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# EMPLOYEE WELLNESS PROGRAMME IN CLOTHING/TEXTILE MANUFACTURING COMPANIES: WHAT ARE THE EFFECTS?

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**Dissertation submitted in fulfilment of the research requirements  
for the Master of Science in Physiotherapy Degree**

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## Declaration

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## Abstract

### **Employee Wellness Programme in Clothing/Textile Manufacturing Companies: What are the effects?**

**Introduction:** The prevalence of health risk behaviours is growing amongst South African employees. Health risk behaviours have been identified as a major contributor to reduced health related quality of life (HRQoL) and the increase prevalence of non-communicable diseases. Worksite wellness programmes promise to promote behaviour changes amongst employees and to improve their HRQoL.

**Aims:** The aim of this study was to evaluate the short-term efficacy of an employee wellness programme on HRQoL, health behaviour change, levels of self efficacy, pain intensity, body mass index (BMI) and absenteeism amongst clothing and textile manufacturing employees.

**Methods:** The study was a randomised control trial consisting of 80 participants from three clothing manufacturing companies in South Africa. The experimental group was subjected to a wellness programme based on the principles of cognitive behaviour therapy (CBT) as well as weekly supervised exercise classes over six weeks. The control group received a once-off health promotion talk and various educational pamphlets, with no further intervention. Measurements were recorded at baseline and at six weeks post-intervention. Outcome measures used included the EQ-5D, Brief Pain Inventory-SF, Stanford Exercise Behaviours Scale, Stanford Self-Efficacy Scale, Stanford Self-Rated Health Scale, BMI and absenteeism.

**Data Analysis:** All the data were analysed with the Statistica-8 software program. Although t-tests are the most commonly used statistical method for evaluating the differences in the means between two groups (e.g. control and experimental), it assumes that the variable is normally distributed. Thus, because the ordinal data were not normally distributed, non-parametric tests were used to evaluate the differences in the medians between the two groups and to determine the level of significance. The Sign test was used in place of the paired t-test to determine the within group changes. The Mann-Whitney U test was used in place of the independent t-test to determine the difference between the two groups.

**Results:** The experimental group consisted of 39 subjects. At six weeks post intervention the experimental group demonstrated improvement in almost every parameter. In contrast, apart from an overall decrease in time off work, there was no change noted in the behaviour of the control group. Seventy percent of the experimental group had improved HRQoL VAS scores post intervention, indicating improved perceived HRQoL. In comparison, only 58% of the control group had improved HRQoL VAS scores post intervention.

**Conclusion:** An employee wellness programme based on the principles of CBT combined with weekly aerobic exercise class was beneficial in improving the HRQoL and changing health-related behaviours of clothing/textile manufacturing employees.

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## Glossary

**Body Mass Index (BMI):** Body mass index is a measure of an individual's weight in relation to his/her height. To calculate BMI measure the weight in kilograms and divide by the height in meters squared.

**Brief Pain Inventory Scale-Short Form (BPI-SF):** A derivative of the longer version of the Brief Pain Inventory Scale. It is a self-report questionnaire used to measure pain intensity and pain interference with functional abilities.

**Clothing Industry Health Care Fund (CIHCF):** A fund specific to clothing manufacturing industry workers that provides primary level health care services to its members.

**Cognitive behaviour therapy (CBT):** Psychosocial therapy that emphasises replacing maladaptive thoughts with more positive and desirable ones' in an attempt to improve functional ability and participation in society.

**Depression Anxiety Stress Scale (DASS-21):** A self-report measure of an individual's level of depression, anxiety and stress.

**EQ-5D:** A standardised generic instrument created by the Euroqol group, and used to measure health-related quality of life.

**Health risk behaviours:** Lifestyle actions that negatively impact on one's health.

**Health-Related Quality of Life (HRQoL):** Refers to the subjective report of the physical, mental, social and emotional wellbeing of an individual.

**Lower back Pain (LBP):** Pain experienced in the lumbar and sacral region.

**Occupation:** The work a person does regularly to earn his/her living.

**Perceived Stress Scale (PSS):** A global measure of self-reported stress levels.

**Primary Health Care (PHC):** Health care that is provided by a health care professional in the first contact of an individual within the health care system.

**Repetitive Strain Injury (RSI):** A collective term that is given to musculoskeletal injuries caused by continuous movements.

**Short-Form 36 (SF-36):** A questionnaire comprising of 36 questions that is used to measure health related quality of life.

**South African Demographic and Health Survey (SADHS):** National health survey performed amongst the general South African population.

**Self-Rated Health (SRH):** Self-Rated Health refers to an individual's perception or rating of their health state.

**Wellness:** The condition of good physical, mental, social and emotional health, especially when maintained by an appropriate diet, exercises and other lifestyle modifications.

**World Health Organisation (WHO):** A United Nations agency that co-ordinates international health activities.

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## **Chapter 1: Introduction**

### **1.1) Background to the Study:**

The achievement and promotion of health is a major concern for individuals and societies across the globe. Previously, health promotion initiatives were focused primarily on preventing disease and death. However, the global shift in the burden of disease from infectious diseases to chronic diseases of lifestyle has seen more emphasis placed on the promotion of healthier lifestyles. This is in alignment with the principles of the Ottawa Charter which advocates that health promotion should provide people with the knowledge of how to improve and maintain good health (Puoane, 2009).

The fundamental characteristic of chronic diseases is the significant influence it has on the functional ability of the individual and their interaction with their home, work and social environment.

Therefore, health-related quality of life (HRQoL) is now accepted as a suitable health outcome for evaluating health interventions. HRQoL refers to an individual's perception of their health state, and their ability to function in their environment (Jiang & Hesser, 2008). Health risk-behaviours are considered significant predictors of individuals health-related quality of life (Wolin, Glynn, Colditz, Lee, & Kawachi, 2007). Health risk-behaviours refers to daily actions which people engage in that negatively affect their health (Prochaska, Spring & Nigg, 2008).

The prevalence of health risk behaviours is growing among South African employees (Kolbe-Alexander et al., 2008). No formal evaluation has been performed on the prevalence of health risk-behaviours amongst South African clothing or textile industry workers but numerous other studies performed throughout South Africa in both rural and urban communities reported a high prevalence of health risk-behaviours among South African adults (Thorogood, Connor, Tollman, Lewando-Hundt, Fowkes, & Marsh, 2007; Joubert, Norman, Bradshaw, Goedecke, Steyn, & Pouane, 2007; Alberts et al., 2005; Steyn et al., 2004).

Physical inactivity, obesity, smoking, poor diet and excessive alcohol consumption have been identified as the leading health risk-behaviours associated with poor health profiles (Prochaska et al., 2008). The presence of multiple health risk behaviours within an individual multiplies the harmful effects. Several studies have reported that multiple health risk-behaviours often exist within individuals (Prochaska et al., 2008; Kolbe-Alexander et al., 2008; Alberts et al., 2005). This can be attributed to the inter-relationship that exists between these behaviours (Emmons, Linnan, Shadel, Marcus, & Abrahams, 1999).

Previous studies report that physical inactivity is associated with reduced wellbeing, diminished self-efficacy, increase pain intensity, poorer mental health status and increased risk of premature death (Wolin et al., 2007; Sawatzky, Liu-Ambrose, Miller, & Marra,

2007; Warburton, Nicol, & Bredin, 2006; Sjgren et al., 2006; Hoffman, Shepanski, Mackenzi, & Clifford, 2005). Similarly, obesity also increases the risk of morbidity and mortality, and decreases one's health related quality of life (Dinc et al., 2006). In addition, research suggests that poor mental health state increases the risk of adopting unhealthy behaviours such as overeating, smoking, and excessive alcohol intake (Kobau, Safran, Zack, Moriarty, & Chapman, 2004).

Social circumstances, environmental factors and occupational exposures can further increase an individual's risk of adopting unhealthy behaviours. Previous studies have reported that long working hours, increased job demands and reduced sleeping patterns to be associated with increased alcohol intake, heavy smoking and increased body mass index (Marchand, 2008; Chaput, Despres, Bouchard, & Tremblay, 2007; Green & Johnson, 1990). Similarly, the lack of job satisfaction, burnout, fear of job loss and strained employee relations with employer can impact on mood and concentration at work. This in turn could lead to increase in sickness absence and decreased productivity. Prolonged reduction in mood and motivation are regarded as the initial stages of developing depression or mood related disorders (Woo & Postolache, 2008). These psychosocial factors predispose employees to developing chronic musculoskeletal conditions such as lower back pain (LBP), neck pain or upper-limb repetitive strain injuries (RSI) (Anderson et al., 2002; Bongers, De Vet, & Blatter, 2002; Chatterjee, 1987).

RSI and LBP are not life threatening disorders, but they are the leading causes of pain and disability amongst manufacturing industry workers, and are associated with reduced HRQoL (Gross & Battie, 2006; Riihimaki, 1995). This can be attributed to occupational exposures such as repetitive work tasks, prolonged static postures, heavy lifting and intensive physical labour. Therefore, RSI and LBP are extremely prevalent amongst textile and clothing manufacturing workers (Jianmongkol, Kosuwon, Thumroj, & Sumanont, 2005). In Europe and America, RSI accounts for over 50% of all reported occupational injuries (Taylor, 2002; Konijnenberg, de Wilde, Gerritsen, van Tulder, & de Vet, 2001). The South African Demographic and Health Survey (SADHS) performed in 1998, reported that 30% of all reported occupational injuries in South Africa were musculoskeletal in nature (SADHS, 1998). This figure may be underestimated, as quite often these injuries may be left unreported.

Occupation related musculoskeletal disorders and health risk behaviours lead to increased health care utilisation. This places an increased financial burden on the employee as well as the employer. According to South African union representatives, the high rates of sickness absenteeism amongst South African clothing industry workers, is attributed to substance abuse (Prince, 2009). The increasing rates of absenteeism coupled with the decline in productivity have placed the South African clothing industry under considerable economic pressures.

Workplace health and wellness programmes offer great benefits to employees. Several studies have reported improved HRQoL, self-efficacy and physical activity levels amongst workers following participation in a worksite intervention programme (Larson, Karlqvist, & Gard, 2008; Nieuwenhuijsen 2004; Dahl & Nilsson, 2001; Emmons et al., 1999). Other studies have also reported that participating in supervised graded exercise programmes at the workplace improves the physical capacity and fitness levels of the participants, as well as reducing their body mass index (Hewitt, Whyte, Moreton, Van Someren, & Levine, 2008; Amati et al., 2007; Atlantis, Chow, Kirby, & Fiatarone-Singh, 2006).

Cognitive behaviour modification therapy (CBT) is a biopsychosocial approach that requires active client participation in changing health related behaviour. It consists of three components namely patient education, behavioural skills training and cognitive skills development (Ackerlind & Okifuji, 2007). This approach has been successful in reducing weight amongst obese participants (Kim, Park, & Lim, 2007), and in the management of chronic pain (Wigers & Finset, 2007). CBT has been effective in achieving long-term changes, since it allows the participant to set their own goals and identify strategies that work best for them. (Wigers & Finset, 2007). This approach together with physical activity has been reported as being most effective in producing a change in health related behaviour (Blissmer, Riebe, Dye, Ruggiero, Geoffrey, & Caldwell; 2006).

Workplace wellness programmes not only benefits the employees but promises to improve the economic functioning of a company as well. In a manufacturing industry a healthy, happy and painfree employee is likely to be more efficient at performing their work duties and hereby enhance the companies production and profit.

## **1.2) Context of Research**

South Africa, which is a rapidly developing country, relies significantly on its clothing and textile industry as source of employment. The South African Clothing and Textile Industries are geographically concentrated in the metropolitan areas of the Western Cape, Kwa-zulu Natal and Eastern Cape Provinces. Due to the growing number of informal traders, it is difficult to determine the exact number of clothing and textile factories in South Africa, but in 2004 there were approximately 1600 clothing and textile factories registered with the Clothing, Textile, Footwear, and Leather Sector Education and Training Authority (Vlok, 2006). The majority of workers employed in the clothing manufacturing industry are females (Vlok, 2006; Salm, 2002) and approximately 94% of those are black (Vlok, 2006).

The Clothing Industry Health Care Fund (CIHCF) has seven health clinics situated in various parts of the Western Cape Province that provides a primary level health service to its members (Mohamed, Tsolekile, & Puane, 2008). In 2008, the CHICF consisted of approximately 33000 principle members, of which majority were female (Mohamed et al., 2008).

### **1.3) Aim and objectives**

The aim of the study was to evaluate the efficacy of an employee wellness programme in three clothing/ textile manufacturing companies in the Cape Town Metropolitan Region.

#### **Objectives:**

In a sample of employees randomly selected from volunteers from three clothing manufacturing companies, the objectives were:

- To compare the demographics of the two groups in terms of gender, age, level of education, home language and skill using frequency distributions to ensure equivalence.
- To compare the health status of the sample groups with regard to HRQoL, self-efficacy, perceived stress levels, exercise behaviours and body mass index (BMI) to ensure equivalence.
- To determine if an employee wellness programme has an impact on health-related quality of life, using the EQ-5D.
- To determine if an employee wellness programme has an impact on pain perception, pain intensity and interference with daily functions, using the Brief Pain Inventory Short Form (BPI-SF) Questionnaire.
- To assess the short-term effects of a wellness programme on perceived health state using the Stanford Self-Rated Health questionnaire.
- To assess the short-term effects of a wellness programme on physical activity, using the Stanford Exercise Behavior Scale.
- To assess the short term effects of a wellness programme on levels of self-efficacy using the Stanford Social/Role Activities Limitations Scale.
- To determine if an employee wellness programme has an effect on staff morale and stress, using the perceived stress scale (PSS).
- To determine whether the implementation of a wellness programme, results in a significant change in:

- Number of sick-days off work
- BMI

#### **1.4) Significance of the Study:**

The South African Clothing manufacturing industry is currently facing huge economic challenges. Statistics South Africa reported that production figures in the clothing industry declined significantly between 1999 and 2003 (Naledi, 2005). Although economists believe that the decrease in production figures is primarily attributed to rising clothing imports from the East (Naledi, 2005), the growing prevalence of health risk behaviours amongst South African adults may be a significant contributor. Health-risk behaviours increases ones' chance of developing musculoskeletal conditions such as lower back pain (LBP) and upper-limb repetitive strain injuries (RSI) (Vindigni, Walker, Jamison, Da Costa, Parkinson, & Blunden, 2005). LBP and RSI prevalence are particularly rife in clothing and textile manufacturing industries due to occupational exposures such as repetitive work tasks, prolonged sedentary postures, long working hours, and high job demands (Vindigni et al., 2005). An increase in predisposing factors multiplies the risk of developing musculoskeletal conditions. This in turn could increase employees' pain, disability and sickness absence and thereby negatively affect the production levels of the company.

The recognition that behavioural factors are the leading contributor to reduced HRQoL, and increase prevalence of non-communicable diseases is fundamental to the development and growth of health care services. Occupational health services in South Africa have improved over the last decade, but are still underdeveloped. According to Iman and Nuwayhid (2004) occupational health services are neglected in developing countries due to competing social, economic and political challenges. In addition, occupational health is still perceived as a luxury in many countries, which contradicts the WHO's definition of health. Occupational health researchers play a significant role in integrating health within society at large, and not addressing it in isolation in the workplace. Occupational health interventions should therefore pay more attention to the worker and his/her social influences and not be solely concerned with medical interventions and ergonomic adjustments at the workplace.

Health promotion interventions addressing health risk behaviours are increasingly offered in developed nations. These interventions are primarily provided at primary health care clinics. Within South Africa primary health care (PHC) services and clinic facilities are already over-loaded as the majority of the South African population rely on the public sector for their health care needs (Peltzer, 2009). Worksites are potentially a more suitable environment for the promotion of health and wellness. Worksites offer the opportunity to

reach a large percentage of the adult population (Emmons et al., 1999). The use of worksites to deliver health promotion programmes presents a more accessible and time-saving option for the working population.

Many studies have reported that females or mothers of a household can influence the health behaviours of spouses and children (Deeks, Lombaard, Michelmore, & Teede, 2009; Eastman, Corona, & Schuster, 2006). The South African clothing industry is a significant employer of females (Vlok, 2006) and the implementation of worksite health promotion interventions within the clothing industry offers the opportunity to reach a large portion of the adult female population. Therefore, the benefits of a worksite health promotion intervention programme within the clothing industry may over time extend beyond the targeted employee.

Although the benefits of workplace health and wellness programmes have been reported in several studies, these studies have primarily been performed in developed nations that have good health-care, occupation and social infrastructure (Van Wier et al., 2006; Galluci, 1995). Minimal literature is available as to the benefits of a worksite wellness programme in South Africa, and no previous employee wellness intervention study has been performed within the South African clothing or textile manufacturing industry. This study thereby aims to investigate the efficacy of an employee wellness programme within a specific occupational industry. Since South Africa relies significantly on its clothing and textile industry as a source of employment (Vlok, 2006), this study may assist the industry as well as the health sector in creating a working environment that not only serves as a platform for promoting health, but that enhances ones' chance of achieving better health and wellbeing. In addition, the wellness programme may decrease employee absenteeism and thereby provide a cursor as to how to address the growing problem of absenteeism.

## **Chapter 2: Literature Review**

### **2.1) Introduction:**

An extensive literature search was completed in order to highlight the prevalence of health-risk behaviours, the impact these behaviours have on employee health and wellness, the impact of health risk behaviours on the global burden of death, disease and disability, and their association with occupational productivity, the need for a worksite wellness intervention programme, and the efficacy of previous behaviour changing intervention programmes.

### **2.2) Health and Health Related Quality of Life**

#### **2.2.1) Defining Health:**

Over the centuries, health has been defined in many different ways (Ross & Deverell, 2004). The most accepted definition of health was formulated by the World Health Organisation (WHO) constitution of 1948 (Ross & Deverell, 2004). Health as defined by the WHO is “a state of complete physical, mental, and social well-being and not merely the absence of disease, or infirmity” (WHO, 1999). This definition places health in a broader, holistic context, and it refers to the dynamic balance and interaction between individuals and their environment (Larson et al., 2008; Koelen & van den Ban, 2004).

#### **2.2.2) Major causes of Ill-Health, Death and Disability:**

Over the last century, there has been a huge shift in the global burden of disease, from infectious diseases to chronic diseases of lifestyle (Maire, Lioret, Gartner, & Delpuech, 2002). This is particularly evident in developing nations, due to increased exposure to lifestyle modernisation (Maire et al., 2002). Chronic diseases of lifestyle or non-communicable diseases account for approximately sixty percent of the global disease burden (Laws, Jayasinghe, Harris, Williams, Davies, & Kemp, 2009). In South Africa, although infectious diseases such as HIV/AIDS and tuberculosis are still the main causes of morbidity and mortality, the burden of non-communicable diseases is growing rapidly (Tollman, Kahn, Sartorius, Collinson, Clark, & Garrenne, 2008). The South African Demographic and Health Survey (SADHS) performed in 1998 reported that nearly one third of all deaths in South Africa are attributed to non-communicable diseases (Kolbe-Alexander et al., 2008). The most common non-communicable diseases are hypertension, diabetes mellitus, and ischaemic heart disease (Adams, Morar, Kolbe-Alexander, & Jheebay, 2007). Behavioural risk factors have been identified as the leading causes of non-communicable diseases (Laws et al., 2009; Frantz, 2005; Coleman, Gill, & Wilkinson, 1998).

### **2.2.3) Health-Related Quality of Life and the Burden of Disease**

With the shift from infectious diseases to chronic diseases of lifestyle being the leading cause of death and disability around the world, health related quality of life has become an accepted indicator of the burden of disease (Jiang & Hesser, 2008). Health-related quality of life (HRQoL) refers to an individual's perception of their health state, and their ability to interact within their environment (Jiang & Hesser, 2008). HRQoL encompasses the social, functional and mental wellbeing of the individual and how this is influenced by disease or provision of health care (Guayatt, Feeny, & Patrick, 1993). However, social, mental and functional abilities should be observed within the individual's personal way of life, customs and norms, as this may influence the individual's perception of health state. With the increased prevalence of chronic diseases the focus of health-care has shifted to improving function, increased self-management and promotion of positive lifestyle behaviours. This shift is significant as people suffering from chronic diseases such as HIV/AIDS or diabetes are not only concerned about treatment prolonging life but also about how it will affect their daily functional abilities, as well as their functioning within society (Tsasis, 2000). Furthermore, HRQoL is a more appropriate measure of individual wellbeing as it accounts for the fact that health is not primarily influenced by disease or pathology but that other factors such as employment, social characteristics of the environment and lack of knowledge may adversely affect health (Herdman, Fox-Rushby, & Badia, 1998).

## **2.3) Health Risk-Behaviours**

### **2.3.1) Health Risk-Behaviours**

Health risk-behaviours has been defined as "actions in which individuals engage that negatively influence health" (Prochaska et al., 2008). Health risk behaviours such as physical inactivity, smoking, poor nutrition, and at-risk alcohol consumption are the main preventable risk factors associated with the development of non-communicable diseases (Laws et al., 2009; Frantz, 2005; Coleman et al., 1998). Other risk factors associated with the development of non-communicable diseases include overweight, obesity, hypercholesterolemia, age and gender (Biggs & Rhoda, 2008; Steyn et al., 2004; Coleman et al., 1998). Health risk-behaviours are significant predictors of individual's health-related quality of life (Wolin et al., 2007). Many studies have reported that physical activity is positively associated with improved wellbeing (Wolin et al., 2007), increased levels of self-efficacy (Rooks et al., 2007; Wolin et al., 2007), reduced pain levels (Sawatzky et al., 2007; Hoffman et al., 2005), improved mental health status (Smith, Blumenthal, Babyak, Georgiades, Hinderliter, & Sherwood, 2007), and reduced risk of premature death (Holth, Werpen, Zwart, & Hagen, 2008). A poor mental health state increases the risk of adopting unhealthy behaviours such as overeating, smoking, and excessive alcohol intake (Kobau et al., 2004). Smoking, alcohol consumption,

and sedentary lifestyle are all negatively associated with health-related quality of life (Arvidsson, Arvidsson, Fridlund, & Bergman, 2008; Wolin et al., 2007). Similarly, obesity and increased BMI is also negatively associated with emotional well-being and health-related quality of life (Bish, Blanck, Maynard, Serdula, Thompson, & Khan, 2007).

### **2.3.2) Prevalence of Health-Risk Behaviours**

Several studies performed throughout South Africa in both rural and urban communities reported a high prevalence of health risk behaviours among South African adults (Thorogood et al., 2007; Joubert et al., 2007; Alberts et al., 2005; Steyn et al., 2004). The South African Demographic and Health Survey (SADHS) performed in 2002 reported nearly half of the men and woman in the general South African population to be physically inactive, and 55% of the females to be overweight (Kolbe-Alexander et al., 2008). The highest prevalence was particularly evident amongst females (Thorogood et al., 2007; Alberts et al., 2005; Steyn et al., 2004). The literature suggests that multiple unhealthy behaviours often exist within individuals (Prochaska et al., 2008; Kolbe-Alexander et al., 2008; Alberts et al., 2005). This is largely due to the interrelationships that exist between the health risk-behaviours (Emmons et al., 1999). For example, sedentary or physically inactive individuals are more likely to be overweight or obese, and tobacco smokers (Blair, Jacobs, & Powell, 1985).

### **2.3.3) Association of Occupation and Health Risk Behaviours**

Occupation and occupational exposures are considered an important determinant of health (LaMontagne, 2004; Levy, Wegman, Baron, & Sokas, 2000). Working conditions can encourage certain health risk-behaviours. Long working hours, shift work and sedentary work promotes physical inactivity. High occupational demands and stress, or long hours of work may affect the eating habits of workers and lead to overweight or obesity. Similarly, an increase in work related stress such as fear of job loss; strained employee and employer relations and unrealistic deadlines could lead to a decrease in motivation and job satisfaction. Many studies have reported that increased occupational stress is closely linked to depression or mood disorders, as well as an increased alcohol intake (Marchand, 2008), smoking behaviours and drug abuse (Schulte et al., 2007; Kobau et al., 2004).

### **2.3.4) Association of Health Risk-Behaviours and Occupation-related diseases**

Health risk-behaviours have been identified as the main predisposing factors to the development of occupation-related musculoskeletal disorders (Vindigni et al., 2005; Fogelholm & Alho, 2001; Rosecrance & Cook, 1998). Several studies have found a significant association between physical inactivity, obesity or increased BMI and increased incidence of chronic musculoskeletal injuries (Holth et al., 2008; Vindigni et al., 2005;

Wearing, Henning, Byrne, Steel, & Hills, 2006; Moqtaderi, Izadi, & Sharafadinzadeh, 2005). Smoking and a BMI above 25 kg/m increases the risk of lumbar disc degeneration (Liuke et al., 2005). In addition, obesity and smoking has been closely associated with occupational-nerve compression syndromes (Novak, 2004). Regular physical activity improves musculoskeletal fitness which is associated with an improvement in overall health-state and functional ability (Warburton et al., 2006).

According to Aw, Gardeniner, and Harrington (2007), just as working conditions influence the worker's health, the pre-existing health-state of a worker also influences the worker's ability to perform his/her work duties. Obesity, chronic pain, and physical fitness levels can affect work performance (Aw et al., 2007; Schulte et al., 2007). A study performed by Gross and Battie (2005) reported that poorer performance on work functional capacity evaluations was associated with higher ratings of pain intensity and disability perception. Jusot, Khlal, Rochereau, and Sermet (2008) believe that people who develop chronic illnesses due to unhealthy behaviours such as smoking and obesity during their working life are less likely to cope with the demands of their job.

## **2.4) Occupation-related Musculoskeletal Disorders**

### **2.4.1) Occupation-related Repetitive Strain Injuries (RSI)**

Occupation-related musculoskeletal disorders are a major contributor to disability, ill-health and costs in the working populations (Larson et al., 2008; Bultmann et al., 2007). Lower-back pain and upper-limb repetitive strain injuries (RSI) are the most commonly reported musculoskeletal occupational injuries (Riihimaki, 1995). They are not life threatening, but significantly affect the quality of life of large portion of the adult population (Riihimaki, 1995). Repetitive Strain Injuries (RSI) is a cumulative term given to injuries involving repetitive trauma to muscles, peripheral nerves and tendons in the upper extremity and neck (Chatterjee, 1987). Many different terms are used to describe these pain syndromes, such as repetitive strain injuries, repetitive motion injuries, cumulative upper limb trauma, cumulative movement disorders, and work overuse upper limb injuries. Overuse has been defined as a level of repetitive micro-trauma sufficient to exceed the tissues' ability to adapt (Sheon, 2006). Work related RSI is believed to be caused or exacerbated by interaction with the work environment (Silverstein & Evanoff, 2006). Carpal tunnel syndrome, hand or wrist tendonopathy and tenosynovitis are the most commonly reported RSI's (Rosecrance & Cook, 1998). Others include rotator cuff tendonopathy and epicondylitis (Rosecrance & Cook, 1998). Symptoms of RSI include severe pain, weakness or reduced grip strength, numbness of fingers, burning sensation or tingling (Silverstein & Evanoff, 2006; Bongers et al., 2002). Initially symptoms may

present intermittently, but gradually over time may lead to chronic pain, impairment or disability (Silverstein & Evanoff, 2006).

