may have assumed in the past."

Participant ***G2-P2*** reflected on this, commenting: *"I always walk out, I remember and it's very important. I'm sure this has also impacted on so many people… you know, it's gonna help people. It's gonna bring change."*

4.9 KNOWLEDGE OF PARTICIPANTS WITH REGARD TO ERGONOMIC-RELATED LOW BACK PAIN AND NECK PAIN

As participants responded to the question of "*what changes have you made in your lifestyle after the intervention*?" it was obvious from their sentiments that these changes were driven by their underlying knowledge. There was evidence of previous ergonomic knowledge in some study participants. With knowledge being a key focus in this study, their displayed behaviours and attitudes emerged as subthemes and were categorized into prior and post keep knowledge-based ergonomic intervention as presented in **Table 4.16** below.

TABLE 4.16: Knowledge of participants before and after ergonomic intervention

Subthemes	Prior to Intervention	Post Intervention
	The below excerpts portray some previous ergonomics knowledge of some study participants before the study intervention. *" ... remembering from college we are taught, because nursing there is a lot of lifting, a lot of walking up and down, and those ergometrics [/ergonomics/]... a number of things were not new, but I think the practicality of doing it or reminding yourself that I need to do, that is the issue" (**G1-P1**)* *"... in computing, aahh, there is also a session of ergonomics yeah, it's actually taught also in computing, because they are seeing people sit for long working with computer..."(**G1-P6**)*	Several sentiments that emerged from the participants with regard to their lifestyle changes after the intervention are described in the subthemes of behaviour and attitude below.
4.9.1 Behaviour	Working posture and taking breaks were some of the behaviours mentioned by participants who had prior knowledge and those who did not. Either pain or improper seats prompted a change of position. *"... I would even sit for long like this, (He demonstrates a*	Most participants reported at least one behavioural change following the knowledge gained from the ergonomics intervention. They admitted having taken some postures for granted previously and also not knowing the impact of their behaviours on their bodies. Many expressed satisfaction about the newly tried adjustments and

	slouching posture). So when I actually started having a back ache, I didn't need to…, but I just remembered and started like now taking it's some time back like five, six years ago, but that problem ended on its own. But now of late, I had another problem. I placed the, my monitor on top of the, of the CPU and it was a bit…, so my posture was like this (he poses with neck in an extended posture) now I developed this … I couldn't even bend like (he demonstrates neck flexion) just now I realized this is now another problem that's coming up. I just kind..aahh, I moved my monitor and after one week again the problem was gone…" ***(G1-P6)*** Participant ***G1-P3***added by saying: "*Actually, after sitting for a while, you'll always find me in the corridors and my boss wonders 'what are you always doing on the corridors?' because I always take the breaks. That has been happening even before your talk; you'd find me in the corridors"* Another participant in the second FGD added: "*… from when we started this study, we noted we have quite a*	reported that the intervention had not been in vain. Different behaviours during both weekdays and weekends were expressed in the below excerpts. *"Basically, I can just start by giving an example. Over the weekend, at times when…when I'm home, I like doing activities, yeah. Like for instance, maybe I have a small garden, I have grass I would cut, I have trees, I would cut branches, like sometimes I have my car, I'd want to wash it, you know, it's just activity yeah, so on Sunday I fetched water and as I was going to the garage then I remembered that you said, actually its…[ ](laughter in the background) water in the bucket, so I always carry one, but that day I fetched two buckets and I was [cross-talk]am telling you I found its sure rather than struggling like this…(he demonstrates leaning to one side like when than struggling like this…(he demonstrates leaning to one side like when you carry something heavy) I was able to balance very well."* *you carry something heavy) I was able to balance very well. So I thought also…so when we say what we do out there really I can't just say that the intervention did just go down and it passed, yeah…"*

	*number of things which we are just either avoiding, or either misinformed. Especially if you work with a computer… we've been working with a computer, but we've not been like let's say after working two hours, you stand, you stretch, you can even work for four hours like in the afternoon but when you go home you start realizing, I have been working with a computer, now I have neck pains, aahh, it has happened. Then also as a nurse when it comes to lifting, the way we've been lifting we have also noted that some of our colleagues that they had back problems…" (**G2-P1)***	*than struggling like this…(he demonstrates leaning to one side like when you carry something heavy) I was able to balance very well. So I thought also…so when we say what we do out there really I can't just say the intervention did just go down and it passed…" **(G1-P6)*** Another female participant added: *"I think, uhh, what I've done is, after your talk, I carry… I have in my bag a pair of shoes ….(chuckles)… normally when I get to that stage and I see…I simply put on my shoes and I start, and I think it does help you walk. You know, 30 minutes, 45 minutes, you're already in … and you saved and you've done some kind of exercise. And I have two bags so I make sure one is on this side and… (chuckles) yeah, because I normally carry two bags, so I always make sure that I don't carry them on one side. And I try to balance them, change them so that at least if one was heavier than the other I'll still…" (**G1-P3)*** Having understood the effects of poor posture, participant ***G2-P3*** had not only adjusted her office sitting posture but explained that she

		did this even at home: *"Ok, for sure I have adjusted my posture; yeah (phone rings)… so that made me (phone network interfering with the recording) cautious of how I sit, even at home when you are on the sofa, watching the TV, you have a tendency of slouching and just sitting lazily on the …on the couch, but to be more cautious, because it has you know in the long term you will see the effects of, you know of being lazy without …. Yeah"*
4.9.2 Attitude	Ignorance was among the attitudes that emerged during the focus group discussions. One could not fail to pick out the participants' underlying carefree attitude. The excerpts below represent their sentiments. *"I would also add that I think sometimes we take so much for granted. You know like those positions where you are saying if you move like this, it's not, if we do these things you feel something, and you just ignore it not knowing…" **(G1-P3)*** *"It's true; you know most often a lot, you know, when we sit, it's not at times you don't engage your minds when you are sitting.*	Participants seemed to have a positive attitude to work and to exercises. They understood that engaging in exercises not simply entailed joining a gym or sports club, but that exercises could be done even within the comfort and confines of their offices. The below quotes portray some of the participants' attitudes after the intervention: *"… And also it has …uumm… really also changed the way they approach work. At times, one would sit and sit and this, it may be a health hazard, but right now you find…or even for the supervisors sees an employee maybe stand up, move out at times, one may*

	*You just come, there's a seat, you sit …" (**G1-P1**)* *"…because for me I never used to care how I sit." **(G2-P2)***	*wonder this employee is just deserting the station." (**G1-P6**)* *"…but I have to take those breaks and at least am glad now that there were those exercises, OK you … somebody may pass there and wonder what is she doing, she must be crazy, but that's OK (people chuckling), it makes me relieve my pain ." (**G1-P3**)* Some other participants, however, confessed to not having been able to effect some of the adjustments with regard to personal exercises. *"We have a plan to be walking to town from here (everyone breaks into laughter)…you know, because we want to lose our tummy and the excess fats that we have and to kip fit." (**G2-P3**)*

4.10 CHALLENGES FACED BY PARTICIPANTS IN IMPLEMENTING ERGONOMIC FACTORS

The challenges that the participants reported to have been facing in adhering to correct ergonomic conditions were classified into four categories. Three of those categories focus on the individual, environmental and physical ergonomic factors surrounding them, while the last category focuses on several attempts made by the participants to overcome all the above challenges.

4.10.1 Individual factors

The participants reported several individual aspects that contributed to the challenges experienced in adhering to ergonomic factors. These varied from behaviour with regard to their commitment to ergonomic factors, both at work and in the home, such as a correct sitting posture; how they juggle work and home duties, experiencing fatigue and time constraints, as well as their financial ability to acquire proper furniture e.g. seats in the home and proper beds. Other participants reported insufficient knowledge and skills to put up with the required physical activity exercise and practices, and in some instances, were due to financial constraints, not able to obtain proper advice from the relevant health professionals or professional gym instructors. Some participants expressed their frustration at experiencing pain while exercising and not knowing how to deal with the situation. Participant ***G1-P4,*** commenting on the value of upright sitting posture, said that,

"It's not very interesting, I was used to a very comfortable posture of lying and sitting and watching anything I want on the Telly. But now I'm forcing myself, of course I realize in that

eehh… it's a matter of my health. And am forced to really try and discipline myself, but it's not that easy. Yes."

The excerpts below represent the participants' sentiments regarding their personal challenges:

"*What I've been doing is, I think mine has just been consistency. Normally, I have the habit. Time has been a constraint, but what I do is, especially over the weekends, I will walk… about 45 minutes' walk and then come back. When I can't do that like during weekdays, at least every alternate day I will do my exercises just at home…"* ***(G1-P1)***

"… when I do those walks, am telling you by evening I can't even walk, am limping, and am like 'my God did I…. did I go for this?' I thought am trying to exercise, but so, is there a limit of how much we can do? … Why should it affect me so that am not able to do the other exercises?" ***(G1-P1)***

4.10.2 Environmental factors

With regard to environmental challenges, they varied from those that prevented the participants' adherence, both during the weekdays and over the weekends. These factors were present both in the work environment and at the participants' homes. Two participants who worked in the same department recounted how their workload would at times prevent them from taking a break at work. These participants further revealed that apart from workload, the weather was also a deciding factor as to whether they would leave the comfort of their work area.

G2-P3: *"… and the workload sometimes you just get soooo busy, by the way like yesterday we were saying Oh, it's 2 O'clock!"*

G2-P4: *"… and of course we sat from 8 so…we had not had a break."*

G2-P3: *"… yes we had not had a break. Mmhhh, that's a challenge."*

Most participants worked throughout the week; a few would have the privilege of getting an entire weekend off. Due to their time constraints, participant ***G1-P6*** felt that participating in some health activities like walking though beneficial, was a time waster, while the weather would at times not allow them to engage in exercise activities.

"You know the other thing, uumm… I tend like … you find like you are wasting time, yeah. You see like, maybe you have a car you are coming from the, from home, maybe to the shopping centre, you find like you're taking time to reach there and back, so one thing, you find that you are wasting that time, maybe if you could do something during that time, yeah, at other times, maybe you find like it's not very convenient, yeah. You are walking, you know, those are maybe the times when the sun is high, it's very hot, so those are things that coz maybe, you come out of the house and at times again you find that it's very hot, then you find like you are going to walk, at times you feel like you are wasting time…" ***(G1-P6)***

The participants in the second focus group discussion added that at times they were not in control of some situations. For instance, they would go for shopping and the workers in the supermarkets would not pack the items bought in an ergonomic friendly manner. This, as participants described, was due to lack of knowledge among the supermarket workers, thus subjecting the public to the possibility of strain by carrying the heavy luggage.

G2-P3: *"I'd blame the supermarkets on this, such that they give you one heavy one …"*

G2-P1: *"… yeah, one heavy one"*

G2-P3: *"… and you just can't start telling them noo… my back muscle or my neck, you can't start telling them such things."*

4.10.3 Physical factors

The physical factor that emerged as a key challenge to the participants in both FGDs was the lack of proper adjustable chairs in some offices and this, given the nature of their work involving prolonged sitting, hampered safe ergonomic practices. During the discussions, participant ***G2-P2*** reiterated the need for the Occupational Health and Safety team to ensure that employees had proper adjustable seats.

"… please remind them about the seats. We really need to save to change some seats… eehh especially these guys who are using computers. Yeah, some of the seats are not so good and you can't lie like this every… (demonstrating a slouch/lean back position), you are always like this so ***unajiumiza mgongo*** *(you hurt your back). You know, I don't know, so you do recommendations."*

Other participants added that, apart from the discomfort caused by these chairs, they had also developed backaches:

G2-P1: *"I'd say the seats, there are some seats, whenever you sit, you'll feel like my back is either aching after some time."*

G2-P4: *"(in the background)… or they are not comfortable at all."*

G2-P1*:"…or they are not comfortable at all."*

4.10.4 Overcoming challenges

During the focus group discussions, participants drew from the knowledge gained during the ergonomics-based interventions as well as the question answer discussions held at the end of

every intervention session. This was seen in how they eagerly responded to some of the challenges faced by their colleagues with regard to exercises. The quotes below show how participants ***G1-P6*** and ***G1-P3*** tried to advise one of their peers ***(G1-P1)*** on the value of various exercises, and portraying an understanding of the fact that some of the pain could possibly be the result of the body trying to adapt.

" *'I think, umm, even before the expert answers, yeah… you see walking is just, aahh… maybe one exercise affecting one part of the body, but in the long run you need to carry out all exercises that will be like now having effect on the whole body. Because you just take walks, you take walking as health exercise, truly, maybe now any other parts of the body aren't getting equal exercises again ... You know you should do many exercises that complement each other.' (**G1-P6**)*

*'My take on this is, since your body is not used, you see something I would believe you have just started doing, your body is not used to. You are still trying to get yourself, it's not your routine so those effects are … there's no way you can avoid it. You are likely to have that effect, because … so maybe and, uhh… like when I say you walk to town, you know, it's not easy if you are used to taking **matatus** (taxis) out here. It's not easy, so the first day you would of course feel my joints, but as you continue doing this, am sure your body is going to get used to.' (**G1-P3**)*

*'I agree the mixing, the mixing of walks and all other exercises. As I said earlier, I gave an allowance of that because I know that affects you. At least until when the body gets used. But now it's not like I've not been doing it. I have been doing it for months now, but every time there is an effect…' (**G1-P1**)***"**

Besides the knowledge gained from the intervention, other participants drew from their own personal experiences as they advised their fellow colleagues on how to overcome some of these ergonomic based challenges with regard to lack of break at work.

***G2-P2**: (clearing the throat) "Yeah, I agree with you guys, sometimes, there is so much work, there is so much to do, and you just remember when you're about to go home. But let me tell you, (clearing the throat again) like today I had so much work since two... I mean eight. Like i've told you I didn't even read your mail, so I just felt I was too pressured to relieve myself, and when I was… I was recently employed. When I came for my examination, I had an infection, **why**??? because I do keep a lot of urine. I didn't know, I used to feel like, aahh ……but am like another 5 minutes…I didn't know it was so bad and I wasn't even feeling any problem, cause I was just OK, I was not sick, I wasn't. So nowadays what I do, I LOVE ME … (all giggling) I LOVE ME… I realize there is work. Like today, I had so much work, but I was like you know let me just wait I'll go after one minute let me finish… I remembered 'WHAT!!! An infection? No' … so that is what I do, despite the work, despite what….(Participants 'umming' in agreement) just loving you and walking out as you go to relieve yourself, that's uumm… a break, uhh… You just try and do your eyes and wherever, it doesn't matter what people think, but me, what people …[Crosstalk] oh, I'm exercising… so I think that's it. For me, I'm not finding it as a chhhaalleenge…'*

***G2-P3**: "So we should drink lots of water? So we are forced to get out."*

***G2-P1**: "Yeah, yeah, yeah"*

***G2-P2**: "Yes I think that's a suggestion, then you'll remember you don't want to get sick, so you'll go to relieve yourself."*

4.11 RECOMMENDATION MADE TOWARDS ERGONOMIC INTERVENTION

On responding to the question "If they would confidently recommend the education based ergonomic programme to others and their recommendation reasons?" The focus group participants mainly highlighted the need for more public awareness of the programme, so as to educate the wider population about ergonomics. In addition, they added that there needs to be policy regulations over matters related to the public's health. Their responses were therefore categorised under two broad subthemes of Health promotion and Policy enforcement.