#### **2.4.2) Prevalence of Occupation-related RSI and LBP**

In the past decade, the prevalence of RSI and LBP has significantly increased (Feuerstein, Callan-Harris, & Carosella, 1993). RSI accounts for over 50% of all reported occupational injuries in both America and Europe (Taylor, 2002; Konijnenberg et al., 2001). A paper by Van Vuuren, Van Heerden, Zinzen, Becker, and Meeusen (2002), states that approximately 30 000 people in South Africa suffer daily from back or neck pain. RSI and LBP is particularly rife in developing countries due to its rapidly growing industrial sector, as well as its below average occupational health and safety standards (Rantanen, Lehtinen, & Savolainen, 2004). LBP is most prevalent amongst manual labourers involved in heavy lifting, jobs involving constrained postures and in sedentary workers (Kwon et al., 2006; Tamrin et al.; 2006). Many studies have reported a high prevalence of RSI and LBP complaints amongst factory or textile industry workers (Sala, Albin, Borghesi, Gullino, Romano, & Apostoli, 2005; Choobineh, Lahmi, Hosseini, Shahnava, & Jazani, 2004; Anderson et al., 2002). According to the South African Demographic and Health Survey (SADHS) completed in 1998, 30% of all reported occupational injuries in South Africa were musculoskeletal in nature (SADHS, 1998). Similarly, a retrospective study performed at a beverage manufacturing company in South Africa, reported RSI as the most common type of occupational injury (Chetty, Jelsma, & Maart, 2007).

#### **2.4.3) Risk factors for RSI and LBP**

Posture, repetitive movements, ergonomics, and psychosocial issues have been identified as the major risk factors for developing RSI or LBP (Kwon et al., 2006; Sheon, 2006; Jianmongkol et al., 2005; Rosecrance & Cook, 1998; Chatterjee, 1987). Behavioural-risk factors such as obesity, physical inactivity and smoking are also closely associated with the development of LBP or RSI (Liuke et al., 2005; Novak, 2004). A population based study performed in Norway reported that musculoskeletal complaints were 28% less common eleven years later among individuals who participated in physical activity at least three times per week at baseline, in comparison to physically inactive individuals (Holth et al., 2008).

High job demands, job dissatisfaction, burnout, poor communication between staff and management, and monotonous work have been identified as the strongest work related psychosocial risk factors for developing RSI or LBP (Bongers et al., 2002; Anderson et al., 2002; Rosecrance & Cook, 1998). Age, gender, anthropometry and BMI have also shown to

have an effect on RSI prevalence (Rosecrance & Cook, 1998). Several studies have reported females as having an increase risk of developing RSI (Anderson et al., 2002; Nortander, Ohlsson, Balogh, Rylander, Palsson, & Skerfving, 1999; Ostergren et al., 2005).

## **2.5) Financial implications of poor health**

Sickness absenteeism is one of the biggest occupational challenges facing employers across the globe (Arnetz, Sjogren, Rydehn, & Meisel, 2003). RSI and LBP are the greatest causes of manpower loss and can lead to increased utilisation of health care services (Hlobil, Uegaki, Staal, de Bruyn, Smid, & van Mechelen, 2007; Kwon et al., 2006; Ostergren et al., 2005). In addition, LBP is the leading cause of disability claims in the workplace (Ammendolia, Cassidy, Eng, Howard, Bhupinder, & Cote, 2009; Hlobil et al., 2007). Several studies have reported obesity, increased BMI, migraine headaches, pain, burnout and mental health status as having a strong association with worker absenteeism and decreased productivity (French & Zarkin, 1998; Burton, Conti, Chen, Schultz, & Edington, 2002; Vincente-Herrero, Burke, & Lainez, 2004; Finkelstein, Fiebelkorn, & Wang, 2005; Arena, Padiyar, Burton, & Schwerha, 2006; Lin, Huang, & Wu, 2007). A study performed at a beverage manufacturing company in South Africa looking at the injury profile of its employees, reported a mean number of 2.9 (range 0-15) sick days off work due to occupational injuries annually (Chetty et al., 2007). According to Van Vuuren et al (2002) compensation costs for LBP in South Africa in 2000, amounted to approximately 20 million US dollars. In addition, the rising prevalence of health risk-behaviours places increased burden on healthcare as well as the economy (Prochaska et al., 2008; Coleman et al., 1998; Rosecrance & Cook, 1998). Poor health outcomes are often associated with unemployment (Jusot et al., 2008).

Although quantifying the financial effects of poor workers' health on companies is a difficult task, it is evident from the literature that poor health and wellbeing not only impacts on the daily functioning of the employee, but indirectly affects the productivity and functioning of the company.

## **2.6) Promoting Health and Wellness**

This section will explain the concept of health promotion and the theory of behavioural medicine. In addition, it discusses the feasibility of health promotion interventions at the worksite and the key role that physiotherapists can play.

### **2.6.1) Health promotion**

Achieving and maintaining good health is a universal goal as it is recognised that good health is essential for personal, economic and social development (Koelen & van den Ban, 2004). The Ottawa Charter advocates that in order for people to achieve their fullest health

potential, they need to be able to take control of the factors that determine their health (Ottawa, 1986). This process of empowering people to assume greater responsibility for their health and to improve their health and wellbeing, is known as health promotion (Ottawa, 1986). Health promotion is aimed at achieving better equity in health (Ottawa, 1986). It is regarded as a multifactor process, that involves education, prevention and protection measures (Frantz, 2005). Koelen and van den Ban (2004) emphasises that health promotion is a continuous horizontal process of information exchange and interaction, and not a unidirectional transmission of knowledge. Thereby, it is vital that health promotion strategies include active participation of the intended target population at all stages (Larson et al., 2008).

### **2.6.2) Health Promotion Strategies**

Health promotion strategies can be facilitated in school, home, work and community settings (Koelen & van den Ban, 2004). However, worksites promises to be the ideal setting for health promotion, as workers spend the majority of their waking hours at work (Dunet et al., 2008; Doak, 2002). In addition, Robroek, Bredt, and Burdorf (2007) believe that worksites offer the opportunity to reach a large portion of the adult population within a natural social environment. Worksite health promotion promises to assist employers to reduce their burden of health care costs and risk of occupational injuries, as well as improve productivity and reduce absenteeism (Dunet et al., 2008). Previous studies have also reported that employers who invest in worksite health and wellness initiatives, improve relations between managers and employees and build happier, and more loyal employees (Panepento, 2004).

### **2.6.3) Theory of Behaviour Medicine**

The recent growth and development of behavioral research has challenged and changed the management of chronic conditions (Prochaska et al., 2008). “Behavior medicine” recognises lifestyle and psychosocial factors as significant contributors to patients’ perception of state of health and pain (Ackerlind & Okifuji, 2007; Nieuwenhuijsen, 2004). The cognitive behavioral framework is based on the theory that patients’ perception and expectations of their condition are significant factors influencing their health-related quality of life and disability (Ackerlind & Okifuji, 2007). Similarly, the Self-Efficacy theory believes that environmental factors, behavior and cognitive processes such as beliefs and attitude shape an individuals’ health behaviour (Reineman, Geertzen, Groothoff, & Brouwer, 2008). Cognitive Behavioral Therapy (CBT) is the most common behavioral treatment approach used for chronic pain management (Donaghy, Nicol, & Davidson, 2008).

### **2.6.4) Changing health behaviours**

The factors most strongly associated with health behaviour change are self-efficacy, the intention to change one’s behaviour and perceived health status ((Nieuwenhuijsen, 2004). Self-efficacy is defined

as the belief in one's ability to perform a task (Wang, Li, Chang, Courtney, & Chang, 2007). Previous studies reported that patients embarking on health behaviour change prefer regular interaction with health professionals, rather than completely self-guided programmes (Kim et al., 2007; Cohen, Tallia, Crabtree, & Young, 2005; Carter, Gaskins, & Shaw, 2005). Therefore for effective health behaviour change, patients need to be equipped with the knowledge and tools on how to improve their state of health and wellness but they should always take responsibility for their own health (Woolf et al., 2005; Stewart, Eales, & Davies, 2002). A study performed amongst manufacturing workers, reported improved physical activity levels and increased fruit and vegetable consumption after participating in a worksite behavioural intervention programme (Sorensen, Barbeau, Stoddard, Hunt, Kaphingst, & Wallace, 2005).

### **2.6.5) Cognitive Behaviour Modification Therapy**

Cognitive Behaviour based health intervention programs have developed greatly over the last few decades (Martin & Macleod, 2008; Welschen, Van Oppen, Dekker, Bouter, Stalman, & Nijpels, 2007). These bio-psychosocial intervention programs have been used widely in the management of obesity, depression and chronic musculoskeletal pain (DeGraaf et al., 2008; Martin & Macleod, 2008; Kim et al., 2007; Karjalainen et al., 2003). Active participation of the patient is critical for the success of CBT (Ackerlind & Okifuji, 2007).

The three main components to Cognitive Behavior Therapy (CBT) are patient education, behavioral skill training and cognitive skill training (Ackerlind & Okifuji, 2007).

-Patient Education: This involves introducing the patient to the basic concepts of pain or disease pathology, and the psycho-physiological factors contributing to pain perception (Ackerlind & Okifuji, 2007). However, a distinctive feature of CBT programs is that the focus is not on pain or disability but rather on the impact of pain and the improvement of individual function (Martin & Macleod, 2008).

-Behavioral Skill Training: Initially patients are taught relaxation and controlled breathing exercise techniques to aid with decreasing anxiety and muscle tension (Ackerlind & Okifuji, 2007). Depending on the needs of the patient or group, aspects such as developing skills to improve interpersonal communication may be incorporated (Martin & Macleod, 2008).

-Cognitive Skill training: Cognitive training helps patients distinguish between emotional, physiological and behavioral responses to pain or stress triggers (Brown & Vanable, 2008; Ackerlind & Okifuji, 2007). It incorporates problem solving and self-efficacy strategies which teach patients to identify their response to pain triggers, to pace their activity and to set goals for themselves (Brown & Vanable, 2008; Martin & Macleod, 2008; Jenson, Nygren, & Lundin, 1994). According to Martin and Macleod (2008) the majority of chronic pain patients lack the skill to pace exercise programs. They therefore engage in too much exercise when they feel active, resulting in fatigue and pain flare-ups,

which then results in prolonged periods of inactivity (Martin & Macleod, 2008). Goal setting involves defining aims and setting specific, measurable, realistic and time-related targets to achieve those aims (Martin & Macleod, 2008). Pacing and goal setting are regarded as important skills to aid patients maintain behavior changes (Martin & Macleod, 2008; Jenson et al., 1994).

### **2.6.6) The role of Physiotherapists in health promotion and behaviour change**

Physiotherapy is a curative, rehabilitative, and preventative discipline that aims to restore optimal function within an individual in the home, work and community environment (Frantz, 2005). This holistic approach to patient management assists the patient in self-managing their condition, which is a significant factor in reducing health risk behaviours associated with non-communicable diseases (Frantz, 2005; Stewart et al., 2002). Physiotherapists have an important role to play in nurturing health promotion (Driver, 2006; Frantz, 2005) and in the management of musculoskeletal conditions.

### **2.7) Creation of a Worksite CBT Health and Wellness Programme**

This section will describe essential components of CBT programmes with regards to content and duration. It will also present the evidence supporting the use of such programmes.

#### **2.7.1) Worksite health promotion**

Worksite health promotion programmes based on the concept of CBT promises to not only promote health behaviour change but to also improve worker productivity and decrease absenteeism (Dunet et al., 2008; Prochaska et al., 2008; Novak, 2004). Prochaska et al (2008) believe that an intervention programme targeting multiple health behaviours is more effective than an intervention programme targeting a single behaviour change. Similarly, Ashbolt, Buchanan, Hoatson, and Munro (2006) reported that addressing ergonomic principles in isolation would be ineffective in reducing RSI in clothing factories.

#### **2.7.2) Exercise prescription guidelines and benefits**

The benefits of participating in regular physical activity has been established in many studies (Martin & Macleod, 2008; Pengal, Refshuage, Maher, Nicholas, Herbert, & McNair, 2007; Duncan et al., 2005; Hoffman et al., 2005). Exercise programs within a CBT intervention is focused on assisting patients to develop the skill of pacing and goal setting, in order to improve activity and participation (Martin & Macleod, 2008). Exercise prescription guidelines recommended by the American Heart Association suggests that moderate physical activity (e.g. aerobics, walking, cycling) performed at least three days a week for 30-minutes can produce changes in cardiovascular disease risk factors (Duncan et al., 2005). Previous studies have reported that supervised exercised programmes have resulted in improved outcomes for chronic pain patients (Pengal et al., 2007; Liddle, 2004).

### **2.7.3) Relaxation therapy**

Relaxation therapy has been used widely for the treatment of chronic pain, headaches and anxiety (Pearce & Erksskine, 1989; Ralston, 2008). Deep progressive muscular relaxation technique teaches patients how to relax their bodies major muscle groups by tensing and relaxing each muscle set (Ralston, 2008). Patients are taught to practice this relaxation technique twice daily initially, and then to try and apply it in various settings at home and at work (Ralston, 2008). Diaphragmatic breathing is another form of relaxation used by physiotherapists (Ralston, 2008). This involves focusing attention on the movement of the abdomen during slow controlled breathing (Ralston, 2008). According to O'Neil, Forsyth and Stanish (2001), a randomized control trial by Spence et al showed that applied relaxation training provided short-term relief of pain, and reductions in pain-related depressed mood amongst chronic upper-limb RSI patients. In another study by Stuckey, Jacobs, and Goldfarb (1986) relaxation training also significantly reduced pain and EMG activity of the Upper Trapezius Muscle. CBT teaches patients the skills of applying relaxation therapy at home and at work (Ralston, 2008; Martin & Macleod, 2008).

### **2.7.4) Structure and duration of Health Promotion Programmes**

Although content and delivery of CBT programmes may differ, its fundamental aim is to promote health behavior change through a collaborative partnership between patient and health-care practitioners (Martin & Macleod, 2008; Stewart, Eales, & Davies, 2002). Research shows varying durations of health promotion intervention programmes ranging from one day to 12 months (Johnson et al., 2007; Atlantis et al., 2006; Dahl & Nilsson, 2001). Thus far studies have not investigated the required duration or exposure time of an intervention programme (Merril, Aldana, Greenlaw, Salberg, Diehl, & Engelert, 2008). However, several studies have reported significant changes in health behaviours (diet, physical activity, self-efficacy), pain and health related quality of life from intervention programmes of four to six weeks duration (Merril et al., 2008; Johnson et al., 2007; Huge et al., 2006; Dahl & Nilsson, 2001). The British Pain Society recommends that outpatient pain behaviour management programmes should last between six to eight weeks with patients attending one to two sessions per week (Martin & Macleod, 2008).

### **2.7.5) Effects of previous behavior-change interventions**

Intervention programmes targeting multiple health behaviours have proven to be more effective than isolated programmes (Prochaska et al., 2008; Kim et al., 2007). A study performed in the United States of America (USA) amongst computer and office workers, addressing the impact of an RSI intervention programme, reported a 62% improvement in behaviour change of the participants (Nieuwenhuijsen, 2004). The implementation of a multidisciplinary work rehabilitation programme for workers suffering from RSI resulted in 74% of the

participants returning to work post completion of the intervention programme (Feuerstein et al., 1993). Of those workers, 91% were able to return to their normal job requirements (Feuerstein et al., 1993). Functional restoration programmes for chronic lower back pain sufferers has shown to significantly improve certain aspects of health related quality of life (Huge et al., 2006). A study by Haines et al (2007) reported significant improvements in the employees perceived health and wellbeing after participating in a 12-week computer-based educational programme. In their study, participants had to rate their perceived wellness with regards to fitness levels, mood, health awareness, nutrition habits, anxiety and happiness on a five-point Likert scale. In another study, Maes, Verhoeven, Kittel, and Scholten (1998) reported significant reductions in absenteeism following participation in a 12-month supervised exercise and education programme. The majority of interventions investigating the effects on health behaviour change have made use of self-report outcome measures (Larson et al., 2008; Aldana, Greenlaw, Diehl, Salberg, Merrill, & Ohmine, 2005; Sorensen et al., 2005).

## **2.8) Outcome measures and Instrumentation:**

An outcome measure quantifies a change in a patients' status over time and allows for standardisation in assessments (Kane, 1994). Previously, health care professionals mainly used performance-based functional measures to assess functional working ability or efficacy of an intervention programme (Gross & Battie, 2005). However, over the last two decades, patient reported health-outcomes have replaced physiological tests as the primary choice of outcome measures (Bryant, Schunermann, Brozek, Jaeschke and Guyatt; 2007). This is particularly true for studies testing the efficacy of an intervention (Bryant, Schunermann, Brozek, Jaeschke, & Guyatt, 2007). A study by Gross and Battie (2005) reported that the workers' performance on a worksite functional capacity evaluation was largely influenced by the individuals' perception of their pain levels, as well as their perceived disability status. Higher self-efficacy beliefs were also strongly associated with higher functional lifting performance (Asante, Brintnell, & Gross, 2007). Therefore, the subjective measure of health status and pain perception is considered as a more important measure if the goal of intervention is to improve health-related quality of life, rather than to prolong life (Bryant et al., 2007).

### **2.8.1) EQ-5D**

There are a large number of measuring instruments available for measuring health related quality of life (Picavet & Hoeymans, 2004). The EQ-5D and SF-36 are the two commonly used generic instruments for assessing health-related quality of life (Whynes & Tombola, 2008; Picavet & Hoeymans, 2004). The EQ-5D is a self-completion questionnaire that was developed by the EuroQol group. It encompasses two components, the first being a descriptive health state and the second being an evaluation of perceived health (Whynes & Tombola, 2008). The descriptive health state consists of

five domains namely mobility, self-care, usual activities, pain and anxiety/depression. Respondents rate their state of health by selecting one of three levels (no problems, moderate problems, severe problems) within each health domain (Picavet & Hoeymans, 2004). Each level within each descriptive domain determines a specific health state. These health states can be converted into a total utility index score by applying preference weights derived from previous EQ-5D population sample studies (Grandy & Fox, 2008). The utility scores consist of a range from -0.594 which indicates death or worst health to one which indicates best possible health (Jelsma, Hansen, DeWeerd, DeCock, & Kind, 2003). The primary advantage of being able to convert the responses of the descriptive domains into utility scores is that it allows one to use the response as a cardinal value which reflects the value of social preferences through health states (Sakthong, Charoenvisuthiwongs, & Shabunthom, 2008). The second component of the EQ-5D is a visual analogue scale (VAS) ranging from zero to one-hundred on which subjects can rate their health, with zero being the worst health and one-hundred being the best possible health (Jelsma & Ferguson, 2002). Although the SF-36 has been proven reliable in a study looking at the effects of health promotion programmes on health related quality of life in the United States of America (Blissmer et al., 2006), the EQ-5D has been proven to be both reliable and valid across various population groups in South Africa (Jelsma & Ferguson, 2002). The added advantage of the EQ-5D is its simplicity and shortness (Picavet & Hoeymans, 2004). The Xhosa version of the EQ-5D has also proven to be both reliable and valid in a Xhosa speaking population (Jelsma, Mkoka, Amosun, & Nieuwveldt, 2004).

### **2.8.2) Brief Pain Inventory Short Form (BPI-SF)**

The McGill Pain Questionnaire and the Brief Pain Inventory Short Form (BPI-SF) are two commonly used pain assessment tools (Shin, Kim, Kim, Chee, & IM, 2007). The BPI-SF Questionnaire has mainly been tested amongst cancer patients, but has been proven to be a reliable and valid chronic pain assessment tool (Osborne, Raichle, Jansen, Ehde, & Kraft, 2006). The BPI has been validated in several different languages in Europe (Gjeilo, Stenseth, Wahba, Lydersen, & Klepstad, 2007; Kalyadina et al., 2008; Bonezzi et al., 2002). It was chosen as a pain-measuring instrument for this study, as it is a multi-dimensional self-administered questionnaire that measures the severity of pain experienced by an individual as well as the interference pain has on daily functions (Gjeilo et al., 2007).

The BPI-SF is a one page questionnaire consisting of fifteen questions. It measures individual perception of pain intensity, location, pain treatment, treatment effectiveness and functional interference from pain (McDonald et al., 2008). The areas covered in the functional interference section are general activity, mood, walking ability, work, relations with people, sleep, enjoyment of life, ability to concentrate, and appetite. The degree of pain interference is rated on an eleven point numerical rating scale (NRS), ranging from zero (no interference) to ten (total interference). A general

disability score can be obtained by summing the ratings of the functional categories (McDonald et al., 2008; Shin et al., 2007).

While the McGill Pain Questionnaire has been used as a pain assessment tool in many studies (Burckhardt & Jones, 2005), the BPI-SF is much simpler and easy to use (Gjeilo et al., 2007). The Short-Form McGill Pain Questionnaire (SF-MPQ) is a derivative of the longer McGill Pain Questionnaire and consists of fifteen descriptors (Neugebauer, Han, Adwanikar, Fu, & Ji, 2007). The respondents are required to rate these descriptors on an intensity scale ranging from zero to three, with zero being no pain and three being severe pain. The second component of the SF-MPQ includes the Present Pain Intensity (PPI) index and a Visual Analogue Scale (VAS) (Neugebauer et al., 2007). However, although the McGill Pain Questionnaire is a valid and reliable pain assessment tool, the ability of the Short-Form McGill Pain Scale to detect change has barely been tested (Strand, Liunggren, Bogen, Ask, & Johnson, 2008).

### **2.8.3) Perceived Stress Scale**

The Perceived Stress Scale is one of the few stress scales that measures a global level of stress. The Perceived Stress Scale-ten (PSS 10) is a ten-point questionnaire that measures the degree to which situations in one's life are appraised as stressful (Cohen & Williamson, 1998). It was chosen as a stress-measuring tool in this study as it is a short and easy to use questionnaire, appropriate for use by subjects with at least a junior high school education (Cohen, Kamark, & Mermelstein, 1983). The questions asked are general in nature and non-content specific, thereby making it appropriate for use among different population groups (Cohen et al., 1983). Very little literature is available as to the PSS 10 use in South Africa, but a study performed in the USA, looking at the perceived stress levels in a probability sample reported the PSS 10 to have significant internal reliability (Cohen & Williamson, 1998). The PSS has been proven to be both valid and reliable in numerous studies that have evaluated the effects of an educational intervention programme (Chen, Tseng, Chou, & Wang, 2000; Cohen et al., 1983).

The DASS-21 scale has also been used frequently as an outcome measure for stress reducing interventions (Edimansyah, Rusli, & Naing, 2008; Stallman & Ralph, 2007). This questionnaire comprises of three sub-scales, namely DASS-depression, DASS-anxiety and DASS-stress. The DASS-stress component measures the respondent's ability to relax, frequency of nervous arousal and reactions to stressful events (Edimansyah, Rusli, & Naing, 2008). However, in comparison to the PSS the DASS-21 scale is more time consuming.

### **2.8.4) Stanford SRH, Exercise Behaviours and Self Efficacy Scales**

The Stanford Self-Rated Health, Exercise Behavior, and Social Activities Limitations Scales have been used frequently in the USA for assessing self-efficacy of arthritic, diabetic and other chronic

disease patients (Lorig et al., 2001; Lorig, Phillip, Ritter, & Jacquez, 2005). Insufficient literature is available as to the reliability or validity of these tools in a South African setting, but they have been proven reliable in several studies in the USA (Lorig et al., 2001; Lorig, Stewart, Ritter, Gonzalez, Laurent, & Lynch, 1996). These Stanford Scales were chosen for use in this Employee Wellness study because of their brevity and simplicity (Lorig et al., 1996). In addition, these scales proved to be a valid and reliable measure of self efficacy in a study looking at the short and long term effects of a chronic disease self-management programme in Texas (Lorig et al., 2005). The Exercise Behavior Scale has also proven to be reliable when used amongst lower back pain patients in an urban setting (Damush, Weignberger, & Perkins, 2003).

The Stanford scales were chosen as outcome measures in this study because they are easy to understand and are not time-consuming to complete (Lorig et al., 1996).

## **2.9) Conclusion:**

The review of literature has revealed that obesity; physical inactivity, unhealthy diet, stress, smoking and alcohol use are significantly associated with chronic diseases of lifestyle and injuries across the globe. These lifestyle factors are the leading causes of mortality and morbidity internationally (Cohen et al., 2005) and impacts significantly on HRQoL (Wolin et al., 2007). The increasing prevalence of health risk-behaviours is therefore not only a major health concern, but also a huge socioeconomic problem, as poor health profiles leads to a distressing amount of sick-days off work (Emmons et al., 1999; Konijnenberg et al., 2001). Fundamental changes are hereby necessary to improve the HRQoL of individuals and reduce the burden of disease (Cohen et al., 2005). By promoting positive lifestyle changes the incidence and prevalence of non-communicable diseases can be reduced significantly (Frantz, 2005). Since employees spend the majority of their waking hours at work, work-sites are the ideal setting for promoting health and wellness. Although locally applied research is still needed, worksite wellness programmes have thus far proven to be a comprehensive approach to improving employee health and wellness (Fronstin, 1996). This integrated approach to health promises to reduce employer health care costs, increase worker productivity and decrease the burden of health (LaMontagne, 2004).

In order to evaluate the effectiveness of an intervention programme targeting positive health behaviour changes, valid and reliable outcome measures are needed to quantify and report on the changes. The review of literature highlights the growing use of self-report outcome measures to assess the efficacy of health promotion programmes. The EQ-5D which is the

primary outcome measure chosen for use in this study has been proven to be both a reliable and valid measure of HRQoL.

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## **Chapter 3: Methodology**

### **3.1) Summary of Research Design**

A quantitative, experimental randomised control trial was used to investigate the effects of an intervention programme. It consisted of a two-group pre-test post-test design (Hicks, 1999). This design uses one group of subjects for the experimental group and the other group for the control (Hicks, 1999). Subjects were allocated to the experimental and control groups randomly. Pre-test measurements were taken of both groups. The experimental group participated in the intervention programme over six weeks, whilst the control group only received a once-off educational talk. Post-test measurements were taken of both groups at six weeks post-intervention programme. This design was chosen as it allowed each participant an equal chance of receiving the intervention or not receiving it, and thereby it minimised bias (Hicks, 1999). In addition, this design permitted the researcher to establish cause-and-effect relations between two or more variables (Hicks, 1999). As all the instruments, apart from weight and height measurements were self-report measures, blinding of the assessor was not necessary and blinding of the participants was not possible.

### **3.2) Research Setting**

The study was conducted at three clothing manufacturing companies situated in the Cape Town Metropolitan Region. This specific manufacturing industry was targeted, as to date minimal research has been done investigating the effects of an employee wellness programme on clothing workers in South Africa. The South African Clothing and Textile Manufacturing Industry is geographically concentrated in the metropolitan areas of the Western Cape, Kwa-Zulu Natal and Eastern Cape Provinces (Vlok, 2006) and thereby made the study feasible. South Africa relies significantly on its Clothing and Textile Manufacturing Industries as a source of employment (Vlok, 2006). The participating companies had an approximate staff count of between 250-700 employees.

### **3.3) Sample**

#### **3.3.1) Sample size**

The Visual Analogue Scale (VAS) of the EQ-5D was chosen as the primary outcome measure and was used to determine the sample size. Data from Jelsma and Ferguson (2004) were used to determine the sample size. The sample size was calculated using an online sample size calculator (Schoenfield, 1995). A sample of 74 was required to detect the predicted difference of 11.4 between the means of control and experimental groups with a power level of 90% and the significance level set to 0.05 if the standard deviation was 14.9 and the expected means were 74.7. The calculated sample size required was 37 in each group. To allow for attrition, a sample size of 90 subjects was selected.

### **3.4) Inclusion and Exclusion Criteria**

#### **3.4.1) Factories**

The following criteria were applied in identifying the participants:

- **Inclusion criteria**

Inclusion criteria were clothing or textile manufacturing companies situated in the Cape Town Metropolitan region. The companies needed to be registered with the South African Clothing/Textile Workers Industry and the Western Cape Clothing Workers Health Care Fund. Each company needed to have either an occupational health nurse or an employee wellness representative to assist with sample selection. The employer of the company had to be prepared to allocate the participants the time off work to participate in the study.

#### **3.4.2) Subjects**

- **Inclusion criteria**

Inclusion criteria were employees working at the selected clothing manufacturing companies who had musculoskeletal type complaints in the last six months or employees who were interested in participating in the study. Employees needed to volunteer participation and give signed consent.

- **Exclusion criteria**

Subjects were excluded from the study if they suffered from uncontrolled hypertension and diabetes, coronary heart disease or any other illness that rendered the participant unsafe to participate in the exercise section of the intervention program. Pregnant females that were in the 2<sup>nd</sup>-3<sup>rd</sup> trimester of the pregnancy were also excluded as pregnancy has in many studies been identified as a major risk factor for developing carpal tunnel syndrome (Ohnari, Uozumi, & Tsuji, 2007; Finsen & Zeitlmann, 2006; Seror, 1997).

### **3.5) Instrumentation:**

The outcome measures listed below were assessed to measure the efficacy and impact of the intervention program, and test the null hypothesis. The primary outcome of the study was measured with the EQ-5D.

#### **3.5.1) EQ-5D**

Health related quality of life was assessed with the EQ-5D. The EQ-5D is a self-completion questionnaire that consists of two components (Whynes & Tombola, 2008). The first component evaluates health status. It consists of 5 dimensions (mobility, self-care, usual activities, pain, anxiety /depression) that are divided into 3 levels (none, moderate, severe/extreme) (Picavet & Hoeymans, 2004). The second component is a visual analogue scale (VAS) on which subjects' rate their health

from zero (worst imaginable health) to 100 (best imaginable health) (Jelsma & Ferguson, 2002). The EQ-5D was chosen as the primary outcome measure in this study because previous studies have proven it to be a valid measure of HRQoL amongst various population groups in South Africa (Jelsma & Ferguson, 2002). In addition, this HRQoL measurement tool was chosen because the responses of the descriptive domains have a pre-determined health state that can be converted into a total utility index score by applying preference weights derived from EQ-5D United Kingdom (UK) based population studies (Dolan, 1997). This allows the ordinal responses to be converted to one cardinal value, which reflects the value of population preferences through health states.

There are a growing number of countries who have determined their own population based preference weights for the EQ-5D (Sakthong et al., 2008; Jelsma et al., 2003). The UK preference weights were applied in this study, because it is the best known weights that can be applied to other populations (Sakthong et al., 2008). The United States of America preference weights are country specific and very different to those of the UK (Sakthong et al., 2008).

### **3.5.2) Brief Pain Inventory Short Form (BPI-SF)**

The BPI-SF is a one page self-completion questionnaire consisting of fifteen questions. It measures individual perception of pain intensity and location, pain treatment, treatment effectiveness and functional interference from pain (McDonald et al., 2008). The areas covered in the functional interference section are general activity, mood, walking ability, work, relations with people, sleep, enjoyment of life, ability to concentrate, and appetite. The degree of interference is rated on an eleven point numerical rating scale (NRS), ranging from zero (no interference) to ten (total interference). A general disability score can be obtained by summing the ratings of the functional categories (McDonald et al., 2008; Shin et al., 2007).

### **3.5.3) Stanford Self-Rated Health (SRH) Scale**

The Stanford SRH Scale consists of one question. It measures the subjects' perception of their health state. Subjects rate their health by choosing one of five options (poor, fair, good, very good, excellent) (Lorig et al., 1996).

### **3.5.4) Stanford Exercise Behaviour Scale**

The Stanford Exercise Behaviour Scale consists of five categories (strengthening exercises, walking, swimming, cycling, and other aerobic exercises). In each of the five categories, subjects need to indicate their total time spent doing exercise during the past week by choosing one of five options (none, less than 30 minutes, 30-60 minutes, 1-3 hours, more than 3 hours) (Lorig et al., 1996).

### **3.5.5) Stanford Social/Role Activities Limitations Scale**

The Stanford Social/Role Activities Limitations Scale is a self-efficacy scale that measures the subjects' perception of how much their health interferes with their activities of daily living (ADL's). It consists of four categories, namely normal social activities, hobbies or recreational activities, household chores, and shopping. Subjects rate their self-efficacy by choosing one of five options in each category (not at all, slightly, moderately, quite a bit, almost totally) (Lorig et al., 1996).

### **3.5.6) Perceived Stress Scale (PSS)**

The Perceived Stress Scale (PSS 10) is a ten-point questionnaire that measures the degree to which situations in one's life are appraised as stressful (Cohen & Williamson, 1998). The scores of the positive items (i.e. question 4, 5, 7, 8) on the ten item Perceived Stress Scale (PSS) were reversed and then summed across with the other scores to obtain a total score for the PSS (Cohen et al., 1983).

### **3.5.7) Body Mass Index (BMI)**

The subjects' height and weight were measured to determine their body mass index (BMI). Subjects were weighed on a manual scale. BMI was calculated using the formula below:

$$\text{BMI} = \text{weight in kilograms} \div \text{height in m}^2$$

### **3.5.8) Absenteeism**

Absenteeism records were assessed for all subjects. This data was collected from absenteeism monitoring systems that were already in existence at the respective companies. Sick-days off work were assessed for the six weeks before the study, six weeks during the intervention period, and the six weeks after the study was completed.

## **3.6) Procedure**

A research proposal outlining the details of the study was submitted to the UCT Medical Research Ethics Committee in May 2008 for ethical approval. Funding for the study was pre-approved by the South African Clothing /Textile Workers Health Care Fund.

Clothing manufacturing companies affiliated to the Clothing Industry Health Care Fund were sent letters explaining the proposed study and invited to participate. The study was also promoted to shop stewards at union meetings. Response from the various companies' management was poor although the occupational health nurses working at the clothing companies displayed a keen interest in the study. Three out of the eighteen clothing or textile manufacturing companies that were approached agreed to participate in the study. The biggest concern for the production managers was allowing the participants to be off the production floor during working hours, as they feared it would decrease the companies production output, and thereby decrease sales and profits. At the time of recruiting, several clothing and textile manufacturing companies in South Africa were facing economic crises and were

executing worker retrenchments. This impacted greatly on the overall poor response rate for participation in the study, and thereby delayed data collection immensely. Recruitment of the factories occurred over six months from June to December 2008. The three companies that participated in the study were clothing manufacturing companies situated in the Cape Town Metropolitan region. Each company had an approximate staff count of between 250 to 700 employees that yielded an adequate sample size.

The Human Resources Managers, Occupational Health staff, departmental managers and the shop stewards at the respective factories, assisted in informing the staff about the study. If staff were interested to participate they submitted their details to their line managers who then forwarded it to the researcher. Employees known to the occupational health practitioner who had complaints of musculoskeletal injuries were asked to participate. All employees had equal opportunity to approach the researcher for inclusion in the study. Notices of the meetings for the intended research were posted in communal areas around the factory.

The principle research investigator thereafter addressed the interested employees and explained the full details of the study. Employees wishing to participate in the study had to give signed consent (see [Appendix I](#)). One-hundred and eight employees signed consent for participation in the study. The occupational health nurse affiliated with the respective company obtained a brief medical history from the interested participants by interviewing the participants, as well as assessing the staff clinic records. All participants were screened for exclusion criteria by the principle research investigator and occupational health nurse working at the staff clinic. Four employees were excluded from participating in the study as two had a history of myocardial infarcts within the past two to three months, and the two others suffered from uncontrolled hypertension.

The names of the consented employees that met the criteria were placed in a hat and thirty employees were randomly selected at each company by the principle research investigator by lottery method (Leedy, 1989) for inclusion in the study. However, the participant list had to be approved by the production manager, to ensure that the participants selected were not all from one sub-department or the same production line. By using random sampling method all employees had an equal chance of being selected for participation in the research study (Brodie, Williams, & Owens, 1994).

The study allowed for a total of ninety subjects from the three clothing manufacturing companies. Each company had between 26 to 30 employees participating in the study. The participants were given a numerical code by a research assistant to ensure that the participants could not be identified during the sampling and analysis process. The participants at each company were divided into control and experimental groups by random sampling. This involved placing the numerical codes of all the participants in a hat, and then by lottery method (Leedy, 1989) assigning the participants to the

control and intervention groups. This further ensured that each participant had an equal chance of receiving the intervention or not (Brodie et al., 1994).

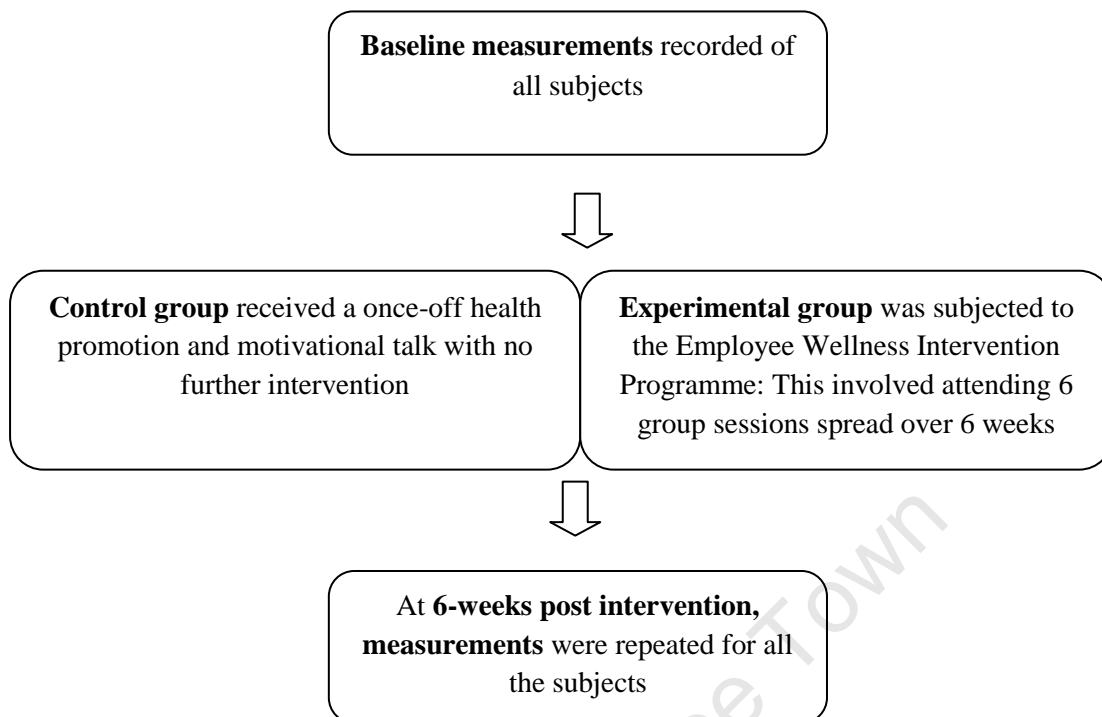
Data collection occurred from October 2008 to May 2009. The study ran in succession at the three companies. The ninety subjects selected were assigned an identification number by the principal research investigator. Thereafter, the subjects were randomly assigned to either the control or experimental group. At each company, the control and experimental group consisted of twelve to fifteen subjects each.

Baseline measurements were recorded for all the subjects at their respective companies. The principle research investigator together with an assistant facilitated this process. All the subjects had to complete the seven page questionnaire containing the EQ-5D, BPI Scale, PSS, Stanford SRH Scale, Stanford Exercise Behavior Scale, Stanford Social Activities Scale and self-structured demographic information questions (see [Appendix II](#)). Thereafter, all the subjects had their weight and height measured by a physiotherapist. To optimize reliability, the same person recorded all weight and height measurements throughout the study. However, she was not blind to the group affiliation of the subjects. The same manual scale was used to weigh the subjects throughout the study.

The experimental group started with their first session of the wellness intervention program two days after baseline measurements were recorded. The wellness intervention program consisted of six group sessions spread over six weeks (see [Appendix III](#)). Each session lasted one hour. Further details about the intervention program can be seen under the section 'Intervention Programme' (see section 3.7). To ensure standardization of the intervention programme and to optimize reliability of the study, the same person (i.e. principal research investigator) facilitated and instructed the intervention programme at the three companies.

Two days after baseline measurements were recorded, the control group was given a once-off thirty minute group health promotion and wellness motivational talk by a physiotherapist assisting the researcher. This session took place onsite from 9h30 to 10h00. The health promotion talk focused on back and neck-care and the benefits of regular exercise. Various health promotion and educational pamphlets were given to the control group at this session. These pamphlets were the same as those given to the experimental group (see [Appendix IV](#)). The control group received no further intervention.

At the end of six weeks, both groups (i.e. control and experimental group) were required to complete the questionnaire containing the EQ-5D, BPI Scale, PSS, Stanford SRH Scale, Stanford Exercise Behaviour Scale and Stanford Social Activities Scale. Height and weight measurements were used to calculate body mass index (BMI). All measurements were recorded by the principle research investigator together with an assistant.



**Figure 1: Flow chart of the data collection process**

Data analysis was performed from May to June 2009. The Human Resource Manager of each company forwarded the total number of sick days off work for each subject to the principle research investigator. Absenteeism records were assessed for the periods, six weeks before the start of the study, the six weeks during the intervention programme, and the six weeks after the completion of the study. The details regarding data analysis and the study results can be seen under those respective sections.

### **3.7) Intervention Programme**

The Employee Wellness Intervention Programme was based on the principles of Cognitive Behaviour Therapy (CBT). It was designed specifically to address the health care needs of the clothing industry workers. The overall aim of the Employee Wellness Programme was to promote health, behaviour change and work ability, and improve self-efficacy of the participants.

The Employee Wellness Programme consisted of six group sessions spreading over a period of six weeks (i.e. one hour session per week). It took place onsite at the three companies. A space was obtained where the researcher met with the group of 12 to 15 participants. The sessions happened after the first tea break for an hour from 10h30 to 11h30 or after lunch break from 14h00 to 15h00. The weekly sessions consisted of a 30-minute mini-workshop and a 30-minute exercise class. The

sessions were facilitated by a physiotherapist. The workshops were instructed in English with Afrikaans translation as needed.

The workshops were structured to promote self-efficacy by teaching participants the skills of goal setting, pacing and self-reflection. However, before making any changes participants needed to understand the reasons or benefits of behavior change. Each week the workshops addressed a different theme or topic of discussion. The six themes were Pain, Posture, Chronic Diseases of lifestyle, Goal setting and pacing, Physical Activity and Nutrition, and Relaxation (see [Table 1](#)). Participants were taught how to improve physical activity, practice better back and neck-care, manage stress effectively, and improve nutrition by setting specific but individual goals for themselves, pacing their activity and behavior change, and self-reflecting regularly. Participants were handed a goal sheet at the first session and guided as to how to set-up individual goals for themselves. Emphasis was placed on setting goals that were specific, measurable, attainable, and realistic and that included a time-frame. Each week the participants' had to bring their goal sheet along to the session and reflect on the behavior changes they made or their goals achieved for that week. This gave the participants an opportunity to practice the skills needed for completing specific tasks such as walking or exercising at a given intensity. Participants were guided as to how to overcome common barriers such as lack of knowledge, time or bad weather. With regards to physical activity, focus was placed on encouraging participants to identify physical activities they enjoy, and which they can easily sustain. Although nutrition or eating behaviours were not directly assessed in this study, considerable attention was placed on improving daily nutrition. Participants were encouraged to have breakfast daily, to increase their daily fruit and vegetable consumption, to plan meals in advance, and educated on ways of how to reduce fat in their diet. Relaxation included identifying individual stress triggers and positive and negative coping mechanisms, and methods of relaxation. Participants were taught the deep, progressive muscular relaxation technique. The weekly sessions were very interactive and constantly engaged participants to relate the topics to real life situations. At the completion of each weekly session a pamphlet with information about the days' topic of discussion was given to each participant. These pamphlets were the same as those given to the control group in their once-off health promotion talk (see [Appendix IV](#)). Majority of the pamphlets were written in English, but a few were translated in Afrikaans.

**Table 1: Time-table of the Employee Wellness Intervention Program.**

Week 1	Workshop: Introduction to Employee Wellness Program; Understanding Pain
	Exercise Class
Week 2	Workshop: Posture, Ergonomics, RSI and Back-care
	Exercise Class
Week 3	Workshop: Chronic Diseases of Lifestyle
	Exercise Class
Week 4	Workshop: Goal setting and Pacing; Healthy eating
	Exercise Class
Week 5	Workshop: Physical Activity
	Exercise Class
Week 6	Workshop: Stress management and relaxation methods.
	Exercise class (relaxation technique)

The exercise class comprised of a brief warm-up, low to moderate intensity aerobics, core stability exercises, and a cool down session including stretching and relaxation techniques. The intensity or repetitions of the exercises were gradually increased each week. Music was played during the exercise class to encourage participants and to make the session fun and enjoyable (see [Appendix III](#) for exercise class).

### **3.8) Statistical Analysis and Data Management**

#### **3.8.1) Statistical Analysis**

The completed questionnaires were numbered and the data captured into an Excel spreadsheet. All data were analysed with the Statistica-8 software program (StatSoft, 2008). Frequency tables were used to describe the sample. Descriptive analysis was performed using Chi-squared tests for categorical variables and t-tests for numerical variables.

The Shapiro-Wilk W test was used to test for normality in the distributions. Although t-tests are the most commonly used statistical method for evaluating the differences in the means between two groups (e.g. control and experimental), it assumes that the variable is normally distributed (Munro,

1997). Thus, because the ordinal data were not normally distributed, non-parametric tests were used to evaluate the differences in the medians between the two groups and determine the level of significance (Munro, 1997). In addition, because the sample size was less than one hundred, non-parametric tests were a more appropriate test to use. Median values were used to describe the ordinal data and Box and Whisker plots were used to display the change in median scores pre and post intervention.

The non-parametric tests used were the Sign test and the Mann-Whitney U test. The Mann Whitney U test was used in place of the independent t-test and the Sign test in the place of the paired t-tests. The Sign test was used to determine whether there was a significant difference between the pre and post intervention scores within each group (i.e. within-group changes). The Sign test allocates a sign, either positive(+) or negative(-) to each observation and assesses if one variable is larger than another variable within a group of subjects (Pett, 1997). In addition it considers whether the value is substantially different to what was expected by chance. Any observation that is found to be equal to the hypothesised value is ignored and dropped from the sample size (Whiteley & Ball, 2002). In terms of the sign test used to test paired scores, the null hypothesis is that approximately half of the differences would be expected to be below zero (negative), whereas the other half would be above zero (positive) (Whiteley & Ball, 2002).

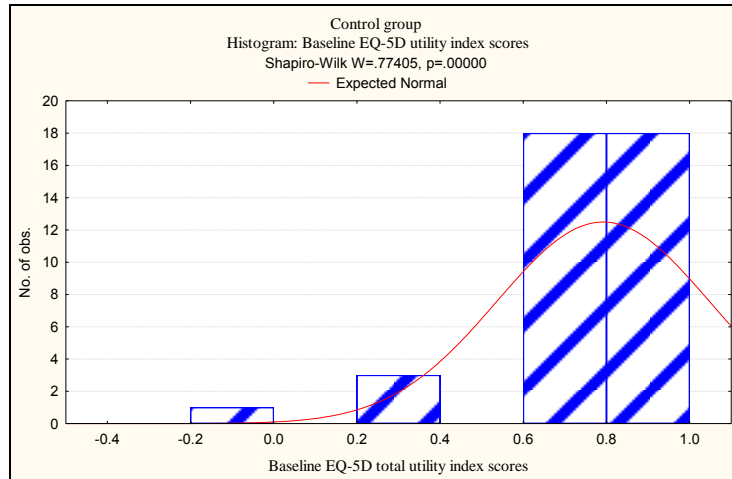
The Mann-Whitney U test was used for between-group comparisons at baseline and at six weeks post intervention. It calculates a rank sum as opposed to a mean value and compares this rank sum between the two groups to establish if they are different. Testing was done at the 0.05 level of significance.

### **3.8.2) Data Management**

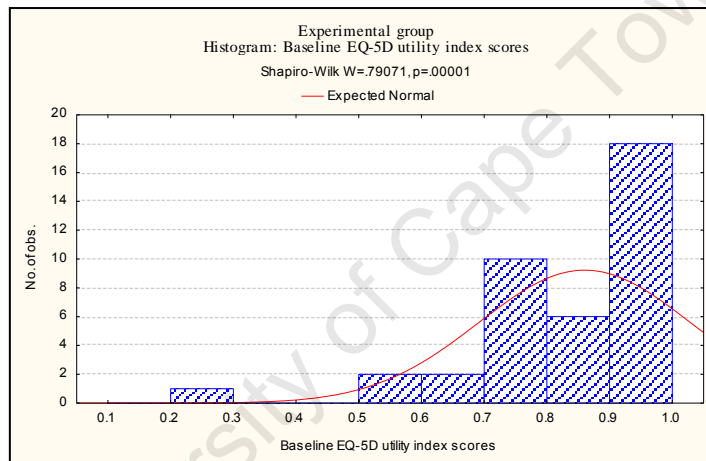
- **EQ-5D**

The scores of the first five domains of the EQ-5D (i.e. Mobility, Self-care, Usual activities, Pain, and Anxiety) were converted into index values (Whynes & Tombola, 2008; Sakthong et al., 2008). The index values were determined using the UK TTO (Grandy & Fox, 2008) preference weights, which has a maximum value of 1(for health state 11111) and a minimum value of 0.59 (for 33333) (Whynes & Tombola, 2008; Sakthong et al., 2008). This was done in order to calculate an overall cardinal score for the descriptor domains of the EQ-5D.

The Shapiro-Wilks test indicated that the distribution of the baseline EQ-5D total index scores for the control ( $w=0.77$ ,  $p<0.001$ ) and experimental group ( $w=0.79$ ,  $p<0.001$ ) were not normally distributed (see Figure 2 and Figure 3). Therefore, non-parametric tests were used to assess the difference in scores between the two groups.

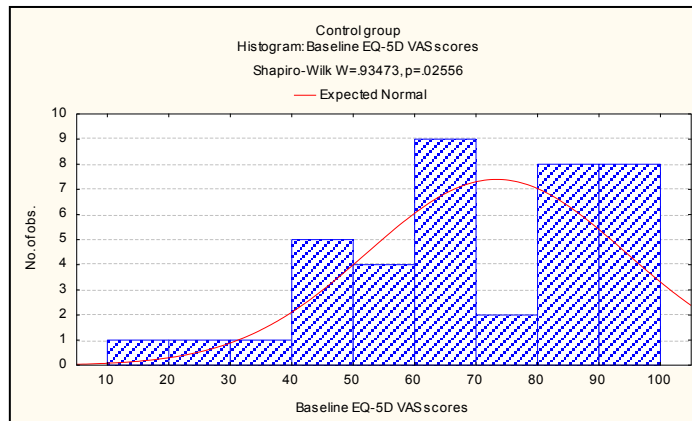


**Figure 2: Baseline EQ-5D utility index scores for the control group**

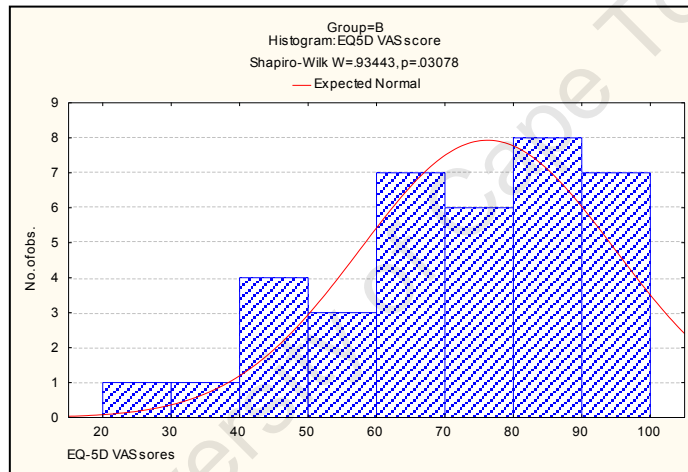


**Figure 3: Baseline EQ-5D utility index scores for the experimental group**

The results of the Shapiro-Wilks test indicated that the visual analogue scale (VAS) data for the control ( $w=0.93$ ,  $p=0.03$ ) and the experimental group ( $w=0.93$ ,  $p=0.03$ ) were not normally distributed (see Figure 4 and Figure 5) and non-parametric statistics were used.