4.11.1 Health promotion

Under this emerging theme, the participants' responses gave rise to several subcategories as they reiterated the need to reach out to other **office and non-office staff,** as they were all exposed to these ergonomic hazards. As this research highlighted the needs in occupational areas, some participants proposed that reviewing the statistics of the WRMDs in the institution would help in evaluating the magnitude of the problem, thus enabling proper measures to help in controlling these disorders. They further stated that the government and relevant physiotherapy bodies needed to be seen as proactive so that there is equity of health information given to the public. This is because there is decreased public knowledge of the role of physiotherapy, unlike other health disciplines, whose roles are clearly highlighted in health campaigns e.g. in Cancer and Heart Awareness Days. The quote by participant ***G1-P4*** below reflects on some of the comments shared:

"I was actually shocked by the figures of the … that she gave, she was doing a presentation that… uhh… over 70% people are suffering with this kind of ailments and that was just a quick

snapshot of what she did here and she quoted some figures of 90% of some other scholars who had done the same elsewhere. Now I saw this, eehh… as just an indication of the problems that we have not only in the institution here, but captured at large and, aahh … at some point in time I was even mentioning that this are some of these things to be stretched even further than just only the research area, because we don't see the country taking anything in terms of, eehh … like we have cancer days and all these things. We are not hearing any serious campaigns from the government, yet most of the population that we have in settings are all in offices most of them and you can be sure that this kind of problems is common and affects them."

Lack of knowledge and skills with regard to exercising and even the proper kind of diet was definitely identified as hampering good behavioural practice and the musculoskeletal problems people experienced. As participant ***G2-P3*** stated:

"*…Uumm, personally, I thought that I was knowledgeable, but I wasn't after the intervention. I think I really don't know when I do this, it strains this number of muscles, or it has effects to these numbers of muscles, besides just your back. So I think we are not knowledgeable about it. We may think we are, that is the perception I think, but that is not something we talk about a lot. Yeah, we just talk about exercising. But you know the way we are told, like you always need to see an instr … a doctor or a physio before we go to the gym and we never do that, cause we base all our faith and trust on an instructor. So… I think we are not knowledgeable coz you know sometimes even those instructors are quarks. You know they may have learnt on the job, they don't really understand this does this and you know… so yeah, I don't think we are and we assume we do."*

In addition, **cultural practices,** as stated by some participants, were also observed to contribute to these problems.

*" Just to add again, you'll notice like even in our homes, if somebody finds that I have put a trough… a basin up there and am washing, they say 'How are you washing your clothes?', 'Why are you standing?' You are so lazy… you should bend, and that is not good. You see… so it is something we just, let's say it is contagious. We are just passing it on unconsciously, not knowing how much harm we are causing, because now we don't want to be seen as the lazy one you believe you have to … to bend." **(G1-P3)***

Another participant added this statement with regard to **expenditure,** based on ergonomic hazards:

*"You find people are having pillows they are having… and really it's just a lot of ergonomics. So other than just leaving or sending those brochures, then there should be like the way like you came to the Department. There should be that kind of intervention at the H.R. and it will save them a lot of money in terms of meeting the… the cost." **(G1-P6)***

4.11.2 Policy enforcement

Several avenues emerged from the focus group discussions when it comes to approaching ergonomic hazards in occupational places. The institution in which the research was conducted, has been accredited by the Joint Commission International Accreditation (JCIA) and as part of the accreditations; the institution was required to have an Occupational Health and Safety Board. The need for this Board to be proactive was reiterated during the focus discussions as part of curbing ergonomic hazards and cut on costs of treating ergonomic related conditions. One of the

focus groups was privileged to have a member of this Board as a participant, hence the hope that the participants' concerns would be addressed as shown in the below excerpts:

G2-P2: *"Question? You are in that committee, Health and Safety Committee?"*

G2-P1: "*Mmhhh…"*

G2-P2: *"Do you, like, train people; do you give pamphlets or something? How do you help guys?"*

G2-P1: *"Very good question! (some chuckles)… that committee was put up last year, late last year. So just hold your horses everything is in progress. We'll create an awareness soon…"*

G2-P2: *"You can actually be teaching us on that and just giving us information."*

Another participant added the following comment:

*"So I can just say … uumm… even like for the… uhh… like the occupation health coordinator, yeah, because I think that's a position within HR, yeah? I think it will be important like if they would… do even like… follow ups within departments because I think like you are saying at times you find… uumm… a lot of … a lot of money… is going to treating ergonomic related problems."****(G1-P6)***

In addition to the policy enforcement, participant ***G1-P4*** highlighted the need of the Kenya Bureau of Standards, in association with the Physiotherapist's Board in the country, to oversee the regulation of properly manufactured seats designed for office use so as to prevent the grave effects of the WRMDs.

"Aahh… a quick one I have just remembered and maybe just wondering, we talk so much of this influence of sitting posture, I'm taking this passionately because I know it's the one that destabilised me …(people laughing) now… is just that now we have a whole board in the country

called KEBS (Kenya Bureau of Standards) it looks at the standards of seats, now if the physiotherapists are not out to help us on this, we are getting seats from ***jua kali*** *(local technicians) they don't know what and how they should be. So no one is really regulating such kinds of standards to ensure that they are being adhered, to so they are really contributing to a lot of things. So I think that probably from the study survey, it needs to be looked at in terms of enhancing the standards of the seats that are used in the country."*

4.12 SUMMARY OF CHAPTER

The aim of the current study was to determine and describe the effect of a knowledge-based ergonomic intervention among administrators in Aga Khan University Hospital, Nairobi, regarding ergonomics related low back pain and neck pain and the prevention strategies. The results therefore indicated that the majority of the administrators were knowledgeable about ergonomic related LBP and neck pain, but had moderate behavioral practice thus their prevention skills were minimal. Low back pain and neck pain were the most prevalent WRMDs. The results of two focus group discussions presented in four themes showed that participants valued the live ergonomic intervention, since they lacked knowledge in specific preventive skills of LBP and neck pain. Continual ergonomic education, as the participants recommended, would help in adherence of preventive behaviours. These findings will therefore be further discussed in Chapter Five.

CHAPTER FIVE

DISCUSSION

5.0 INTRODUCTION

The aim of this current study was to determine the effect of a knowledge-based ergonomics intervention among administrators at the Aga Khan University Hospital, Nairobi regarding ergonomics related low back pain and neck pain, and appropriate prevention strategies. This chapter will further discuss both the quantitative and qualitative findings of the study in relation to the relevant literature.

5.1 PREVALENCE OF LOW BACK PAIN AND NECK PAIN

According to the Nordic Musculoskeletal Questionnaire (De Barros & Alexandre, 2003), which was used in this survey, the twelve month prevalence of LBP and neck pain was 75.5% and 67.8% respectively. These results show that low back pain was the highest symptomatic WRMDs, followed by neck pain, which agreed with other studies (Collins *et al*., 2011; Widarnako *et al*., 2011). The above prevalence of LBP in the administrators of AKUH, N is consistent with the findings of a study conducted amongst sedentary office workers in Nairobi, Kenya who had a twelve month's prevalence of LBP of 76.53% (Mukandoli, 2004). A study done among New Zealand employees ranging from light to heavy physical workload, showed a prevalence of LBP at 54% whereas that for neck pain was 43% (Widanarko *et al*., 2011). Neck pain prevalence was 63% in a study conducted in Finland's office environment (Sillanpaa *et al*., 2003), whereas another study on university administrative workers in South Africa showed a prevalence of work-related neck pain at 71.9% (Panwalkar, 2008). In as much as the findings in

this study is consistent with literature in saying that LBP and neck pain are prevalent WRMDs, there is some discrepancy in the twelve months prevalence findings between the developed and the developing countries. This discrepancy can be as a result of difference in settings, or inferred to mean that in a span of almost ten years, the developed countries have somehow succesfully managed to decrease their prevalence rates. Additional findings of this research showed that trouble in the hips (30.2%), knees (28.4%) and low back (27.4%) respectively, prevented the study participants from carrying out activities in the past 12 months. Pain in the hips and knees have been linked as radiating pain from the lower back (Petty, 2011; Magee, 2006). Further research is therefore recommended in this setting to deteremine if these findings are independent or in relation to LBP.

5.1.1 Prevalence of LBP and neck pain as it relates to gender

Females constituted the majority of this study's participants (58.5%), as well as the most affected with the 12 month's prevalence of LBP being 47.3% and 28% among female and male respondents respectively. These results further show a statistically significant association between LBP and gender. Gender separation sees a difference of work distribution between the males and females, with females considered to be more exposed to potential LBP and neck pain, as they tend to be mostly involved in light oriented duties requiring sitting, unlike the males who are mostly involved in heavy physical duty (Widanarko *et al.*, 2011; 2012). In a study by Mukandoli (2004) among sedentary office workers in Nairobi, Kenya, he found that women still had a higher prevalence of LBP (54.7%) in comparison to males (45.3%). Greek public office workers showed a higher lifetime and point prevalence of LBP in women, whereas in the 12 month's and two year's LBP prevalence, men contrastingly took the lead (Spyropoulos *et al.*, 2007). A review by Widanarko *et al.* (2011) showed a higher 12 month's prevalence of LBP in

males (56%) than females (51%), and these differences with this study could mostly be due to variation in the study population, methodology and settings.

The 12 month's prevalence of neck pain in this study was 40.8% for females and 27.2% for males respectively. Females reported more neck pain symptoms (59.2%) to men (54.7%) in a one year's study of computer workers in Sri Lanka (Ranasinghe *et al*., 2011). A study by Widanarko *et al*. (2011) showed that females had a higher 12 month prevalence of neck pain than their male counterparts, and this was mostly seen in administrative, legislative and professional jobs, whereas the male were also seen to be equally more affected in jobs requiring more physical effort. A high prevalence of work-related neck pain (70.3%) was also established among female university administrative workers in South Africa (Panwalkar, 2008). Female respondents were therefore seen as most commonly affected by any musculoskeletal pain which is consistent with this study's findings (Widarnako *et al*., 2011; Fillingim *et al*., 2009).

Hormonal changes (luteal and follicular phases) in the females have been seen to influence pain by increasing their perception and sensitivity (Aloisi & Bonifazi, 2006; Fillingim & Ness, 2000). In addition, societal expectations regarding gender roles are that men should have greater tolerance to pain, as confirmed by studies among female and male respondents, in which males showed increased pain tolerance in the presence of the opposite gender, but not in the presence of members of the same gender (Fillingim *et al*., 2009; Fillingim & Ness, 2000). Robinson *et al*. (2001) describe the words sex and gender in relation to biological distinction and social roles respectively. The gender-role expectation of pain (GREP) instrument has established that it is more socially acceptable for women to openly express and report pain (Fillingim *et al*., 2009; Wise, Price, Myers, Heft & Robinson, 2002; Robinson *et al*., 2001). Women have also been noted to have a smaller body size and lower physical capacity than men especially when it comes

to shoulder muscle strength, in addition, women have also been seen to perform tasks differently from men, even the same duties, in the sense that they work with a higher musculoskeletal load such as applying higher forces when using the mouse (Yang & Cho, 2012; Hush *et al*., 2009; McLennan, Groeller, Smith & Taylor, 2008; Korhonen *et al*., 2003; Sillanpaa *et al*., 2003). These findings call for further research to be conducted in this setting, in order to determine if there will be similar findings with regard to the reason for increased prevalence of WRMDs in the female gender.

5.1.2 Prevalence of LBP and neck pain as it relates to age

No statistically significant association was established between LBP and neck pain and age in this study. These findings compare to those in a study of the prevalence of musculoskeletal symptoms in relation to gender, age and occupational/industrial group (Widanarko *et al*., 2011). There are conflicting conclusions as to whether musculoskeletal symptoms are more prevalent in the older or younger population (Ibrahim *et al*., 2012; Hoy *et al*., 2010b; Green, 2008; Hogg-Johnson *et al*., 2008; Janwantanakul *et al*., 2008; Panwalkar, 2008). However in this study, a higher prevalence of LBP (73=36.7%) and neck pain (63=31.8%) was seen in the age groups of 31 - 40 years, followed by the 26 - 30 years age group (41=20.6% and 41=20.7% respectively). LBP was most prevalent in the age group of 30 – 39 years (82=82.83%) in the study by Mukandoli (2004) which is similar to this study's findings. A study on the effect of work with video display units on musculoskeletal disorders in the office environment showed a high prevalence of neck pain (64.4%) in those younger than 35 years (Sillanpaa *et al*., 2003), whereas another study showed a double likelihood of neck pain in employees above 30 years (Green, 2008). In the review by Hogg-Johnson *et al*. (2008), most studies showed an increased

prevalence of neck pain with an increase in age especially in middle-ages, and a dropping prevalence in the later years. The conclusive findings of this study can be possibly related to the contention of Janwantanakul *et al.* (2008) that the younger age group has not yet developed strategies of coping with work. Furthermore, in this study, the age group of 31- 40 years worked for longer hours (40%) than employees in the 41 - 50 years' age group (39%). Despite the small difference in the working hours, this can be regarded as an overexposure of the younger age group to computer use and the related hazards (Lühmann *et al*., 2006; Omokhodion & Sanya, 2003). In addition, the underrepresentation of the older age group in this study could also have affected these results, hence need for this consideration in future research.

5.1.3 Prevalence of LBP and neck pain as it relates to marital status

No statistically significant association was established between marital status and LBP and neck pain. However, those who were married, presented with an increased prevalence of both LBP and neck pain, at 46.3% and 39.2% respectively. Cagnie *et al.* (2007) have established no statistically significant association between marital status and neck pain. Yang and Cho (2012) and Côté *et al*. (2008a) have established increased musculoskeletal pain in those who were married, which they related to their increased domestic roles besides their work related duties. In this study, majority of the participants (55.1%) who spent more than one hour in domestic activities reported the highest prevalence of LBP (80=39.2%) and neck pain (88=42.9%). There are therefore some similarities from the findings of this study in relation to other studies, despite the differences in methodology.