**Figure 4: Baseline EQ-5D VAS scores for the control group**

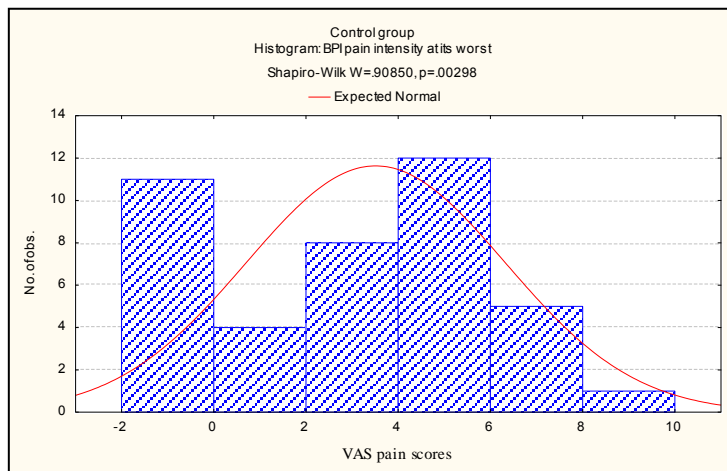


**Figure 5: Baseline EQ-5D VAS scores for the experimental group**

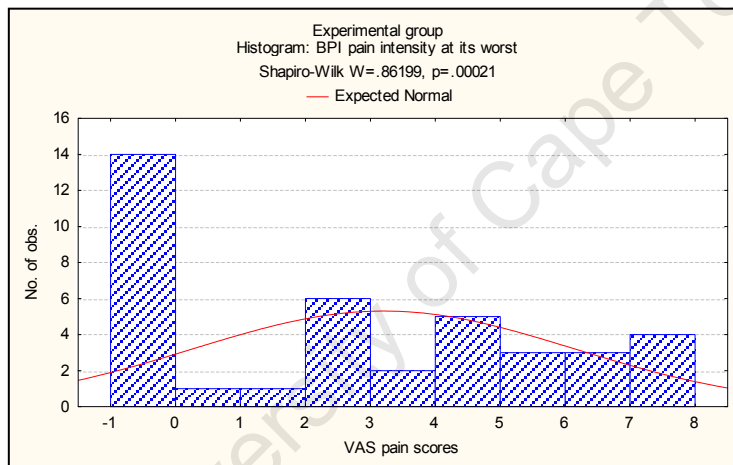
- **Brief Pain Inventory Short-Form (BPI-SF)**

Pain intensity on the BPI-SF was computed by determining the median of pain intensity at its worst, as well as the median of average pain intensity. Total functional interference from pain was computed by determining the median of responses to the nine interference items consisting of pain interference with general activity, mood, walking ability, work, relations with people, sleep, enjoyment of life, concentration, and appetite.

The Shapiro-Wilks W test reported a non-normal distribution of the pain intensity data of the BPI-SF at baseline (see Figure 6 and Figure 7 as an example). Therefore, non-parametric tests were used to analyse the difference in the baseline and post-intervention scores.



**Figure 6: Control group's baseline VAS scores for pain intensity at its worst**



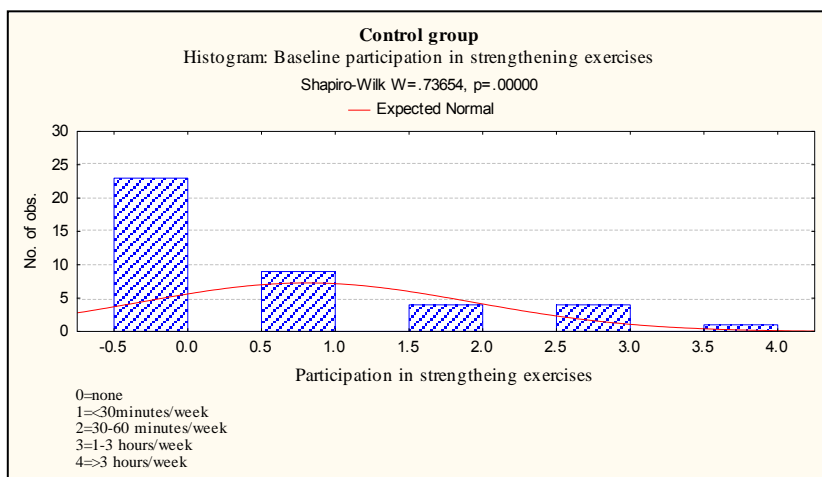
**Figure 7: Experimental group's baseline VAS scores for pain intensity at its worst**

- **Stanford Self-Rated Health (SRH) Scale**

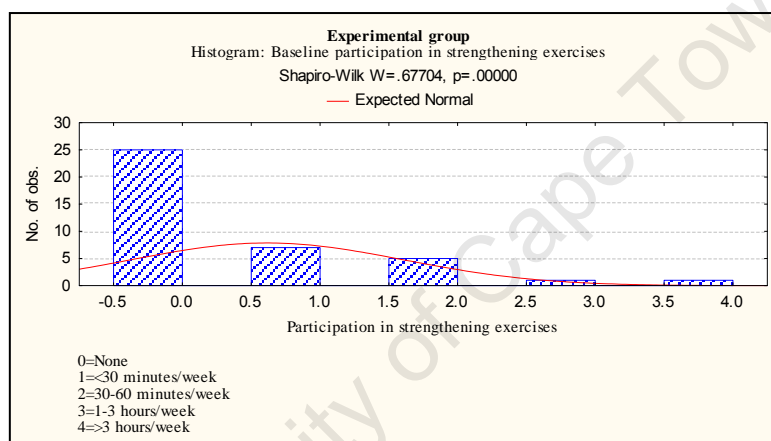
As the data of the Stanford Self-Rated Health scale were ordinal, non-parametric tests were used to compare the differences in the scores at baseline and at six weeks post-intervention.

- **Stanford Exercise Behaviours Scale**

The Shapiro Wilks-W test for normality indicated a non-normal distribution of the baseline data of the control ( $w=0.74$ ,  $p<0.01$ ) and experimental groups ( $w= 0.68$ ,  $p<0.01$ ) for participation in strengthening/stretching exercises (see Figure 8 and Figure 9). Therefore, non-parametric tests were used to compare the baseline and post-intervention scores.



**Figure 8: Control group's baseline scores for participation in strengthening/stretching exercises**



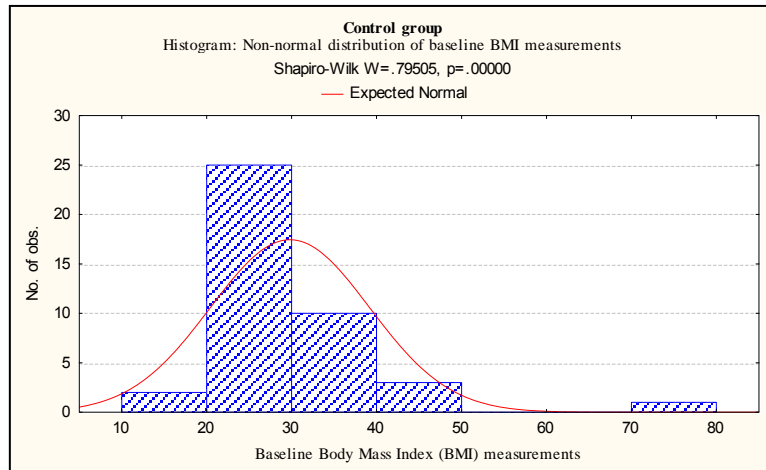
**Figure 9: Experimental group's baseline data for participation in strengthening/stretching exercises per week**

- **Perceived Stress Scale**

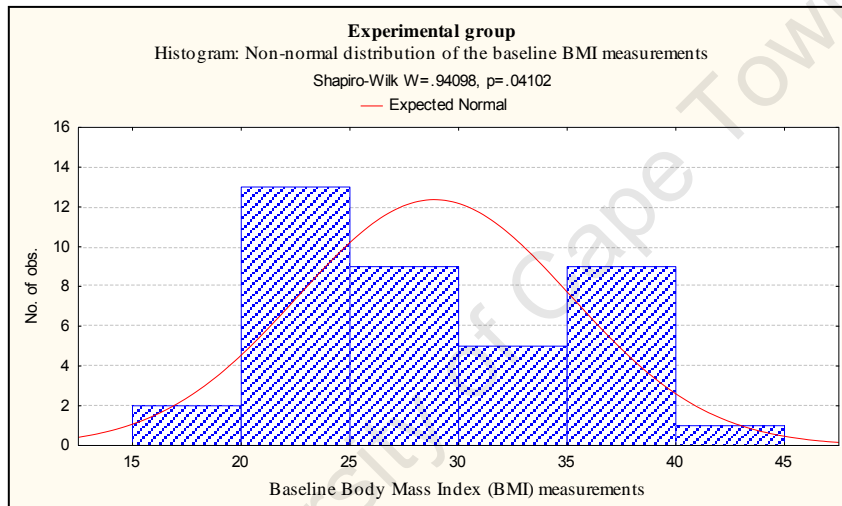
The scores of the positive items (i.e. question 4, 5, 7, 8) on the ten item Perceived Stress Scale (PSS) were reversed and then summed across with the other scores to obtain a total score for the PSS at baseline and at six weeks post-intervention. As the PSS is an ordinal rank scale non-parametric statistics were used to analyse the data.

- **Body Mass Index (BMI)**

The Shapiro-Wilk test reported a non-normal distribution of the baseline BMI measurements (see [Figure 10](#) and [Figure 11](#) ). Therefore, non-parametric tests were used to determine the change in BMI at baseline and post-intervention.



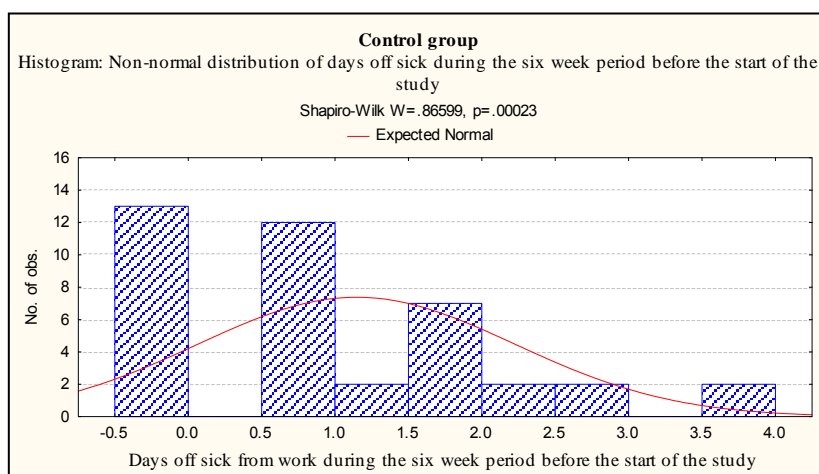
**Figure 10: Baseline BMI measurements for the control group**



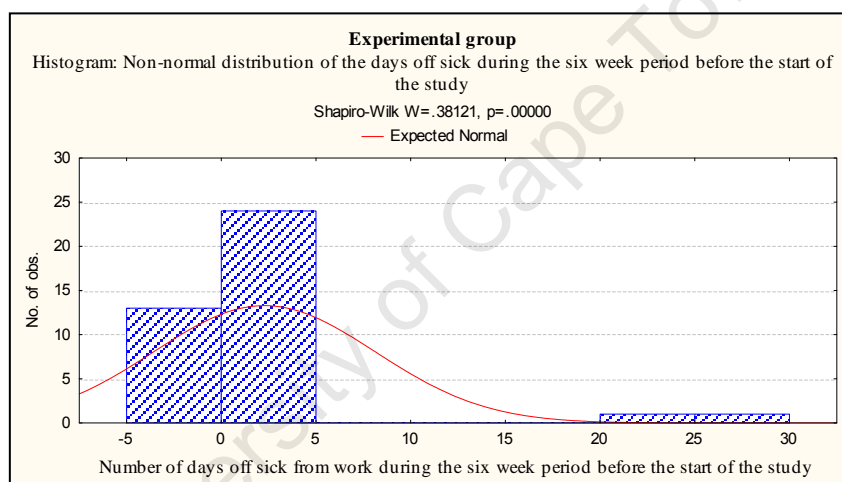
**Figure 11: Baseline BMI measurements for the experimental group**

- **Absenteeism**

Non-parametric tests were used to analyse the days off sick as the data were not normally distributed (see [Figure 12](#) and [Figure 13](#)).



**Figure 12: Control group's days off sick during the six weeks before the start of the study**



**Figure 13: Experimental group's days off sick from work during the six week period before the start of the study**

### 3.9) Ethical Considerations

Ethical approval for the study was granted by UCT Health Sciences Faculty Research Ethics Committee (069/2008). Permission was obtained from the managers at the respective factories. The Human Resources manager and Occupational Health practitioner had to obtain the employees' permission before they could pass their details to the researcher. Informed and signed consent were obtained from all the participants. The Western Cape Clothing Workers Union was also informed of the intended study.

All the employees from the selected companies were eligible to participate in the study provided they did not have any of the exclusion criteria. Any participant that was a health risk needed medical approval to participate or continue with the intervention programme. All the subjects were explained the details and procedure of the study, possible health benefits, potential risk factors and assured anonymity. The subjects were required to give signed consent for participation in the study. The intervention group were also asked to commit to the six week programme. However they were assured that their withdrawal from the study would not have any consequence related to their employment. They were informed that their participation was voluntary and they would not be financially rewarded.

Participants were randomly allocated to the control and experimental groups, thereby allowing each subject an equal opportunity of receiving the intervention or not. The questionnaires were kept anonymous but each subject was allocated an identification number to allow for the comparison of pre-and-post intervention data. All subjects entered the study voluntarily, and there was no retribution for any subject who refused participation or who withdrew from the study.

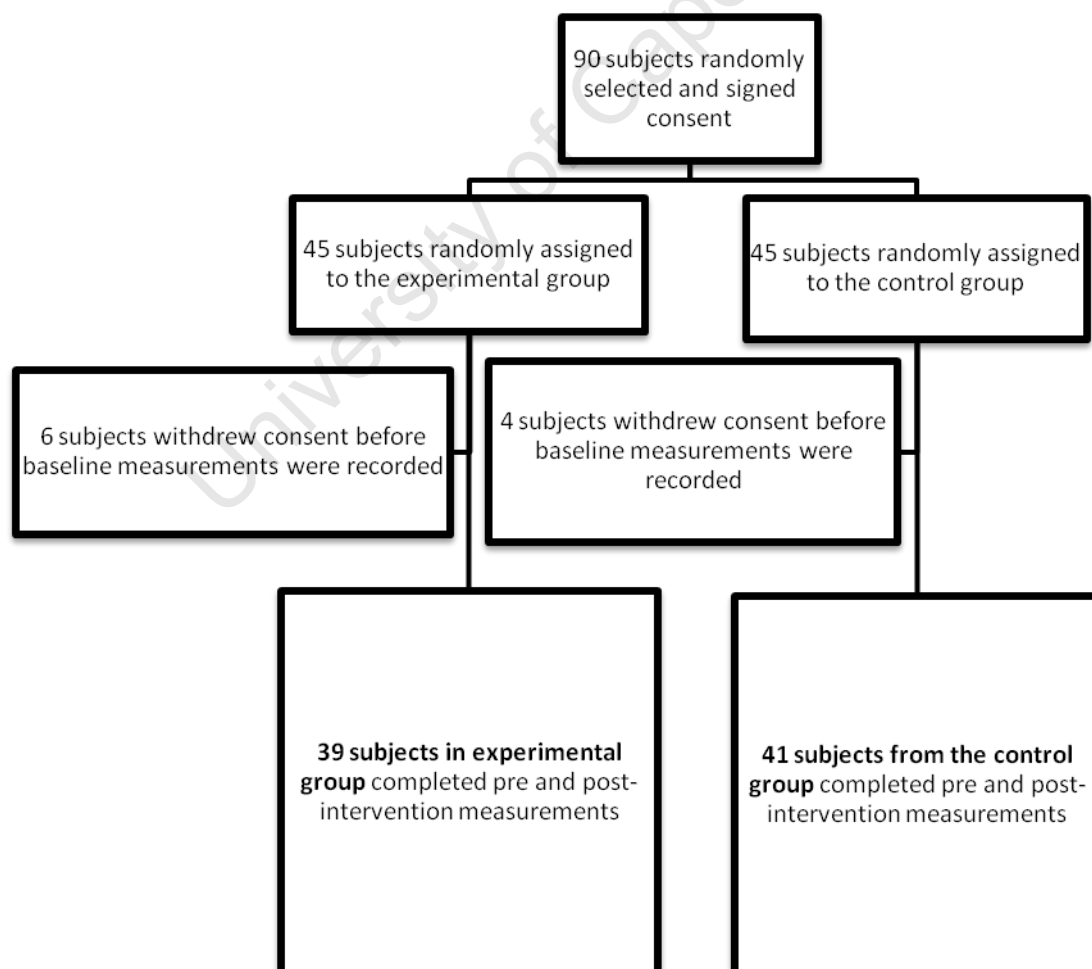
The study was funded by the Clothing Industry Health Care Fund, with strong support from the Clothing and Textile Workers Union, but this did not bias participant selection. Participation was equally open to non-union members and union members.

At the end of the study, the wellness programme was repeated for six weeks at each company, and the control group as well as other employees were invited to attend if they so wish. This did not form part of the study, but it allowed the subjects' of the control group to experience the wellness programme.

## Chapter 4: Results

### 4.1) Sample

The sample consisted initially of 90 subjects, with the control and experimental groups having 45 subjects each. Six subjects from the experimental group withdrew their consent before baseline questionnaires were completed, leaving the experimental group with 39 subjects. Four of the six subjects withdrew from the study due to personal reasons, while the other two withdrew as their working contract was terminated due to retrenchments at the company. Four subjects from the control group also withdrew consent before baseline measurements were recorded, as their working contracts had also been terminated due to retrenchments at the company. This left the control group with 41 subjects. Data was therefore analysed on 80 subjects (see [Figure 14](#) ). The attendance rate across the six weeks for the intervention sessions was 94% (see [Table 2](#)). Different subjects were absent during each week.



**Figure 14: Flow and number of subjects during the course of the study**

**Table 2: Attendance at Wellness Programme Sessions**

N=39	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Attendance (%)	100%	87.2%	89.7%	92.3%	94.9%	94.9%

#### 4.2) Demographic data

The mean age of the sample was 36.0 years ( $SD=\pm 10.7$ ) and there was no significant difference in the means of the experimental ( $M=37.3$ ,  $SD=\pm 9.8$ ) and control groups ( $M=34.8$ ,  $SD=11.5$ ,  $t=1.03$ ,  $df=78$ ,  $p=0.305$ ). The sample consisted of 70 females, and the gender distribution between the two groups was the same ( $Chi-sq=0.35$ ,  $df=1$ ,  $p=0.554$ ). The mean body mass index (BMI) of the sample was 29.36 ( $SD=\pm 7.98$ ,  $df=79$ ,  $p=0.614$ ), with no statistical difference between the two groups (See [Table 3](#)).

Statistically there was no significant difference in the distribution of highest level of education between the two groups ( $Chi-sq=.35$ ,  $df=2$ ,  $p=.839$ ). In the experimental group 79.5% of the subjects had secondary level education and 10.3% had tertiary level education. The sample consisted of subjects working in the production, administrative or manual labour departments. The majority of the subjects were working in the production departments (68.3%). There was statistically no significant difference in the distribution of occupational departments between the two. Statistically, there was also no significant difference in the distribution of first language between the two groups ( $Chi-sq=1.476$ ,  $df=4$ ,  $p=0.831$ ). Fifty-eight percent of the sample was first language Afrikaans speakers (See [Table 3](#)).

Forty-eight percent of the sample had musculoskeletal pain on the day of baseline assessment. Areas of pain included lower back, mid-back, neck, upper-limb and lower-limb. Twenty-three percent reported pain in the lower back region and 12.5% reported pain in the lower-limbs. A further 10% had multiple joint pain complaints. Statistically there was no significant difference between the distribution of pain areas between the two groups ( $z=1.60$ ,  $u=297$ ,  $p=0.110$ ). The experimental and control group therefore were similar in terms of all the demographic variables tested.

**Table 3: The demographic characteristics of the experimental and control groups.**

		<b>Experimental group:</b>	<b>Control group:</b>	<b>Statistic</b>	<b>p-value</b>
Subjects (N=80)		39 (48.1%)	41 (50.6%)	t=0.47	P=0.637
Female		35 (89.74%)	35 (85.37%)	Chi-sq=0.35	P=0.554
Male		4 (10.26%)	6 (14.63%)		
Mean (SD) age (years)		37.3 (9.87)	34.8 (11.50)	t=1.03	P=0.306
BMI mean (SD)		28.90 (6.29)	29.80(9.37)	t=-0.51	P=0.614
Mean years worked in clothing industry(SD)		13.74 (10.7)	12.76 (11.74)	t=0.39	P=0.699
Education level	Primary level	4 (10.26%)	6 (14.63%)	Chi-sq=0.35	P=0.839
	Secondary level	31 (79.49%)	31 (75.61%)		
	Tertiary level	4 (10.26%)	4 (9.76%)		
Occupation department	Production	24 (61.54%)	32 (78.05%)	Chi-sq=5.30	P=0.071
	Administration	14 (35.90%)	6 (14.63%)		
	Manual Labour	1 (2.56%)	3 (7.32%)		
Home language	Afrikaans	23 (58.97%)	24 (58.54%)	Chi-sq=1.48	P=0.831
	English	7 (17.95%)	9 (21.95%)		
	English and Afrikaans	4 (10.26%)	5 (12.20%)		
	Xhosa	4 (10.26%)	3 (7.32%)		

**4.3) EQ 5D**

At baseline 87.2% of the experimental group and 80.5% of the control group reported no problems with mobility (see [Table 4](#)). Over 90% of both the control and experimental groups reported no problems with self-care at baseline. Eighty-two percent of the experimental group and 90% of the control group reported no problems with usual activities at baseline. At baseline 62% of experimental

group reported no problems with pain compared to 44% of the control group. However, 51% of the control group reported moderate pain compared to 36% of the experimental group at baseline (see [Table 4](#)).

**Table 4: Self-reported health status (EQ-5D) at baseline**

EQ 5D domains		Experimental group		Control group	
		N (39)	percentage	N (41)	percentage
Mobility	No problems	34	87.2	33	80.5
	Some problems	5	12.8	7	17.1
	Confined to bed	0	0	1	2.4
Self-care	No problems	37	94.9	38	92.7
	Some problems	2	5.1	3	7.3
	Completely unable	0	0	0	0
Usual activities	No problems	32	82.1	37	90.2
	Some problems	7	17.9	4	9.8
	Completely unable	0	0	0	0
Pain/Discomfort	No pain	24	61.5	18	43.9
	Moderate pain	14	35.9	21	51.2
	Extreme pain	1	2.6	2	4.9
Anxiety/Depression	Not anxious	31	79.5	28	70.0
	Moderately anxious	8	20.5	10	25.0
	Extremely anxious	0	0	2	5.0

At baseline, the median for the total index utility scores was 0.88 for the experimental group and 0.80 for the control group (see [Table 5](#)). The Mann-Whitney U test indicated that there were no statistically significant differences between the rank sum scores of the two groups for the EQ-5D total index scores at baseline (see [Table 5](#)).

At six weeks post intervention the median for the total index scores was 0.85 for the experimental group and 0.80 for the control group (see [Table 5](#)). Inter-quartile ranges are also depicted in [Table 5](#)

below. Fifty percent of the experimental group reported a higher total EQ-5D index score at six weeks post intervention, which implies that 50% reported the same or lower scores after six weeks. The Sign test indicated that this was not statistically significant ( $z=-0.20$ ,  $p=0.84$ ) (see [Table 6](#)). At six weeks post intervention a similar 51.6% of the control group had also improved in their total EQ-5D index scores ( $z=0.00$ ,  $p=1.0$ ) (see [Table 6](#)). The Mann-Whitney U test was used to compare the groups EQ-5D index scores rank sums at baseline and at six weeks post intervention. Statistically there was no significant difference between the total index scores at baseline and at six weeks post-intervention between the two groups (see [Table 5](#)).

**Table 5: EQ-5D median values at baseline and at 6-weeks post intervention**

		Experimental Group (N=39)		Control Group (N=41)		Level of significance (Mann- Whitney U test)
		Median	Inter-quartile range: Q1-Q3	Median	Inter-quartile range: Q1-Q3	p-value
EQ-5D total index scores	Baseline	0.88	0.80-1.00	0.80	0.69-1.00	0.283
	6-weeks post intervention	0.85	0.73-1.00	0.80	0.67-1.00	0.354
EQ-5D VAS scores	Baseline	80.0	70.0-90.0	70.0	60.0-90.0	0.596
	6-weeks post intervention	90.0	70.0-95.0	80.0	55.0-90.0	0.076

The baseline median VAS scores describing the samples perception of their state of health was 80.0 for the experimental group and 70.0 for the control group (see [Table 5](#)) and these were not statistically different. However, the difference between the two groups rank sums was approaching statistical significance at six weeks post intervention ( $z=1.78$ ;  $p=0.076$ ) with the experimental group reporting better health (see [Table 5](#)).

The change over time was compared between the two groups and at six weeks post intervention 70% of the experimental group reported an improvement in the VAS health scores, indicating a significant improvement in their perception of health ( $p=0.045$ ) (see [Table 6](#)). At six weeks post intervention 58% of the control group reported an improvement in their perception of their health. However, this change was not statistically significant ( $p=0.472$ ) (see [Table 6](#)).

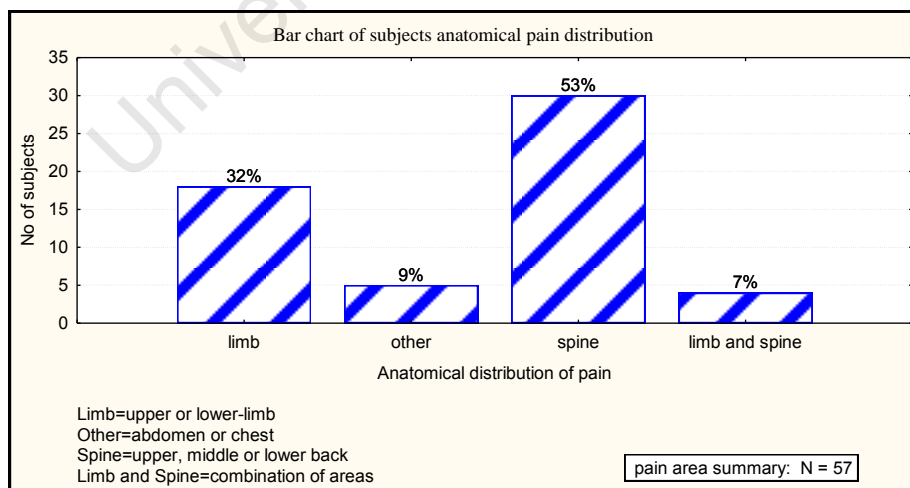
**Table 6: Change in EQ-5D scores within each group.**

Change in value between baseline and 6 weeks post-intervention score	Experimental group (N=39)			Control group (N=41)		
	Percent second score higher	z	p	percent	z	p
EQ-5D total score	50.0	-0.20	0.845	51.6	0.00	1.000
VAS	70.0	2.01	<b>0.045</b>	58.0	0.72	0.472

In summary, the two groups were equivalent at the onset of the study in terms of both the index score and the VAS. At the conclusion of the study the experimental group showed a tendency to having a higher VAS score and demonstrated more improvement in the VAS than the control group.