5.1.4 Prevalence of LBP and neck pain as it relates to educational level

Educational level showed no statistically significant association with regard to neck pain and LBP in this study. College and University levels were the categories most affected with LBP prevalence, at 34.5% and 28.6% respectively, whereas neck pain prevalence was 31.7% and 26.3% respectively. Literature shows that higher education levels translate in high posts, meaning increased administrative responsibilities (Widanarko *et al.*, 2011; Omokhodion & Sanya, 2003). However, the findings in this study are contrary, which can be attributed to a lack of significantly increased educational levels in the current research setting. Tertiary education, at the level of PHD (0.5%) and Masters (9.7%) degree, was not very common; senior job responsibilities were also carried by those who had College (45.6%) and University (40.3%) levels of education. There are conflicting results in literature with regard to the association of both LBP and neck pain with education. Two studies showed no association between neck pain and lower education levels (Green, 2008; Cagnie *et al.*, 2007), whereas some studies showed increased prevalence of neck pain in those with low education level (Hogg-Johnson *et al*., 2008), and another study also found an association between LBP and low educational level status (Hoy *et al.*, 2010). Further research is therefore needed to investigate this association.

5.1.5 Prevalence of LBP and neck pain as it relates to occupation level

The occupation of the study participants was mostly sedentary, as 77.4% of the administrators sat for more than eighty percent of the day, and only 22.6% were seen to be breaking this monotonous cycle of sitting. According to Green (2008), office work has replaced a lot of work that involved movements; most work currently confines one to computer use, e.g. patient services and finance departments. Of those respondents who sat for less than 80% of their working time, their computer use was interspersed with other job activities e.g. looking for

patients' files in the cabinets (medical records clerks) and delivering them to various departments, others received stock orders and arranged them for supply to various departments; while some attended to the delivery of the items (stock and inventory controllers, as well as unit coordinators). The nature of their work was considered to have twisting and bending involved, besides sitting for computer use. No statistically significant associations were found between these work factors in respect of either neck pain or LBP. However, those who sat for more than 80% of their working time had the highest prevalence of both neck pain and LBP at 52.2% and 58.7% respectively.

Neck symptoms have been seen to be more prevalent in light physical work, e.g. computer use, where one is expected to sit for prolonged periods of time and uses one's hands more (Côté *et al*., 2008a). Sedentary and awkward postures are common with light physical workload and according to Ariëns *et al*. (2001); those who sat for 95% of their working time had twice the risk of developing neck pain than those who did not work in a sitting position. Static load produced symptoms mostly in respect of neck pain (Cagnie *et al*., 2007; Ariëns *et al*., 2001). However, in a systematic review of the causal assessment of awkward occupational postures and LBP, no significant relationship was established between awkward postures and LBP, while two studies indicated that some causal relationship had very a weak association (Roffey, Wai, Bishop, Kwon & Dagenais, 2010). Other studies conducted, have established that sitting in itself was not a causative factor in respect of LBP, but rather had to have a combination of other spinal forces like akward posture, as well as whole body vibration; and the dose of exposure to these factors added to the risk of having LBP (Claus *et al*., 2008; Maria Lis *et al*., 2007). These findings in relation to this study confirm the multifactorial aetiology of LBP and neck pain.

5.2 RISK FACTORS FOR LOW BACK PAIN AND NECK PAIN

The risk factors for LBP and neck pain will be examined as those relating to work factors and those that were individually instigated. Besides having non modifiable risk factors like one's gender and age, most of the other factors are considered as being modifiable risk factors.

5.2.1 Work-related risk factors for LBP and neck pain

Computer use has become very common in current times; 82.7% of the study participants used computers for an average of two hours or more in one sitting. The mean hours worked in a day totaling nine hours and the average working duration nine years. Despite the fact that there was no significant association between these work related factors and LBP and neck pain, other studies showed increased risk of neck pain being directly proportional to the number of years worked (Côté *et al*., 2008) and the hours sitted at work (Ranasinghe *et al*., 2011; Green, 2008; Ariëns *et al*., 2001). Kamwendo (1991, as cited in Ariens *et al*., 2001) established a high risk of neck pain with sitting for more than five hours, while another study contrasted this finding by indicating no association between neck pain and the length of time worked (Hush *et al*., 2009). Further investigations should therefore be undertaken to establish conclusive information about this finding.

With regard to work-related risk factors, only the type of back support given by the office chair and job worries showed statistically significant associations with LBP in this study. Static posture alone, as stated in the previous sections, was not sufficient in causing LBP; this finding is in line with the findings of this study (Claus *et al*., 2008; Maria Lis *et al*., 2007). However, those who interspersed their sitting with twisting and bending forces would have been expected to experience more pain, but this was not the case. This finding could maybe be due to the

underrepresentation of this sample in the study. Further research needs to be conducted to confirm this finding in this research setting. However, Ismail *et al.* (2010) confirmed in their study that seats that firmly supported the lower back would help in decreasing the symptoms; therefore, the positive association between LBP and office chairs is justified. Work organisational factors, such as increased work pressure, lack of job security or decision-making opportunities, as well as problems in work atmosphere, may contribute to an increased occurrence of work-related musculoskeletal complaints (Widanarko *et al.*, 2012; Ranasinghe *et al.*, 2011; Korhonen *et al.*, 2003). Despite the fact that only LBP showed a positive association with job worries getting one down physically, neck pain has also been shown to be affected by work psychosocial factors as well (Côté *et al.*, 2008; Green, 2008). No statistically significant association was established between job satisfaction and neck pain and LBP, which is in line with another study on neck pain (Bongers *et al.*, 2006). Other studies, however, have indicated different findings, and therefore further researchmust be conducted on this issue.

The majority of the study participants (65%) acknowledged to taking at least ten minutes' rest breaks, but in contrast these same participants indicated an increased prevalence of both neck pain and LBP, at 42.6% and 47.8% respectively. There was no statistically significant association between those who took work breaks with both neck pain and LBP. The finding in this study is in contrast to what other studies have established, namely that rest breaks in-between computer work were considered good for the prevention of neck pain (Green, 2008; Cagnie *et al.*, 2007; Ariëns *et al.*, 2001). This finding could probably suggest that the cause of their neck pain was not only work related, but could be attributed to other factors, as previously suggested. In general, 50% of the study participants that experienced neck pain (n=141), experienced the pain while using computers, and this prevented only 9.2% from being unable to

use the computer due to neck pain. Of the 26.2% respondents who related their neck to a specific incident; 52.8% of those related the onset of their neck pain to computer use and 13.9% to accident. Twenty two percent of the respondents experienced neck pain while engaging in other activities thus still confirming non work-related factors. Interestingly, some two studies also showed no association between neck pain and rest breaks from computer usage (Côté *et al*., 2008; Korhonen *et al*. 2003). A review on the effects of exercise and rest breaks on musculoskeletal discomfort in computer tasks, showed evidence in ten out of fifteen studies, that decreased musculoskeletal discomfort in the low back, neck and even visually was possible, due to rest breaks of not more than ten minutes per hour (De Vera Barredo & Mahon, 2007). The review further showed no superior evidence of exercises over passive rest breaks in some instances, while another study still showed an increase in musculoskeletal discomfort with the rest breaks. The similarities and differences between this study and others could be attributed to differences in methodological procedures and research settings hence, further research especially of longitudinal design is recommended in this setting.

5.2.2 Individual factors

In this section, only mental stress and current health status of the participants showed statistically significant associations ($p<0.05$) with LBP. Psychosocial factors such as stress and lack of job satisfaction have been found to be associated with both LBP and neck pain (Takala *et al*., 2009; Moffett & McLean, 2006; Korhonen *et al*., 2003). More neck studies conducted also showed statistically significant association with increased stress level (Côté *et al*., 2008a; Panwalkar, 2008). This lack of association in this setting should further be examined for conclusive findings. An individual's health and other self risk factors, like smoking and obesity, have also been

associated with musculoskeletal disorders (Freburger *et al*., 2009; Hogg-Johnson *et al*., 2008; Woolf & Akesson, 2007). In this study, one's health status only showed a statistically significant association with LBP, with most participants reporting a good health status (59.9%). A study conducted among South African university administrators did not establish any significant association between one's health and neck pain (Panwalkar, 2008), which is therefore consistent wih this study's findings. Smoking did not show any statistically significant association in this study, which could be due to the fact that majority of the respondents were non-smokers (91.7%). In contrast though, those who did not smoke, had increased prevalence of both neck pain (63.4%) and LBP (68.9%), thus giving evidence of the multifactorial aetioogy of WRMDs.

The mean BMI of the study participants revealed that they were overweight and there was no statistically significant association between this finding and either LBP or neck pain. However, those who were overweight had the highest prevalence of LBP (52=30.8%), whereas those who were normal had the highest prevalence of neck pain (50=29.6%). In those who were obese, LBP still had the highest prevalence (18=10.7%), indicating an increased risk for LBP in both the obese and the overweight. In-as-much as the relationship between LBP and obesity is still controversial in literature, two studies have established that obesity or high BMI (>30 BMI) is associated with an increased occurrence of LBP, with women showing a stronger association than men (Hoy *et al*., 2010; Shiri, Karppinen, Leino-Arjas, Solovieva & Viikari- Juntura, 2009). The meta-analysis of Shiri *et al*. (2009) showed a stronger relationship in the cross-sectional studies for obesity than overweight which is a contrast to this study. However, a study among office workers by Côté *et al*. (2008a) did not show a positive association between neck pain and BMI, whereas Nilsen, Holtermann and Mork (2011) established that BMI was positively

associated with both chronic LBP and neck pain. Hobbies and domestic activities as other individual related factors in this study did not show any statistically significant associations with neck pain and LBP, which is consistent with findings from Korhonen *et al.* (2003). However, Nilsen *et al.* (2011) showed a decreased risk of both neck pain and LBP in those who were physically active for a minimum of an hour or more a week. Some of the above findings confirm the multifactorial aetiology of LBP and neck pain, hence the difference in findings. Methodological differences could also have led to a contrast between some findings in this setting with the literature, thus needing further investigations.

5.3 PARTICIPANTS' KNOWLEDGE OF ERGONOMIC RELATED LOW BACK PAIN AND NECK PAIN AS WELL AS PREVENTION

The findings of this survey showed that most study participants were knowledgeable about the biomechanical occurrence and prevention of LBP and neck pain. However, despite the participants being perceived as having good knowledge, there was still a high prevalence of both neck pain (67.8%) and LBP (75.5%) in this research setting. This finding suggests that, despite the study participants possessing knowledge, this knowledge did not directly translate into behavioural modifications and hence, the likely presence of WRMDs symptoms.

Studies have shown that an increase in ergonomics knowledge motivates workers to modify their working postures and behaviour thereby improving their health (Robertson *et al*., 2009; Amick *et al*., 2003). Previous studies also related knowledge about disease prevention and concern about personal contraction of the disease to have led to disease prevention behavior but unfortunately in this study this was not seen to be so (Becker & Maiman, 1975). The above observation by

Becker and Maiman (1975) was very evident in a review of the knowledge, attitude and behaviour of university students concerning HIV/AIDS, which indicated that their already acquired knowledge was not efficiently translated into safe sexual behaviour (Sveson, Carmel & Varnhagen, 1997). With regards to occupational safety, a study on workers in a Nigerian refinery showed that 44% of the workers suffered from work-related injuries inclusive of LBP (Aliyu & Saidu, 2011). However, there was still no complete compliance to the required safety measures at work, despite the fact that these workers were knowledgeable of the occupational hazards they were exposed to. Human behaviour is thus complex and there is a need for further studies, as also recommended by other authors, so as to know the most effective health promotion behavioural model that would help decrease both the incidence and prevalence of WRMDs (Côté *et al*., 2008; Jiang *et al*., 2007). Sveson *et al*. (1997) add that human beliefs and behaviour change over time; therefore, it is important to continually give education and evaluate their effects in order to detect the dominant factors that led to adherence or lack of adherence of proper health related behaviors. This would best be administered in the form of longitudinal studies in order to bring out the true picture of compliance to the relevant variables, considering the multifactorial aetiology of the WRMDs.

In the twenty two questions that were asked regarding the biomechanical knowledge of LBP and neck pain, participants demonstrated good knowledge in their response to sixteen questions. This good knowledge could in part be attributed to the research setting being a hospital institution, hence the increased awareness of biomechanical knowledge of LBP and neck pain risk factors. In addition, the research setting was in an urban area, where there was easy access to information. This could have influenced the results of this study significantly. A glance at the sources of knowledge of the study participants with regard to sitting instructions in the office

revealed the media (e.g. newspaper, radio, T.V and the internet) as the most popular source of information (53=45%). A study outside of the hospital institution and even one among administrators in a non-urban area are recommended to compare these study's findings.

Participants were, however, not sure of their responses to the remaining six questions; for example, if bed rest for more than one or two days was a good idea if one had back ache. Moffett and McLean (2006) emphasised the need for early return to work and normal activities even if the pain is not completely resolved, as fear avoidance of movement would only prolong recovery. This, he adds, can be ensured through work modifications, as continuous bed rest hampers quick recovery. Regarding whether back pain settled quickly enough for one to get on with one's normal activities, Pengel, Herbert, Maher and Refshauge (2003), in a sytematic review on the prognosis of acute LBP, state that people with LBP experience a rapid improvement in pain and disability within a month. The uncertainty among the majority of the study participants (51%) regarding this variable could be attributed to the belief that back pain was disabling and also fear avoidance of worsening the problem by movement (Moffet & McLean, 2006). Return to work according to Pengel *et al*. (2003) was seen to take place within the first month, with the residual pain expected to clear up within the subsequent three months and twelve months was the longest expected time before one is able to return to work. Literature teaches that a quick resumption to day-to-day daily activities usually prevents chronification of pain and enhances quick recovery (Freburger *et al*., 2009; Moffet & McLean, 2006; Pengel *et al*., 2003). The majority of the participants (51.9%) were not sure if weakness of the arm and hands could be caused by neck pain. Weakness of the arm and hands, in association with neck pain, was seen to be an indication of nerve root involvement; hence upper limb neurodynamic and conduction tests would be useful as part of physical examination to identify the specific

dermatomes involved (Kerry, 2011; Sran, 2009). The uncertainty about this particular variable among the study participants is indicative of lack of knowledge of the underlying anatomy of the human spine in relation to bodily function.