**4.4) Brief Pain Inventory-Short Form Scale**

The BPI-SF measures individual perception of pain intensity and location, pain treatment, treatment effectiveness and functional interference from pain. The degree of interference is rated on an eleven point numerical rating scale (NRS), ranging from zero (no interference) to ten (total interference). Forty-eight percent of the sample group reported that they had pain at baseline. The majority of the subjects with pain indicated their pain to be in the spine region (i.e. upper, middle or/and lower back) (see Figure 15).



**Figure 15: Respondents’ self-reported anatomical area of pain distribution at baseline.** (Spine=upper, middle or lower back; limbs=upper-limbs or lower-limbs)

Both the control and the experimental group median scores for their rating of their pain *at its worst* were 3 at baseline. The median for experimental groups' rating of their *average* pain level was 2 compared to a median of 3 in the control group. At baseline the median for the both groups' total *functional interference* was 10. There was no significance difference between the ranking of the two groups either before or after intervention (see [Table 7](#) ).

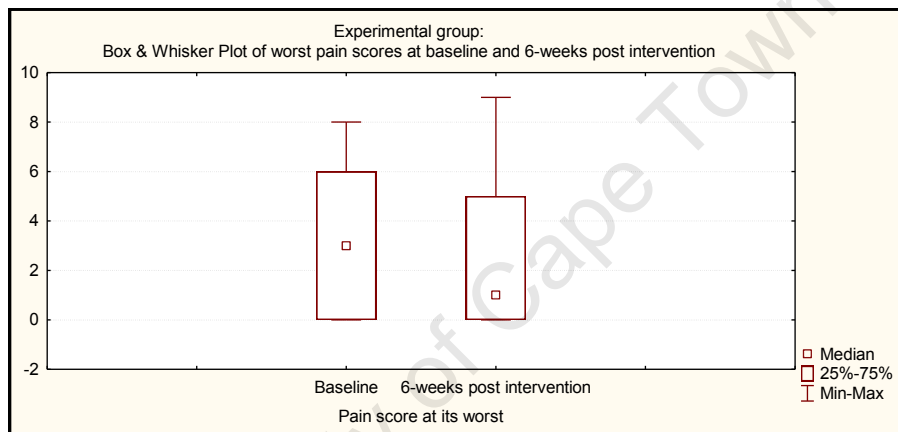
**Table 7: Brief Pain Inventory Short Form Scale median values at baseline and at 6-weeks post intervention.**

		Experimental group (N=39)		Control group (N=41)		Mann-Whitney U test results
		Median	Inter-quartile range: Q1-Q3	Median	Inter-quartile range:Q1-Q3	p-value
Rating of pain levels at its worst	Baseline	3	0-6	3	0-6	0.617
	6-weeks post intervention	1	0-5	3	0-6	0.182
Rating of average pain levels	Baseline	2	0-5	3	1-5	0.444
	6-weeks post intervention	2	0-5	3	1-5	0.142
Total pain interference with function	Baseline	10	0-41	10	2-39	0.346
	6-weeks post intervention	7	0-16	9	0-38	0.279

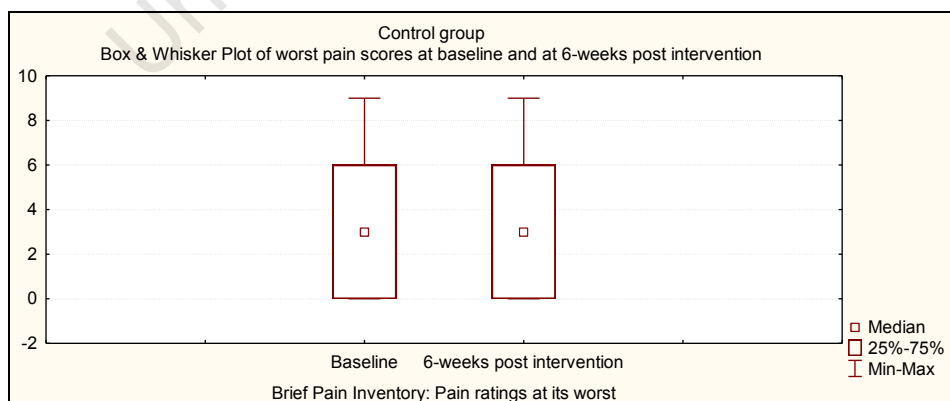
However, as can be seen in [Table 8](#), the experimental group experienced an amount of change from baseline which approached significance, whereas the control group remained static. At 6-weeks post intervention, the experimental groups' median for their rating of their pain level at its worst was 1, having decreased from baseline (see [Table 7](#)). Seventy-one percent of the experimental group reported lower ratings for their pain at its worst. This change approached statistical significance ( $z=1.84, p=0.066$ ). Forty-five percent of the control group reported a higher score, with the rest either deteriorating for their rating of pain at its worst and this was not statistically significant ( $z=0.36, p=0.719$ ) (see [Table 8](#)).

**Table 8: Change in scores on the Brief Pain Inventory Short Form Scale**

	Experimental group (N=39)			Control group (N=41)		
	Percent with second score lower	z	p	Percent with second score lower	z	p
Rating of pain at its worst	70.8	1.84	<b>0.066</b>	45.2	0.36	0.719
Rating of pain on average	56.5	0.42	0.677	38.5	0.98	0.327
Pain interference with total function	65.5	1.49	0.137	51.4	-0.00	1.000



**Figure 16: Change in median scores for the experimental group’s rating of their worst pain. The lower score indicates less pain.**



**Figure 17: Control groups' median values for their rating of their pain at its worst on the BPI-SF scale. The lower score on the scale indicates less pain.**

Although more subjects in the experimental group reported lower scores at six weeks in average pain and pain interference with activities, the proportion was not significant. The control group did not

show any significant change in the proportion who reported less pain, and at six weeks there was a higher proportion reporting higher pain scores than at baseline in worst and average pain, with the pain interference scores remaining unchanged (see [Table 8](#)).

In summary, there appeared to be no significant difference between the two groups in terms of the ranking of any of the sections of the BPI-SF. However the proportion of participants who improved from baseline in the rating of pain at its worst approached significance in the experimental group and in contrast to the control group, a greater proportion reported a lower pain score at six weeks, although the difference was not significant.

#### 4.5) Stanford Self Efficacy Scales

##### 4.5.1) Self-Rated Health Scale

At baseline about 70% of both groups rated their health as *Good to Excellent*, although more respondents in the experimental group indicated *excellent to very good* health (see [Table 9](#)). Both the experimental and the control groups median score for self-rated health was 3, indicating good health.

**Table 9: Frequency distribution of the experimental and control groups' Stanford Self-Rated Health scores at baseline.**

Self-reported health rating	Experimental group (N=39)		Control group (N=41)	
	count	percentage	count	percentage
(1) Excellent	8	20.5	4	9.8
(2) Very good	9	23.1	5	12.2
(3) Good	11	28.2	21	51.2
(4) Fair	10	25.6	11	26.8
(5) Poor	1	2.6	0	0

The Mann-Whitney U test was used to compare the rank sum scores of the groups at baseline and at six weeks post intervention. Statistically there was no significant difference between the rank sums of the two groups at baseline but at six weeks post intervention the difference in the post intervention rank sum scores between the two groups was statistically significant ( $z=-2.06$ ,  $p=0.04$ ) with the experimental group reporting better health (see [Table 10](#)).



**Table 10: Between group comparisons for the Stanford Self-Rated Health Scale Scores.**

		Experimental group		Control group		Mann-Whitney U test		
		N	Rank sum	N	Rank sum	z	u	p
Self-Rated Health	Baseline	39	1465	41	1775	-1.10	685	0.273
	6-weeks post intervention	39	1366	41	1875	-2.06	586	<b>0.040</b>

Similarly, at six weeks post intervention 74% of the experimental group reported an improved self-rated health status compared to baseline, a change which approached significance ( $z=1.84$ ,  $p=0.066$ ) (see [Table 11](#)). In comparison, only 53% of the control group reported an improved health with the remainder reporting decreased or the same self-rated health status and this was not statistically significant ( $z=-0.00$ ,  $p=1.000$ ) (see [Table 11](#)).

**Table 11: Change in the Stanford Self-Rated Health Scale scores.**

	Experimental group (N=39)			Control group (N=41)		
	Percent improved	z	p	Percent improved	z	p
Baseline self-rated health and 6-weeks post intervention self-rated health	73.7	1.84	0.066	53.3	-0.00	1.000

#### 4.5.2) Exercise Behaviour Scale

Frequency tables were used to express the baseline exercise behaviours of each group. At baseline, 64% of the experimental group and 56% of the control group reported no participation in strengthening or stretching exercises per week. Thirty-one percent of the experimental group and 27% of the control group reported that they engaged in less than thirty minutes of walking for exercise per week (see [Table 12](#)). The frequency of participation after the intervention is reported in [Table 12](#).

**Table 12: Frequency distribution of the experimental and control groups exercise behaviours.**

		Experimental group (N=39)		Control group (N=41)	
		Baseline	Six weeks post- intervention	Baseline	Six weeks post- intervention
Participation in stretching or strengthening exercises	None	64.1%	7.7%	56.1%	46.3%
	Less than 30 minutes/ week	17.9%	48.7%	22.0%	34.1%
	30-60 minutes/ week	12.8%	28.2%	9.8%	12.2%
	1-3 hours/ week	2.6%	15.4%	9.8%	4.9%
	More than 3 hours/ week	2.6%	7.7%	2.4%	2.4%
Participation in walking for exercise	None	33.3%	5.1%	26.8%	17.1%
	Less than 30 minutes/ week	30.8%	23.1%	26.8%	36.6%
	30-60 minutes/ week	23.1%	38.5%	19.5%	22.0%
	1-3 hours/ week	5.1%	23.1%	9.8%	9.8%
	More than 3 hours/ week	7.7%	10.3%	17.1%	14.6%
Participation in swimming for exercise	None	87.2%	79.5%	80.5%	85.4%
	Less than 30 minutes/ week	2.6%	15.4%	9.8%	4.9%
	30-60 minutes/ week	5.1%	5.1%	7.3%	2.4%
	1-3 hours/ week	2.6%	0.0%	2.4%	2.4%
	More than 3 hours/ week	2.6%	0.0%	0%	4.9%
Participation in cycling for exercise	None	100%	82.1%	90.2%	85.4%
	Less than 30 minutes/ week	0%	10.3%	4.9%	2.4%
	30-60 minutes/ week	0%	5.1%	2.4%	7.3%
	1-3 hours/ week	0%	2.6%	2.4%	0.0%
	More than 3 hours/ week	0%	0.0%	0%	4.9%
Participation in other aerobic exercise	None	89.7%	59.0%	87.8%	82.9%
	Less than 30 minutes/ week	7.7%	15.4%	2.4%	4.9%
	30-60 minutes/ week	1%	15.4%	4.9%	4.9%

	1-3 hours/ week	0%	7.7%	4.9%	2.4%
	More than 3 hours/ week	0%	2.6%	0%	4.9%

The Sign test was used to evaluate the within group difference in scores pre and post intervention (see [Table 13](#)). Significant changes were seen in exercise behaviour in all categories apart from swimming in the experimental group. All the subjects reported more participation in cycling than at baseline. No significant changes were noted in the control group (see [Table 13](#)).

**Table 13: Change in the Stanford Exercise Behaviour Scale scores.**

	Experimental group (N=39)			Control group (N=41)		
	Percent improved	z	p	Percent improved	z	p
Baseline & 6-weeks post intervention participation in strengthening/stretching exercises per week	87	3.95	<b>&lt;0.01</b>	58	0.59	0.556
Baseline & 6-weeks post intervention participation in walking for exercise per week	77	2.87	<b>&lt;0.004</b>	57	0.57	0.571
Baseline & 6-weeks post intervention participation in swimming for exercise	60	0.67	0.546	56	0.00	1.000
Baseline & 6-weeks post intervention participation in cycling or bicycling for exercise	100	2.27	<b>0.023</b>	71.4	0.76	0.450
Baseline & 6-weeks post intervention participation in other aerobic exercise	81	2.25	<b>0.024</b>	63	0.35	0.724

The Mann-Whitney U test was used to compare the difference in rank sums between the control and experimental group at baseline and post-intervention for the Stanford Exercise Behaviours Scale scores (see [Table 14](#)). No significant differences were seen between the two group's baseline exercise behaviours for all four categories. At six weeks post intervention, significant differences were noted in participation of strengthening exercises ( $z=3.34$ ,  $u=452$ ,  $p=0.001$ ), as the experimental group were participating in more strengthening exercises compared to the control group (see [Table 14](#)).

Statistically no significant differences were noted in the other four categories, but the results depicted in table 14 show that at six weeks post intervention the differences were approaching significance for the categories walking and other aerobic exercises.

**Table 14: Between group differences for the Stanford Exercise Behaviour Scale scores**

		Experiment al group (N=39)	Control group (N=41)	Level of Significance		
		Rank sum	Rank sum	z	u	p
Participation in strengthening/ stretching exercises	Baseline	1509	1732	-0.68	729	0.497
	Six weeks post-intervention	1927	1313	3.34	452	<b>0.001</b>
Participation in walking for exercise	Baseline	1460	1780	-1.15	680	0.252
	Six weeks post-intervention	1764	1476	1.77	615	0.077
Participation in swimming for exercises	Baseline	1535	1706	-0.43	755	0.668
	Six weeks post-intervention	1614	1627	0.32	766	0.747
Participation in cycling or bicycling for exercise	Baseline	1502	1739	-0.75	722	0.446
	Six weeks post-intervention	1596	1644	0.15	783	0.878
Participation in other aerobic exercise	Baseline	1563	1677	-0.15	783	0.878
	Six weeks post-intervention	1759	1482	1.72	621	0.086

#### 4.5.3) Social/Role Activities Limitations Scale

Frequency tables were used to express the baseline scores of the two groups for the Stanford Social/Role Activities Limitations Scale. At baseline, over 50% of both groups reported that their health did not interfere with normal social activities with family or friends. Sixty-seven percent of the experimental group and 56% of the control reported no interference of their health with hobbies or recreational activities. In the experimental group, 23% reported that their health interferes quite a bit with completion of household chores. In comparison, 10% of the control group reported their health interfering with their ability to complete household chores. The majority of both the experimental and

control groups reported no interference of their health with their ability to perform errands or shopping (see [Table 15](#)).

**Table 15: Frequency table depicting the pre and post intervention scores of the Stanford Social/ Role Activities Limitations Scale.**

		Experimental group (N=39)		Control group (N=39)	
		Baseline (%)	Six weeks post-intervention (%)	Baseline (%)	Six weeks post-intervention (%)
Health interference with normal social activities with family and friends	Not at all	59.0	56.4	58.5	56.1
	Slightly	10.3	25.6	17.1	14.6
	Moderately	15.4	10.3	7.3	14.6
	Quite a bit	10.3	7.7	17.1	14.6
	Almost totally	5.1	0.0	0.0	0.0
Health interference with hobbies or recreational activities	Not at all	66.7	59.0	56.1	61.0
	Slightly	12.8	20.5	17.1	19.5
	Moderately	15.4	17.9	14.6	14.6
	Quite a bit	2.6	2.6	7.3	2.4
	Almost totally	2.6	0	4.9	2.4
Health interference with household chores	Not at all	56.4	64.1	53.7	56.1
	Slightly	12.8	12.8	19.5	19.5
	Moderately	2.6	12.8	9.8	12.2
	Quite a bit	23.1	7.7	9.8	9.8
	Almost totally	5.1	2.6	7.3	2.4
Health interference with errands and shopping	Not at all	48.7	59.0	51.2	56.1
	Slightly	17.9	17.9	17.1	7.3
	Moderately	10.3	12.8	14.6	14.6
	Quite a bit	20.5	5.1	9.8	14.6
	Almost totally	2.6	5.1	7.3	7.3

As can be seen from table 16, a greater proportion of the experimental group reported less problems in health interference with errands and shopping (significant) and in household chores (approaching significance). There was no change in any of these in the control group.

**Table 16: Change in the Stanford Social/Role Activities Limitations Scale scores.**

	Experimental group (N=39)			Control group (N=41)		
	Percent improved	z	p	Percent improved	z	p
Health interference with normal social activities with family or friends	64.7	0.97	0.332	42.9	0.44	0.663
Health interference with hobbies or recreational activities	53.3	-0.00	1.000	55.6	0.24	0.814
Health interference with household chores	76.5	1.94	<b>0.052</b>	61.9	0.87	0.383
Health interference with errands and shopping	76.2	2.18	<b>0.029</b>	50.0	-0.22	0.823

#### 4.6 Perceived Stress Scale (PSS)

The scores of the positive questions (i.e. question 4, 5, 7, 8) on the ten item Perceived Stress Scale (PSS) were reversed (e.g. 0=4, 1=3, 2=2, etc) as these questions were positively stated items. These scores were then summed across with the other scores to obtain a total score for the PSS at baseline and at 6-weeks post intervention. The higher total score is indicative of more stress. At baseline the experimental groups' median value for the total Perceived Stress Scale scores was 18 with an inter-quartile range of 18-26. The control groups' baseline median for the total PSS scores was 19 with an inter-quartile range of 10-26 (see [Table 17](#)).

The Mann-Whitney U test reported no significant difference in the rank sums of the two groups for the total PSS scores at baseline but there was a significant difference at six weeks ( $u=563$ ,  $z=-2.27$ ,  $p=0.023$ ) (see [Table 18](#)). However, as can be seen in table 19 the proportion who reported a change in stress levels was not significant in either group.

**Table 17: Median values of the Perceived Stress Scale (PSS)**

Perceived Stress Scale (PSS)		Experimental group (N=39)		Control group (N=41)	
		median	Inter-quartile range: Q1-Q3	median	Inter-quartile range: Q1-Q3
Total scores for PSS	Baseline	18	18-26	19	10-26
	6-weeks post intervention	17	9-21	19	12-26

**Table 18: Between group differences in Perceived Stress Scale scores.**

		Experimental group (N=39)	Control group (N=41)	Level of Significance		
		Rank sum	Rank sum	u	z	p
Perceived Stress Scale total scores	Baseline	1476	1765	696	-1.00	0.319
	6-weeks post intervention	1343	1897	563	-2.27	<b>0.023</b>

**Table 19: Change in Perceived Stress Scale scores.**

	Experimental group (N=39)			Control group (N=41)		
	Percent with second score lower	z	p	Percent with second score lower	z	p
Change in Perceived Stress Scale scores from baseline to 6-weeks post intervention	61.8	1.20	0.230	56.8	0.66	0.511

**4.7) Body Mass Index**

At baseline the mean body mass index (BMI) was 28.9 (SD= 6.29) for the experimental group and 29.8 (SD=9.37) for the control group. Statistically there was no significant difference in the baseline BMI measurements of the two groups ( $u=791$ ,  $z=0.08$ ,  $p=0.935$ ) (see [Table 21](#)).

At 6-weeks post intervention 89% of the experimental group reduced in their BMI measurements. The Sign test reported this change as statistically significant ( $z=3.73$ ,  $p<0.01$ ). In comparison, 79% of the control group reduced in their BMI measurements at 6-weeks post intervention, which the Sign test reported as statistically significant ( $z=2.83$ ,  $p=0.05$ ) (see [Table 20](#)). Statistically there was no significant difference in the BMI scores between the two groups at six weeks post intervention (see [Table 21](#)).

**Table 20: Change in Body Mass Index.**

	Experimental group (N=39)			Control group (N=41)		
	Percent lower	z	p	Percent lower	z	p
Change in BMI scores: 6-weeks post intervention-baseline	88.5	3.73	<0.01	78.6	2.83	0.005

**Table 21: Difference in mean values for BMI measurements.**

Body Mass Index Scores	Experimental group (N=39)			Control group (N=41)			Level of Significance (Mann-Whitney U test)		
	mean	SD	range	mean	SD	range	u	z	p
Baseline	28.9	6.29	19-44	29.8	9.37	19-71	791	0.08	0.935
6-weeks post intervention	27.8	5.66	19-40	29.0	9.34	19-70	791	-0.08	0.935

#### **4.8) Absenteeism**

Absenteeism was assessed for the six week period before the start of the study, six weeks during the study, and the six week period after the completion of the study. Table 22 shows the number of days off work in the three six week time periods before, during and after the intervention. There were no significant differences detected, although the experimental group had taken more days off work before and during the intervention (see [Table 22](#)).

**Table 22: The control and experimental groups mean number of sick days off work.**

Total days off work due to sickness	Experimental group (N=39)			Control group (N=41)			Mann-Whitney U test results for level of significance		
	mean	SD	range	mean	SD	range	u	z	p
6-week period before the study started.	2.3	5.9	0-30	1.1	1.1	0-4	760	-0.20	0.845
6-week period during implementation of intervention programme.	1.0	1.1	0-4	0.9	0.9	0-4	751	0.28	0.776
6-week period post the completion of the study.	0.7	0.7	0-2.5	0.9	0.9	0-4.4	740	-0.39	0.695

**Table 23: Change in sick days taken off from work.**

	Experimental group (N=39)			Control Group (N=41)		
	Percent lower than baseline	z	p	Percent lower than baseline	z	p
Change in absenteeism 6-weeks post completion of the study and 6-weeks before study implemented	65.5	1.49	0.137	64.0	1.20	0.230
Change in absenteeism during the 6-week intervention period and 6-weeks before study started	52.9	0.17	0.864	59.3	0.77	0.441
Change in absenteeism during the 6-weeks of the intervention period and 6-weeks post completion of the study	64.0	1.20	0.230	51.6	-0.00	1.000

Table 24 indicates that both groups took less time off work from the beginning to the end of the study. The Sign test reported this change as statistically significant ( $z=2.04$ ,  $p=0.041$ ) (see [Table 24](#)).

**Table 24: Change in days off sick from work of total sample group**

	Total Sample Group (N=80)		
	percent	z	p-value
Change in days off sick from work at 6-weeks post completion of study compared to 6-weeks before start of the study	65	2.04	<b>0.041</b>

**Summary of findings:**

The experimental and control groups were equivalent in terms of all the demographic variables tested. Significant changes were detected for the experimental group's perceived HRQoL, exercise behaviours, perceived stress levels and BMI at six weeks post intervention. Both the control and experimental group took less days off sick from work at the end compared to the beginning of the study.

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## **Chapter 5: Discussion**

The implementation of a wellness programme at the workplace, based on the principles of cognitive behaviour therapy was beneficial in improving the employees' health-related quality of life, physical activity behaviours and levels of self-efficacy. The experimental group demonstrated improvement over time in almost every parameter. In contrast, apart from an overall decrease in time off work in both groups and a reduction in BMI, there was no significant change noted in the behaviour of the control group.

### **5.1) Sample**

The majority of the participants in this study were female. The participants are representative in terms of gender, of clothing manufacturing employees as both global (Sajhau, 2000) and national employment statistics (Vlok, 2006) report that the majority of employees within the clothing manufacturing industry are female. However, this limits generalisability with employees of other industries which may consist of a different gender distribution. In addition, it may be argued that although the subjects were randomly assigned to the experimental and control groups, the sample comprised of volunteers who were interested in improving their own health and thereby may not be representative of all the employees within the clothing and textile manufacturing industry. The age distribution of the sample in this study is similar to the South African economically active population range of 25-55years (KILM, 2000). This allows the results to be generalised to the South African working age population. The majority of the subjects in this study had some or completed secondary level education which is representative of adults over the age of 20 years in the Western Cape Province (SSA, 2001). The home language of the majority of the study participants was Afrikaans which is also representative of the Western Cape Province population (SSA, 2001).

The South African Demographic and Health Survey (SADHS) performed in 2002 reported that a large portion of the adult population were insufficiently physically active (Kolbe-Alexander, et al., 2008). Consistent with those findings, this study also reported the majority of the sample to be insufficiently active at baseline. Participants in this study were also particularly unhealthy with regards to baseline BMI measurements. The mean BMI of the sample was 29.36 at baseline, which is indicative of overweight but closely approaching obesity. The majority of the study participants had a baseline BMI above 25 which is representative of adults in the Western Cape Province (SADHS, 2003).

### **5.2) Participation and attendance**

There was little or no attrition in the number of participants in the experimental group that would threaten the internal validity of this study. Attendance at the weekly intervention sessions was generally high which further strengthened the study's internal validity. Similarly, other worksite

intervention studies have also reported a high attendance and participation rate but these studies were not randomised controlled trials (Schutgens, Schuring, Voorham, & Burdorf, 2009; Bertera, 1990). In the study by Schutgens et al (2009) the participation rate was 73% but the high participation and attendance rate in their study was partly attributed to the compulsory nature of the study. The participants in their study who attended less than 70% of the health promotion sessions faced a cut in social benefits received from the Employment Centre (Schutgens et al., 2009). Therefore, fear of retribution could have been responsible for the high attendance rate in their study. In comparison, participation in this study was voluntary and no subject was forced to participate. There were no financial rewards promised to the participants and the participants did not face retribution if they chose not to participate or if they withdrew from the study. The high attendance and compliance of participants in this study could partly be attributed to excitement at the companies associated with the employee wellness programme. The study was implemented during a period of considerable tension amongst the employees, as two of the participating companies were implementing large scale retrenchments at the time. The employees were excited and motivated to participate in this study as it was the first time an employee wellness programme was implemented within the South African clothing manufacturing industry. In addition, the high attendance was partly due to the fact that the wellness programme occurred during normal working hours and did not interfere with the participants lunch or tea-breaks. The high attendance rate in this study indicates that the participants welcomed the idea of the wellness programme at the companies. Further studies, incorporating focus groups may be able to explore the employees perception of the wellness programme in greater detail.

### **5.3) Impact of the intervention**

#### **5.3.1) Health Related Quality of Life**

The outcome of this study demonstrated that the CBT-based wellness programme implemented over a period of six weeks, was no more effective in improving self-reported difficulties on the EQ-5D than the once-off education session. The lack of significant difference between the two groups utility index scores (mobility, self care, usual activities, pain, depression) was not completely unexpected as the short-term wellness programme was not focused on symptomatic relief, but rather designed to equip employees with the knowledge and skill of improving health and promoting positive health behaviour change. This approach was utilised to afford the participants an opportunity to set realistic short-term goals for themselves and to gradually progress their behaviour changes. Similarly, a study by Baker et al (2008) showed that participating in a short-term combined walking and education programme did not produce significant changes in the EQ-5D utility scores amongst the participants. In their study, the intervention programme was spread over twelve weeks and participants attended an individual session educating them on the benefits of physical activity, goal setting and behaviour change. Unlike this study which implemented the intervention programme at the worksite, their study was based within the community and included unemployed individuals from low socioeconomic regions. Their

study consisted of seventy-nine participants who had volunteered participation and who were randomly selected and assigned to control and intervention groups. Prior to selection, their study participants were screened for physical activity behaviours and only those who were insufficiently physically active were included in their study. It is unclear from the literature where the health promotion sessions took place (Baker et al., 2008).

Although we may not have expected large symptomatic improvements in this study, the lack of significant change could also be attributed to the choice of outcome measure. The EQ-5D is a generic instrument that measures health-related quality of life and is not disease specific. (Jelsma & Ferguson, 2002). Although the EQ-5D has been validated for use among the South African population (Jelsma et al., 2004), a few studies have reported it to be insensitive to detect a change when baseline scores are high (Eversden, Maggs, Nightingale, & Jobanputra, 2007; Louwagie, Bachmann, Meyer, Booysen, Fairall, & Heunis, 2007). In this study, the majority of the subjects had high baseline scores for the EQ-5D health state descriptors indicating no problems with most of the functional domains. Therefore, the lack of significance in the change of scores could be attributed to insensitivity of the EQ-5D.

A study by Jelsma et al (2005) investigating the effects of HAART medication on the HRQoL of South African adults living with HIV reported the VAS scores to increase considerably in the short term, while the health descriptors increased more gradually over time. Similarly, this study reported significant improvements in the VAS scores at six weeks post intervention, while there were no significant changes in the utility scores in the short term. In addition, the weightings for the EQ-5D utility scores were derived from the UK population, and valuations amongst a South African population may differ due to socio-economic factors and cultural beliefs (Louwagie et al., 2007).

Whilst the difference in EQ-5D utility index scores between the two groups were not significant, the study reported an overall improvement of the subjects' perceived health-related quality of life, as measured by the VAS. This result could be attributed to excitement at the companies linked to the intervention programme and the fact that the participants of both groups entered the study highly motivated to improve their health and wellbeing. Even though all the study participants did not participate in the intervention programme, the control group did have an educational seminar and received health promotion pamphlets. The weekly interventions could have had a spin-off effect on non-participants of the wellness programme. Similarly, Baker et al (2008) have shown that participation in a community wellness study improved the perceived HRQoL of both the control and intervention groups, with no significant difference between the two groups at 12-weeks. In their study, the intervention group were subjected to a series of physical consultations and pedometer monitoring walking programme whilst the control group received a once off motivational session (Baker et al., 2008). In addition, when interpreting these results it should be noted that previous studies have

reported that the presence of illness or disability is not the sole determinant of perceived HRQoL (Jelsma & Ferguson, 2002; Cott, Gignae, & Badley, 1999). The study by Jelsma and Ferguson (2002) that investigated the determinants of self-reported HRQoL amongst a socially and culturally diverse community in South Africa, reported that socioeconomic factors such as income had a significant impact on individual reportings of perceived health state. Since this study did not collect any socioeconomic data on the subjects, it is unknown whether a change in socioeconomic status had an impact on overall improvements in perceived HRQoL.

Improvements in perceived HRQoL in this study may also be attributed to behavioural factors such as participating in weekly aerobic exercises at the worksite and the perceived knowledge gained from the interactive educational workshops. In addition, the social interaction and group support obtained from the intervention may also be responsible for the improvements in perceived HRQoL. Consistent with these findings, other studies implementing short-term supervised exercise sessions and psychosocial workshops have also reported improved subjective reportings of HRQoL amongst patients with chronic musculoskeletal pain (Wigers & Finset, 2007; Huye et al., 2006; Dahl & Nilsson, 2001). A study by Dahl and Nilsson (2001) proved that participation in a four week cognitive behavioural intervention at the worksite effectively improved the perceived health state of nurses at risk of developing chronic pain. In their study, the cognitive behaviour therapy sessions were administered by a physiotherapist and registered nurse on an individual basis, twice a week for four weeks (Dahl & Nilsson, 2001). The study by Wigers and Finset (2007) showed improved overall HRQoL at six months amongst patients with chronic musculoskeletal pain after participating in a four week CBT education and exercise programme. Perceived HRQoL in their study was measured with a five point verbal rating scale. However, their study did not have a control group and in conjunction with the behavioural intervention the participants also attended individual physiotherapy sessions four times per week for myofascial release. Both studies included individual components to their programmes which seem to have an effect on subject adherence and an improved perception of HRQoL. A study by Blissmer et al (2006) has also shown that an intervention programme consisting of weekly health education workshops and supervised aerobic exercise sessions were effective in improving the perceived HRQoL of clinically overweight or obese participants post-intervention. However, in their study HRQoL was measured with the SF-36 scale, and the behavioural and exercise intervention programme were implemented over six months, which may explain the long-term significant changes amongst their participants (Blissmer et al., 2006). Overall, these results suggest that behavioural techniques and supervised exercise programmes appeared to be beneficial in improving the perceived HRQoL of the participants. However, since a 10-point improvement was noted in both the control and the experimental group's EQ-5D VAS scores at six weeks post-intervention, the improvements in perceived HRQoL cannot only be attributed to the wellness programme. The overall improvement may be due to the Hawthorne or other non-specific effects as a result of being part of the study. The

subjects may have perceived their health as improved due to being a participant in a health and wellness study. Long-term follow-up studies are recommended to investigate whether the improvements of perceived HRQoL is maintained after the intervention ends and whether the difference between the two groups becomes more apparent in the long-term.

### **5.3.2) Pain**

Pain associated with musculoskeletal injuries or conditions is a well recognised source of loss of function among working adults (Adedoyin, Idowu, Adagunodo, Owoyomi, & Idowu, 2005; Taylor, 2002; Rosecrance & Cook, 1998). A study by Gross and Battie (2005) reported that higher subjective ratings of pain intensity was moderately associated with lower functional capacity evaluations of lifting ability. In this study nearly half of the sample reported musculoskeletal type pain. However, the median for pain intensity for both the control and the experimental groups were below five at baseline as well as post-intervention. These observations indicate that majority of the sample group did not suffer from severe pain. In addition, at baseline the sample group in this study had in general a high level of function with minimal interference from pain as indicated on the BPI-SF scale.

Although the findings of the current study did not report significant difference in the subjective pain reports between the two groups, the results indicate that the experimental group's pain levels had a tendency to decrease compared to the control group's which remained constant. The change in the experimental group's pain scores may be attributed to them having a better understanding of pain, pain language and improved coping skills as a result of attending the wellness group sessions. People who do not view pain in a negative way are less likely to have persistent pain (Innes, 2005). Other studies have also reported that psychosocial interventions that have educated participants on pain mechanisms and taught methods of coping with pain in everyday life are effective in reducing pain intensity and improving functional abilities (Lillefjell, Krokstad, & Espnes, 2007; Smeets et al., 2006; Moseley, 2002). In addition, the lack of significant change in the functional abilities of the participants on the BPI-SF scale may indicate that supplementary individual physiotherapy is necessary to improve the functional abilities of employees suffering from specific musculoskeletal type pain. In the study by Moseley (2002) patients with chronic low back pain of moderate intensity were subjected to a four week combined physiotherapy manual treatment and psychosocial pain education programme. Including psychosocial pain education with conventional physiotherapy techniques appeared to enhance the effects of their intervention by reducing pain intensity and improving functional abilities over time (Moseley, 2002).

The tendency for the experimental group to have decreased pain levels in this study might also be attributed to the social interaction of the weekly group sessions. Pain theorists believe that peer support and social interaction are important predictors of pain intensity (Saunders, 2004). Thereby,

people who engage in regular social activities are more likely to have a positive outlook on pain and report decreased pain intensities (Lillefjell et al., 2007).

Overall, the findings of this study reported that the experimental group displayed a greater reduction in pain intensity scores and a greater improvement in functional abilities compared to the control group after participating in a short-term cognitive behaviour wellness programme. This demonstrates that CBT programmes are beneficial in improving the participants ability to cope with pain. However, the study findings revealed that the CBT programme did not cure the experimental group participants of pain at six weeks, and thereby CBT programmes cannot be implemented with the aim of curing musculoskeletal type pain or replacing conventional physiotherapy techniques. A study by Moseley (2002) reported that including psychosocial pain education with conventional physiotherapy techniques appeared to enhance the effects of the behavioural intervention by reducing pain intensity and improving functional abilities over time. Therefore, supplementary individual physiotherapy treatment is recommended to improve the functional abilities of employees suffering from specific musculoskeletal type pain.

### **5.3.3) Self-Rated Health**

Studies have reported a strong association between health behaviour change and perceived health status (Nieuwenhuijsen, 2004; Stewart et al., 2002). A study by Bernards, Jans, van-der-Heuvel, Hendriksen, Houtman, and Bongers (2006) reported that participating in strenuous physical activity at-least once to twice per week was associated with improved self-reported health state amongst workers with sedentary occupations. In addition, individuals with improved levels of self-esteem and good psychological wellbeing are more likely to report better perceived health states (Hasson, Arnetz, Theorell, & Anderberg, 2006). This study reported that the CBT based wellness programme effectively improved the self-rated health (SRH) of the participants at six weeks. These findings match those of previous studies that reported that cognitive behavioural interventions coupled with physical activity are an effective method of improving the perceived health status of individuals at risk of developing chronic non-communicable conditions (Wigers & Finset, 2007; Wolin et al., 2007; Dahl & Nilsson, 2001; Burckhardt, Mannerkorpi, Hedenberg, & Bjelle, 1994). A study by Wigers and Finset (2007) reported significant improvements in HRQoL amongst patients with musculoskeletal disorders at 12-months following participation in a four week psychosocial rehabilitation programme. However, contact sessions in their study were much longer and more frequent than this study, and these factors could have contributed to the significant long-term changes.

### **5.3.4) Exercise behaviours**

The findings of this study have shown that participation in the employee wellness program had a positive impact on physical activity behaviours amongst the intervention group. Participants were encouraged to exercise at their own pace and to engage in leisure time physical activities that they

enjoyed. This may have contributed to the change and increase of physical activity behaviours. In addition, the participants were guided as to how to set weekly goals for themselves to improve physical activity levels which could have further improved adherence to a regime of physical activities. Literature suggests that individual goal setting abilities have a positive effect on short-term behaviour change and exercise maintenance (Shain & Kramer, 2004; Galluci, 1995). Knowledge and beliefs have also been proven to have a significant influence on individual behaviour (Murphy, 2005). A study by Galluci (1995) that investigated the influence of goals on exercise behaviours reported that the majority of the participants that participated in the worksite aerobic classes reported that they had set goals for their exercise programmes.

The increase in physical activity behaviours in this study is comparable to other studies which reported that behavioural interventions including graded exercise programmes are an effective method of improving leisure time physical activity behaviours within sedentary or insufficiently active individuals (Aldana et al., 2005; Sorensen et al., 2005; Emmons et al., 1999; Johansson, Dahl, Jannert, Melin, & Andersson, 1998). The common thread amongst these studies was that the inclusion of education on the benefits of physical activity, methods of engaging and sustaining physical activity behaviours, and how to progress physical activity levels. Therefore, guiding individuals on self-managing and monitoring of exercise behaviours seems to improve physical activity behaviours and adherence. Other studies have made use of pedometers to monitor walking behaviours (Haines et al., 2007; Aldana et al., 2005). The primary benefit of using a pedometer is that it provides an objective measure of energy expenditure that can be monitored by both researcher and participant. However, pedometers are expensive and can be intimidating for people to use. Furthermore, considering that this study was not focused on investigating the physiological effects of a wellness programme but rather on the subjective impact on health behaviours and HRQoL, the self-report measures were more appropriate outcome measures.

Literature suggests that individuals that are physically active are less likely to engage in substance abuse (Emmons, Marcus, Linnan, Rossi, & Abrahams, 1994; Blair et al., 1985). This may be attributed to the fact that an interrelationship exists between health behaviours. Depressed individuals do not participate in exercise due to the symptoms of fatigue associated with depression (Munir, Khan, Yarker, Haslam, Bains, & Kalawsky, 2009). However, engaging in regular physical activity leads to improved psychological wellbeing by stimulating endorphin levels and reducing stress, anxiety and depression (Bernards et al., 2006; Warburton et al., 2006). Considering, that union representatives reported a high prevalence of substance abuse amongst South African clothing industry employees (Prince, 2009), the findings of this study are highly relevant, as they emphasise the need for the implementation of wellness programmes to increase physical activity levels amongst the employees.

### **5.3.5) Levels of Self-efficacy**

Research has also shown a strong association between health behaviour change and levels of self-efficacy (Nieuwenhuijsen, 2004). Engaging in regular physical activity promotes feelings of control, improves self-esteem and distracts individuals from unpleasant stimuli (Bernards et al., 2006). The current study found that the wellness programme was effective in improving the levels of self-efficacy amongst the experimental group. The improved confidence in their ability to perform household chores and errands may be attributed to the self-reflection and the process of self-monitoring that was guided and encouraged at each weekly session. In addition, listening to the other participants reporting successful behaviour changes and how they achieved their weekly goals may have added to the improved motivation and levels of self-esteem. According to the theories of self-efficacy, peer support and group interaction enhances individual self-esteem and improves motivation to change health-related behaviours (Bandura, 1997). Similar to this study, a study by Larson et al (2008) provided evidence that a worksite intervention consisting of psychosocial group education sessions was effective in improving the self-efficacy levels of the employees at ten weeks post-intervention. However, the employees in their study attended ten weekly group sessions of three hour duration. Parallel to their psychosocial sessions, participants in their study also met two to three hours per week to engage in supervised physical activities. Duration and frequency of behavioural interventions appears to impact on change in levels of self-efficacy. In comparison, this study showed that the participants had improved levels of self-efficacy following participation in a short-term wellness intervention programme. These results indicate that weekly group sessions of one hour duration spread over six weeks is sufficient to produce significant improvements in levels of self-efficacy.

The improvements in the employees levels of self-efficacy reported in this study, are beneficial to manufacturing industries, as higher levels of self-efficacy have been associated with better functional capacity evaluations (Asante et al., 2007). A study by Asante et al (2007) reported that amongst a sample of workers with occupation-related back injuries, self-reported perceived disability status was moderately associated with the number of failed functional ability tasks. Since functional capacity evaluation is regarded as a reliable measure of assessing an injured worker's maximum physical ability to perform work-related tasks (Gross & Battie, 2002), behavioural worksite interventions are potentially an effective means to return injured workers back to work. Further studies are required to investigate this effect amongst South African employees.

### **5.3.6) Perceived Stress**

Interventions which are interactive and that teach individuals active coping mechanisms and self-monitoring have proven to be most effective in reducing perceived stress levels among employees (Cook, Billings, Hersch, Back, & Hendrickson, 2007; Stice, Burton, & Bearman, 2007). Similarly, the findings of this study reported that cognitive behavioural therapy was more effective than a once-off

health promotion talk in reducing the perceived stress levels of the employees at six weeks post-intervention. Although the control group in this study received the same pamphlet on stress management as the experimental group, the experimental group met weekly for six weeks, and the social interaction and peer support could have contributed to the decrease in perceived stress levels.

Edimansyah et al (2008) have shown that a short-term worksite intervention comprising of aerobic exercise plus stress management training was effective in reducing the self-perceived stress levels of the experimental group post completion of the intervention. Similarly, the current study showed that the six week long employee wellness programme comprising of weekly aerobic exercise classes and cognitive behaviour therapy which included stress management training was effective in reducing the perceived stress levels of the experimental group post completion of the intervention. Considering that a busy and competitive industry such as the clothing manufacturing would unlikely be able to implement a long and time consuming wellness programme, these findings are very beneficial as they indicate that significant changes occurred after participation in a short-term intervention. However, it should be noted that this study investigated the short-term effects of the wellness programme. Further research is recommended to determine the long term effects of an employee wellness programme on perceived stress levels. To date very little literature is available on the effects of worksite interventions on perceived stress levels.

### **5.3.7) Body Mass Index (BMI)**

The findings of this study indicated that the employee wellness programme was effective in reducing the body mass index of the experimental group in a short time frame. This could be attributed to participation in the weekly aerobic exercise classes coupled with the nutritional guidelines given in the weekly sessions. Although fruit and vegetable consumption was not measured in this study, the intervention programme encouraged participants to set weekly nutrition goals and increase their daily fruit and vegetable consumption. Similarly, a study by Aldana et al (2005) proved that a worksite intervention programme addressing nutritional behaviours and encouraging self-monitoring of nutrition was effective in reducing the BMI of the participants at six weeks post intervention. Although their study did not include participation in supervised aerobic exercise classes, their educational workshops were much longer in duration and were more frequently held in comparison to this study. In addition, their participants had access to scheduled shopping tours and cooking demonstrations by a dietician, which may have enhanced change in diet behaviours and thereby decrease BMI (Aldana et al., 2005). Overall, educating employees on nutrition and cooking methods coupled with supervised exercise programmes appears to have an impact on reducing BMI.

Research suggests that psychosocial work factors may be related to overweight or obesity (Schulte et al., 2007). Working long hours, increased occupational stress and demands and poor employee and supervisor relationship promote poor eating habits which lead to obesity (Levy et al., 2000). In

addition to the weight loss in the experimental group, the current study found a significant reduction in the BMI of the control group at six weeks post-intervention. The overall reduction in the BMI of the sample could be attributed to the fact that all the subjects entered the study highly motivated to improve their health. Self-motivation and intention to change has been associated with successful health behaviour change (Nieuwenhuijsen, 2004). In addition, managements' approval of the study during working hours may have lead the study participants to perceive the employer as being interested and concerned about their health and wellbeing, which could have had a positive impact on reduction in BMI. A study by Lemon, Zapka, Li, Estabrook, Magner, and Rosal (2009) proved that a greater perception of organisational committment and support is associated with reduction in BMI. Furthermore, the control group received a once-off thirty minute educational seminar which encouraged participation in regular physical activity and they were given health education pamphlets which included basic nutrritional and cooking guidelines. This information may have played a role in promoting changes in dietary behaviours, and thereby assist reductions in BMI. A study by Amati et al (2007) proved that participation in a once-off educational workshop significantly reduced the BMI measurements at one year post intervention. However, in their study the once-off workshop was a full day, and used psychosocial techniques to aid motivation and behaviour changes. However, the reduction in BMI amongst the control group could also be attributed to the fact that participants were aware that they would be weighed at six weeks, and thereby they made a concerted effort to reduce their weight. It is unknown whether the participants of the control group went on a diet during the six weeks, used supplements to aid weight loss or consulted a dietician on methods of changing diet.

The findings of this study, and those of previous studies (Amati et al.,2007; Haines et al., 2007) suggest that motivation to change, education and self-managed nutritional and exercise programmes assists reduction in BMI. It remains unknown whether other factors such as media or family and peer support had an impact on the overall reduction in BMI. Further studies are needed to investigate whether the reductions in BMI continues when the intervention has ended. However, considering that the wellness programme was not primarily aimed at reducing BMI, the findings of this study are of interest to the management of obesity and overweight amongst employees. Worksite wellness programmes appears to have the potential to decrease the burden of obesity amongst the working adult population and thus minimise associated health risks.

#### **5.3.8) Absenteeism**

Similar to the decrease in BMI across the two groups, the study found a statistically significant reduction in sickness related absenteeism of the entire sample group post completion of the study. The overall reduction in sickness related absenteeism could be attributed to improved morale amongst the study participants due to the excitement of the wellness study. The fact that the employers allowed the wellness study to occur during paid working hours may have resulted in the participating employees

feeling like management was interested in their health and wellbeing. According to Nawaz (2006) acknowledging and appreciating employees promotes improved morale at the workplace. Other studies that allowed employees to participate in a wellness programme during normal working hours have also reported significant reductions in absenteeism post-intervention (Maes et al., 1998; Jeffery, Forster, Dunn, French, McGovern, & Lando, 1993). A study by Jeffery et al (1993) showed that after the implementation of a work-site health promotion programme for weight and smoking cessation both the experimental and the control group took less days sick leave post intervention. In their study, participants met three times per week for a thirty minute session, and half of the time was considered paid working hours while the other half was considered part of the employee's free lunch period. However, the wellness programme in their study was implemented over two years. The increased duration of their wellness programme could have impacted on the long-term reduction in absenteeism.

Although the difference between number of days sick leave taken by the control and experimental groups post-intervention was not found to be statistically significant, the findings of this study indicate that the participants of the experimental group tended to be less days off-sick from work post-intervention. The experimental group's decrease in absenteeism could be due to the participants feeling healthier and motivated after participating in the wellness programme. Studies have reported an association between self-rated health and sickness absence (Eriksson, Von-Celsing, Wahlstrom, Janson, Zander, & Wallman, 2008; Busch, Goransson, & Melin, 2007). A study by Eriksson et al (2008) reported that employees with a poorer self-rated health reported more sick days off work as the negative feelings associated with poor SRH discouraged them from being productive or functional.

The overall reduction in absenteeism in this study, indicates that worksite wellness programmes can potentially offer positive economic benefits to the company. However, in order to determine the financial effects a larger population would be required and absenteeism rates would need to be monitored over a much longer period than was done in this study. Employer sponsored health promotion programmes have reported positive economic benefits to the company after implementing an employee wellness programme (Goetzel, Ozminkowski, Bruno, Rutter, Isaac, & Wang, 2002; Maes et al., 1998). According to Goetzel, since Johnson and Johnson implemented an employee wellness programme the company has seen an annual medical savings of approximately \$225 per employee (Goetzel et al., 2002). However, financial gains to the company should never be the primary objective or motivation for implementing an employee wellness programme. Success and effects of the worksite wellness programme should rather be based on whether the intervention addresses the needs of the employees and achieves positive health behaviour changes. Cost analysis and return on investment should however be incorporated in further research studies to assist employers with determining the finances required for implementing and investing in a staff wellness programme.

#### **5.4) Duration of a worksite wellness programme**

To date there is insufficient literature available to prove what the ideal duration and frequency of a worksite wellness programme should be. This study showed that a wellness programme of six weeks duration attended one hour per week was highly effective in improving the perceived HRQoL, increasing exercise participation, improving levels of self-efficacy and producing overall reductions in BMI and absenteeism of the participants. Other studies have shown that more frequent sessions can enhance the short-term effects of the psychosocial intervention programme and have an enduring effect over time (Wigers & Finset, 2007; Smeets et al., 2006 ; Dahl & Nilsson, 2001).

#### **5.5) Strengths and limitations of study**

This study had strengths and limitations. The major strength of the study was the use of a randomized controlled experimental design. Power analysis was performed to determine a sample size sufficient to detect the predicted difference. Despite a few drop-outs in the subjects selected, the sample size was above the number required. The same person conducted the wellness programme at the three companies and thereby standardization of the intervention programme was maintained.

A major short-coming of the study was that it failed to record the detailed medical history of the participants. Although the sample was matched for all other demographic variables measured, it could be argued that the groups were not matched for co-morbidities which could have impacted on results and adherence to the programme. Therefore it is unknown whether the presence of co-morbidities in either group impacted on the results. Other studies have reported that the presence of co-morbidities has an impact on HRQoL (Picavet & Hoeymans, 2004; Gijzen, Hoeymans, Schellevis, Ruwaard, Satariano, & Bos, 2000). It is recommended that future studies include a detailed medical history of the study participants.

Another short-coming of the study was that the person recording height and weight measurements of the participants was not blinded to the group affiliation of the subjects. This may have introduced bias in the results. However, when measurements were taken post-intervention, the researcher had no records of the participants' pre-intervention measurements with her, and the large sample size makes it unlikely that she would be able to remember the previous readings.

Another factor that may have introduced bias within the study is the fact that apart from the BMI measurements and absenteeism records assessed, the study relied significantly on self-report outcome measures. A possible Hawthorne effect may have caused information bias as the participants may have tried to please the researcher by giving favourable and not honest answers. However, considering that this study was primarily concerned with the effects of the intervention on perceived HRQoL, self-efficacy and exercise behaviours, self-report measures are the only possible indicators of change. Double-blinding is impossible with this type of intervention as participants can easily identify what is the intervention being tested. However, although the experimental group participants may

have benefited from the extra attention given to them, it is unlikely that attention alone is responsible for the health behavior change and improvements in perceived HRQoL. The Hawthorne effect can be minimized in future studies by doing longer-term evaluations and by including some physiological outcome measures. Many other factors may have also influenced the participant's knowledge, perceived health state and health-related behaviours during the study period. However, the degree to which these factors may have influenced the results remain unknown.

In this study subjects were randomly selected for participation in the study to allow all the employees an equal opportunity to be selected for participation. However, employees needed to give consent to the employer for their names to be passed on to the principle research investigator. Therefore, it may be argued that although subjects were randomly selected for inclusion in the study and randomly assigned to the control and experimental groups, the sample comprised of volunteers who were motivated to improve their health and wellbeing. This limits generalisability of the findings to all employees of the clothing manufacturing industry. While it would be beneficial to compare the outcome measures of those employees that participated in the study, with those that did not volunteer, ethically it was vital that employees gave consent for consideration and participation in the study.

The reliability and validity of the outcome measures may also be questioned in this study. The EQ-5D which was the primary outcome measure of this study has previously proved to be a valid and reliable outcome tool for use in a South African population (Jelsma & Ferguson, 2002). The secondary outcome measures used (BPI-SF, PSS, Stanford Scales) have been proven to be valid and reliable outcome measures internationally (Osborne et al., 2006; Cohen & Williamson, 1998; Lorig et al., 1996), but their validity amongst a South African population has not formally been tested. However, they seemed to perform well in this study and the results appeared to be internally consistent. In addition, all questionnaires were administered in English. This may have further affected the reliability of the results as although all the participants understood English, it may not have been their first language. However, research assistants that were blind to the group affiliation of the subjects were available to assist with interpretation of the questions.

## **Chapter 6: Conclusion**

### **6.1) Conclusion**

This study aimed to evaluate the efficacy of an employee wellness programme amongst clothing or textile manufacturing employees within the Cape Town Metropolitan region. To our knowledge this wellness study was the first of its kind performed within the South African clothing manufacturing industry. The findings of the study report that the wellness programme appeared to be beneficial in improving health-related behaviours and perception of health-related quality of life of the employees.