Literature has shown that smoking was associated with musculoskeletal pains (Hogg-Johnson *et al*., 2008; Korhonen *et al*., 2003). However, in the study, a large percentage of the participants (83=40.7%) were not sure if there was any association between smoking and neck pain. In a study by Korhonen *et al*. (2003) for predictors of incident neck pain amongst office employees, smoking was found to be associated with neck pain in that there was an increased pain tendency in those who smoked. The reason for the lack of knowledge rearding the association between smoking and neck pain in this setting could be the fact that the majority of the study participants (91.7%) did not smoke; therefore smoking was not considered a major risk factor in this setting, unlike in other areas, where it forms the burden of the risk factors. A large percent of the study participants (48.2%) were not sure if a cervical collar was indicated for all neck pain. A cervical collar/neck brace is commonly used at the treatment and prevention phases of neck pain management. Lack of clarity regarding the use of a cervical collar could either mean that the participants lacked knowledge of this assistive device and its consequential use. The other area, about which study participants (47.8%) were not sure, was if people with back pain often suffered from a slipped disc or an entrapped nerve. Waddell (1998, as cited in Magee, 2006) classified low back pain in three categories, i.e. non-specific low back pain (accounting for > 90%), serious spinal pathology (< 10%) and nerve root pathology (accounting for < 2%). A study by Galukande, Muwazi and Mugisa (2005), on the aetiology of LBP in Uganda revealed 62.3% of the patients suffering from non-specific LBP of mechanical nature, 19.1% had nerve root pathology due to prolapsed intervertebral discs, and 17.2% had serious spinal pathology from

various causes such as tuberculosis and fractures. It is therefore evident that most LBP are non-specific and mechanical in nature.

Besides the knowledge level, the study results showed most participants as having moderate behavioural practice. A majority of the study participants (64.7% and 43.8% respectively) were not sure about two questions, namely; whether one maintained an upright posture for the whole day, and whether one bent their back fully to pick something off the floor. Despite there being a lack of strong independent causal association for occupational bending with LBP, some studies have revealed that bending activities involving higher degrees of trunk flexion are associated with disabling types of LBP (Wai, Roffey, Bishop, Kwon & Dagenais, 2010; Claus *et al*., 2008). This lack of uncertainty reveal that the study participants did not engage their minds while performing specific risk attributed behaviours and therefore had an increased likelihood of suffering from musculoskeletal pains, especially LBP. Further investigation with the focus on these variables should be done in this research setting so as to get more conclusive information.

5.4 IMPACT OF THE KNOWLEDGE-BASED ERGONOMICS PROGRAMME

A knowledge-based ergonomic programme was meant to influence participants' behaviour with regard to their work habits (Ismail *et al*., 2010; Robertson *et al*., 2009; Amick *et al*., 2003). It was hypothesised that the high prevalence of LBP and neck pain was due to lack of knowledge of the work-based ergonomic hazards, and this study therefore sought to seek the effect of a knowledge-based ergonomic intervention. Before designing an intervention, one needs to undertake a situational analysis of the relevant problem, which will help in addressing the

particular needs of a population (Ismail *et al*., 2010). The Nordic musculoskeletal questionnaire, which was used to analyse musculoskeletal symptoms in an ergonomic or occupational health context revealed several musculoskeletal symptoms amongst the participants of this survey (De Barros & Alexandre, 2003). The low back and neck region were the highest symptomatic body parts and hence necessitated an ergonomic-based intervention. Ismail *et al*. (2010), in their study that evaluated two ergonomics intervention programmes among school children, concluded that health promotion without additional ergonomic furniture implementation would not give extended positive benefits. As earlier described in **Section 3.4.2**, ergonomics knowledge was provided in the form of a PowerPoint presentation, after which some exercises were demonstrated. Exercise pamphlets were distributed to the participants for both home exercise programme and for office rest breaks. These exercise pamphlets, as described by Becker *et al*. (1977), were intended to serve as external cues to action and remind the participants of the expected preventive health behaviours and hence assist with compliance with the education that they received.

Four major themes emerged from the two focus group discussions that were held after the knowledge-based ergonomic programme. These themes will aid a better understanding of what facilitates and inhibits safe ergonomic practices among participants in this setting (Lühmann *et al*., 2006).

5.4.1 Experiences of administrators with regard to knowledge-based ergonomic programme

The participants' experiences of ergonomics intervention were based on three subthemes that looked at the mode of ergonomic information provided to them, the value of the information given and, finally, the impact of the information on their day-to-day lives. Participants preferred

the live ergonomic-based information to information sent in the form of electronic mail. This was because they often had heavy workload and hence never gave the electronic information the priority that it needed. Live intervention, on the other hand, gave them an opportunity of obtaining first-hand information and having their questions answered. Mode of communication was therefore seen as a very important entity that influenced compliance with any kind of preventative action with regards to our health (Ranasinghe *et al*., 2011). Becker and Maiman (1975), on sociobehavioural determinants of compliance with health and medical care recommendations, stated that behavioural change was dependent on one's perceived susceptibility, severity and threat to a particular disease. They further stated that people would generally not make any effort to prevent any condition unless they had the relevant knowledge to perceive themselves as being at risk of being affected. Hence, how information is conveyed to an individual, will determine how they respond and this was evident from the participants' excerpts about the value and impact that the knowledge-based ergonomic intervention had on them. Most of the participants reported that the information was very useful and acted as an eye-opener that changed their approach to how they did their work.

5.4.2 Knowledge of participants with regard to ergonomic-related low back pain and neck pain

Knowledge as a major variable in this study also emerged as a theme during the focus group discussions held. One's knowledge in this instance was measured with regard to the perceived attitudes and behaviours of the study participants, and it was further categorised based on their attitude and behaviour before the ergonomic-based intervention and afterwards. Despite the debates about the quality of knowledge interpretation through the use of qualitative research (Mays & Pope, 2000), other researchers pointed out that emphasis on member interaction during

the FGDs enabled one to get the different perceptions, attitude and knowledge of participants about the issues being discussed (Wong, 2008; Kitzinger, 1994). Prior to the ergonomic intervention, the participants portrayed a carefree attitude and were not conscious of the manner in which they performed work, both in the office and at home. As one participant claimed "*he used to sit lazily watching the T.V*", which has been associated with neck pain, even in the literature (Green, 2008). Some participants reported of being ignorant, despite the fact that they had received prior ergonomic information and it took the onset of pain, for them to readjust their office positions. According to Becker *et al*. (1977), it actually takes some cues of action for one to be able to perceive one's suceptibility to a particular situation. The cue for action in this instance was an internal factor, i.e. pain. Without pain, none would have presumably taken the trouble of going through some changes. After the ergonomic intervention, the study participants reported some behavioural change, both at the office and even at the home environment as a result of the new knowledge learnt. They attributed their prior untroubled attitude to lack of proper information, but now having known the impact of their actions on the body, they possessed more confidence in doing exercises and taking preventative actions against WRMDs (Becker & Maiman, 1975).

According to Glanz (2005), the health belief model (HBM) was regarded as fit for addressing problem behaviours evoking health concerns. The six constructs of HBM therein provided a useful framework for designing both short-term and long-term behavioural change strategies. In this study, it was anticipated that having identified the prevalence of WRMDs and the knowledge and behaviour of participants from the survey questionnaire, a knowledge-based ergonomic education would have sufficed in filling the behavioural gaps that existed and hence prevent and decrease the impact of WRMDs. One's perceived benefit from particular disease prevention

needs to be more than one's perceived barriers towards prevention for a high compliance to healthy behaviour to take place (Glanz, 2005; Becker *et al*., 1977). From the focus group excerpts, some participants struggled with compliance with health behaviours, while others gained substantial motivation to adhere to good health behavioural practice. Part of these struggles was due to lack of proper exercise guidelines and some external factors within their work environment. Continual knowledge-based ergonomic education would therefore increase the participants' confidence in the skills gained, and also help in evaluating the education given and assist in further compliance. In addition, emphasis on compliance to the right behavioural practice and attitudes, as well as institutional support in terms of modifications of working stations would decrease the high medical expenditures in treating WRMDs. This in return as confirmed by WHO and ILO would enhance productivity in the work place as well as the general well-being of workers (Eijkemans, 2004). According to the 2002 world health report by WHO, 37% of back pain was attributed to work-related factors. The joining together of these international bodies (WHO and ILO) was thus in recognition of the global burden of workers safety especially in developing countries like in the Africa region, which seems not to have been taken seriously (Eijkemans, 2004). This union hence fosters the need of joint approach by the relevant stakeholders to work together for the well-being of workers within Kenya as a country and also globally.

5.4.3 Challenges faced by the participants in implementation of ergonomic factors

The challenges that the participants reported to have been facing in adhering to correct ergonomic conditions could best be classified into four categories. Three of those categories focus on the individual, environmental and physical ergonomic factors surrounding them, while the final category focused on several attempts made by the participants to overcome all the above

challenges. Individual factors revolved around insufficient knowledge about ergonomic related LBP and neck pain prevention and actual engagement in some behavioural factors like taking rest breaks, ensuring proper desk and chair alignment in the office, as well as doing physical exercises. Other participants expressed financial constraints that prevented them from getting proper equipment or even consulting professional guidance for the exercises. The health belief model (HBM) regards behavioural change to be dependent on one's knowledge of the subject matter, as well as perceived costs in comparison to the benefits of the problem (Glanz, 2005; Becker *et al.*, 1977). Further literature added that healthy behavioural change was easier for those who regarded the financial cost of adjustments as affordable (Nzuve & Lawrence, 2012; Driessen *et al.*, 2011; Woodcock, 2007; Becker *et al.*, 1977). With regard to environmental factors being a challenge, the study participants reported an increased workload at work and deadlines that did not allow them to take the necessary rest breaks in-between work. The weather also prevented some other participants from engaging in healthy behaviour, e.g. walking, and it was also seen as wasting time due to the fact that participants worked through most weekends and therefore had, limited time to themselves. Unless one perceived the benefits of one's actions to be stronger than being in their comfort zone, then behavioural change was seen to be difficult.

Physical challenges emerged from factors around lack of proper adjustable chairs in the work-place, and these led to some particpants developing discomfort pain while using them. Thus despite the knowledge gained from the ergonomic intervention, there needed to be a complementary action from work institutions to modify the work stations that would see effective results (Ranasinghe *et al.*, 2011; Ismail *et al.*, 2010). So far in this study, participants appreciated the role that ergonomics intervention played in making supervisors and top management understand the importance of work rest breaks as one of the preventative actions

taken for WRMDs. All stakeholders are thus needed to take action in order to make lasting changes that will prevent the rampant effect of WRMDs amongst administrators (Driessen *et al*., 2011; David *et al*., 2008; Bongers *et al*., 2006; Eijkemans, 2004; Romer & Hornick, 1992). Other participants shared their personal experience of how they had been able to overcome some challenges in the work environment. The experience of neck pain and LBP of one participant due to poor workstation design, and the bladder infection that developed in another participant, due to the suppression of the urge to empty one's bladder prompted these participants to comply with the recommended healthy behaviour. According to Becker *et al*. (1977, p. 30), a cue to action must occur to trigger the appropriate health behaviour; this stimulus can be either internal (e.g. symptoms) or external (e.g. interpersonal interactions and mass media communications). Hence in this study, the presence of symptoms prompted compliance with healthy behaviour. In addition, after the ergonomic intervention, some participants used the knowledge gained from the question and answer sessions to answer some other participants in the FGDs who did not have enough knowledge, e.g. about the format of exercises (Driessen *et al*., 2010).

5.4.4 Recommendation made towards the ergonomics intervention

On asked whether they would recommend the ergonomics programme, participants aired their views and two themes of health promotion and policy enforcement emerged from these discussions. Participants expressed that the majority of people were not knowledgeable about the impact of ergonomic hazards on their daily lives and persisted in unsafe behavioural practice, giving rise to increased prevalence of WRMDs. They reiterated that awareness should be created, and not only to include office workers, but rather the general population at large. They noted the inequity in dissipation of knowledge of public health concerns by the health fraternity,

and further stated that physiotherapists should be seen as proactive in ensuring mass information, that could even help people question cultural beliefs, that influence poor health behaviour. Hoy *et al*. (2010a) in measuring the global burden of LBP also reiterated the fact that LBP was not given a high priority in the global burden of disease. This was due to methodological differences in its definition hence they are making efforts in developing standardised ways of examining LBP in both the developed and developing countries which at times lacks resources to diagnose the type of LBP. This will thus ensure equity in handling health issues globally and improving on workers safety.

Regarding the effect of social influence, some inappropriate cultural beliefs (e.g. as one participant stated (***G1-P3)***: "*women having to bend their backs fully while washing clothes*") place pressure on individuals to comply with societal expectations (Becker & Maiman, 1975). Equipping workers with knowledge of ergonomic hazards and self-protection was therefore seen as their fundamental human right, that will act as an investment for economic productivity of a healthy workforce as well as saving costs to treat WRMDs (Muigua, 2011; Ranasinghe *et al.*, 2011).

Policy enforcement would also be relevant in ensuring that safe ergonomics is practised within work places. The participants from the FGDs constantly reiterated the need for the Occupational Health and Safety Board to be proactive in ensuring workers' safety in the workplace. The presence of this Board as well as joint measures by other relevant stakeholders, e.g. the Kenya Bureau of Standards (KBS) as well as physiotherapists, will ensure the certification of the correct furniture that is being produced for institutional use. The presence of an Occupational Health and Safety Board in each institution was a requirement by the International Labor Organization (ILO) to govern the safety of workers and hence the government should help in tightening and

ensuring the implementation of such measures (Nzuve & Lawrence, 2012; Muigua, 2011; Afubwa, 2004; Eijkemans, 2004). Much as there was awareness of the requirement of the Occupational Health and Safety Board in Kenya, compliance with the required regulations is still wanting as was evident in the study setting. A study by Nzuve and Lawrence (2012), on the extent of compliance with Occupational Safety and Health (OSH) regulations at registered workplaces in Nairobi established an awareness rate of 90%, inspection and assessment of workplaces by OSH officers at 52.2% and a general compliance rate of 64.49%. This had, however, improved from a previous report, which indicated that more than half of employers (55.4%) were not aware of OSH, and that only 35% had existing OSH committees in place (Mbakaya, Onyoyo, Lwaki & Omondi, 1999).

General public awareness e.g. in the form of mass media, as further recommended by several authors, as well as the findings of this study from the FGDs, would therefore act as a cue to action in seeing improved compliance with work safety regulations (Nzuve & Lawrence, 2012; Muigua, 2011; Ng'uurah & Frantz, 2004; Becker *et al.*, 1977). With regard to policy implementation, the curricula for the health professionals should therefore orient them towards disease prevention as a form of management with incorporation of the psychosocial factors involved (Rantanen *et al.*, 2004; Mbakaya *et al.*, 1999; Becker *et al.*, 1977). These authors, as well as Ranasinghe *et al.* (2011), further add that the spread of already known knowledge and continuous evaluation by the health practitioners and policy makers would help increase the personal responsibility taken by workers towards their own health, thereby ensuring cost-effectiveness in preventive management of WRMDs.

5.5 SUMMARY OF CHAPTER

This chapter discussed the major findings of the study in line with the study objectives and further related to similar or contrast findings by other studies in the literature. No other study was found especially with regards to neck pain in this research setting. Therefore this research adds to the body of knowledge with regard to the prevalence of work-related LBP and neck pain, as well as the knowledge status of administrators with regard to ergonomics. Concepts valued by the participants from the knowledge-based ergonomics intervention would therefore assist in further research in this setting. Chapter Six will now present a summary of the study, the conclusion and recommendations.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.0 INTRODUCTION

This chapter summarizes the findings of this study with regards to its implications, strength and limitations.

6.1 SUMMARY

The study results indicated a high prevalence of both work-related low back pain and neck pain among administrators, which is consistent with the literature. The administrators were regarded as being knowledgeable regarding ergonomics and the prevention of WRMDs. However, their behaviour with regard to the prevention of these disorders was limiting. This thus saw the study participants displaying a high prevalence of LBP (75.5%) and neck pain (67.8%) which were the most common WRMDs in this setting, which prompted the design of a knowledge-based ergonomic intervention that addressed the participants' problems in these work areas. Focus group discussions were held after the ergonomic intervention, and they were experienced as very informative as they expressed several concepts that the participants valued from the entire study. The participants appreciated the live intervention more than the previous mode of information (e-mails). The live intervention allowed them to interact with the facilitators and obtain first-hand information, and also served as a platform for their questions about their musculoskeletal disorders to be answered. The study participants also expressed the impact that the intervention had in reminding them of being cautious in their work environments and even in their behaviours

outside work. They also expressed the challenges faced while trying to comply with health related behaviors and they made several recommendations that would be helpful for future studies in curbing the grave effects of WRMDs.

6.2 IMPLICATIONS OF STUDY

Musculoskeletal disorders are fast becoming a burden of disease all around the world and more so in relation to LBP and neck pain. There has been an identified gap of literature with regard to physiotherapy services and occupational illnesses, and the findings of this study sought to address this gap. It is evident that there was a high prevalence of work related LBP and neck pain in the research setting, which calls for follow-up research to be carried out in this field, especially by the physiotherapists who daily attend to these patients. Follow up research will create databases that will help in monitoring the prevalence and incidence trends of WRMDs and therefore create a platform to address these problems. Despite the study participants being regarded as knowledgeable about ergonomic related LBP and neck pain, their subsequent health related behaviours were rated as poor. This therefore implies the need for continual education to create awareness of the impact of daily activities on the musculoskeletal system. Policies should therefore be put in place for:

- Recording and reporting any WRMDS
- Incorporating ergonomics knowledge in the school curriculum, as behavioural change needs a continuous reminder through one's stages of life

- Physiotherapists must be actively involved in the health education of WRMDs and awareness creation of occupational health. Physiotherapists should therefore form an integral part of the Occupational Health and Safety team.
- Government to tighten policies regarding safety in the work places so as to save costs with regard to treating WRMDs.

6.3 STRENGTH OF STUDY

The mixed method design of this study as well as the fair response rate by the participants enabled the researcher to get strong findings with regard to the knowledge level of the study participants, their prevalence of LBP and neck pain as well as the concepts they valued from the knowledge-based ergonomic intervention. Interacting in a social context enabled the researcher to get a rich understanding of the participants' underlying knowledge and behaviour with regard to ergonomic related LBP and neck pain. In addition, this is the first study of its kind to be conducted in this research setting and the findings therefore create a strong foundation for future research to be undertaken in this setting.

6.4 LIMITATIONS OF STUDY

The findings of this study should be interpreted with caution, for the following reasons:

- The cross-sectional nature of the study means that participants gave information from their memory, which prevented firm conclusions regarding causality. This calls for future studies of other designs, e.g. longitudinal, that would monitor the variable characteristics over a duration of time.

- The data obtained in this study regarding musculoskeletal symptoms should be interpreted with caution as it was based on self-report hence having a lower reliability. Future studies should be complimented with clinical assessment and direct measurements of ergonomic assessments to strengthen the reliability and validity of the research findings.
- Although the questionnaire was tested for validity, on analysis it is evident that some of the questions (Behaviour Section) could have been more detailed to get exact answers and avoid the "*Not Sure"* option.
- The study was carried out in an urban centre, and more specifically, in a hospital environment, hence the study participants could be advantaged as they were exposed to better knowledge. Future studies should be held either in a rural set-up or away from hospital environments so as to allow the generalisation of the findings.
- Representation in the FGDs could have been biased, as the people who did not sit continuously for long periods were underrepresented. More situational analysis should therefore be done before introducing education-based interventions to ensure that one addresses the underlying problems in a specific environment.

6.5 RECOMMENDATIONS

The findings of this study prompted recommendations to several institutions.

1. Employers
    - There should be a health and safety board in every institution, which continuously evaluates work stations and the education of employees and employers, because

of the high prevalence of WRMDs. This would help in enabling compliance with health related behaviors.

- More research should be done in this area, as the paucity of literature indicated that it is an under-researched area.
- Organizations should look at the work factors relating to WMRDs and act on them, e.g. task rotation and physical and work psychosocial factors.

2. Government

- The government through the Ministries of Health and Labour should be forefront in showing collaboration in their working so as to reinforce the implementation of the health and safety requirements. This would see an increase in the country's economy as a result of increased productivity, reducing the burden on health care professionals in treating and managing cases that would have been prevented as well as reduce the medical expenditure incurred in treating WRMDs.
- The training of professionals in Occupational health and safety must be facilitated to reinforce the understaffed workers in carrying out audits at work places. Occupational health and safety should also be introduced as part of the curriculum in schools, so as to act as a primary prevention of WRMDs. This, coupled with health education in the form of mass media, should also be implemented among the general public to help create awareness and the prevention of WRMDs.
- Proper documentation of any reported WRMDs should be ensured as they form a burden of diseases worldwide. Databases to assist in doing follow-ups and the

evaluation of the process of working towards decreasing both the prevalence and incidences of WRMDs would assist in this regard.

- The Occupational Health and Safety act should not only be theorized, but actually made to become practical, and offenders against this Act should be convicted for that.

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APPENDIX A: ETHICAL APPROVAL UWC

UNIVERSITY of the
WESTERN CAPE

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

PROFESSOR RENFREW CHRISTIE
DEAN OF RESEARCH
14 NOV 2011
UNIVERSITY OF THE WESTERN CAPE

20 September 2011

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 ethics of the following research project by:
Ms NE Wanyonyi (Physiotherapy)

Research Project:	Assessment of knowledge of administrators regarding ergonomics on low back and neck pain.
Registration no:	11/8/14

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

APPENDIX B: APPROVAL LETTER AKUH, N

The Aga Khan University Hospital, Nairobi

P.O. Box 30270 - 00100 G.P.O., Nairobi, Kenya
Tel: (254 20) 3740000 / 3662000 / 3742531 / 353999
Fax: (254 20) 3741749

November 24, 2011

Nancy E. Nekoye Wanyonyi
University of the Western Cape
Private Bag X17, Belville, 7535
South Africa

Dear Ms. Wanyonyi

Re: Request to undertake a research in Aga Khan University Hospital, Nairobi

We are in receipt of your letter and research proposal requesting for permission to use the Aga Khan University Hospital for your research.

We are pleased to inform that your request has been approved and permission granted to carry out the study on "**Assessment of Knowledge of administrators regarding ergonomics on low back and neck pain**" for your Masters Degree in Physiotherapy at the University of the Western Cape, South Africa.

The following are the terms and conditions of the study: -

1. This hospital will in no way be responsible for funding of this project.
2. No material belonging to the hospital e.g. files, CDs, etc may be taken out of the hospital premises.
3. On completion of the study, a copy of the report will be presented to the Hospital or the result of the study may be given in a lecture form to the medical fraternity in the hospital.
4. No part of the study may be published without written permission from The Aga Khan University Hospital, Nairobi Kenya.

You will be expected to liaise/ work closely with the Physiotherapy department Manager, copied in this letter.

Yours sincerely,

Dr. John M. Tole
Associate Dean, Clinical Affairs &
Chief of Staff

Copy to: Mr. Suleiman Kweyu - Manager, Physiotherapy Department

AK 133

APPENDIX C: ETHICAL CLEARANCE, RC AKUH, N

THE AGA KHAN UNIVERSITY

RC Ref: 2011/RC-30
21st December 2011

Faculty of Health Sciences
Medical College

Ms. Nancy E. Nekoye Wanyonyi
Faculty of Community and Health Sciences
University of Western Cape
South Africa.

Dear Ms. Wanyonyi,

Re: Assessment of Knowledge of Administrators Regarding Ergonomics on Low Back and Neck Pain

Thank you for submitting your proposal to the Aga Khan University-EA Research Committee. The committee deliberated on the proposed study on 19th December 2011 and was satisfied that it is a proposal of scientific merit and that it does not require further ethical approval since it is not intrusive to the research subjects.
Further, the committee included a representative of the hospital administration who confirms authorisation for the proposed work to be undertaken within the hospital.

You are authorized to conduct this study from **09th January 2012**. This approval is valid until **09th March 2012.**

However, this approval is subject to inclusion of the following recommendations;

- Summary (background, objectives, methods); adjustment and clarity is required to reflect aspects of the study
- Additional information required on the background to link the study with the Kenyan perspective
- Research question needs clarity and redefining and a hypothesis my be required
- Some of the objectives stated are beyond the scope of this particular study
- The study design has mixed methods of approach which are too demanding for the scope of the study i.e carrying out a survey as well as an interventional program which may be clashing and competing objectives
- Study timeline not stated
- The sample size needs to be justified and calculated giving the confidence level and interval levels
- Data collection methods and tools need to be revised
- Need to provide sample consent form and information sheet
- State plan for the dissemination of the findings
- Needs to make the budget more elaborate

3rd Parklands Avenue, off Limuru Road, P. O. Box 30270, GPO 00100, Nairobi, Kenya
Tel: +254 20 366 2107/2109; Fax: + 254 20 374 3935
Email: medicalcollege.enquiries@aku.edu; Website: www.aku.edu

Please note that as the Principal Investigator, you have the full administrative, scientific and ethical responsibility for the management of the research project in accordance with the University policies and guidelines. You must advise the R&EC when this study is finished or discontinued and present the final report of your study to the Aga Khan University Research Office.

Yours sincerely,

Prof. William Stones
Chair, Research Committee

THE AGA KHAN UNIVERSITY

RC Ref: 2011/RC-30
12th Jan. 2012

Faculty of Health Sciences
Medical College

Ms. Nancy E. Nekoye Wanyonyi
Faculty of Community and Health Sciences
University of Western Cape
South Africa.

Dear Ms. Wanyonyi,

Re: Assessment of Knowledge of Administrators Regarding Ergonomics on Low Back and Neck Pain

Thank you for submitting your revised proposal to the Aga Khan University-EA Research Committee.
The Committee is satisfied that the proposed recommendations as earlier communicated have been incorporated.
The initial authorization to conduct your study from **09th January 2012** to **09th March 2012** is thus valid.

Please note that as the Principal Investigator, you have the full administrative, scientific and ethical responsibility for the management of the research project in accordance with the University policies and guidelines. You must advise the R&EC when this study is finished or discontinued and present the final report of your study to the Aga Khan University Research Office.

Yours sincerely,

Prof. William Stones
Chair, Research Committee

3rd Parklands Avenue, off Limuru Road, P. O. Box 30270, GPO 00100, Nairobi, Kenya
Tel: +254 20 366 2107/2109; Fax: + 254 20 374 3935
Email: medicalcollege.enquiries@aku.edu; Website: www.aku.edu

APPENDIX D: ETHICAL CLEARANCE NCST

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams:"SCIENCETECH", Nairobi
Telephone: 254-020-241349, 2213102
254-020-310571, 2213123,
Fax: 254-020-2213215, 318245, 318249
When replying please quote

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref:
NCST/RCD/12A/012/06

Date:
27th January, 2012

Nancy Nekoye Wanyonyi
University of the Western Cape
Private Bag
South Africa

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on "***Assessment of knowledge of administrators regarding ergonomics on low back and neck pain,***" I am pleased to inform you that you have been authorized to undertake research in **Nairobi** for a period ending ***30th March, 2012.***

You are advised to report to **The Provincial Commissioner and the Provincial Director of Education** before embarking on the research project.

On completion of the research, you are expected to submit **one hard copy and one soft copy** of the research report/thesis to our office.

DR.M.K RUGUTT,PhD,HSC
DEPUTY COUNCIL SECREATRY

Copy to:

The Provincial Commissioner.
The Provincial Director of Education
Nairobi Province

Noted
for
09 FEB 2012

APPENDIX E: INFORMATION SHEET

Project Title: The effect of a knowledge-based ergonomic intervention amongst administrators at Aga Khan University Hospital, Nairobi

What is this study about?

This is a research project being conducted by Nancy Wanyonyi at the University of the Western Cape. We are inviting you to participate in this research project because you have been identified as a potential research participant since your occupation and nature of work directly suits the description of my research. The purpose of this research project is to identify the knowledge of administrators regarding how they conduct themselves while working so as to reduce straining their low back and neck muscles. With the nature of administrative jobs which require long periods of sitting working on your computers or any other desk related jobs, it has been noted with concern that there is an increase in neck and low back pains. These pains when not taken care of at an early stage can progress into some form of disability. The information gained from this study will help us design programmes that will help to educate the participants on identifying the predisposing factors in the work environment and therefore monitor their behaviours in both the work and house environment. This will in return decrease the amount of strain put on your low back and neck muscles while working and therefore improve your quality of life.

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

You will be asked to fill in a questionnaire either in the presence of the researcher or later at your convenience. This should take about 40minutes of your time to fill. The questionnaire will have data regarding demographics (age, weight, height)low back pain prevalence, behavioural pattern of pain in the general body and its predisposing factors as well as postural habits about lifting and physical activities both at work and at home.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. Only the researcher and the research supervisor will know that you participated in the study. To help protect your confidentiality, your answers will be locked in a filing cabinet and storage areas using identification codes only on data forms and using password-protected computer files. The surveys are anonymous and will not contain information that may personally identify you. If we write a report or article about this research project, your identity will be protected to the maximum extent possible.

In accordance with legal requirements and/or professional standards, we will disclose to the appropriate individuals and/or authorities information that comes to our attention concerning abuse or neglect of disabled or other vulnerable adults that may need to be disclosed to comply with legal requirements or professional standards.

What are the risks of this research?

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

What are the benefits of this research?

The benefits to you include increased awareness of the predisposing factors to low back and neck pain in your work and home environments. This research is not designed to help you personally, but the results may help the investigator learn more about the knowledge of administrators regarding ergonomics on low back and neck pains. We hope that, in the future, other people might benefit from this study through improved understanding of the predisposing factors involved and take the necessary preventative measures.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

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

Action will be taken to refer any participants requiring further attention to the relevant health professional.

What if I have questions?

This research is being conducted by Nancy Wanyonyi of the Physiotherapy Department at the University of the Western Cape. If you have any questions about the research study itself, please contact Nancy Wanyonyi at: University of Western Cape, Private Bag X17, Bellville 7535, Tel. +27790814507, +254721541080

E-mail: wanyonyi_nancy@yahoo.com

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

Head of Department: Prof. Julie Phillips

Dean of the Faculty of Community and Health Sciences: Prof. Ratie Mpofu

University of the Western Cape

Private Bag X17

Bellville 7535

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

APPENDIX

UNIVERSITY OF THE WESTERN CAPE

INFORMATION SHEET TEMPLATE

ADDITIONAL GUIDANCE FOR SPECIFIC ISSUES

Informed Consent

Informed consent is a process, not just a form. Information must be presented to enable persons to voluntarily decide whether or not to participate as a research subject. Therefore, informed consent language and its documentation must be written in language that is understandable to the people being asked to participate.

SUGGESTED WORDING

Instructions: You should cut and paste these paragraphs, where applicable, into the appropriate area of the Informed Consent Form. However, the suggested wording below should be modified appropriately for the specifics of your study.

Audio taping/Videotaping/Photographs/Digital Recordings

[Include the following information in the what about confidentiality? section]

This research project involves making **[*audiotapes/videotapes/photographs*]** of you. **[Then explain why the tapes/photos are being made, who will have access to them, where they will be stored, and when (or if) they will be destroyed]**

___ I agree to be **[**videotaped/audiotaped/photographed**]** during my participation in this study.

___ I do not agree to be **[**videotaped/audiotaped/photographed**]** during my participation in this study.

APPENDIX F: INFORMED CONSENT FORM

CONSENT FORM

Title of Research Project: The effect of a knowledge-based ergonomic intervention amongst administrators at Aga Khan University Hospital, Nairobi

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name……

Participant's signature……

Witness……

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: Nancy E. Nekoye Wanyonyi

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021)959-2542

Cell: +27790814507, +254721541080

Fax: (021)959-1217

Email: wanyonyi_nancy@yahoo.com

APPENDIX G: THE EFFECT OF A KNOWLEDGE-BASED ERGONOMIC INTERVENTION AMONGST ADMINISTRATORS AT AGA KHAN UNIVERSITY HOSPITAL, NAIROBI

QUESTIONNAIRE:

INSTRUCTIONS

Please answer the questions by writing in the space or by putting a cross (X) in the appropriate box.

SECTION 1: DEMOGRAPHIC DATA

1. Gender

i.	Male
ii.	Female

2. Age group:
   □18-25 □26-30 □31-40 □41-50 □51-60

3. What is your marital status?

Single	Married	Divorced	Separated	Other

4. What is your highest level of education?

High School	A-level	College	University	Masters	PhD

5. Occupation_____

SECTION 2: KNOWLEDGE QUESTIONNAIRE

Knowledge about low back and neck pain

We are trying to find out what people think about low back and neck trouble and the risk factors associated with these pains.

Please indicate your general views towards back and neck trouble by answering ALL statements and indicate whether you **agree** or **disagree** with each statement by cycling the appropriate number on the scale

Rating	1	2	3	4	5	6
Meaning	Completely disagree	Strongly disagree	Somehow disagree	Somehow agree	Strongly agree	Completely agree

6	I maintain an upright sitting posture for the whole day	1 2 3 4 5 6
7	Whenever I pick up something from the floor I use a stooping position (bending my back fully)	1 2 3 4 5 6
8	I seek help whenever I lift a heavy load	1 2 3 4 5 6
9	For at least 10 minutes a day, at least three times a week; I do recreational physical activities like walking, jogging, swimming, bicycling, exercises	1 2 3 4 5 6
10	Neck pain can cause pain to the shoulders and down the arm	1 2 3 4 5 6
11	People who are physically active generally get less back pain and recover faster if they do	1 2 3 4 5 6
12	Poor posture is harmful to my spine	1 2 3 4 5 6
13	If you have backache, bed rest for >1 or 2days is not a good idea	1 2 3 4 5 6
14	Including neck exercises in the treatment of neck pain reduces pain and improves function	1 2 3 4 5 6
15	I would expect my doctor/therapist to send me for an X-	1 2 3 4 5 6

	ray/CT-Scan/MRI	
16	Weakness of the arm and hands cannot be caused by neck pain	1 2 3 4 5 6
17	Work shifts, work load and support from supervisors are not contributing factors to neck pains	1 2 3 4 5 6
18	Most of back pain settle quickly, at least enough to get on with normal activities	1 2 3 4 5 6
19	Smoking is not associated with neck pain	1 2 3 4 5 6
20	A neck/cervical collar is indicated for all neck pains	1 2 3 4 5 6
21	Abdominal muscle exercises are not beneficial for my low back pain	1 2 3 4 5 6
22	Psychological factors e.g. fatigue, depression and emotional distress can contribute to the development of low back pain	1 2 3 4 5 6
23	Surgery is the most effective way to treat back trouble	1 2 3 4 5 6
24	After recovery and improvement of back pain the patient is cured and there is no risk of further crises	1 2 3 4 5 6
25	If you have backache you should avoid exercise	1 2 3 4 5 6

Please answer the following section by circling your most appropriate answer.

26. I tend to twist my back while on my job
    1. True 2. False 3. Not sure

27. If I have two bags I put together the two bags and carry them on one side
    1. True 2. False 3. Not sure

28. I will walk on short distances instead of using a car transport
1. True 2. False 3. Not sure

29. The spine is one of the strongest parts of the body
1. True 2. False 3. Not sure

30. Back pain is not usually due to any serious disease
1. True 2. False 3. Not sure

31. People with backache often have a slipped disc or entrapped nerve
1. True 2. False 3. Not sure

32. A bad back should be exercised

1. True 2. False 3. Not sure

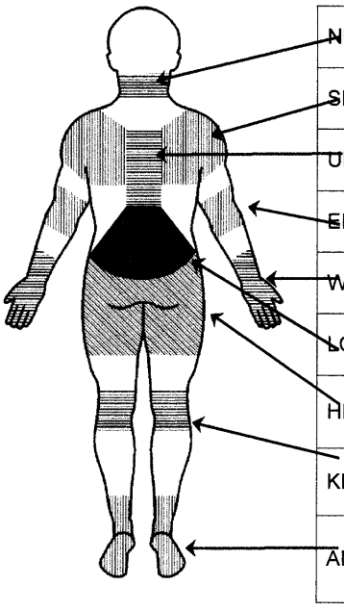
33. Medication is the only way of relieving back trouble
1. True 2. False 3. Not sure

34. Headaches can never be caused by neck pain
1. True 2. False 3. Not sure

35. Strengthening and stretching exercises are very good for the neck
1. True 2. False 3. Not sure

SECTION 3a: PREVALENCE OF MUSCULOSKELETAL COMPLAINTS AND ITS CONSEQUENCES IN THE PAST 12 MONTHS (QUESTIONS 36-39)

Please answer by putting a cross in the appropriate box_ one cross for each question. Please answer every question even if you have never had trouble in any parts of your body. This picture shows how the body has been divided. You should decide for yourself which part (if any) is or has been affected.



	Have you at any time during the last 12 months had trouble (such as ache, pain, discomfort, numbness) in:	During the last 12 months have you been prevented from carrying out normal activities (e.g. job, housework, hobbies) because of this trouble in:	During the last 12 months have you seen a physician for this condition:	During the last 7 days have you had trouble in:
NECK	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
SHOULDERS	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
UPPER BACK	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
ELBOWS	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
WRISTS/ HANDS	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
LOWER BACK	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
HIPS/ THIGHS	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
KNEES	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes
ANKLES/ FEET	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes	☐ No ☐ Yes

SECTION 3b: Prevalence of neck and low back pain: We are trying to get more information about the neck and low back pain. Please indicate by putting 'X' in all the sections that apply to you. If you do not have any neck or low back pains please skip this section and continue to section 4.

40. What was your main complaint in the past:

Area	Time	Discomfort	Stiffness	Pain	Tingling/Numbness
Neck	12 months				
	1 month				
	1 week				
	Current				
Low Back	12 months				
	1 month				
	1 week				
	Current				

41. Indicate by marking with an 'X' where you would rate your pain in the below line, with the beginning being no pain and the end being maximum pain?

Neck

No Pain _____ Maximum pain

Low back

No Pain _____ Maximum pain

42. When did you feel the symptoms in your neck or low back?

	Neck	Low back
Working on the computer at your office desk		
Other (please list)		

43. Have the symptoms in your neck or low back resulted in you not being able to use the computer?

	Neck	Low back
i.	Yes	Yes
ii.	No	No

44. Can you relate the initial onset of the neck or low back pain to a specific incident?

	Neck	Low back
i.	Yes	Yes
ii.	No	No

45. If yes, please specify the incident

Neck_____

_____

Back_____

_____

46. Have your neck or low back pain led to absence from work:

	Neck	Low back
i.	Yes	Yes
ii.	No	No

47. If yes how often have you been off from work as a result of the above mentioned complaint?

Days	Neck	Low Back
1-7 days		
8-14 days		
15- 30 days		
> 30 days		

48. What course of action do you normally follow when you experience your symptoms?

	Neck	Low back
Consult a medical doctor		
Consult a physiotherapist		
Use medication bought at the pharmacy without a prescription		
Bed rest		
Carry on with activities		
Other (please specify)		

SECTION 4: WORK RELATED AND INDIVIDUAL FACTORS

Please fill in the answers in the following section and mark with an 'X' where necessary.

49. How long have you been working?

_____

50. How many hours do you work per day?

_____

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

_____

52. During one session at work, how long do you spend using the computer or seated doing office work?

    i. Less than 30 minutes
    ii. About 45 minutes
    iii. 1 hour
    iv. 2 hours or more

53. Have you received any instruction on how to sit in front of the computer or while working on your desk?

i.	Yes
ii.	No

54. If "Yes", who instructed you?

In service education in the department	Doctor
Physiotherapist	Gym
Media e.g. newspaper, radio, T.V, Internet	Other (please specify)

55. While working, do you take deliberate short breaks for at least 10 minutes every hour in order to relieve the strain on your back or neck? (A short break means to stop using your hands at the keyboard/mouse, e.g. to stand up, stretch out, use the bathroom, etc.)

i.	Yes
ii.	No

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

i.	Yes
ii.	No

57. If "Yes", please briefly describe the type of stretches or exercises that you do.

_____
_____
_____
_____

58. Does your office chair fully support your back?

i.	Yes
ii.	No

59. How often do job worries get you down physically?
    1. Never
    2. Very occasionally
    3. Sometimes
    4. Often
    5. Always
60. How often do problems associated with the job keep you awake at night?
    1. Never
    2. Very occasionally

3. Sometimes
4. Often
5. Always

61. How often do you worry about making a decision whether you did the right thing?
    1. Never
    2. Very occasionally
    3. Sometimes
    4. Often
    5. Always

62. How often do you breathe a sigh of relief when you finish work for the day?
    1. Never
    2. Very occasionally
    3. Sometimes
    4. Often
    5. Always

63. What is your height : _____ cm
64. What is your weight : _____ kg
65. What is your smoking status?
    1. Never a smoker
    2. Current smoker
    3. Ex-smoker
66. How would you rate your current health status?
    1. Very poor
    2. Poor
    3. Average
    4. Good
    5. Very good
67. How would you rate your level of mental stress?
    1. None
    2. Little
    3. Some
    4. Fairly much
    5. Very much
68. How would you rate your job satisfaction?
    1. Never satisfied
    2. Satisfied at times
    3. Satisfied

4. Often satisfied
5. Very satisfied

69. How many hours per day on average do you spend on domestic activities such cleaning, child care, cooking, gardening and home repairs.
    1. < 1 hour
    2. > 1 hour
    3. None

70. How many hours per day on average do you spend on hobbies e.g. reading, handicrafts, music instrument playing, computer games. Hours spent on average during working days
    1. < 1 hour
    2. > 1 hour
    3. None

APPENDIX H: AKUH,N KNOWLEDGE BASED ERGONOMIC INTERVENTION

H1: POWERPOINT PRESENTATION

Biomechanics & system anatomy of the spine.

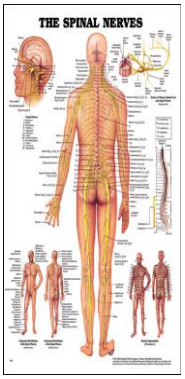
Biomechanics is the science concerned with the internal and external forces acting on the human body and the effects produced by these forces.

The vertebral Column

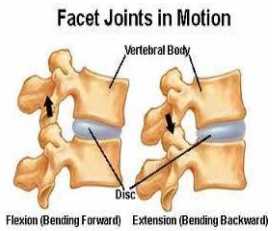
P1

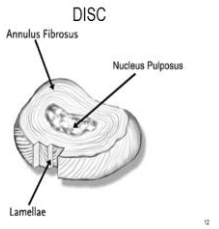
Anatomy

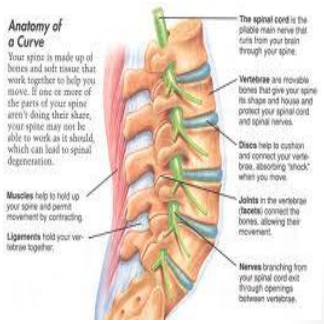
- The vertebral column is divided into 5 parts:
  - The cervical region has 7 vertebraes and 8 spinal nerves
  - The thoracic region has 12 vertebraes and 12 spinal nerves
  - The lumbar region has 5 vertebraes and 5 spinal nerves
  - The sacrum has 5 fused vertebraes and 5 spinal nerves
  - The coccyx has 4 fused bones but not spinal nerves
- Besides the vertebral bones and the spinal nerves from the spinal cord, the vertebral column is also held together by other connective tissues e.g. the muscles, intervertebral discs and ligaments.



The intervertebral disc







Why Neck and Low back pain in office workers?

- Low back pain and neck pain are the most prevalent musculoskeletal disorders at work. The lumbar and cervical region are most mobile and if not well exercised they're less stable unlike the thoracic region supported by the ribs.
- Other prevalent work related/ repetitive/cumulative strain injuries are:
  - Carpal Tunnel Syndrome
  - DeQuervain's Syndrome
  - Golfers/Tennis Elbow
  - Thoracic outlet Syndrome
  - Ganglion
  - Rotator cuff strain
  - Tension neck syndrome
  - Shoulder

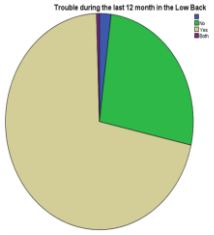
Epidemiology of low back and neck pain

- 60-85 % of the general population presents with low back pain
- 70% of general population present with neck pain

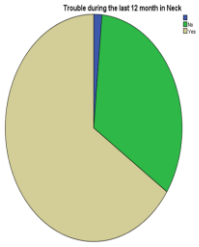
Epidemiology of low back and neck pain cont.

- In Kenya, a study done by Kumuntu Mukandoli in 2004 looking at chronic low back pain in sedentary office workers in Nairobi showed the prevalence as being at 76.53 %.
- In AKUH,N the survey done by Tuesday 30th Jan 2012, 200 out of 214 questionnaires were collected which is 93.5% of the total feedback.

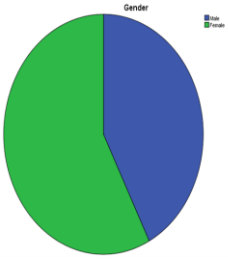
Low back trouble past 12 months in AKUH,N. Yes 71.0%, No 26.5%



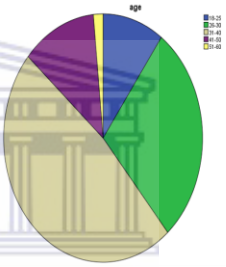
Neck trouble past 12 months in AKUH,N. Yes 65.5%, No 33.0%



Gender: Female 57%, Male 42%



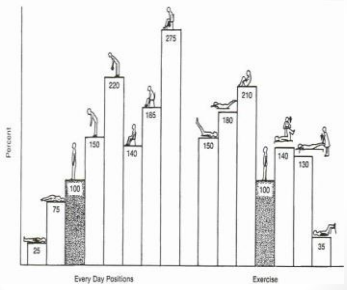
Age groups within AKUH,N



Musculoskeletal system is designed to move

- There is an old saying that either you "use it or loose it" and with movement with proper control comes the correct biomechanics.

What are the effects of activities to the low back?



Neck

- Neck is the 2nd most prevalent musculoskeletal disorder after low back pain
- 12 month prevalence of pain between 30-50% and a greater prevalence in women (Hogg-Johnson et al 2008).
- Neck pain is estimated to rise with an ↑ in prolonged static sedentary work postures and computer use.
- Neck pain working population = risk factors.
  - Computer mouse more than 6 hours /day
  - Prolonged periods of sitting, especially with ↑ neck Flexion

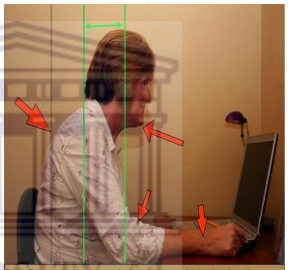
Causes of low back and neck pain

- Degenerative arthritis: The normal degenerating process of the body which starts from the age of around 40years
- Diseases e.g. Cancers (malignant), tumours,
- Ergonomic related:
- 1. Individual Factors- Weak and unconditioned muscles, body size, smoking, age.
- 2. Physical Factors-
  - Static work- stationery sitting causes muscles to lengthen thus they become weaker e.g. while sitting the hamstrings become shorter causing a posterior pelvic tilt (muscle imbalance)
  - Dynamic work- lots of repetitive movements can cause break down of tissues leading to inflammation
  - Poor postures and lifting techniques

Cont....Causes of low back and neck pain

- Static work- stationery sitting

Sitting Posture



Poor Posture - Note rounded shoulders, chin poke, head forward, elbow extended and wrist extended causing increased pressure from gravity and therefore muscular tension...

Cont....Causes of low back and neck pain

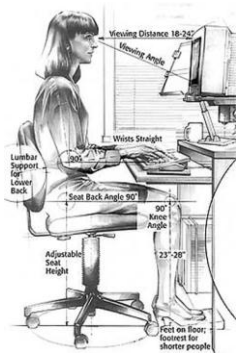
- 3. Environmental Factors:
  - Increased stress and pressure at work
  - Lack of job satisfaction
  - Monotonous work

Other Conditions in AKUH,N

Area 12 months	Yes	No
Shoulders	58.6%	39.4%
Upper Back	47.2%	50.8%
Elbows	17.5%	80.5%
Wrist/Hands	35.2%	62.3%
Hips and Thighs	26.9%	71.1%
Knees	32.3%	65.7%
Ankles/Feet	39.2%	58.3%

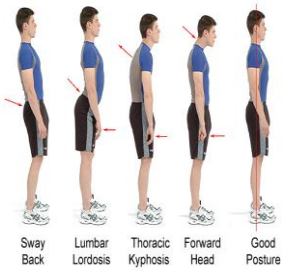
Prevention Strategies

- Good Posture i.e. in sitting, standing and lifting
- Breaks in every hour
- Exercises both at home and during the breaks at work
  - Stretching & Flexibility exercises help to ↓ muscle spasm and pain immediately. It also helps shortened muscles to become safe in maintaining postures and the improve body mechanics.
  - Strengthening exercises helps in improving posture by improving the balance of strength from anterior to posterior or left to right. They also helps to overcome a generally deconditioned musculoskeletal system especially the core stabilizer muscles.
  - Aerobics exercises strengthen the muscles and increases cardiovascular endurance by doing them at a specific targeted heart rate. e.g. walking, swimming, cycling
- Task rotation i.e. avoid being in one stationary position



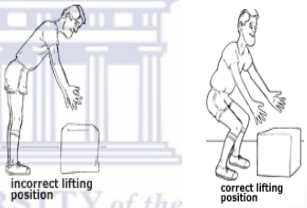
Postural Advice

- Good standing

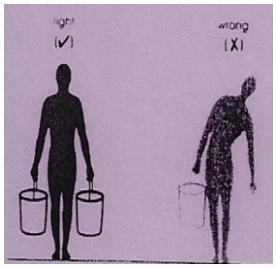


Lifting techniques

- Always best to bend your knees and not your back



- Always distribute your weights on both sides instead of carrying on one side.

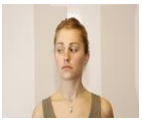


Eye Exercises

- Keeping the back and neck straight and the head still, look as high as possible, and look down. Repeat this movement 10 times. Close and rest the eyes for about 30 seconds before moving to the next exercise.

Cont….Eye Exercises

- Keeping the eyes wide open, look as far to the right as possible, and then to the left. Repeat this movement 10 times, close and rest the eyes for 30 seconds.

- Make wide circles with your eyes by rolling them clockwise. Perform at least 10 circles. Repeat the exercise counter-clockwise. Close and relax the eyes.

Neck exercises

1. Head rolls

Gently lower ear to shoulder and hold for 10 seconds. Repeat on the other side. Do this several times gently without jerking your neck.

2. Head turns

Turn head slowly to look over left shoulder and hold for 10 seconds. Repeat this on the other side. Do this several times.

Cont. neck exercises

3. Chin tucks

Raise the head to straighten the neck. Tuck the chin in and upwards creating a double chin. This also results in a forward tilt of the head. Hold for 10 seconds and repeat several times.

Shoulder Exercises

1: Shoulder rolls

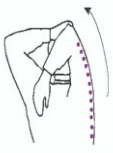
- Circle shoulders forward several times, then backwards. Repeat 3- 5 times.

Cont. shoulder exercises

2: Shoulder Stretch

Stretch arm above head, cradle elbow with hand and pull elbow behind the head.

Hold for 10 seconds and repeat



Cont. shoulder exercises

3: Shoulder Arm Swing

- Get up from your desk, walk to an open space and swing one arm forward like a windmill. Swing it backwards. Now practice on the other arm. Repeat several times
-

Wrist, hand & arm Exercises

Wrist Stretch Exercise 1

Interlace fingers, palms outwards and straighten arms in front. Hold for 10 seconds and repeat several times.

Cont. wrist Exercises

- **Wrist Rotation Exercise 2:**
- Rotate wrists clockwise for 30 seconds then rotate them anti clockwise

Low back Exercises

- Lower Back Stretch: Sit tall and place the left arm behind left hip. Gently twist to the left, using the right hand to deepen the stretch, holding for 20-30 seconds. Repeat on the other side

Trunk Exercises

- Side Bends: Hold a water bottle with both hands and stretch it up over the head, arms straight. Gently bend towards the left as far as you can, contracting the abs. Come back to centre and repeat to the right. Complete 10 reps (bending to the right and left is one rep).

Cont.... Trunk Exercises

- Abdominal Twists: Hold the water bottle at chest level and, keeping the knees and hips forward, gently twist to the left as far as you comfortably can, feeling the abs contract. Twist back to centre and move to the left for a total of 10 reps. Don't force it or you may end up with a back injury.

FURTHER MANAGEMENT OF LBP AND NECK PAIN

- Physiotherapy
  - Ultrasound/ Shortwave Diathermy
  - Moist heat
  - Tens (Transcutaneous Electrical Nerve Stimulation)
  - Soft tissue and joint mobilisation
  - Hydrotherapy
  - Assistive Devices e.g.
    - Lumbar Corsets
    - Neck Collars
    - Wrist Support
    - Sacro-ease
    - Orthopaedic pillows
    - Lumbar rolls

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H2: NECK AND LOW BACK HOME PROGRAMME EXERCISES

Exercises for the Neck & Back

Question: If my neck and back hurt, why should I exercise?

Answer: Your neck and back are supported by muscles, and by keeping these muscles strong and flexible, you are able to function better and also reduce your risk of injury. Such muscles include:

*Abdominal *Back
*Buttocks *Thighs

Performing the following exercises for just **30 minutes a day** will keep the muscles that support the spine stronger and more flexible!

Exercise TIPS!

- Check with your doctor before starting an exercise program.
- Pace yourself! Start slow and work up to more vigorous exercise.
- Stretch slowly to a point *short* of discomfort. Don't jerk or bounce.
- Don't forget to breathe while exercising!

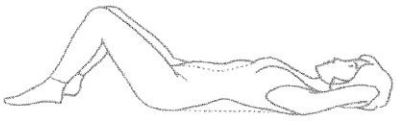
Hedenschoog, K. (2006). Department of Physical Therapy, University of Missouri, Columbia.

Back Exercises

- **Position: Lying on your back**

Before beginning any back exercise, FIRST position your low back in neutral:

- Envision the face of a clock on your abdomen, with 12:00 at the belly button and 6:00 at the pubic bone. Tilt your pelvis so that 12:00 rocks toward the floor and then 6:00 rocks toward the floor. Do this repeatedly 10 times in each direction gently and slowly. The neutral position is the position of *greatest comfort* within that range. Tighten your abdominal muscles to help maintain this position. **From this neutral position, perform the following exercises (while on your back).**



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1. **Bridge-Up**

Lie on your back with your knees bent.
Keep your feet and palms flat on the floor.
Slowly raise your hips upward, tightening your buttocks. Raise your hips high enough to straighten your back. Hold for 5 seconds.
Lower your hips to the floor.
Repeat 10 times.

2. **Partial Curl-Up**

Cross your arms loosely.
Tighten your abdomen and curl halfway up, keeping your head in line with your shoulders.
Hold for 5 seconds and then uncurl to lie down.
Repeat 10 times.

3. **Hamstring Stretch**

Put a towel behind one knee or calf.
Use the towel to pull the leg toward your chest, keeping the leg straight or slightly bent.
Hold for 20 seconds and then lower the leg.
Repeat 3 times. Do 1 time each day.

4. **Trunk Rotation**

Drop both knees to one side and turn your head,
looking in the other direction.
Keep your shoulders flat on the floor.
Hold for 20 seconds, then slowly switch sides.
Perform 3 times on each side.

- **Position: Lying on your stomach**

1. **Press-Up**

Lie face down, feet slightly apart, forehead on the floor.
Push yourself up on your forearms, keeping your neck straight.
Stop when you feel light pressure in your lower back.
Hold for 20 seconds, then slowly lie back down.
Repeat 3 times.

- **Position: On hands and knees**

1. **Cat Stretch**

Begin by tightening you abdominal and buttocks
muscles to press your back upward.
Let your head drop slightly. Hold for 5 seconds.
Next, slowly relax your abdominal and buttocks
muscles, lifting your head and letting your back sag.
Keep your weight evenly distributed.
Hold for 10 seconds.
Repeat 3 times.

2. **Arm Reach**

Stretch one arm straight out in front of you.
Do not raise your head or let your supporting shoulder sag.
To prevent your trunk from sagging, tighten your abdominal muscles! Hold for 5 seconds, then lower arm to ground.
Repeat 10 times, then switch arms.

3. **Arm Reach with Leg Reach**

Extend one leg straight back while extending opposite arm straight forward.
Do not arch your back or let your head or body sag.
Tighten your abdominal muscles!
Hold for 5 seconds, then lower knee and arm to ground.
Repeat 10 times, then switch legs.

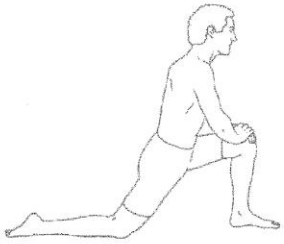
4. **Spine Stretch**

Assume the hands and knees position.
Begin to sit backwards onto your heels until you feel a good, painless stretch in your buttocks. Hold for 20 seconds, then return to hands and knees position.
Repeat 3 times.

Position: Standing

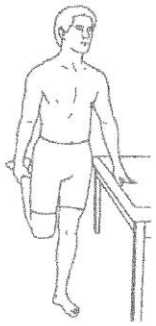
1. Hip Flexor Stretch

Kneel on the floor. Put one foot on the floor in front of you with the knee slightly bent. If needed, hold on to a chair for balance. Tighten your abdomen. Move your hips forward, keeping your back and shoulders upright. Feel the stretch in front of your hip. Hold for 15 seconds. Return to starting position.
Repeat 3 times, then switch sides.



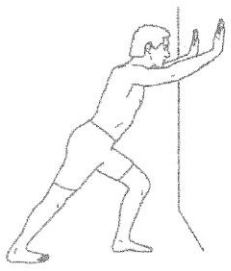
2. Quadriceps Stretch

Stand arm's length from a wall.
Place one hand on it.
With your other hand,
grasp your ankle on the same side.
Pull the heel towards your buttocks,
and then stand with your knees together.
Do not arch your back.
Hold for 15 seconds.
Repeat 3 times, then switch sides.



3. Calf Stretch

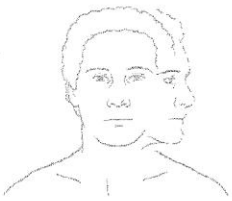
Face a wall 2 feet away.
Step toward the wall with one foot.
Place both palms on the wall and
bend your front knee. Lean forward,
keeping the back leg straight and
heel on the floor. Hold for 15 seconds.
Repeat 3 times, then switch legs.



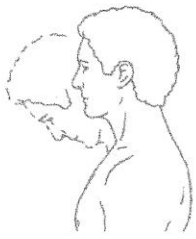
Neck Exercises

Range-of-Motion Exercises

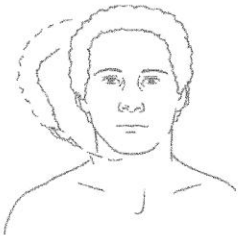
Slowly turn your head to the right side
as far as is comfortable. Hold for 10 seconds.
Return your head to center.
Do the same turn to the left side.
Repeat 3 times on each side.



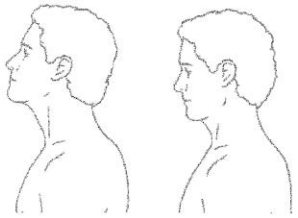
Drop your chin down slowly toward your
chest as far as is comfortable. Hold for 10
seconds. Bring your head back up.
Repeat 3 times.



Tilt your head to the side toward your left
shoulder. Hold for 10 seconds.
Return your head to center.
Do the same toward the right side.
Repeat 3 times on each side.



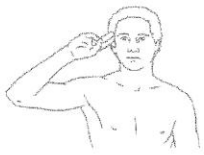
(1) First, perform a chin tuck. (2) From this position,
tilt your head backward so you can see the ceiling.
Hold for 10 seconds, then bring your head upright.
Repeat 3 times.



Isometric Exercises

Press your forehead into your palms slowly. Resist any forward motion with your hands. Hold for 5 seconds, then relax.
Repeat 10 times.

Place your hand against the side of your head. Push slowly with your hand while resisting with your neck muscles. Hold for 5 seconds.
Repeat 10 times.



Place both hands against the back of your head. Try to push your head back, while resisting any movement with your hands. Hold for 5 seconds.
Repeat 10 times.

Place your hand on the side of your head. Try to turn your chin to your shoulder, but resist any motion with your hand. Hold for 5 seconds.
Repeat 10 times.

Hedenschoug, K. (2006). Department of Physical Therapy: University of Missouri, Columbia.

Aerobic Conditioning

Question: Why do I need to participate in aerobic exercise? Isn't strengthening the muscles in my neck and back enough?

Answer: Aerobic exercise conditions the heart and lungs, improves circulation, tones muscles, and helps you to control your weight. All of this helps you to maintain a healthy back!

Getting Started:

- **Start with a 5-10 minute walk. Add a few more minutes each day.**
- **Progress to taking three 10-minute walks each day.**
- **Walk to visit a friend instead of talking on the phone.**
- **Walk around the entire store or mall before you shop.**
- ***Make it a GOAL to walk 30 minutes each day!***

CHOOSE AN ACTIVITY YOU *ENJOY*!

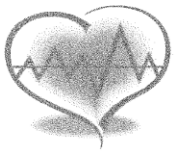
Walking	Swimming
Bicycling	Running
Skiing	Water Aerobics
Basketball	Volleyball
Tennis	Hiking

Monitor How Hard You Are Exercising!

- During the aerobic activity you choose, aim for a rating of between 4 and 6 on the following scale ("somewhat severe breathlessness" to "severe breathlessness"). A rating within this range indicates that you are exercising at a proper level of intensity.

Borg Scale for Rating Perceived Shortness of Breath

0	Nothing at all.
0.5	Very, very slight (just noticeable).
1	Very slight.
2	Slight.
3	Moderate.
4	Somewhat severe.
5	Severe.
6	
7	Very severe.
8	
9	Very, very severe (almost maximal).
10	Maximal.



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5 Keys to PREVENTION of Neck & Back Injury

#1 **Posture**
By maintaining proper posture in all positions, you can reduce the stress on your spine. This helps to prevent back injury.

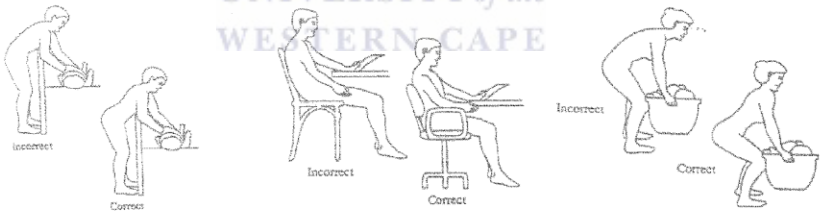
Check Your Standing Posture

To improve your standing posture, following these steps:

- Breathe deeply.
- Relax your shoulders, hips, and knees.
- Think of the ears, shoulders, hips, and ankles as a series of dots. Now, adjust your body to connect the dots in a straight line.
- Tuck your buttocks in just a bit if you need to.

#2 **Rest**
Proper rest is vital to the maintenance and function of a healthy back.

#3 **Body mechanics**
It is important to keep your back "locked in" while performing all activities. This means that you should maintain proper posture while performing all activities. The following are examples of *correct* and *incorrect* ways of doing everyday activities. Notice the position of the spine in the *correct* examples.



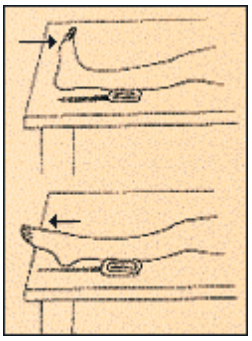
#4 **Lifting**
Most back injuries occur while lifting! Use proper lifting techniques to prevent injury.

#5 **Exercise**
Make it your goal to maintain good mobility and strength in your back. ***Exercise should be a daily routine activity for the rest of your life!***

Hedenschoug, K. (2006). Department of Physical Therapy: University of Missouri, Columbia.

H3: ANKLE EXERCISES - Strengthen Your Feet and Ankles

1. **Ankle Dorsiflexion and Plantar flexion**



Place a rolled-up towel under your left calf. Move your foot up toward your body. Keep your knee straight. Hold this position for six seconds. Then move foot slowly downward and hold for six seconds. Return to starting position and do six repetitions. Repeat the entire exercise with the other leg.

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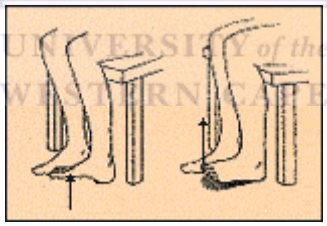
2. Foot Inversion and Eversion, Active



Sit up straight with your back firmly against the back of a chair. Slowly turn your left foot inward. Hold this position for six seconds. Then turn foot very slowly outward and hold for another six seconds. Repeat this exercise six times. Repeat entire exercise with right foot. (To make exercise a strengthening exercise, add weights.)

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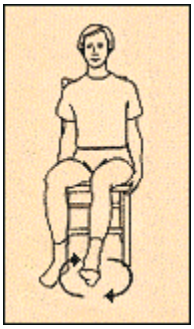
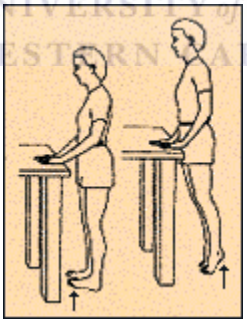
3. Ankle Dorsiflexion, Plantar flexion, Inversion and Eversion- Ankle Circles



Sit up straight with your back firmly against the back of the chair. Slowly move your left foot in a circle moving clockwise. Repeat this movement six times. Then slowly move the same foot in a circle counter-clockwise. Repeat this movement six times. Repeat the entire exercise with the right foot.

4. Ankle Dorsiflexion and Plantar flexion - Active



Stand in front of a table. Place your hands on the table and raise yourself up on your toes. Remain on toes for six seconds. Then slowly return to standing position and rock back on heels. Hold position for six seconds. Repeat this six times.

5. Ankle Plantar flexion - Stretching

Stand with forearms on wall, left toes close to wall, right foot behind. Toes on the right foot face inward (toward the middle of your body). Roll weight gently to outside border of the right foot. Lean body forward with back leg straight. Keep heel on floor. Stretch is felt in the calf. Hold for six seconds. Repeat with opposite leg and hold again for six seconds. Repeat entire stretching exercise six times.

H4: OFFICE ERGONOMICS EXERCISE SHEET

GET ACTIVE AT WORK

Shoulder Shrugs
- Raise shoulders towards ears
- Hold
- Relax downward to a normal position

Upper Back Stretch
- Interlace fingers behind head with elbows out
- Pull shoulder blades together
- Hold 5 seconds, then relax

Neck Tilts
- Keep shoulders relaxed and arms hanging loosely
- Tilt head sideways, first to one side, then the other
- Hold 5 seconds on each side

Wrist/Forearm Stretch
- Place hands palm to palm
- Move hands downward, keeping palms together and elbows even
- Hold 5-8 seconds

Wrist/Forearm Stretch
- Place hands palm to palm
- Rotate palms around until they face downward keeping elbows even
- Hold 5-8 seconds

Hand/Finger Stretch
- Separate and straighten fingers
- Hold 10 Seconds
- Bend fingers at knuckle and hold 10 seconds
- Separate and straighten again

Back and Hip Stretch
- Bend left leg over right leg and look over left shoulder
- Place right hand on left thigh and apply pressure
- Repeat for right side

Back Stretch
- Lean forward
- Keep head down and neck relaxed
- Hold 10-20 seconds
- Use hands to push yourself back up

Upper Body Stretch
- Interlace fingers, turn palms upward and straighten arms above head
- Elongate arms to stretch through upper sides of your rib cage
- Hold 10-15 seconds
- Breathe deeply

Side Stretch
- Hold left elbow with right hand
- Gently pull your elbow behind your head to feel stretch in shoulder or back of upper arm
- Hold 10 seconds
- Don't overstretch or hold breath
- Repeat on right side

Hamstring Stretch
- Sitting, hold onto upper left leg just above and behind the knee
- Gently pull bent knee toward chest
- Hold 15-20 seconds
- Repeat on right leg

Neck Stretch
-Sit or stand with arms hanging loosely
- Gently tilt head forward
- Keep shoulders relaxed and downward
-Hold 5 seconds

THIS IS A GUIDE ONLY!

If you feel: -Pain -Discomfort -Numbness -Tenderness -Tingling -Clumsiness -Loss of Strength & Flexibility
STOP EXCERCISING AND CONTACT A HEALTH PROFESSIONAL

APPENDIX I: INFORMATION SHEET FOCUS GROUP DISCUSSION

INFORMATION SHEET-FOCUS GROUP DISCUSSION

Project Title: The effect of a knowledge-based ergonomic intervention amongst administrators at Aga Khan University Hospital, Nairobi

What is this study about?

This is a research project being conducted by Nancy Wanyonyi at the University of the Western Cape. We are inviting you to participate in this research project because you have been identified as a potential research participant since your occupation and nature of work directly suits the description of my research. The purpose of this research project is to identify the knowledge of office workers regarding how they conduct themselves while working so as to reduce straining their low back and neck muscles. With the nature of office work which requires long periods of sitting working on your computers or any other desk related jobs, it has been noted with concern that there is an increase in neck and low back pains. These pains when not taken care of at an early stage can progress into some form of disability. The information gained from this study will help us design programmes that will help to educate the participants on identifying the predisposing factors in the work environment and therefore monitor their behaviours in both the work and house environment. This will in return decrease the amount of strain put on your low back and neck muscles while working and therefore improve your quality of life.

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

You will be asked to participate in a focus group discussion where you will share your experience on the value of the information provided during the knowledge based intervention and how it assisted you. The duration of the focus group discussion may last between one to two

hours and it will be guided by a broad question with probes e.g. How did the intervention impact in your day to day life? Are you doing anything differently than before in your office or at home? What are the challenges that you have faced during your adjustment process?

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. Only the researcher and the research supervisor will know that you participated in the study. To help protect your confidentiality, your answers will be locked in a filing cabinet and storage areas using identification codes only on data forms and using password-protected computer files. The surveys are anonymous and will not contain information that may personally identify you.If we write a report or article about this research project, your identity will be protected to the maximum extent possible. By taking part in this focus group discussion you as a participant shall also be required not to disclose any information shared during this forum. Accepting to participate shall automatically be taken as an acceptance to the confidentiality clause.

In accordance with legal requirements and/or professional standards, we will disclose to the appropriate individuals and/or authorities information that comes to our attention concerning abuse or neglect of disabled or other vulnerable adults that may need to be disclosed to comply with legal requirements or professional standards.

Audio taping/Videotaping/Photographs/Digital Recordings

This research project involves making ***audiotapes*** of you. The purpose of audio taping is to capture all the relevant information during the focus group discussion as it may be not be possible to write out everything being discussed.

___ I agree to be audiotaped during my participation in this study.

___ I do not agree to be audiotaped during my participation in this study.

What are the risks of this research?

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

What are the benefits of this research?

The benefits to you include increased awareness of the predisposing factors to low back and neck pain in your work and home environments. This research is not designed to help you personally, but the results may help the investigator learn more about the knowledge of office workers regarding ergonomics on low back and neck pains. We hope that, in the future, other people might benefit from this study through improved understanding of the predisposing factors involved and take the necessary preventative measures.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

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

Action will be taken to refer any participants requiring further attention to the relevant health professional.

What if I have questions?

This research is being conducted by Nancy Wanyonyi of the Physiotherapy Department at the University of the Western Cape. If you have any questions about the research study itself, please

contact Nancy Wanyonyi at: University of Western Cape, Private Bag X17, Bellville 7535, Tel. +27790814507, +254721541080

E-mail: wanyonyi_nancy@yahoo.com

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

Head of Department: Prof. Julie Phillips

Dean of the Faculty of Community and Health Sciences: Prof. Ratie Mpofu

University of the Western Cape

Private Bag X17

Bellville 7535

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

APPENDIX J: FOCUS GROUP INFORMED CONSENT FORM

CONSENT FORM

Title of Research Project: The effect of a knowledge-based ergonomic intervention amongst administrators at Aga Khan University Hospital, Nairobi

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name……

Participant's signature……

Witness……

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: Nancy E. Nekoye Wanyonyi

University of the Western Cape

Private Bag X17, Belville 7535

Telephone: (021)959-2542

Cell: +27790814507, +254721541080

Fax: (021)959-1217

Email: wanyonyi_nancy@yahoo.com

APPENDIX K: INTERVIEW GUIDE

Focus Group Discussion

1. How did the intervention impact in your day to day life? What are you doing differently than before in your office or at home?
    - Breaks at work?
    - Seat adjustment.
    - Posture
2. What changes have you made in your lifestyle after the intervention? If yes what changes? If no, why is that?
    - Recreational activities, e.g. walking, swimming, gym
    - Parking a car at a distance to allow you to walk
    - Shopping? How do you deal with loads?
3. What are the challenges that you have faced during your adjustment process? How have you overcome them?
    - Personal factors
    - Environmental factors
    - Physical factors
4. Would you confidently recommend the following programme to another and why?