In addition the wellness programme lead to significant improvements in BMI, levels of self-efficacy, mental health state and absenteeism. Although the pain levels of the participants tended to decrease after participating in the wellness programme, the lack of significant changes in pain levels and pain interference with functional abilities suggest that supplementary individual physiotherapy treatment is needed to manage musculoskeletal type pain. Therefore, the worksite wellness programme should not replace individual physiotherapy treatment for musculoskeletal injuries, but is a valuable method of promoting health-related behavior change in the workplace.

Although an economic analysis was not performed in this study, the findings suggest that adopting an employee wellness programme within the South African clothing manufacturing industry promises to improve productivity, reduce sickness related absenteeism and employer health care costs, and thereby have economic benefits to the industry.

Furthermore, this study highlighted the key role that physiotherapists can play within organizations in advocating for, creating and implementing worksite health and wellness programmes. Interventions aiming to improve employees health and overall wellness should include active engagement of the participants, guide and assist with problem solving, goal setting and self-reflection, and incorporate supervised exercise sessions to initiate health behavior changes. Worksite health promotion programmes are more convenient and feasible for employed adults to attend, and the peer support gained from these sessions is a key element to the success of the intervention.

In this study, a minimal intervention was given to the control group as it would be unethical to withhold information. As a result, the control group also demonstrated improvements in perceived HRQoL and reductions in BMI and absenteeism post-intervention, making it difficult to establish a true intervention effect. The potential Hawthorne effect and the excitement of starting a wellness programme at the companies could have also influenced the results of the study.

Despite the limitations, the findings of this study provide some evidence that a worksite wellness programme implemented over a short time-frame was beneficial in improving the wellbeing of the participating employees. The high attendance rate maintained each week of the intervention and the low attrition rate suggest that employees welcome the idea of a worksite wellness programme. If implemented and sustained, an employee wellness programme is likely to benefit both the employee and the employer.

## **6.2) Recommendations**

Recommendations are that employee wellness programmes be implemented within the South African clothing manufacturing industry. This study showed that a wellness programme of six weeks duration attended once per week was effective in producing significant improvements in the perceived HRQoL, health related behaviours and levels of self-efficacy of the participants. Other studies have

shown that more frequent sessions lead to more significant improvements in levels of self-efficacy (Larson et al., 2008) and health related behaviours (Emmons et al., 1999). While increasing the frequency of the wellness programme may enhance the intervention effects as participants would be afforded more contact time to exercise, engage in discussions and reflect on changes made, there remains little evidence on the dosage effects of a workplace wellness intervention programme. It is recommended that future studies investigate this effect, as it has cost implications on the company. The content of the wellness programme within the South African clothing manufacturing industry should focus on lifestyle modification, and can include other behavioural aspects that are relevant to the South African population such as HIV education and sexual behaviours.

Further recommendations are that other companies or industries perform a health needs analysis amongst their employees in order to ascertain the specific type of programme that will promote wellness and improve productivity within their workforce.

Further research is required to investigate the long-term benefits of the wellness programme with regards to HRQoL, health behavior change, BMI and absenteeism. Recommendations are that future studies investigating the efficacy of a worksite wellness programme include physiological outcome measures as well as self-reported outcome measures, and ensure that the assessor of the physiological measurements is blinded to the group affiliation of the subjects. Future studies should include a detailed medical history of the subjects to determine the impact of co-morbidities on adherence, participation and effects of the wellness programme. In addition, further studies investigating the feasibility and effects of a worksite gym or the creation of physical activity clubs within the clothing industry may be beneficial to investigate potential methods of maintaining positive behavior changes amongst the employees.

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## **Appendices**

### **Appendix I: Consent form**

#### **Employee Wellness Research Study**

##### **Introduction:**

My name is Naila Edries. I am a qualified physiotherapist, currently studying towards a Masters degree in physiotherapy at the University of Cape Town. The research I am conducting at your industry is aimed at implementing two different techniques of health promotion and evaluating the affects of these programmes.

##### **Purpose:**

The main aim of the study is to promote 'healthy lifestyles' at clothing/textile manufacturing companies. The study aims to investigate the effects of the two methods of executing health promotion at the worksite. This information can assist the industry, as well as the health sector in creating health promotion programmes that are beneficial to the workers.

##### **What does the study involve?**

The study will consist of 90 workers from three selected clothing/textile manufacturing companies (i.e. 30 workers from each company). The study involves your participation in one of two health promotion programmes. The study will be run for six weeks at each company, from March through to April 2009.

Participants will be given a numerical identification, and then be randomly assigned to a group of 15 workers. Each company will consist of two groups of fifteen workers each, namely group 1 and group 2 (see table below). All participants will be required to complete a questionnaire, and height and weight measurements will be taken. Group 1 will be given a health promotion talk of 30 minutes and several health education pamphlets. Group 2 will be required to attend six group workshops of one hour each. These group workshops will be spread over six-weeks (i.e. 1 hour per week for 6-weeks). The workshops will comprise of a 30-minute health discussion and a 30-minute exercise class per week. The exercise class will be a light aerobic class, including a few back strengthening exercises and arm and leg stretches. The study relies on you to be present at all of the six workshops.

Tabular description of the group requirements at each factory:

<b><u>Group 1</u></b> (15 participants)	<b><u>Group 2</u></b> (15 participants)
<ul style="list-style-type: none"><li>• A once off 30-minute health talk</li><li>• Given various health promotion pamphlets</li></ul>	<ul style="list-style-type: none"><li>• Attend a 1hour long workshop per week for 6-weeks.</li></ul>

The health talks, exercise classes and the time required for you to complete the questionnaires have been approved by your employer. It will run during normal working hours and will not affect your lunch or tea breaks.

The study relies on you to be honest when answering the questionnaires and to be present at all of the sessions assigned to your group. However, should you wish to withdraw from the study, you are free to do so.

**Are there any risks, dangers, or discomfort involved?**

The risks involved are minimal. Participation in the exercise classes could have you experiencing muscle stiffness and soreness the following day. Any worker who suffers from uncontrolled hypertension, diabetes or unstable angina will not be allowed to partake in the study as they would be unsafe for participation in the exercise classes. All information obtained from the questionnaires that will identify you, will be kept confidential and be made available only to the principal research investigator and the research supervisor. Information extracted from the questionnaires for the purpose of the study will be grouped together with the information of the other participants so that you cannot be identified. You do not risk job loss, promotion opportunities or any other institutional sanctions by not participating in this study.

**Will compensation be made by participating in this study?**

No, there will be no payment or monetary reward for your participation in this study.

**Who will receive the results of the study?**

The principal researcher will give the results of the study, without identifying any individual names to the University of Cape Town Physiotherapy Department and the Medical Research Council of South Africa. Should you be interested in viewing the results of the study, you may request a copy from the researcher.

**Can I withdraw from the study?**

Your participation in the study is entirely voluntarily. Therefore, you are free to withdraw from the study at any time if you so wish, and there will be no negative consequences if you refuse to participate.

Should you have any questions or queries relating to the study please feel free to contact the persons' listed below:

Principal research investigator:

**Ms Naila Edries:**

Cell: 073 133 1473

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Your signature below indicates that you have read and understood the above information, that you have no question(s) regarding the study and that you freely volunteer to participate in the study.

\_\_\_\_\_

Participants' signature

\_\_\_\_\_

Participants' name

\_\_\_\_\_

Date

\_\_\_\_\_

Witness' signature

\_\_\_\_\_

Date

Company name: \_\_\_\_\_

**Appendix II: Participant Questionnaire**

Participant number: \_\_\_\_\_

Company name: \_\_\_\_\_

University of Cape Town

## Demographic Information Sheet

Date: \_\_\_\_\_

Name and Surname	
Date of Birth (dd/mm/yy)	
Age	
Gender ( <i>male/female</i> )	
Highest level of Education	
Occupation	
How long have you worked in this occupation? <i>e.g. 10 years as a machinist</i>	
How long have you worked in the Clothing/Textile Industry?	
What is your home language? <i>e.g. English, Afrikaans, Xhosa</i>	

---

## **Anthropometric Data Sheet**

(To be recorded by researcher)

Weight	
Height	
BMI	

**EQ-5D** (EuroQuol, 1990)

By placing a tick in one box in each group below, please indicate which statements best describe your own state of health TODAY.

**Mobility**

I have no problems in walking about

I have some problems in walking about

I am confined to bed

**Self-Care**

I have no problems with self-care

I have some problems washing or dressing myself

I am unable to wash or dress myself

**Usual Activities** (*e.g. work, study, housework, family or leisure activities*)

I have no problems with performing my usual activities

I have some problems with performing my usual activities

I am unable to perform my usual activities

**Pain/Discomfort**

I have no pain or discomfort

I have moderate pain or discomfort

I have extreme pain or discomfort

**Anxiety/Depression**

I am not anxious or depressed

I am moderately anxious or depressed

I am extremely anxious or depressed

---

Compared with my general level of health over the past 12 months, my state of health today is:

Better  PLEASE TICK

Much the same  ONE

Worse  BOX

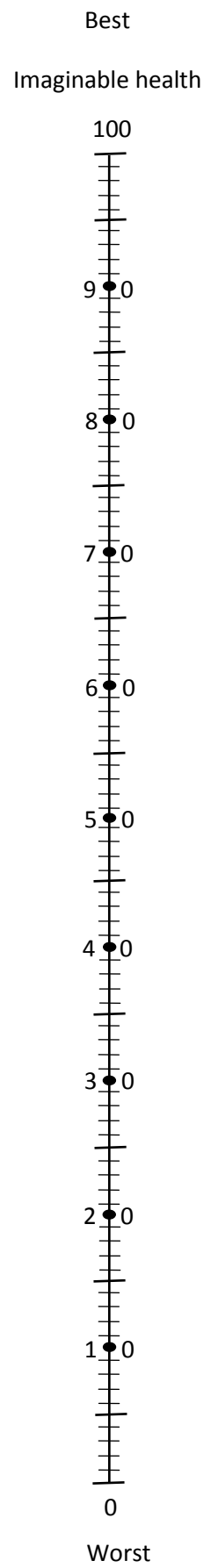
---

To help people say how good or bad their state of health is, we have drawn a scale on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale, in your opinion, how good or bad your own health is today. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your state of health is today.

**Your own  
state of health**

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### **Perceived Stress Scale- 10 Item**

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a cross how often you felt or thought a certain way.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

3. In the last month, how often have you felt nervous and "stressed"?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

5. In the last month, how often have you felt that things were going your way?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

7. In the last month, how often have you been able to control irritations in your life?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

8. In the last month, how often have you felt that you were on top of things?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

9. In the last month, how often have you been angered because of things that were outside of your control?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

\_\_\_0=never \_\_\_1=almost never \_\_\_2=sometimes \_\_\_3=fairly often \_\_\_4=very often

(Cohen, Kamarck, & Mermelstein, 1983)

**Stanford Self-Rated Health**

**In general, would you say your health is... (circle one number)**

- |           |   |
|-----------|---|
| Excellent | 1 |
| Very good | 2 |
| Good      | 3 |
| Fair      | 4 |
| Poor      | 5 |

### Stanford Exercise Behaviours

During the past week (even if it was not a typical week for you), how much total time (for the entire week) did you spend on each of the following? (Please circle one number for each question)

How much time during the past week...	None	Less than 30 minutes/week	30-60 minutes/week	1-3 hours/week	More than 3 hours/week
1. Stretching or strengthening exercises (range of motion, weights, etc)	0	1	2	3	4
2. Walk for exercise	0	1	2	3	4
3. Swimming or aquatic exercise	0	1	2	3	4
4. Bicycling (including stationary exercise bikes)	0	1	2	3	4
5. Other aerobic exercise (specify: _____)	0	1	2	3	4

(Stanford Patient Research Education Centre <http://patienteducation.stanford.edu/research>)

### Stanford Social/Role Activities Limitations Scale

During the past 4 weeks, how much has your health interfered with your...

	<b>Not at all</b>	<b>Slightly</b>	<b>Moderately</b>	<b>Quite a bit</b>	<b>Almost totally</b>
1. Normal social activities with family, friends, neighbours, or groups?	0	1	2	3	4
2. Hobbies or recreational activities?	0	1	2	3	4
3. Household chores?	0	1	2	3	4
4. Errands and shopping?	0	1	2	3	4

(Stanford Patient Research Education Centre: <http://patienteducation.stanford.edu/research>)

**Brief Pain Inventory-Short Form**

University of Cape Town

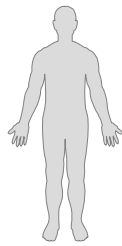
# Brief Pain Inventory

Date: \_\_\_\_\_ Time: \_\_\_\_\_

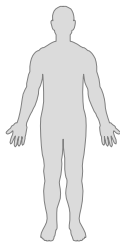
Name: \_\_\_\_\_

- 1) Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?  
1. Yes      2. No

- 2) On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.



front



back

- 3) Please rate your pain by circling the one number that best describes your pain at its **worst** in the past 24 hours.

0 1 2 3 4 5 6 7 8 9 10  
No pain      Pain as bad as you can imagine

- 4) Please rate your pain by circling the one number that best describes your pain at its **least** in the last 24 hours.

0 1 2 3 4 5 6 7 8 9 10  
No pain      Pain as bad as you can imagine

- 5) Please rate your pain by circling the one number that best describes your pain on **average**.

0 1 2 3 4 5 6 7 8 9 10  
No pain      Pain as bad as you can imagine

- 6) Please rate your pain by circling the one number that tells how much pain you have **right now**.

0 1 2 3 4 5 6 7 8 9 10  
No pain      Pain as bad as you can imagine

- 7) What treatments or medications are you receiving for your pain?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 8) In the past 24 hours, how much relief have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.

0% 10 20 30 40 50 60 70 80 90 100%  
No relief      Complete relief

- 9) Circle the one number that describes how, during the past 24 hours, pain has interfered with your:

A. General activity

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

B. Mood

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

C. Walking ability

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

D. Normal work (includes both work outside the home and housework)

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

E. Relations with other people

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

F. Sleep

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

G. Enjoyment of life

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

H. Ability to concentrate

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

I. Appetite

0 1 2 3 4 5 6 7 8 9 10  
Does not interfere      Completely interferes

## **Appendix III: Employee Wellness Programme**

### **Week 1: Agenda**

1. Ice-breaker:  
Introduce them-selves and state their main reason for participating in the wellness program.
2. Intention of wellness program:
  - To educate employees on how to achieve better health.
  - How to improve the quality of life. To be able to do the things you enjoy.
  - To teach you the skills of goal setting, pacing activity, self reflection.
3. Wellness program:
  - Meet as a group for 1 hour per week for 6 weeks.
  - Education workshop and exercise class.
  - Wear comfortable clothing and shoes to group sessions.
4. Today's theme: Understanding Pain
  - What is pain? Acute and Chronic
  - How do we experience pain?
  - What influences the severity of pain? Pain triggers
  - Why do we experience pain?
  - Chronic pain syndrome
5. Themes for the next few weeks:
  - Spine, RSI and posture at work
  - Goal setting and pacing activity
  - Diseases of Lifestyle
  - Physical activity and nutrition
  - Relaxation and stress management

## **Exercise Class: Week 1**

### **Warm-up:** 5-8 minutes

In Standing:

- Deep breathing exercises (x5)
- Cervical flexion and extension (free active range of movement exercises) (x5)
- Cervical rotation to left and right (free active range of movement exercises) (x5)
- Cervical side-flexion to right and left (free active range of movement exercises) (x5)
- Shoulder rolls backwards (x10)
- Trunk mobility exercises to right and left (x10)
- Marching on spot (4x10)

### **Cardio and Strength:** 10-15 minutes

- Marching on spot with arm swings: increase the pace.
- Aerobic side-stepping to the right and left.
- Aerobic stepping backwards and forwards.
- Squats against a wall (2x10)
- Heel/calf raises (1x10)
- Lunges to right and left (1x10 each)
- Pelvic tilts in sitting (becoming accustomed to neutral pelvis) (x10)

### **Cool down:** 5-8 minutes

Deep breathing exercises incorporated with all stretches.

- Gastrocnemius stretch in standing (x3)
- Soleus stretch in standing (x3)
- Quads stretch in standing (x3)
- Rectus femoris stretch in standing (x3)
- Hamstring stretch in long sitting (x3)
- Hip external rotators stretch in long sitting (x3)

## Employee Wellness Program

### Week 2: Agenda

1. Brief reflection on previous week. Discuss any individual goals that were set and any changes in lifestyle that were attempted. Assist participants with “SMART” goals.
  
2. Theme: Posture, Your back and ergonomics
  - Basic anatomy of the back (muscles, bones, ligaments, nerves)
  - What is posture: normal curves, pelvis
  - What is ergonomics? Work environ, duties, body build etc
  - Factors influencing posture (mood, stress levels, muscles strength/flexibility, duties, weight, pain, fatigue, environment)
  - Kinetic handling: lifting techniques, weight shifts in standing etc.
  - What is meant by core strength; how to palpate transverses abdominus muscle (TrA); how to contract the TrA.
  
3. Exercise class

## **Exercise Class: Week 2**

### **Warm-up:** 5-8 minutes

In Standing:

- Deep breathing exercises (x5)
- Cervical flexion and extension (free active range of movement exercises) (x5)
- Cervical rotation to left and right (free active range of movement exercises) (x5)
- Cervical side-flexion to right and left (free active range of movement exercises) (x5)
- Shoulder rolls backwards (x10)
- Trunk mobility exercises to right and left (x10)
- Marching on spot with arm swings (5x10)

### **Cardio and Strength:** 10-15 minutes

- Aerobic side-stepping to the right and left.
- Aerobic stepping backwards and forwards.
- Squats against a wall (2x10)
- Heel/calf raises (2x10)
- Lunges to right and left (2x10 each)
- Pelvic tilts in sitting (becoming accustomed to neutral pelvis) (x10)
- TrA activation in crk, ly. (hold for 5-8 seconds)

### **Cool down:** 5-8 minutes

Deep breathing exercises incorporated with all stretches.

- Gastrocnemius stretch in standing (x3)
- Soleus stretch in standing (x3)
- Quads stretch in standing (x3)
- Rectus femoris stretch in standing (x3)
- Hamstring stretch in long sitting (x3)
- Hip external rotators stretch in long sitting (x3)

## Employee Wellness Program

### Week 3: Agenda

1. Brief reflection on previous week. Discuss any goals that were set and any changes in lifestyle that were attempted.
2. Today's theme: Chronic Diseases of lifestyle:
  - Diabetes:
    - What is insulin?
    - What is diabetes? Glucose levels
    - Different types of diabetes
    - Risk factors
    - Signs and Symptoms
    - What you can do to manage your diabetes.
    - What can you do to decrease your risk of developing diabetes?
  - Hypertension:
    - The heart: basic anatomy and functioning.
    - What is Hypertension?
    - Risk factors
    - Signs and Symptoms
    - What can you do to manage your hypertension?
    - What can you do to decrease your risk of developing hypertension?
3. Exercise Class

### Exercise Class: Week 3

#### Warm-up: 5-8 minutes

In Standing:

- Deep breathing exercises (x5)
- Cervical flexion and extension (free active range of movement exercises) (x5)
- Cervical rotation to left and right (free active range of movement exercises) (x5)
- Cervical side-flexion to right and left (free active range of movement exercises) (x5)
- Shoulder rolls backwards (x10)
- Trunk mobility exercises to right and left (x10)
- Marching on spot (4x10)

#### Cardio and Strength: 10-15 minutes

- Marching on spot with arm swings: increase the pace.
- Aerobic side-stepping to the right and left.
- Aerobic stepping backwards and forwards.
- Scapula setting exercises (hold for 5-6 counts)
- Squats against a wall (3x10)
- Heel/calf raises (2x10)
- Pelvic tilts in sitting (2x10)
- TrA activation in crk. Ly. (hold for 10-12 counts)

#### Cool down: 5-8 minutes

Deep breathing exercises incorporated with all stretches.

- Gastrocnemius stretch in standing (x3)
- Soleus stretch in standing (x3)
- Quads stretch in standing (x3)
- Rectus femoris stretch in standing (x3)
- Hamstring stretch in long sitting (x3)
- Hip external rotators stretch in long sitting (x3)

## Employee Wellness Program

### Week 4: Agenda

1. Reflect on previous week. Goals set and achieved. Any challenges faced this week.
2. Theme:
  - Goal Setting and Pacing
    - What is the purpose of setting goals?
    - ‘SMART’ goals (Specific, Measurable, Attainable, Realistic, Time-Frame)
    - Tips for starting and progressing goals.
    - What is pacing?
    - Importance of reinforces to motivate yourself.
    - Examples of reinforces.
  - Healthy Eating Plan
    - Plan meals in advance
    - Ensure that you eat breakfast every day. Don’t skip meals.
    - Cutting down on ‘fatty’ foods.
    - Improving food preparation
    - Recommended daily requirements (increase fruit and vegetable consumption).
3. Exercise class

## **Exercise Class: Week 4**

### **Warm-up:** 5-8 minutes

In Standing:

- Deep breathing exercises (x5)
- Cervical flexion and extension (free active range of movement exercises) (x5)
- Cervical rotation to left and right (free active range of movement exercises) (x5)
- Cervical side-flexion to right and left (free active range of movement exercises) (x5)
- Shoulder rolls backwards (x10)
- Trunk mobility exercises to right and left (x10)
- Marching on spot (4x10)

### **Cardio and Strength:** 10-15 minutes

- Marching on spot with arm swings: increase the pace.
- Aerobic side-stepping to the right and left.
- Aerobic stepping backwards and forwards.
- Scapula setting exercises (hold for 6-10 counts)
- Squats against a wall (3x10)
- Heel/calf raises (4x10)
- Pelvic tilts in sitting (2x10)
- TrA activation in crk. Ly. (hold for 10-15 counts)
- Alternate lunges to the right and left (1x10)

### **Cool down:** 5-8 minutes

Deep breathing exercises incorporated with all stretches.

- Gastrocnemius stretch in standing (x3)
- Soleus stretch in standing (x3)
- Quads stretch in standing (x3)
- Rectus femoris stretch in standing (x3)
- Hamstring stretch in long sitting (x3)
- Hip external rotators stretch in long sitting (x3)

## Employee Wellness Program

### Week 5: Agenda

1. Reflection on previous weeks' goals and achievements.
2. Theme: Benefits of regular exercise
  - Cardiovascular
  - Respiratory
  - Strength of bones
  - Weight control
  - Manage diabetes/hypertension
  - Helps relieve stress and anxiety
  - Reduces risk of certain cancers

-Identifying an enjoyable physical activity.

-Exercise program made up of 3 components (i.e. warm-up; cardio and strength; cool down).

-How to progress exercises.

-How to measure BMI.

-How to measure pulse.

-Recommended exercise guidelines.

-Pacing skills

3. Exercise class

## Exercise Class: Week 5

### Warm-up: 5-8 minutes

In Standing:

- Deep breathing exercises (x5)
- Cervical flexion and extension (free active range of movement exercises) (x5)
- Cervical rotation to left and right (free active range of movement exercises) (x5)
- Cervical side-flexion to right and left (free active range of movement exercises) (x5)
- Shoulder rolls backwards (x10)
- Trunk mobility exercises to right and left (x10)
- Marching on spot (4x10)

### Cardio and Strength: 10-15 minutes

- Marching on spot with arm swings: increase the pace.
- Aerobic side-stepping to the right and left.
- Aerobic stepping backwards and forwards.
- Shoulder internal and external rotation exercises with elbow in 90° flexion (2x10)
- Squats against a wall (4x10)
- Heel/calf raises (4x10)
- Pelvic tilts in sitting (2x10)
- Alternate lunges to the right and left (2x10each)

### Cool down: 5-8 minutes

Deep breathing exercises incorporated with all stretches.

- Gastrocnemius stretch in standing (x3)
- Soleus stretch in standing (x3)
- Quads stretch in standing (x3)
- Rectus femoris stretch in standing (x3)
- Hamstring stretch in long sitting (x3)
- Hip external rotators stretch in long sitting (x3)

## Employee Wellness Program

### Week 6: Agenda

1. Reflection on previous week's goals achieved.
2. **Theme: Coping Skills for Stress Management**
  - What is Stress? Your body's response to a challenging stimulus.
  - Signs and symptoms: group members can discuss their S&S.
  - Coping Skills:
    - Dealing with anger (some anger may serve a useful purpose initially, but lots of anger is usually destructive, energy is better spent solving the problem.)
    - Avoidance of blaming (blaming arouses anger). See mistakes as a series of events that simply happened.
    - Being task orientated and not letting emotions take over: Emotions can cloud one's judgement. First acknowledge the emotion, and then separate it from the issue.
    - Learning to be more assertive.
    - Managing time efficiently.
    - Rewarding one-self for a job performed well done.
    - Giving oneself permission to make mistakes.
    - Having someone to confide in and establishing good relationships.
    - Distancing oneself (if too overwhelming, stepping back, picture how someone else may solve the problem).
    - Living in the present (savouring the moment, enjoying the journey, a lot of stress often arises from regret from the past and fear/anxiety of the future).
    - Regular exercise (endorphins)
    - Relaxation methods
3. Progressive relaxation technique:
  - work/designed by Edmund Jacobson (physiologist-physician) in 1930's
  - Tense-release system
  - Muscle tension is believed to be closely linked to the state of your mind.
4. Reflection on the 6-weeks: Goals achieved. Methods of sustaining behaviour change.
5. Exercise/Relaxation class

## **Week 6: Relaxation technique**

1. I am going to lead you through some of the major muscle groups of the body, asking you to contract and relax them, one by one. Tensing and releasing muscles can help to induce a feeling of physical relaxation. You may also feel mentally relaxed.
2. Make yourself as comfortable as you can. Let your breathing settle down and observe its natural rhythm. (After a minute or two) now follow a natural breath out, making it a bit longer than usual...then let the air in...let it gently fill your lungs...and breathe out slowly, releasing your tensions with the air. Now slowly allow your breathing to take care of itself.
3. I'd like you now to focus your attention on your right arm. With your palm facing flat down on the mat or floor, slowly press your finger tips into the surface, drawing them towards your palm so that your hand takes on the shape of a spider. As you hold the position, notice the tension in your hand and the underside of your forearm...feel them build up...then...relax...let the tension go...relax the muscles...and let the tension disappear.
4. Still with the right arm, I want you to slowly tense up all the muscles so that the arm becomes rigid. Begin with a little tension in the finger tips...let it grow until the fingers are drawn into the palm making a fist shape. Then stretch out the arm, creating tension in the forearm and upper arm until the arm gets rigid like a rod. Now feel the tension throughout the arm...and relax...let it flop down...feel the muscles going slack and the arm becoming limp...notice the relief, the pleasant tingling and the sense of warmth. Let the arm go on relaxing...and relaxing a bit more...imagine all your tension is flowing out your fingertips.
5. Turn your attention to your legs which are lying flat on the floor. Point your feet up towards your face, keeping the backs of your knees on the ground. Now hold the position...and notice the sensations you are getting in the working muscles in the shin bones...and then...relax...As you let go your leg muscles, feel the tension draining out of them...and continuing to drain out as your legs and feet become more and more relaxed.
6. This time I want you to point your feet down, as if you were using them to indicate something. Now as you hold the position, feel the tensions in your calves,...and then...relax...let go...let all the tension dissolve...feel the comfort returning to your lower legs...notice the sensations you get from relaxing the muscles...continue letting go until you feel they won't let relax any further.

7. Let your attention now focus on your toes. Curl your toes down and feel the tension in them build up. Now feel the tension in the sole of your feet and the calf of your leg...then relax...let it go...feel the muscles going slack...feel them going slacker as the tension disappears...notice how the muscles feel when they are relaxed.
8. Now turn your attention to your breathing again...notice its rhythm...place one hand over your upper abdomen and notice the gentle up and down motion of your abdomen...avoid any inclination to alter the rhythm...just let the breathing take care of itself...
9. Focus next on the abdominal muscles,...make the area over your internal organs go flat and hard as you pull the muscles in...Now feel the tension under your ribs, over your organs and around the back of your pelvis...then relax and let go...allow your muscles to spread themselves...feel a sense of deep relaxation...and let the relaxation become deeper as the moments pass.
10. Moving to the region of the back, bring your attention to the blade-bones behind your shoulders. Draw them back so that they get nearer to each other...now feel them being gently squeezed together...notice also how your chest is lifted away from the supporting surface...and then relax...release the tension...let the muscles soften...and notice the feeling of relaxation...let the feeling continue on and on...
11. Moving to the neck region, I'd like you to lift your shoulders..hunch them up as if to touch your ears...now...feel the tension in the lower neck...and relax...let the shoulders drop...and go on dropping...further...and further as the tension flows away...feel your shoulders completely relaxed.
12. Now move your attention towards your face. Raise your eyebrows...raise them high...feel the tension in the muscle that stretches across the brow...and relax...let the tension flow out...continue until there is no tension left in your brow.
13. Focus your attention on your lips. Press your lips tightly together as if you were rejecting some unpleasant medicine...now...hold your lips pursed...then relax...let them go...and as they relax, notice feelings such as the warmth of the blood flowing back into your lips...
14. Continue relaxing...let the feeling spread across your face...to your neck...to your shoulders, your arms, back, stomach and your legs...Allow your entire body to feel completely relaxed...continue relaxing for a few minutes...

15. And now, I'm slowly going to bring this session to an end...I'd like you to gradually return to normal activity...but first I'll count from one to three to help you make the adjustment. When I get to three, I'd like you to open your eyes, feeling fresh and alert and ready to carry on with your life...one....two....three...

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**Appendix IV: Health promotion and education pamphlets**

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## Range of Movement Exercises

*These exercises help keep the spine mobile!*

- 1) Slowly place your chin on your chest. Return to midline position.  
**Repeat 5 times.**



- 2) Slowly turn your head to the right, then turn it to the left.  
**Repeat 5 times to each side.**



- 3) Slowly take your right ear to your right shoulder.  
**Repeat 5 times for each side.**



- 4) Slowly look up towards the ceiling.  
Return to the midline.  
**Repeat 5 times.**



work, complete these exercises every 1-2 hours!

# Neck Care

- Neck Injuries are very common among workers who sit or stand for most of the day.
- Neck Injuries are extremely painful.
- Neck Injuries are often caused by poor posture!

*Doing  
regular exercises  
and simple  
stretches  
can reduce your  
risk of neck injury  
and decrease  
your  
PAIN*

## Isometric Exercises

*This helps to strengthen and relax the muscles of the neck.*



Ref: [www.revolutionhealth.com/handsonhead](http://www.revolutionhealth.com/handsonhead)

1) Place your hands against the side of your head. Push slowly while resisting with your neck muscles. **Hold for 5 seconds and relax. Repeat 10 times.**

2) 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 and relax. Repeat 10 times.**

3) Press your forehead into your palms and resist any forward motion with your hands. **Hold for 5 seconds and relax. Repeat 10 times.**

## Gentle Neck Stretches

*Stretching loosens up the tight muscles*

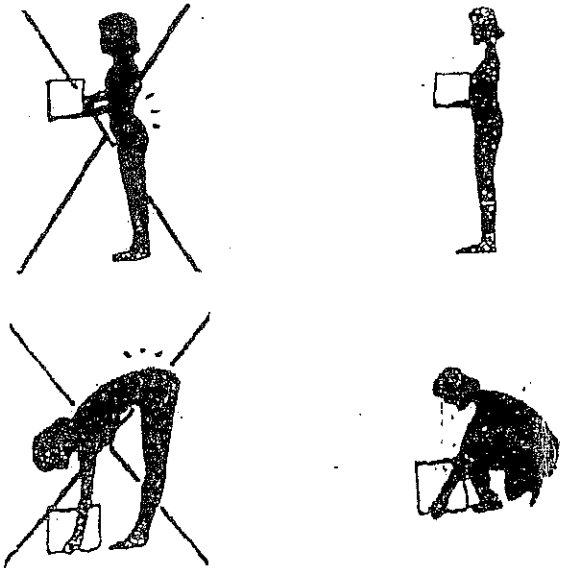


Ref: [www.bodyosteo.com/pages/stretches](http://www.bodyosteo.com/pages/stretches) (21/10/08)

- 1) Sit on one hand and sit up straight. With the other hand pull your head gently towards the opposite hip until you feel a stretch in your neck. **Hold it there for 20 seconds, then relax. Repeat 3 times.**

Jou rug is baie belangrik en moet ten alle tye opgepas word veral wanneer iets ogetel word.

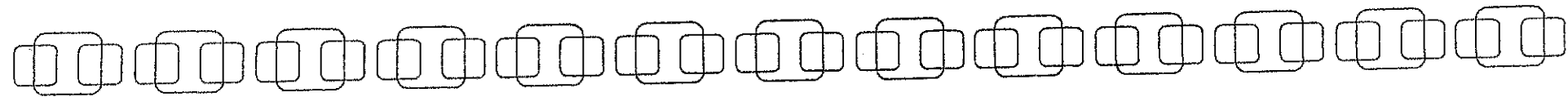
- Trek jou naaltjie in en op.
- Voete stewig op die grond en 'n entjie van mekaar af.
- Buig jou kniee, en hou die rug reguit!
- Hou die gewig nearby aan jou lyf.
- Lig op deur jou kniee terwyl jou rug reguit bly.



## Rugpyn

Kan verminder word duer gereelde oefeninge!!!



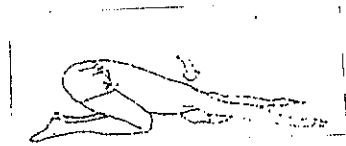


## Oefenings Program

**Opwarming:** Loop vir 5 min op een plek om die liggaam op te warm. Lig die bene hoog op en swaai die arms.

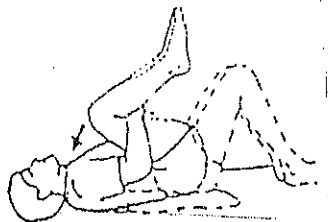
### Strekke:

1. Strek uit hande en arms vorentoe met die rug ruiguit. Hou posisie vir 20 sekondes en kom stadig weer terug.



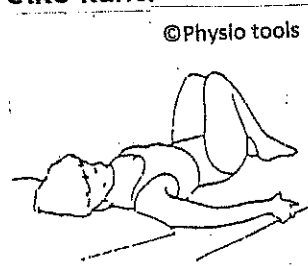
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2. Le op die rug en buig kniee een vir een op na die borskas. Sit hande agter kniee en trek na borskas. Hou vir 20 sekondes.



©Physio tools

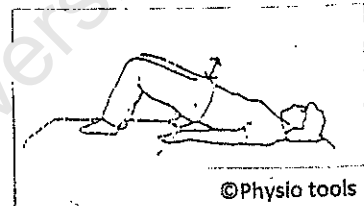
3. Le op die rug met kniee gebuig. Beweeg nou bene van kant tot kant terwyl bolyf stil gehou word. Herhaal 5 keer na elke kant.



©Physio tools

### Sterk oefeninge:

1. Le op die rug met kniee gebuig. Lig boude 'n entjie van die vloer af. Hou posisie vir 10 sekondes. Herhaal 10 keer.



©Physio tools

2. Staan op hande en kniee. Kry midposisie van lae rug. Lig een arm op en daarna teenoorgestelde been. Hou posisie vir 5-10 sekondes. Herhaal 10 keer aan elke kant.



©Physio tools

**Afkoeling:** Loop in die rondte en skud boude af. Haal diep asem terwyl stilstaan.

Herhaal vorige strekke 3 keer.

***Vir goeie resultate moet oefeninge stadig en gekontroleerd op 'n gereelde basis gedoen word***

***+/- 4 keer per week!***

**MY GOALS** 😊

No.	Goal	Action	Achieved Yes/No
1			
2			
3			
4			
5			
6			

**MY GOALS** 😊

No.	Goal	Action	Achieved Yes/No
1			
2			
3			
4			
5			
6			

## EXERCISE GUIDELINES

Remember! When starting exercises for the first time it is recommended that you consult your doctor first for medical clearance.

Always start exercises slowly, and gradually (slowly) increase the pace of your exercises.

25-30 minutes of exercises performed 3-4 times per week is recommended.

1. Go for walks outside with a friend or family member. Having someone to talk to while you walk will make your walk more enjoyable.
2. March up-and-down on the spot. You can play music to make it more fun and enjoyable.
3. Step up-and-down on one step. Count the amount of steps you can manage, work at that pace for a week, before you increase it by 10 steps.



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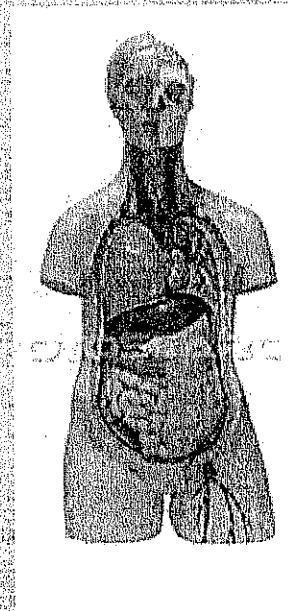


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### Ref:

1. [www.netdoctor/hypertension.com](http://www.netdoctor/hypertension.com)
2. [www.medicinenet.com/hypertension](http://www.medicinenet.com/hypertension)
3. "Hypertension" World Book Encyclopedia, World Bk Inc 1987.
4. [www.fotosearch.com/cvs/exercises](http://www.fotosearch.com/cvs/exercises) (all pictures)

## HYPERTENSION



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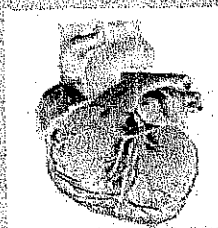
### What can you do?



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## HOW THE HEART WORKS

- The heart is a muscle-pump that pumps blood to the organs and all the tissues of our body.
- The arteries (like pipes) carry the blood from the heart to the organs and tissues.



## BLOOD PRESSURE DEPENDS ON 2 FACTORS.

1. How forcefully the heart pumps the blood.
2. How narrowed the arteries are.

## RISK FACTORS FOR HYPERTENSION

- Family history (genetic)
- High salt diet (more than 5.8 grams per day)
- Lack of physical exercise
- Overweight or obesity
- Smoking (causes decrease in elasticity of arteries)
- High cholesterol
- Diabetes
- Kidney disease
- High alcohol intake
- Stress (uncontrolled)

## SIGNS AND SYMPTOMS

*High blood pressure most often does not cause any symptoms. Therefore it can go unnoticed, until it causes a stroke or heart attack!*

These symptoms can occur:

- Headache
- Sleepiness
- Confusion
- Coma

## WHAT IS HYPERTENSION?

- Hypertension or high blood pressure means **high pressure in the arteries**.
- It occurs when blood is forced through the arteries at an increased pressure.
- Increased pressure puts a strain on the arteries and the heart. This can cause an artery to rupture.

## WHAT CAN YOU DO?

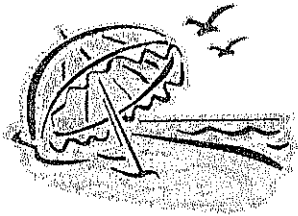
- Go for regular check-ups on your blood pressure, weight, cholesterol levels and blood glucose (sugar) levels.
- Change your lifestyle!
  - Stop smoking
  - Decrease your salt intake
  - Decrease or cut-out alcohol
- Exercise regularly (25-30 minutes, 3-4 times a week)
- Take your medication (that was given by your doctor) regularly.



## Simple exercises or activities

Regular exercise will help with weight loss, reduces stress levels, and decreases your blood glucose levels.

- Go for regular walks outside. Take a friend or family member along. You can chat and have fun while you are walking.
- March up and down on the spot in your home. Play some music to make it fun.
- Step up and down one step repeatedly. Count how many steps or for how long you are able to do it.



*Walk on the beach with family and friends to make exercise more fun and enjoyable ©*



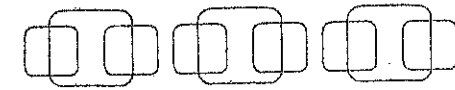
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Ref:

1. [www.diabetessa.co.za](http://www.diabetessa.co.za)
2. [www.heartfoundation.co.za/diabetes](http://www.heartfoundation.co.za/diabetes)
3. [www.fotosearch.com/exercise\\_pics](http://www.fotosearch.com/exercise_pics)

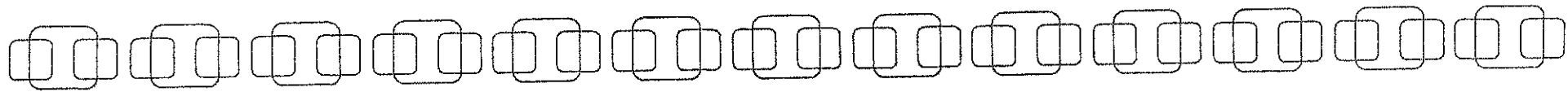


## Diabetes

What can you do to enjoy better health?

Early diagnosis is essential to prevent complications!





## What is Insulin?

- Insulin is the hormone needed to carry glucose (sugar) from the bloodstream to the tissue cells of the body.
- Glucose (sugar) is needed for energy.

## What is Diabetes?

- Diabetes Mellitus is the abnormally high blood glucose (sugar) level in the bloodstream.

## Types of Diabetes

*There are two main types of Diabetes*

### Type 1: Insulin dependent diabetes.

- Pancreas stops producing insulin.
- Usually occurs in children or young adults.
- Therefore, these individuals need to inject themselves with insulin to survive.

### Type 2:

- Occurs when the pancreas does not produce enough insulin, or it does not work properly.
- Majority of people with diabetes have type-2 diabetes.
- Common with overweight people, and people who do not exercise.
- Also common amongst people over 40.

### Signs and Symptoms

- Unusual thirst
  - Unusual frequent urination
  - Unusual weight loss
  - Extreme fatigue or lack of energy
  - Blurred vision
  - Tingling or numbness in the hands and feet.
  - Cuts and bruises that are slow to heal, boils and itchy skin.
- \*\*Many people who have type-2 diabetes may have no symptoms.**

Have yourself and your family tested regularly for diabetes at your nearest clinic or day hospital!

## How is Diabetes treated?

Having diabetes does not mean the end of a normal life!

- Your doctor will prescribe medication and/or insulin depending on the type and stage of your diabetes.

## What can you do to control your diabetes?

- Healthy eating
- Exercise regularly
- Control your weight
- Stop smoking
- Manage stress better

***25-30 minutes of exercise performed 3-4 times a week is recommended to maintain good health.***

*Consult your nearest physiotherapist to assist you with a suitable exercise program.*

Start slow and gradually increase it!

---

# The Diabetic Food Pyramid

## Fats:

A serving of fat can be:  
 1/8 avocado  
 1 Tbsp. cream cheese or salad dressing  
 1 tsp. butter, margarine, oil, or mayonnaise  
 10 peanuts



- Eat less fat.
- Eat less saturated fat. It is found in meat and animal products such as hamburger, cheese, bacon, and butter.
- Saturated fat is usually solid at room temperature.

## Sweets:

A serving of sweets can be:  
 1/2 cup ice cream  
 1 small cupcake or muffin  
 2 small cookies



- Choose sweets less often because they are high in fat and sugar.
- When you do eat sweets, make them part of your healthy diet. Don't eat them as extras.

## Alcohol:

- If you choose to drink alcohol, limit the amount and have it with a meal. Check with your health professional about a safe amount for you.

## Fats, Sweets, & Alcohol

## Milk

(2-3 servings)

A serving can be:  
 1 cup milk  
 1 cup yogurt

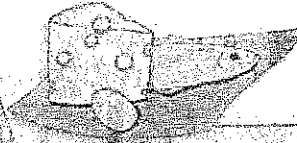


- Choose low-fat or nonfat milk or yogurt.
- Yogurt has natural sugar in it. It can also have added sugar or artificial sweeteners. Yogurt with artificial sweeteners has fewer calories than yogurt with added sugar.

## Meat & Others

(2-3 servings)

A serving can be:  
 2 to 3 oz. cooked lean meat, poultry, or fish  
 1/2 to 3/4 cup tuna or cottage cheese  
 2 to 3 oz. cheese  
 1 egg  
 2 Tbsp. peanut butter  
 1 oz. tofu



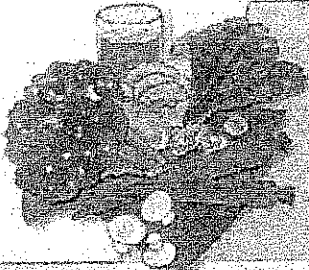
- Choose fish and poultry more often. Remove the skin from chicken and turkey.
- Select lean cuts of beef, veal, pork, or wild game.
- Trim all visible fat from meat.
- Bake, roast, broil, grill, or boil instead of frying or adding fat.

\*equivalent to 1 oz. of meat

## Vegetables

(3-5 servings)

A serving can be:  
 1 cup raw vegetables  
 1/2 cup cooked vegetables  
 1/2 cup tomato or vegetable juice



- Choose fresh or frozen vegetables without added sauces, fats, or salt.
- Choose more dark green and deep yellow vegetables, such as spinach, broccoli, romaine, carrots, chiles, and peppers.

## Fruits

(2-4 servings)

A serving can be:  
 1 small fresh fruit  
 1/2 cup canned fruit  
 1/4 cup dried fruit  
 1/2 cup fruit juice



- Choose whole fruits more often than juices. They have more fiber.
- Choose fruits and fruit juices without added sweeteners or syrups.
- Choose citrus fruit such as oranges, grapefruit, or tangerines.

## Grains, Beans, & Starchy Vegetables

(6 or more servings)

A serving can be:  
 1 slice bread  
 1/2 small bagel, English muffin, or pita bread  
 1/2 hamburger or hot dog bun  
 1 6-inch tortilla  
 4 to 6 crackers  
 1/2 cup cooked cereal, pasta, or bulgur  
 1/3 cup cooked rice  
 3/4 cup dry cereal  
 1/2 cup cooked beans, lentils, peas, or corn  
 1 small potato  
 1 cup winter squash  
 1/2 cup sweet potato or yam



- Choose whole-grain foods such as whole-grain bread or crackers, tortillas, bran cereal, brown rice, or bulgur. They're nutritious and high in fiber.
- Choose beans as a good source of fiber.
- Use whole-wheat or other whole-grain flours in cooking and baking.
- Eat more low-fat breads such as bagels, tortillas, English muffins, and pita bread.
- For snacks, try pretzels or low-fat crackers.



## Reduce your Fat!

- Eat skinless chicken and fish.
- Avoid full-cream dairy products.
- Use only lean cuts of mutton, beef or pork.
- Keep meat portions small.
- Limit your use of foods with "hidden fats", such as sausage, polony, viennas and fried fish.
- Buy tinned fish in water or tomato rather than brine or oil.

### Did You Know?

One cup of full cream milk contains 10g of fat ☺

And

One cup of skim milk contains 1g of fat ☺



Stock up on fresh fruit

### and Vegetables

- Include 5 fruit and vegetables in your diet per day.
- Apples and Pears are high in fibre, and are a good source of vitamin C.
- Apples contain antioxidants which help reduce damage caused by cholesterol.
- Dried Apricots are high in iron, protein and vitamin A.
- Yoghurt is low in fat and high in calcium. It is loved by your gut. But choose low fat yoghurt that contains probiotics.
- Using honey instead of sugar or artificial sweeteners can reduce cholesterol levels.

### Cooking Tips

- Don't fry your food. Roast, bake or grill on a grid to drain the fat.
- Avoid re-using oils.
- Use Sunflower, Canola or Olive oil in food preparation.
- Avoid using margarine or butter for cooking.
- Cut off all visible fat on meat and chicken before

For every teaspoon of butter, margarine and oil you cut out, you save 4g of fat ☺

Ref: 1) "Top ten healthy snacks" RealBuzz.com

2) "Healthy Food" <http://www.heartfoundation.co.za/>

# 'N GESONDE LEWENSTYL

deur Annari Venter en Lienke Ligthelm

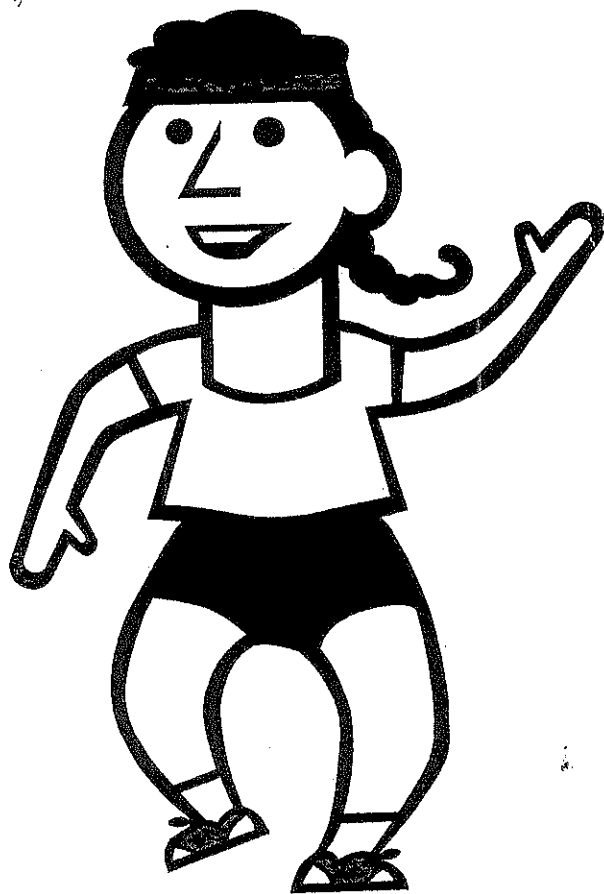
## Alledaagse advies

- Stap winkel toe i.p.v. ry.
- Klim die trappe i.p.v. die hysbak.
- Doen van die huiswerk self, bv. stofsuig.
- Eet gesond en drink genoeg water.
- Doen gereeld die oefeninge.

## Oefenprogram

Die oefenprogram bestaan altyd uit 3 dele.

1. Opwarming: (5-10 minute)  
Begin die oefenprogram deur eers 3x diep asem te haal en doen die aktiwiteite eers stadig, bv. stap eers stadig en fokus jou denke op die oefeninge wat gaan volg.
2. Kern: (30 minute)  
Hierdie is die tyd wat jou uithou vermoë en kardio-vaskulêre fiksheid gaan verbeter, bv. stap nou vinniger en swaai jou arms.
3. Afwarming: (5-10 minute)  
Dit is nodig om jou harttempo en sirkulasie te normaliseer. Gaan voort met die aktiwiteit teen 'n stadiger tempo en eindig met strekke.



## Tuisoefeninge

Kern:

- Muur "push-up" :

Staan voor 'n muur. Plaas albei palms teen die muur, skouerhoogte. Leun vorentoe, buig albei elmboë tot jou neus amper die muur raak en stoot jousef weg. (herhaal)

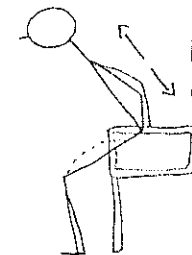


- Trapklim:

Klim 1 trappie op met regtervoet, dan linkervoet. Trap af met regtervoet eerste, dan linkervoet. Wissel.

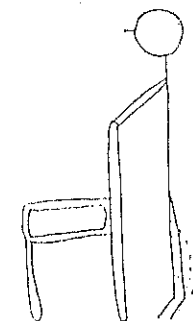
- Stoel "squat" :

Staan voor 'n stewige stoel, strek na agter en plaas albei hande op armleuning. Met voete skouerbreedte uitmekaar, buig die knieë asof gaan sit, maar moenie. Kom regop en herhaal.



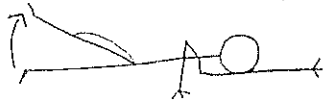
- "Heel Raise" :

Staan agter 'n stoel met albei hande op die leuning. Lig hakke sodat op tone staan. Hou en laat sak stadig. Herhaal.



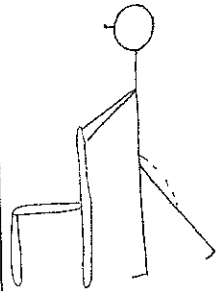
- Sywaartse beenoplig:

Lê op sy. Gebruik onderste arm om jou kop op te rus. Plaas ander arm voor jou vir balans. Maak albei bene reguit. Lig boonste been stadig op. Hou en laat sak. Herhaal. Doen ook op ander sy.



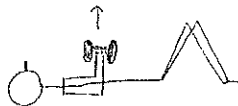
- “Back leg Swing” :

Staan agter stoel. Hou rug reguit (moenie vorentoe leun). Lig een been na agter. Laat stadig sak. Herhaal met ander been.



- “Bench press” :

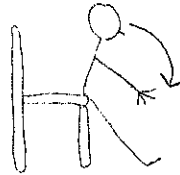
Lê op rug met knieë gebuig en voete op die mat. Maak seker hele rug is plat op mat. Buig elmboë met 'n gewiggie in albei hande. Maak arms reguit en stoot gewiggies na dak. Hou vir 3-5 sekondes en laat stadig sak. Herhaal.



## Strekke

Dit kan deel vorm van die afwarming. Hou die strekke vir ten minste 30 sekondes. Moenie oorstrek nie d.w.s. geen pyn met die strekke.

- Agterbeen strek:



- Kuitstrek:



- Bobeen strek:



- Armstrekke:

