

**THE EFFECTS OF A BACK EDUCATION PROGRAMME AMONG
EMPLOYEES AT AN INDUSTRIAL SETTING
IN CAPE TOWN, SOUTH AFRICA**

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Abstract

Low Back Pain (LBP) is the most common musculoskeletal disorder in the industrial workplace. Moreover, it has been one of the major causes of disability and work loss in the last fifty years. A number of interventions aiming at preventing occurrence of LBP have taken place at various industrial settings in the past but there have been few interventions to prepare employees to overcome disability once they suffer LBP. The present study sought to determine the effects of a back education programme that at the same time aimed at preventing the occurrence of LBP through biomechanical instruction and preventing low back disability through positive back beliefs instruction.

The objectives of this study were to determine the effects of a back education programme on biomechanical knowledge, back beliefs, the occurrence of LBP, disability, and work loss among employees at an industrial setting in Cape Town, South Africa. Furthermore, the study sought to determine the perceptions of back education that are held by industrial employees.

The project was designed as cohort study with pre-test, post-test, and after three months evaluations. The participants in the present study were employees in the printing industry. The particular study setting had a staff size of nineteen employees. Fifteen of them consented to take part in the study and completed the pre-test evaluation. Before the post-test; three others dropped out and there remained twelve participants up until the end of the study. A back education programme's intervention took four hours divided into six weekly presentations of forty minutes each. These employees from an industrial setting in Cape Town, South Africa were taught good postures, safe lifting techniques, and exercises to prevent the occurrence of LBP. Furthermore they were equipped with

knowledge to improve their back beliefs so that they can cope appropriately with LBP once it occurs hence reducing low back disability and days off work.

All participants received a “back book” and handouts for all the presentations. In addition, seven participants attended all the six presentations while five others due to high work agenda missed some presentations. All along, the study used three self-administered questionnaires. The first questionnaire (“quality of life questionnaire”) was designed to collect the sociodemographic data, the occurrence of LBP, levels of disability and days off work. The second questionnaire was “knowledge questionnaire” which sought data from participants on their biomechanical knowledge and on their back beliefs. The third questionnaire was the course evaluation form which elicited information on how participants perceived a back education programme.

It was found that a back education programme could improve back beliefs in general up until before the end of three months. Furthermore, the employees in this industrial setting expressed high satisfaction towards a back education programme. However, a back education programme was not seen able to improve biomechanical knowledge nor to reduce the occurrence of LBP and the levels of disability among employees at this setting. No employees were reported to have been off work because of LBP either before a back education programme or after. Furthermore, there was no significant difference between the participants with full attendance and those with partial attendance in all outcome measures.

Given the fact that the study used a small sample and was conducted in a short period of time, it is recommended that more studies could be conducted on this topic involving a bigger sample and having a longer follow-up period.



Keywords

Back education programme

Biomechanical knowledge

Back beliefs

Low back pain myths

Low back pain misconceptions

Biopsychosocial back education

Cognitive-behavioural education

Industrial setting



Declaration

I hereby declare that “**The effects of back education among employees at an industrial setting in Cape Town, South Africa**” is my own work, that it has not been submitted, or part of it, for any degree at any other university, and that all sources I have used or quoted have been indicated and acknowledged by means of complete references.

Philippe Niyobuhungiro

Signature:.....

Witness:

.....

Mr. H. Pharaoh



Dedication

I would like to dedicate this work to my parents Joseph Murego and Régine Ngezaho, to whom I am eternally grateful for their love and sacrifice. Thank you for making me who I am today. To my two sisters and my old brother you are precious to me and I love you. May the Lord Jesus Christ be with you forevermore.



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Abbreviations

LBP: Low Back Pain

USA: United States of America

UK: United Kingdom

HIV: Human Immunodeficiency Virus

AIDS: Acquired Immuno Deficiency Syndrome

SARPCCO: Southern African Regional Police Chiefs Cooperation Organisation

MRI: Magnetic Resonance Imaging

CT-scan: Computed Tomography-scan





Chapter one: Introduction

1.1 Introduction to the chapter

This chapter presents the background of the study, the statement of the problem, the aim of the study, the objectives, the significance of the study, the definition of terms, and the summary of chapters.

1.2 Background

Lower Back Pain (LBP) constitutes an epidemiological and economic burden (Maniadakis & Gray, 2000) which is on the increase despite positive trends in diagnosis and therapy (Pfingsten, 2001). World point prevalence ranges from 12% to 33%, one-year prevalence ranges from 22% to 65%, and lifetime prevalence ranges from 11% to 84% (Walker, 2000). LBP is a big burden both to individuals and society (Loisel et al., 2001 & Kim, Hayden & Mior, 2004).

Negative impacts of LBP on the patient include constant or episodic pain, loss of physical function, disruption of physical functioning manifested through depression, anxiety, and somatic complaints. Furthermore, LBP sufferers undergo the loss of social functioning noticed through decreased income, and decreased participation in social and leisure activities (Patrick & Erickson, 1993 & Clairborne, Vandenburg, Krause & Leung, 2002).

In some cases it affects people in such a way that they permanently stay away from their jobs after suffering LBP (Marras, 2000 & Ihlebæk & Eriksen, 2004). Millions of working days are lost every year because of LBP (Burn, 2000). Moreover, billions in US dollars are lost through paying health care bills and disability compensation following LBP (Lamb et al., 2007). LBP continues to be the most common musculoskeletal problem at the workplace (Burton et al., 2004). LBP occurrence is high in both highly industrialised and developing countries (Ehrilch, 2003).

The increase in the incidence of LBP on the African continent is a reason for concern (Louw, Morris & Grimmer-Somers, 2007a). In South Africa, it is estimated that the annual prevalence of LBP among the general population varies between 50% and 52.6% (Jordaan, Kruger, Stewart & Becker, 2005). In middle-income countries like South Africa, LBP rates are higher in urban population especially among workers at industrial places (Volinn, 1997). Furthermore, in one South African manganese industry, lifetime prevalence was found to be 71.6% (Van Vuuren, Zinzen, Van Heerden, Becker & Meeusen, 2005a). The annual prevalence in that factory was 69.8%. The monthly prevalence was found to be at 55.0%, while one-point prevalence was 37.6%.

In most cases, LBP does not have a specified anatomopathological diagnosis (Snook, 2004). A large majority of LBP cases have no specific causes (Krismer & Van Tulder, 2007). However, there are some factors that are known to predispose people to LBP. Factors worthy of mention include age, genetics, and previous history of LBP (McGill, 2002 & Snook, 2004).

During the last 50 years, intervention measures have been implemented to prevent LBP (Waddell & Burton, 2001). Some of these include adjusting of work environments, the use of mechanical lifting, use of back belts, exercises, and teachings of safe lifting techniques and good posture (McGill, 2004). In instruction of safe lifting techniques and good posture, people are taught how to lift objects without straining their backs, the proper posture in every activity, and the need to be physically active (Andrews, 2004). However, existing evidence from more than 500 quality systematic reviews invalidates the effectiveness of all these approaches used in LBP prevention with the exception of physical exercises (Krismer & Van Tulder, 2007).

Like many other preventive measures, teachings of safe lifting techniques and good posture when used alone is not effective (Maher, 2000; Heymans, Van Tulder, Esmail, Bombardier & Koes, 2004, Waddell & Burton, 2001; Burton et al., 2004; Van Poppel, Hooftman & Koes, 2004 & Krismer & Van Tulder, 2007). Despite the clear evidence pointing to the fact that safe lifting techniques and good postures do not prevent the occurrence of LBP, such efforts continue in primary prevention because of the obvious benefits that they hold. Furthermore, it has been reported that exercises, safe lifting techniques, and good posture are more effective than exercises alone in preventing LBP (Airaksinen et al., 2006 & Brox et al., 2007). Instruction in safe lifting techniques, good posture, and the necessity of physical activities combined with exercises carries the name of “back school” (Brox et al., 2007) or “a back education programme” (Cardon, De Clercq. & De Bourdeaudhuij, 2002a).

A back education programme was hypothesised to reduce occurrence of LBP through improving the biomechanical knowledge of employees (George et al., 2007). However due to factors that are unpreventable such as vulnerability due to previous LBP episodes and the age-dependency character of LBP, some people would certainly not avoid LBP despite their acquisition and practice of biomechanical skills (Snook, 2004). Therefore, more emphasis is now put on the prevention of disability rather than LBP itself (Burton et al., 2004 & Berger, 2007). It is necessary to equip industrial employees with positive back beliefs so that they can incur the least of low back disability in case they suffer LBP sometime in the future (Roland, Waddell, Moffett, Burton & Main, 2002).

Recently it has been found that psychosocial factors are more significant than the extent of tissue damage in the prolongation of disability among LBP sufferers (Pfingsten, 2001). Negative beliefs associated with the cause, the reason, the quality of life after LBP, the diagnosis, and the management of LBP appear to be among the root causes of disability resulting from LBP (Gross et al., 2006). So far, most interventions for preventing low back disability have targeted the sufferers of LBP. However, misconceptions about LBP are widespread in the general adult population including non-patients (Gross et al., 2006). In general, health professionals in Western countries are changing their attitudes towards LBP in accordance with new clinical guidelines (Ihlebaek & Eriksen, 2004). However in South Africa, sometimes, there is pressure from patients that makes health care providers to compromise with the guidelines of the management of acute LBP for example by ordering unnecessary back X-rays (Hough et al., 2006). Therefore, briefing the general public on conceptions of LBP would help health care providers in complying with LBP

guidelines and reduce unnecessary health costs attached to LBP (Deyo & Weinstein, 2002).

The existing literature shows that there are very few studies dealing with a back education programme the aims at reversing both the biomechanical factors and the psychosocial factors at the same time (George et al., 2007). The biomechanical principles contribute to the prevention of LBP while psychosocial principles provide knowledge on the prevention of disability (Cardon et al., 2002a & Burton et al., 2004). Over 90% of published studies on LBP have been carried out in developed Western countries whose population covers only 15% of world population (Volinn, 1997). Therefore, there is a need for studying the effectiveness of a back education programme in other parts of the world (Van Vuuren et al., 2005a). There is a need to determine the best ways of preventing LBP in Africa (Berger, 2007 & Louw et al., 2007a) and changing LBP among industrial workers in South Africa (Van Vuuren et al., 2005a).

WESTERN CAPE

1.3 Statement of the problem

It is not clear whether or not the biopsychosocial back education programme is effective in improving biomechanical knowledge, back beliefs, occurrence of LBP, and low back disability.

1.4 Aim of the study

The aim of the present study was to determine the effects of a back education programme among employees at an industrial setting in Cape Town, South Africa.

1.5 Objectives

1. To determine the effect of a back education programme on biomechanical knowledge among employees at an industrial setting in Cape Town, South Africa.
2. To determine the effect of this programme on back beliefs among employees at an industrial setting in Cape Town, South Africa.
3. To determine the effect of the programme on LBP occurrence, days off work, and disability among employees at an industrial setting in Cape Town, South Africa.
4. To determine the perceptions about a back education programme among employees at an industrial setting in Cape Town, South Africa.

1.6 Significance of the study

According to Kim et al. (2004), the back education programme is to impart biomechanical knowledge and skills to the participants which could result into the reduction of the occurrence of LBP amongst them (Andrews, 2004). Furthermore, Roland et al. (1996) suggested that the back education programme equips individuals with positive back beliefs that would help them to overcome disability once they suffer LBP.

Moreover, Buchbinder et al. (2001) reported that the back education programme cuts down the work absenteeism and disability that limits the productivity of employees.

The significance of the study to the body of research would be to provide evidence of what works and of what does not within a biopsychosocial back education programme as highlighted by George et al. (2007).

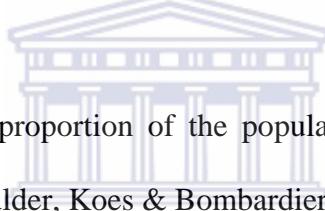
1.7 Definition of the key terms

Low back pain: pain on posterior aspect of the region between the margin of the 12th rib and the gluteal folds (Petersen, 2003).

Acute low back pain usually defined as the duration of an episode of low back pain persisting for less than six weeks (Burton et al., 2004).

Subacute low back pain a low back pain persisting between six and twelve weeks (Burton et al., 2004).

Chronic low back pain a low back pain persisting for twelve weeks or more (Burton et al., 2004).



Point prevalence of LBP: a proportion of the population that experiences LBP at a particular point in time (Van Tulder, Koes & Bombardier, 2002).

One-year prevalence of LBP: a proportion of the population that experiences LBP during a one-year period of time (Van Tulder et al., 2002).

Lifetime prevalence of LBP: a proportion of the population that has experienced at least one episode of LBP during their life (Van Tulder et al., 2002).

Incidence of LBP: a proportion of the population that experiences LBP for the first time within a given year (Van Tulder et al., 2002).

Back school: an intervention strategy consisting of a biomechanical education programme, including physical exercises (Heymans et al., 2004).

A back education programme: a concept consisting of any form of education aiming at changing beliefs, attitudes, and behaviour with the aim to reduce the burden of LBP (George et al., 2007).

Biomechanical knowledge: knowledge of safe lifting techniques, good postures, and exercises that can promote the health of the back (Burton et al., 2004).

Back beliefs: perceptions about the nature, the cause, prognosis, diagnosis, and management of LBP (Van Tulder et al., 2006).

Red flags in LBP: typical signs or symptoms that suggest something serious like tumors, infection, fractures, underlying active inflammatory disease, spinal stenosis, and cauda equina syndrome might be behind LBP (Krismer & Van Tulder, 2007).

Yellow flags: prognostic factors associated with a more unfavourable and often chronic disabling course of the disease (Krismer & Van Tulder, 2007).

Primary prevention of LBP: interventions that target the population completely or partially made of people who never had LBP symptoms (Frank et al., 1996).

Secondary prevention of LBP: interventions and strategies that are implemented during the acute episode of low back injury, before chronic symptoms occur (Frank et al., 1996).

Tertiary prevention of LBP: interventions that target people with chronic LBP in order to help them to have a better quality of life (Frank et al., 1996).

1.8 Summary of chapters

Introduction has presented the background of the study, it has stated the study problem, the research questions, the aims and objectives of the study, the significance of the present study as well, and definitions of terms.

The literature review highlights the history of back education programme, multifactorial nature of LBP, the content of back education programme, the significance of this, , and the effectiveness of back education programme. Methodology entails the study setting,

population and sample, study setting, data collection and the intervention, the nature and contents of the questionnaires, reliability of the questionnaires, the pilot study, data analysis, and the ethical considerations. The chapter of results presents the results according to the objectives of the study. Discussion compares the present findings with previous findings. It further gives the reasons of some findings. Finally it reports the limitations of the study. Conclusion chapter presents the conclusions of the study and the recommendations of the study.



Chapter two: Literature review

2.1 Introduction

The literature review presents the history of back education programme, the multifactorial nature of LBP, the contents of a back education programme, the significance of this back education programme, and the effectiveness of a back education programme.

2.2 History of a back education programme

LBP treatment involves many health disciplines including pharmacology, surgery, chiropractics, psychology, and physiotherapy (Burton et al., 2004). The most common treatment of LBP include medication, bed rest, surgery, manipulation, McKenzie techniques, exercises, acupuncture, dry needling, trigger points therapy, heat therapy, electrotherapy, cryotherapy, massage, and back education programme (Louw et al., 2007b). Apart from being used for curative ends, back education programmes are used for preventive purposes (George et al., 2007).

In 1969, health promoters in Sweden introduced instruction about good posture, safe lifting techniques, and the need of physical activity with the objective of preventing LBP (Weber et al., 1996 & Heymans et al, 2004). Early in the 1980s, exercises were recommended as another measure for prevention of LBP (Moffett, Chase, Portek & Ennis, 1986). Different types of exercises seem to have similar effectiveness (Burton et al., 2004). However, some exercises like aerobic exercises (Van Poppel et al., 2004),

office stretching (McGill, 2002), relaxation exercises (Roland et al., 1996), core stabilisation (Louw, Morris & Sklaar, 2007b) are particularly recommended.

From the late eighties, doubt about the effectiveness of safe lifting techniques and good posture started to grow (Maher, 2000). It is now clear that teaching about good posture and safe lifting techniques, when carried out alone, is not effective (Burton et al., 2004).

These practices are not capable of reducing the occurrence of LBP (Weber et al., 1996).

There is some evidence that the use of exercises is the better means to prevent LBP (Burton et al., 2004). However, to date more credit is given to education that combines instruction of good posture, safe lifting techniques, and exercises (Brox et al., 2007).

In the past, a back education programme was focused on biomechanical factors (Burton et al., 2004). This approach has been criticised for its lack of effectiveness (Weber et al., 1996). Nowadays, healthcare gives more credit to the biopsychosocial approach, as it is perceived to give better results than the biomechanical approach alone (Burton et al., 2004 & Berger, 2007).

There are effectively two concepts used in LBP prevention (Borkan, Koes, Reis & Cherkin, 1998). The first concept is primarily concerned about prevention of LBP and its recurrence (Doumont & Libion, 2001) and utilises the biomechanical approach. The biomechanical approach teaches basic spinal anatomy and how to work without straining the back (Brox et al., 2007). In this tradition, workers already suffering LBP are taught to wait until pain goes away before they can start to be active again, lest they get reinjured (Burton et al., 1999).

The second concept investigates beliefs that lead to disability and work loss among workers suffering LBP (Goossens, Vlaeyen, Hidding, Kole-Snijders & Evers, 2005), and is broadly based on psychosocial principles. This concept is based on the assumption that inactivity causes most of the long-lasting disabilities (Roland et al., 1996) and it advocates the maintenance of activity. It has been revealed that psychosocial mechanisms such as personal beliefs, and perceptions and expectations about pain and recovery are very important in explaining the development of pain and disability (Kendall, 1999). It has been emphasised in the second concept that back pain itself is not a problem (Main & Williams, 2002) but the problem lies on coping with it (Roland et al., 1996). Generally, low back disability comes about as the result of the behaviour that people engage in when they suffer the common impairment known as LBP (Kendall, 1999).

Despite the fact that many scholars believe that the first concept concerning safe postures and safe lifting techniques is unduly alarmist, there is evidence that it does indeed reduce people's fear-avoidance beliefs (Cardon, De Clercq & De Bourdeaudhuij, 2002b).

Therefore a combination of both concepts could be more beneficial (Kendall, 1999 & Van Tulder, Koes & Bombardier, 2002). Furthermore, multiple systematic reviews conclude that the most promising back education programme should at least involve physical exercises and appropriate biopsychosocial education (Burton et al., 2004).

Little has been done to determine the results of a biopsychosocial back education programme that combines education along with exercises (Smeets, 2006). A back education programme has targeted patients in different phases of the syndrome i.e. acute, subacute, and chronic phases. It is also administered to the general population and working class.

2.3 Content of a back education programme

2.3.1 Introduction

The biopsychosocial back education teaches both the biomechanical knowledge and the positive back beliefs (George et al., 2007). Both components are discussed in this section.

2.3.2 Biomechanical knowledge

As a matter of improving employees' biomechanical knowledge, they are taught that a person has to change the posture after every thirty to fifty minutes (McGill, 2002) with, if possible, with a two to five minutes break. Furthermore, while lifting if the weight is too heavy, help must be sought. While lifting, the full bent of the spine is not good (Andrews, 2004) rather, the squatting position is the best option while lifting heavy objects (Dekenah, 2006). However to avoid the tiresomeness of squatting, the golfer's position is the better position in lifting light objects repetitively (McGill, 2004).

Overprotection of the back should however be avoided because that does more harm than good. The back is made to move. Therefore, it should be allowed to move as much as possible (Andrews, 2004). Whenever possible, a person should walk to the workplace and plan time for recreational physical activities. For good health, exercises should be undertaken moderately at an intensity of thirty minutes a day at least three times a week (Andrews, 2004). Exercises to be included are stretching exercises (McGill, 2004),

relaxation exercises (Roland et al., 1996), and most importantly core stabilisation exercises (George et al., 2007 & Louw, Morris & Sklaar, 2007b).

2.3.3 Multifactorial nature of LBP

Earlier on, LBP like any other pain was taken in its simplistic definition as an unpleasant sensory experience associated with actual tissue damage between the 12th rib and gluteal folds (Petersen, 2003). With this view, LBP was normally destined to go away with the tissue recovery that normally does not go beyond 12 weeks. However, with time it was discovered that for some individuals, pain does not portray the status of tissue healing (Moseley, 1996). Some sufferers would be able to cope with pain while others are totally down because of the same amount of pain (Merskey & Bogduk, 1994). For some sufferers, LBP would be there for years after the tissue has already healed (Kendall, 1999). There are factors that would explain the delay in recovery and these factors are known to be the yellow flags (van Tulder & Krismer, 2007). The negative beliefs about the reason of LBP, the prognosis of LBP, and the management of LBP are among the major yellow flags. Major negative beliefs include thinking that once in LBP it is necessary to stop working (fear-avoidance beliefs), beliefs that LBP means great damages have taken place and that there will be huge misery after LBP (LBP catastrophising), and beliefs that the third party is solely the one with abilities to take away the pain (lack of self-efficacy). A back education programme aims to counteract these negative beliefs (Moseley, 2004).

2.3.4 Positive beliefs from new facts around LBP

2.3.4.1. Introduction

In order to prevent future low back disability, a back education programme strives to change negative beliefs held by the general population (Moffet, Newbronner, Waddell, Croucher & Spear, 2000). Its instruction in this regards are founded on the most recent evidence-based conceptions of the LBP (Coudeyre et al., 2006). Since 1993, a number of countries have published new conceptions of LBP interestingly with a lot of similarities (Koes, Van Tulder, Raymond, Burton & Waddell, 2001). It is imperative to provide individuals with information concerning the expected course, the diagnosis, and the management of the LBP syndrome (Chou et al., 2007). The education of patients ensures congruence between patient and care provider (Cedraschi et al., 1996). All the facts would concurrently help to impart positive back beliefs to people(Roland et al., 1996)

2.3.4.2. Positive beliefs from the stable anatomy of the back

The recent evidence clearly highlights that the back is one of the strongest parts of the body. It is made of bones with blocks of solid joints and discs held together with strong ligaments, surrounded by large and powerful muscles (Roland et al., 1996). Therefore, it is hard for the back to undergo serious damage. Generally, LBP is not derived from anything serious (Coudeyre et al., 2006) and it is known as a benign and self-limiting painful syndrome (Loisel et al., 2001). Most cases of LBP result from simple sprain or strain (Waddell & Burton, 2005) which cannot cause serious damage (Indahl, 2004).

Therefore, it is possible to carry the normal activities despite having LBP (Roland et al., 1996).

2.3.4.3. Positive beliefs from good prognosis of LBP

The majority of LBP cases recover spontaneously between one and twelve weeks (Kinkade, 2007). In some cases, pain is not over in twelve weeks but it has subsided enough to allow the normal life to go on (Roland et al., 1996). Even in cases of disc herniation (Rose & Beattie, 1996), the prognosis is still good. Sequential MRI studies reveal that the herniated portion of the disc tends to regress with time, with partial or complete resolution in two thirds of cases after six months (Indahl, Velund & Reikerås, 1995). Only about 10% of patients with a herniated disc have sufficient pain such that after six weeks surgery is considered (Kendall, 1999). Furthermore, terms like degeneration should not be interpreted to mean the worst since degeneration is just a normal and relatively harmless ageing process like graying of hair (Roland et al., 1996).

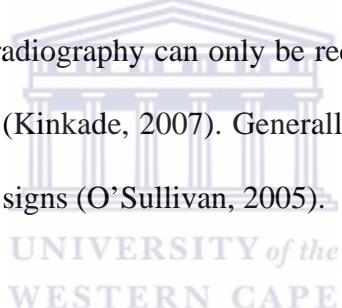
2.3.4.4 The new approach of the examination of LBP

Symptomatic treatment is preferred over the specific treatment because in 85% of cases, the diagnoses are either wrong or inaccurate (Waddell & Burton, 2001 & Deyo & Weinstein, 2001). Therefore, the care provider is not able always to tell exactly what went wrong in the backs (Hazard, 2007).

X-rays, CT-scans, or MRI do help in case of serious problems, and reveal spinal disorders (Roland et al., 1996). They are necessary when warning signs are present (Chou et al., 2007). The warning signs include bilateral pins and needles, foot clonus, Babinski

signs, fever, pain after severe trauma, severe pain that does not have any easing factor, loss of sensation in reproductive area, or bladder and bowel incontinence (Van Tulder et al. 2006). These signs may indicate underlying tumors, infection, fractures, underlying active inflammatory disease, spinal stenosis, and cauda equina syndrome (Krismer & Van Tulder, 2007).

However, routine X-rays, CT-scan, or MRI investigations are discouraged in most cases of LBP (Deyo & Weinstein, 2001). Radiologists acknowledge that in most cases X-rays are misleading in diagnosing acute LBP. Even when healthy people are X-rayed, undergo CT-scan or MRI, the findings are alarming (Jensen et al., 1994 & Little et al., 1998). In the absence of warning signs, radiography can only be recommended four weeks later in case symptoms do not subside (Kinkade, 2007). Generally, every health care provider is able to detect all these warning signs (O'Sullivan, 2005).



2.3.4.5. New-evidence based management of LBP

There is increasing appeal in the medical literature for patients to assume more responsibility in self-care, and lessen their dependence on the health care provider (Kinkade, 2007). Furthermore, a facilitated self-care is recommended to be effective enough as a treatment of acute LBP (Main & Williams, 2002). The patient is encouraged to cope so as to make the treatment successful (Roland et al., 1996). Pain killers, heat, cold, vertebral mobilisation and manipulation, massage, as well as electrotherapy and acupuncture are utilised to control the pain (Roland et al., 1996). However, they can not replace the participatory role of the patient (Krismer & Van Tulder, 2007). It is suggested that all passive treatments are to be utilised only in the first month of the symptoms, then

exercises and cognitive-behavioural education followed thereafter (Kinkade, 2007). Prolonged treatment leads to a lack of self-efficacy, and the patient's belief that someone else must control the pain instead of the patient himself, resulting in dependence (Main & Williams, 2002). However, passive treatments can resume when acute spells are experienced on top of chronic condition. It is advised to use basic analgesics instead of opioids (Krismer & Van Tulder, 2007).

Bed rest should be discouraged and instead people should remain active in their occupational and recreational activities (Louw et al., 2007b). Bed rest and long-lasting passive treatments are not appropriate strategies as they may actually exacerbate the problem (Waddell, Feder & Lewis, 1997; Roland et al., 1996 & Van Tulder et al., 2006). Even when pain lasts longer, it does not mean it is serious and in such a case the patient should remain active (Coudeyre et al., 2006). Even when LBP reoccurs it does not necessarily mean there is something serious, and the patient should remain active (Rose & Beattie, 1996). Actually, LBP might result from a tissue problem but the resulting disability greatly depends on the psychosocial factors (Kendall, 1999). If the right attitude is adopted, a person can defeat LBP and make it a minor impairment without major functional harm (Roland et al., 1996).

There is no need to avoid simple movements and simple activities. They cannot cause further injuries. Even in case of disc herniation, light activity would not further injure the disc or other structures (Indahl et al., 1995). The exacerbation that is normally felt during exertion results from protective muscle spasms. Furthermore, avoidance of movements is a good predictor of chronicification. It causes muscle weakness and joint movement restriction, and it increases fear, depression, and distress. All of these dysfunctions result

in more pain (Pfingsten, 2001). After rest, a person might experience more pain, disability, and work loss. Therefore, avoidance does more harm than good (Kinkade, 2007). Even when pain is severe, the patient is still encouraged to report to his workplace and perform a modified job (Frank et al., 1998 & Roland et al., 1996). The patient should be told to start with a low pace of work and then gradually increase intensity. It will most likely make him confident through showing him what big improvement has been made (Roland et al., 1996). Only in very severe pain should bed rest be allowed, though it must not be beyond three days (Roland et al., 1996; Chou et al., 2007 & Louw et al., 2007b).

Surgery is not the only good option for management of a herniated disc (Brox et al., 2007). It has been observed that patients with herniated disc who undergo surgery do not return to work earlier than those who receive nonsurgical therapy, although they have better symptomatic and functional outcomes (Kendall, 1999). A back education programme must equip both patients and non-patients with all this knowledge and these beliefs so that LBP does not harm their daily lives (Linton, Ryberg, 2001).

2.4 Significance of a back education programme

2.4.1 Introduction

The reasons why a back education programme should include biomechanical instruction and why it should aim at changing back beliefs are all discussed in this section.

2.4.2 The reasons for improving the biomechanical knowledge

In order to prevent the occurrence of LBP, it is important to address the matters of lack of physical exercises, postural habits, and hazardous lifting (McGill, 2004). The acquisition of biomechanical knowledge would help in understanding the proper lifting behaviour and in adopting good postures during any activity. It would lead into the practice of exercises that are believed to prevent LBP (Andrews, 2004).

Prevention is needed to reduce the burden of LBP (McGill, 2002). LBP is a very common ailment condition (Van Vuuren et al., 2005a). About 60%-85% of the population will

suffer LBP during their lifetime (Krismer & Van Tulder, 2007). Furthermore, between 40% and 80% of cases reoccur (Liebenson, 2002), and 14% of LBP has been observed to become chronic while 11% of patients become permanently disabled (Webb et al., 2003).

LBP remains the predominant occupational health problem in most industrialised countries, accounting for about 20% to 30% of all workers' compensation claims and up to 50% of all direct compensation costs (Tuchin, 1998). For example, the USA loses 180 million working days every year (Burn, 2000) and 20-50 billion dollars in treatment and compensations to those who suffer LBP (Mirovsky, 2007).

In Africa, the situation of LBP is not different from that found in Western countries. Point prevalence in Africa ranges from 10% to 59% while in the Western countries, it ranges between 12% and 33%. The ranges of annual prevalence in Africa and in Western countries are respectively 14% - 72% and 20% - 62%. Lifetime prevalence follows the same rules since the ranges are 28% - 74% in Africa and 30% - 80% in Western countries (Louw et al., 2007a).

Hospital-based studies have shown that LBP is the reason for 30 to 40 % of visits to rheumatologists in Togo (Mijiyawa, Onionkitan, Kolani & Koriko, 2000). The one-point prevalence among industrial employees in Ibadan city, Nigeria is around 59.7% (Sanya & Ogwumike, 2000). LBP affects 58.48% of women daily in Lesotho (Worku, 2000). LBP is one of the most costly and disabling conditions in Rwanda (Twagirayezu & Gurie, 2005). Annual prevalence of LBP among physiotherapists in Bloemfontein, South Africa, varies between 56.8% and 76.6% (Barnes et al., 2007).

Advancing technology and progressive industrialisation of the African continent are thought to be among the most important reasons for the high prevalence (Volinn, 1997). Technology such as computers leads people to sit for long periods of time hence gradually causing overuse micro-trauma of back tissues. Industrialisation has made life so static and machines have replaced human beings in a wide range of activities. Therefore, people underuse their back tissues. This situation is as harmful as overuse as a result of the deconditioning process (McGill, 2002). Therefore, a back education programme is highly needed to improve biomechanical knowledge and to prevent the occurrence of LBP (Cardon et al., 2002a).

2.4.3 The reasons for improving people's back beliefs

Psychosocial factors play a pivotal role in the development of disability. Cognitive beliefs are more important than physical features (Waddell & Burton, 2005). Beliefs, attitudes, and expectations appear to influence recovery from back pain (Airaksinen et al., 2006). Even when the accurate cause is known, psychosocial factors still play a role.

Impairments (such as a disc prolapse) are not caused by psychosocial factors, whereas the perception and appraisal of pain is always subjective and is readily influenced by such factors (Pfingsten, 2001).

There is discrepancy between LBP evidence-based conceptions and the public opinion (Gross et al., 2006). The general population has erroneous beliefs about aetiology, diagnosis, and treatment of LBP. People tend to think that simple movement while in pain could lead to further damage. There needs to be a correction of the belief that when backs hurt it is always because there is harm. Also needing correction is the belief that it is necessary to wait for the pain to go away before movements and activities are resumed, and the false expectations concerning diagnosis and cure of LBP (Goubert, Crombez & De Bourdeaudhuij, 2004). People also believe that activity avoidance is the proper handling of LBP (Goubert et al., 2004). Most people tend to think that back pain makes everything in life worse and that it would eventually stop them from working, and will become progressively worse with age (Moffet et al., 2000). The negative back beliefs also include beliefs that X-ray, CT-scan and MRI should always reveal what is wrong with the back, that the health care provider should be able to tell what is wrong, and that surgery is the only effective treatment in case of slipped disc (Deyo, 1998; Moffet et al., 2000 & Brox et al., 2007).

Furthermore, patients exert pressure on their care providers to do something to find the cause of their backache. A good proportion of diagnosis results from the pressure of patients on the care provider to pinpoint what went wrong with their backs (Chew-Graham & May, 1999). Approximately 28% of X-rays are requested because patients have been found to insist they should be X-rayed (Moffet et al., 2000). Despite the fact

that 85% of the cases of LBP are of unknown origin, most people in the general population believe that slipped discs and pinched nerves are the main causes of LBP (Moffet et al., 2000).

However, patients have a genuine desire to learn about the genesis of their LBP, what to expect within the course of LBP, and what can be done (Cherkin, Deyo, Street, Hunt & Barlow, 1996). In view of the beliefs discussed above, interventions designed to reduce negative attitudes and promote positive beliefs may help to reduce long-term disability (Fullen et al., 2008). The matching of the treatment concept and patients' beliefs about prognosis, the nature of LBP syndrome, and its long-term management, will result in higher patient satisfaction and better outcomes (Cedraschi et al., 1996 & Chew-Graham & May, 1999). Patients and some health care providers have negative beliefs about back pain. Widespread standardised education programmes about LBP for rheumatologists and patients should be developed (Poiraudieu et al., 2006).

Maladaptive beliefs and attitudes about LBP were thought to start in the early days of pain (Kendall, 1999). However, the misconceptions are common in the general population and employees. Therefore, it is clear that the public needs to be re-educated (Deyo, 1998; Ihlebaek & Eriksen, 2003 & Gross et al., 2006). If education can change attitudes and beliefs, and give rise to a concomitant alteration in expectations, the rising incidence of disability from low back pain may be stemmed or reversed (Buchbinder, Jolley & Wyatt, 2001).

Africa is still trailing far behind in ensuring sound health and welfare for its population. The most common forms of management in Africa include rest and pain killers (Louw et al., 2007a). However, LBP patients in Kenya would like to know the prognosis (Nyagah

& Frantz, 2004). They reported that contradictory diagnosis worsens their worries. In South Africa like elsewhere in the world, negative back beliefs are one of the major predictors of low back disability (Parker, 2007). Fear-avoidance beliefs are noticeable among industrial employees in South Africa (Van Vuuren et al., 2006). It is necessary therefore to have in place interventions which aim at reversing negative back beliefs among employees at the industrial setting (Burton et al., 2004).

Management of LBP in Africa seems to be of substandard quality. Therefore, it is still difficult to prevent low back disability (Louw et al., 2007a). Apart from a few research reports, not much literature is available in Africa concerning back education (Mijiyawa et al., 2000). Smith (2007) reported that fifty-five percent of Cape Town metropolitan school learners have received general postural instruction on musculoskeletal injury prevention. A percentage of 51.22 of learners take rest breaks. Stretching exercises have been instructed to 25.4% of learners during breaks rest. In Rwanda physiotherapists provide education to patients with acute LBP. However, sometimes, their advice is discordant with the current evidence since they encourage things like bed rest. Records show that 92% of physiotherapists in Rwanda believe that a patient with acute LBP needs bed rest (Twagirayezu & Gurie, 2005).

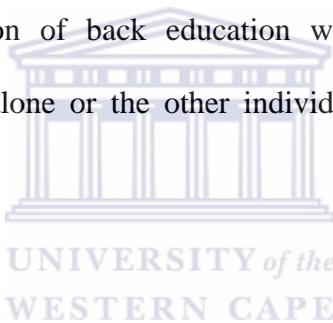
2.5 Effectiveness of a back education programme

2.5.1 Introduction

Due to commonness, high rate of recurrence, and chronicity of LBP, a back education programme targeting the general population and employees gathers in more members that

currently suffer acute, subacute, highly recurring, or chronic LBP than people without symptoms (Burton et al., 2004). As a result, the evidence from people can be indeed be part of study on employees.

Furthermore, sometimes, there is an overlap between interventions directed to the general population and workers. Evidence may be used sometimes interchangeably for both groups (Burton et al., 2004). Therefore, the evidence from population studies is going to be part of the evidence in the present study's literature. Every subsection below will deal with the evidence on a particular outcome measure. Effectiveness of back education programme will be compared to no intervention, to other interventions. Furthermore the effectiveness of a combination of back education with other intervention will be compared to back education alone or the other individual interventions that form the combination.



2.5.2 Effectiveness of a back education programme on biomechanical knowledge

The dissemination of a back education programme is more effective than doing nothing in improving biomechanical knowledge among patients with acute LBP (Cherkin et al., 1996 & Roberts et al., 2002) among schoolchildren (Cardon et al., 2002a & Smith, 2007) and workers (Carlton, 1987; Shi, 1993 & Woodruff et al., 1994). The effect can be maintained for more than three months.

2.5.3 Effectiveness of a back education programme on back beliefs

Provision of a back education programme is not better than no intervention in improving back beliefs among general practitioners (Schechtman, Schroth, Verme & Voss, 2003; Dey et al., 2004; Waddell & Burton, 2005 & Werner, Gross, Lie & Ihlebæk, 2008). However, Bishop and Wing (2006) and Buchbinder and Jolley (2007) found that a back education programme was more effective than no intervention in improving back beliefs among general practitioners. The improvement was maintained over a period of at least six years.

A back education programme proved to be more effective than non-standardised advices in improving back beliefs among patients with subacute and chronic LBP over the period of three months (Burton, Waddell, Burtt & Blair, 1996 & Coudeyre et al., 2006). This is also true over a one-year period of follow-up among patients with acute and recurring LBP (Burton, Waddell, Tillotson & Summerton, 1999). Little et al. (2001) reported that a back education programme was more effective than exercises alone in improving back beliefs among patients with acute LBP. The summary of systematic reviews reached the conclusion that a back education programme provides a positive shift in back beliefs (Burton et al., 2004).

2.5.4 Effectiveness of prevention of the occurrence of LBP

The use of a back education programme is not better than no intervention in reducing occurrence of LBP (Daltroy et al., 1997; Van Poppel, Koes, Smid & Bouter, 1997 &

Maher 2000). There is minimal evidence to support the fact that the use of a back education programme is capable of preventing the occurrence of LBP (Lahad, Malter, Berg & Deyo, 1994).

2.5.5 Effectiveness of a back education programme on disability levels and days off work

A back education programme has been found to be more effective than doing nothing in reducing sick leave and disability, though it is not more effective compared to normal physiotherapy among patients with acute LBP (Picavet et al., 2002 & Brox et al., 2007) and among patients with recurring and chronic LBP (Kim et al., 2004). There is conflicting evidence on the relative effectiveness of a back education programme and acupuncture in terms of reducing days off work, and disability among patients with acute LBP (Brox et al., 2007). Kovacs et al. (2007) found that postural education alone is not as good as the full biopsychosocial back education programme in terms of disability among people with LBP over six months. Furthermore it has been observed that a back education programme coupled with usual care is more effective than a back education programme alone in reducing the levels of disability among patients with acute LBP after up to six months of follow-up (Wand et al., 2004).

Several studies found that a back education programme is not more effective than no intervention in terms of reducing days off work (Waddell, O'Connor, Boorman & Torsney, 2007 & Werner et al., 2008) among the general population. However other studies found that a back education programme is a better strategy than employing a placebo, doing nothing, or exercises alone in reducing disability and days off work on a

short or long-term (Buchbinder & Jolley, 2004; Heymans et al., 2004 & Brox et al., 2007).



Chapter three: Methodology

3.1 Introduction

This chapter presents the study setting, the population and the sample. Furthermore it highlights the study design, the data collection and the intervention procedures, the research tools, and the data analysis. It ends by commenting on the ethical considerations.

3.2 Study setting

The research for this study was conducted at a printing factory in Bellville South, Cape Town, South Africa. The factory caters for different printing services. Some of the services provided by this company include colour proofing, prepress printing, binding, colour pamphlets, and leaflets among other things. The company supplies some universities and colleges around Cape Town.

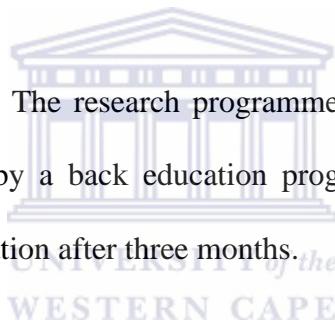
3.3 Population and sample

The sample of this study came from a population of nineteen employees. Some of them are engaged in dynamic technical tasks that involve picking up, lifting, and moving objects such as boxes and paper reams. Other employees are engaged in office work that is of a more static nature such as sitting in front of a personal computer designing pamphlets and booklets. Inclusion criteria include being a permanent employee of the printing company headquarter and having consented through a written consent form to participate in the study. Exclusion criteria during the sampling was whether a participant

reports being diagnosed with a specific LBP (LBP resulting from cancer, infection, back fracture, pregnancy, and visceral-referred pain). The researcher individually explained to the participants what this research was all about following the rules described in the ethical consideration section. He further asked them whether currently they suffer LBP and what was the diagnosis to check whether the participant falls into the exclusion criteria or not. None of the nineteen employees fell into the exclusion. Fifteen employees agreed to participate in the study and signed the consent form (Appendix M).

3.4 Study design

The study was a cohort study. The research programme entailed the following phases: Pre-test evaluation, followed by a back education programme of six weeks, post-test evaluation, and a further evaluation after three months.



3.5 Data collection and the intervention

3.5.1. Succession of events

Data was collected before a back education programme was offered, immediately after inception, five weeks later, and three months subsequently. In this process, data was collected through self-administered questionnaires. Hand to hand method was used while giving and getting the questionnaires back. The participant who had time completed them on the same day. Those who failed to fill in their questionnaires on the same day informed the researcher when to come back to collect them. On the first day of the research study the participants were given “a quality of life questionnaire”. This was

followed two days later by the “knowledge questionnaire”. Three days after the participants were given a back education programme, they were asked to complete the knowledge questionnaire and the course evaluation form.

Five weeks after undergoing a back education programme participants completed a quality of life questionnaire. Three months later the participants were asked once again to complete the knowledge questionnaire and the quality of life questionnaire. In order to relate progressive individual data the researcher asked the participants to put their birthdays at the head of every questionnaire that they completed.

The study started in the second week of April 2008. The first week (second week of April 2008) consisted of getting consents and pre-test data. The intervention started in the following week (third week of April 2008) and lasted six weeks. The intervention ended in the second week of June 2008 and the post-test data took place in the following week (third week of June 2008). Five weeks later the “quality of life questionnaire” was completed. The reason for having to wait for five weeks was to be able to compare changes in quality of life five weeks before and five weeks after. Therefore, the post-test data collection was finished in the third week of July 2008. During the third week of September 2008, the researcher collected data to find out what had happened three months after the end of a back education programme.

Two research assistants were involved in making the presentations. Both of them were Masters’ students in Physiotherapy. They underwent a short briefing about a back education programme before getting involved.

3.5.2 Nature of intervention

The material conveyed was based on the biopsychosocial concept. The study used the recommended booklet known as “the back book” (Appendix E) which was proven to impart to patients and non-patients the knowledge to cope with LBP, once it occurs (Louw et al., 2007b). The complementary biomechanical advice consisted of principles from the most recent evidence. Intervention was performed once a week, either on a Thursday or a Friday, depending on the convenience of the participants. The intervention took four hours divided into six presentations of forty minutes each. The first presentation concerned the basic anatomy, biomechanics, and epidemiology of LBP (Appendix F). The second presentation taught good postures, safe lifting techniques, and encouraged physical activity (Appendix G). The third presentation concerned preventive exercises (Appendix H). Due to time constraints, exercises were only demonstrated exercises and advised to do them at their own time. The fourth and fifth presentations briefed participants on positive back beliefs and attitudes to equip them for better coping once they suffer LBP (Appendices I and J). The sixth presentation consisted of revision and answering questions.

3.6 Research tools

3.6.1 Introduction

The present study used self-administered questionnaires as the research tools. This section presents the nature and contents of the questionnaires, their reliability, and the findings of the pilot study.

3.6.2 Nature and contents of the questionnaires

The present study sought how a back education programme could change the back related knowledge of the participants as well how it could change the quality of life of the participants who suffered LBP. Therefore, the knowledge questionnaire and the quality of life questionnaire were part of questionnaires used.

The quality of life questionnaire consisted of three sections dealing with the demographics and back history, occurrence and work loss in the last five weeks, and functional abilities in the last five weeks. The first section consisted of six questions which sought to elicit data such as age, gender, job title, history in relation with LBP in the last ten years, and whether any other back education programme before has been provided before. The second section consisted of three questions seeking to collect data related to the occurrence of LBP and days of work in the last five weeks. In these two sections, closed-ended questions and open-ended questions were used.

The third section consisted of questions about the levels of functional abilities for those who suffered LBP in the last five weeks. The third section consisted of nine activities. Each activity had six alternative answers portraying the levels of functional inability. The first answer was “doing that activity without extra pain”. The second was “doing the activity but with extra pain”. The third was “doing the activity but with little help”. The fourth was “doing activity but with moderate help”. The fifth was “doing activity but with a lot of help”. The sixth alternative answer was “the total inability to do that activity”. The section on functional inability was “the Oswestry Disability Index”. The

Oswestry Disability Index has an internal consistency reliability of 0.86 Cronbach's alpha value (Wittink, Turk, Carr, Sukiennik & Rogers, 2004).

The first two sections of the questionnaire were made by the researcher. Different standardised questionnaires and literature related to the topic helped the researcher in that process. The quality of life questionnaire remained the same during pre-test and post-test. However during the after three months' evaluation, it became the modified quality of life questionnaire (Appendix D). The reason of this change was because there was a need to get and compare data on LBP occurrence, days off work, and low back disability three months before the intervention and three months after. The modified quality of life questionnaire resembles the quality of life questionnaire. However, unlike the quality of life questionnaire, it had five sections. Section one dealt with sociodemographics and back history. Section two dealt with LBP occurrence and days off work during three months that preceded a back education programme. Section three dealt with disability during three months before back education programme. Section four dealt with LBP occurrence and days off work during three months after the end of back education programme. Section five sought the levels of disability during three months after a back education programme.

The second questionnaire is known as the "knowledge questionnaire" (Appendix B). It was made up of two sections. The first section consisted of eleven items which elicited data on biomechanical knowledge. The second section consisted of twenty-two items meant to give data on back beliefs.

The second section was a modified “Back Beliefs Questionnaire”. The reason of the modification was to better serve the evaluation of back beliefs as defined in the literature. The back beliefs questionnaire has an internal consistency reliability of 0.84 Cronbach’s alpha value (Symonds, Burton, Tillotson & Main, 1995). Both sections used the Likert scale of rating starting from 1 “strongly disagree” up to 6 “strongly agree”.

The third questionnaire named “course evaluation” comprised four sections. The sections respectively consisted of ratings on content of the intervention, general quality of intervention, presenters, and presentations. All the sections were made in the form of the Likert scale of rating, starting from 1 “poor” up to 5 “excellent”. Section three is a modified pre-course evaluation form used in HIV/AIDS training for members of SARPCCO (Pharaoh & Weiss, 2004).

In the pre-test and the post-test data collection, the quality of life questionnaires together with the knowledge questionnaires were used. During the after three months’ data collection, both the modified quality of life questionnaires and the knowledge questionnaires were used. Furthermore during the post-test, those who had attended all the presentations completed the course evaluation form.

3.6.3 Reliability of the questionnaires

The test-retest was carried out to find out the reliability of the “quality of life questionnaire” and the “knowledge questionnaire”. Three people working in one bookshop were involved. There was an interval of nine days between test and retest. There was a positive correlation between answers from the first round and the second round with 0.73 Pearson’s correlation coefficient for the “quality of life questionnaire”.

Therefore, the test-retest reliability of the “quality of life questionnaire” was good (Pretorius, 2007).

The researcher calculated the internal consistency reliability of the “knowledge questionnaire”. He used data from the above-mentioned three people working in a bookshop. Cronbach’s alpha value for the first section was 0.740 whereas the second section was 0.671, giving a mean of 0.7055 which therefore was Cronbach’s alpha value for the “knowledge questionnaire”. This value indicates that there was good internal consistency reliability for the “knowledge questionnaire” (Pretorius, 2007). The test-retest reliability of the “knowledge questionnaire” was found to be fair. There was a moderate, positive correlation between answers of the first round and the ones from the second round (Statistics Department UWC, 2008). Its Pearson’s correlation coefficient was 0.43. Given that the quality of life questionnaire comprised many sociodemographic questions that in most cases looked independent the calculation of internal consistency would not make any sense.

3.6.4 Pilot study

Before data collection, the researcher conducted a pilot study. Three people who lifted objects and performed other physically demanding work in one Cape Town supermarket were involved. From there, the researcher knew that answering the knowledge questionnaire and quality of life questionnaire would take approximately one hour. Therefore, it was decided to administer the two questionnaires on two different occasions to avoid boredom on the part of the participants of the main study.

The pilot study also revealed that some questions were difficult to understand. Therefore, some wording modifications were made to improve the clarity of the questionnaires. The understanding of participants in the main study was far better because apart from the editing of questionnaires the participants have better educational background than the participants of the pilot study. Therefore, in the main study, it took relatively less time to fill in these questionnaires (twenty to thirty minutes were enough to answer both questionnaires).

4.7 Data analysis

The data analysis was carried out using the Statistical Package for Social Science (SPSS) version 15.0 and Microsoft Excel 2003. The functional inability (Appendix A, section three), biomechanical knowledge (Appendix B, section 1), back beliefs (Appendix B, section 2), and all the sections of the evaluation form (Appendix C) needed summations of their respective scores in order to get the total score.

While entering data, the percentage of functional inability was calculated. The 6 statements from each of the 9 sub-sections were scored from 0 to 5 with the first statement scoring 0 through the last statement scoring 5. The maximum score for all ten sections was therefore 45 points. To get the percentage of disability, we would take the total score divided by 45 and multiply by one hundred (Johnson & Thompson, 2007).

Change in LBP status was also analysed. LBP status in five weeks before and after the intervention was compared as well as three months before and three months after. The same happened with the levels of disability. For the two outcomes, only

participants who reported that they suffered LBP during the periods of comparison were involved. The person who had suffered LBP before the intervention and recovered after was put in the category of LBP before. Participants who had suffered LBP before and still suffered after were put in LBP both before and after category whereas those who had no LBP before and suffered it after the intervention were put in LBP after category.

A participant whose percentage of disability decreased after back education compared to before was put in the category of improvement. Participants who had higher percentage of disability after back education compared to before were put in a deterioration category whereas a no change category was designed to accommodate participants whose percentage would remain constant.

To score the biomechanical knowledge subscale, the researcher summed up individual scores on eleven items, with each item having the score from 1 to 6. Therefore, the total score ranged from 11 to 66, with the higher score meaning a better self-reported knowledge. Some of the items were expressed in a negative way like “I spend the whole day without changing position”. These kinds of items include the item numbers 1, 2, 3, 4, 5, 6, 8, and 9. Other items were expressed in a positive way like “I seek help whenever I feel the load is too much”. These items include numbers 7, 10, and 11. Therefore, in order to get the total score the researcher had to reverse the rating for negative items and then add on the actual rating for the positive items.

To score the back belief subscale, individual scores were summed up in twenty-two items, with each item having the score from 1 to 6. Therefore, the total score ranged from 22 to 132, with a higher score meaning more positive back beliefs. Some of the items in

the questionnaires expressed the negative back beliefs like “Medication is the only treatment to LBP”. These kinds of items include the item numbers 3, 6, 8, 9, 11, 12, 14, 15, 16, 18, 19, 20, 21, and 22. Other items expressed the positive back beliefs like “People who are physically active get less LBP and they recover faster if they do”. These kinds of items include item numbers 1, 2, 4, 5, 7, 10, 13, and 17. Therefore, in order to get the total score, the rating of negatively expressed items was reversed and then added to the actual rating of positively expressed items. To score the different sections of course evaluation form, ratings on individual items had to be summed. The score of the whole form was got via summing up the scores of sections. Descriptive data analysis was then carried out. The means, standard deviations, and frequencies were calculated. Where necessary, the range of scores was presented and bar charts were used to classify the employees' responses.

The t-test of the paired samples was used to check whether the effect of a back education programme was significant or not. T-test for independent samples was used to determine the difference between those with full attendance and those with partial attendance in terms of change in biomechanical knowledge, change in back beliefs, and percentage of disability. Z-test for two different proportions was used to determine whether there was any significant difference in LBP proportions between five weeks before and five weeks after a back education programme as well as three months before and three months after. The same test was used to see whether there was any significant difference in proportions between participants with full attendance and those with partial attendance. In every test, results were considered significant if p-value was smaller than 0.05.

3.8 Ethical considerations

The study took place after the approval permission and the ethical clearance were obtained from the Higher Degrees Committee and Research Grant committee (Appendix K). Thereafter, permission to carry out the study was obtained from the manager of that industrial setting. Participants were first given the necessary information prior to the researcher explaining the aims of the study, and how the study was to be carried out. Furthermore, the benefits of the research were explained to them, and so were their safety in participating in this study, why, what and how much time would be needed to complete the study. Participants were also informed that they had the right to withdraw from the study at any time without any consequence. Anonymity and confidentiality of the information were also guaranteed to the participants (Appendix L). The use of birthdays to distinguish the participants did not compromise with the principles of anonymity and confidentiality since it was not possible for the researcher to link the birthday with a particular participant. As a proof of the voluntary participation, each participant was asked to sign a consent form (Appendix M).

Chapter four: Results

4.1 Introduction

This chapter presents the findings on socio-demographic data, biomechanical knowledge, back beliefs, LBP occurrence, disability, and perceptions of a back education programme.

4.2 Socio-demographic data

Out of a population of nineteen employees, fifteen participated in the research study. All fifteen participants completed the pre-test questionnaires and took part in a back education programme which ran over a period of six weeks. Only seven participants attended the full six week programme and five participants attended certain sessions. All participants, however, were issued with pamphlets relating to a back education programme. Only twelve participants completed the post test and the after three months' evaluations. Table 1 presents the socio-demographic results.

Table 1: Bio-socio-demographic data of the participants (N=12)

Variable	Frequency
Age group	
18-40 years	6
41-65 years	6
Gender	
Male	4
Female	8
Nature of work	
Dynamic work	6
Static work	6
LBP history in ten years	
At most one episode	4
Lowly recurring LBP (between 2 and 5 episodes in ten years)	2
Highly recurring LBP (more than 5 episodes in ten years)	5
Chronic LBP	1
A back education programme before	
Yes	3
No	9

4.3 Data from different evaluations

4.3.1 Data from pre-test evaluation

It was found that during pre-test the mean score in biomechanical knowledge was 45.07.

The standard deviation was 4.53. The mean score in back beliefs was 79.92 with a standard deviation of 9.491. Three participants (25 %) reported suffering LBP in the five weeks before the pre-test. The mean percentage of low back disability in the five weeks before was 29.91 % with a standard deviation of 10.87 %. Table 2 presents individual scores in biomechanical knowledge, in back beliefs. It presents individual LBP's status and the percentage of low back disability in the five weeks before the pre-test.

Table 2: Pre-test individual data

Participant number	Score in biomechanical knowledge (Maximum is 66)	Score in back beliefs (Maximum is 132)	LBP in five weeks before	% disability in five weeks before
P1 (P.A)	44	85	No	NA
P2 (F.A)	46	87	No	NA
P3 (F.A)	46	95	Yes	17.50
P4 (F.A)	45	62	Yes	34.44
P5 (F.A)	36	73	No	NA
P6 (P.A)	44	66	Yes	37.78
P7 (P.A)	50	75	No	NA
P8 (P.A)	53	79	No	NA
P9 (F.A)	46	85	No	NA
P10 (P.A)	45	82	No	NA
P11 (F.A)	52	88	No	NA
P12 (F.A)	42	82	No	NA

P: Participant

NA: Not Applicable

P.A: Partial Attendance

F.A: Full Attendance

4.3.2 Data from post-test evaluation

It was found that during post-test the mean score in biomechanical knowledge was 44.83. The standard deviation was 6.86. The mean score in back beliefs was 89.17 with a standard deviation of 8.943. Three participants (25 %) reported suffering LBP in the five weeks after the back education. The mean percentage of low back disability in the five weeks after was 22.89 % with a standard deviation of 20.00 %. Table 3 presents post-test's individual scores in biomechanical knowledge, in back beliefs. It presents individual LBP's status and the percentage of low back disability in the five weeks after the back education.

Table 3: Post-test individual data

Participant number	Score in biomechanical knowledge (Maximum is 66)	Score in back beliefs (Maximum is 132)	LBP in five weeks after	% of disability in five weeks after
P1 (P.A)	43	88	No	NA
P2 (F.A)	49	85	No	NA
P3 (F.A)	31	105	Yes	00.00
P4 (F.A)	47	100	Yes	31.71
P5 (F.A)	43	100	No	NA
P6 (P.A)	37	81	Yes	36.96
P7 (P.A)	51	77	No	NA
P8 (P.A)	41	86	No	NA
P9 (F.A)	51	96	No	NA
P10 (P.A)	40	80	No	NA
P11 (F.A)	54	86	No	NA
P12 (F.A)	51	86	No	NA

P.A: Partial Attendance

F.A: Full Attendance

4.3.3 Data from an after three months' evaluation

After three months the mean score in biomechanical knowledge was 45.83. The standard deviation was 6.589. The mean score in back beliefs was 83.17 with a standard deviation of 8.943. Three participants (25 %) reported to have had LBP in the three months before

the back education. Four people out of the twelve participants (33.33 %) reported to have suffered LBP in the three months after back education. The mean percentage of low back disability in the three months before was 14.55 % with a standard deviation of 2.50 %. The mean percentage of low back disability in the three months after was 31.67 % with a standard deviation of 23.96 %. Table 4 presents after three months' individual scores in biomechanical knowledge, in back beliefs. It presents individual LBP's status and the percentage of low back disability in the three months before the back education and in three months after the back education.

Table 4: After three months' individual data

Participant number	Score in biomechanical knowledge (Maximum is 66)	Score in back beliefs (Maximum is 132)	LBP in three months before	LBP in three months after	% of disability in three months before	% of disability in three months after
P1 (P.A)	42	84	No	Yes	NA	13.33
P2 (F.A)	55	91	No	No	NA	NA
P3 (F.A)	33	99	Yes	Yes	14.12	8.89
P4 (F.A)	48	92	Yes	Yes	17.24	48.89
P5 (F.A)	51	99	No	No	NA	NA
P6 (P.A)	43	67	Yes	No	12.29	NA
P7 (P.A)	50	79	No	No	NA	NA
P8 (P.A)	41	76	No	Yes	NA	55.56
P9 (F.A)	51	91	No	No	NA	NA
P10 (P.A)	40	72	No	No	NA	NA
P11 (F.A)	39	74	No	No	NA	NA
P12 (F.A)	51	75	No	No	NA	NA

P.A: Partial Attendance

F.A: Full Attendance

4.4 The effect of a back education programme on biomechanical knowledge

4.4.1 Effect on biomechanical knowledge scores (comparison between pre-test and post-test)

The mean score deteriorated from 45.07 with a standard deviation of 4.53 to 44.83 with a standard deviation of 6.86. However, using the t-test for paired samples, it was found that the deterioration in biomechanical knowledge, from pre-test to post-test, was not statistically significant ($p=0.677$). Table 5 presents the effect on individual biomechanical knowledge scores

Table 5: Effect on individual biomechanical knowledge scores (comparison between pre-test and post-test)

Participant number	Pre-test score (maximum is 66)	Post-test score (maximum is 66)	Effect of a back education programme
P1 (Partial attendance)	44	43	Deterioration
P2 (Full attendance)	46	49	Improvement
P3 (Full attendance)	46	31	Deterioration
P4 (Full attendance)	45	47	Improvement
P5 (Full attendance)	36	43	Improvement
P6 (Partial attendance)	44	37	Deterioration
P7 (Partial attendance)	50	51	Improvement
P8 (Partial attendance)	53	41	Deterioration
P9 (Full attendance)	46	51	Improvement
P10 (Partial attendance)	45	40	Deterioration
P11 (Full attendance)	52	54	Improvement
P12 (Full attendance)	42	51	Improvement

4.4.2 Effect on biomechanical knowledge scores (comparison between post-test and after three months)

The mean score improved from 44.83 with a standard deviation of 6.86 to 45.83 with a standard deviation of 6.589. However, using the t-test for paired samples, it was found that the improvement in biomechanical knowledge, from post-test to after three months, was not statistically significant ($p=0.769$). Table 6 presents the effect on individual biomechanical knowledge scores.

Table 6: Effect on individual biomechanical knowledge scores (comparison between post-test and after three months)

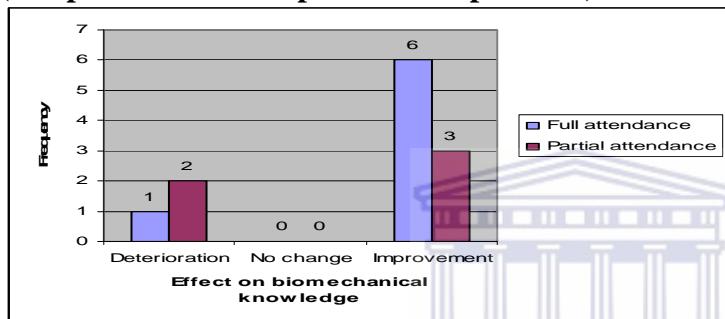
Participant number	Post-test score (maximum is 66)	After three months score (maximum is 66)	Effect of a back education programme
P1 (Partial attendance)	43	42	Deterioration
P2 (Full attendance)	49	55	Improvement
P3 (Full attendance)	31	33	Improvement
P4 (Full attendance)	47	48	Improvement
P5 (Full attendance)	43	51	Improvement
P6 (Partial attendance)	37	43	Improvement
P7 (Partial attendance)	51	50	Deterioration
P8 (Partial attendance)	41	41	No change
P9 (Full attendance)	51	51	No change
P10 (Partial attendance)	40	40	No change
P11 (Full attendance)	54	39	Deterioration
P12 (Full attendance)	51	51	No change

4.4.3 Effect on biomechanical knowledge scores according to attendance status

4.4.3.1 Comparison between pre-test and post-test

Using t-test for mean differences of two independent samples, no statistically significant difference was observed between those with full attendance and those with partial attendance ($p=0.741$). Figure 1 presents the effect according to attendance status.

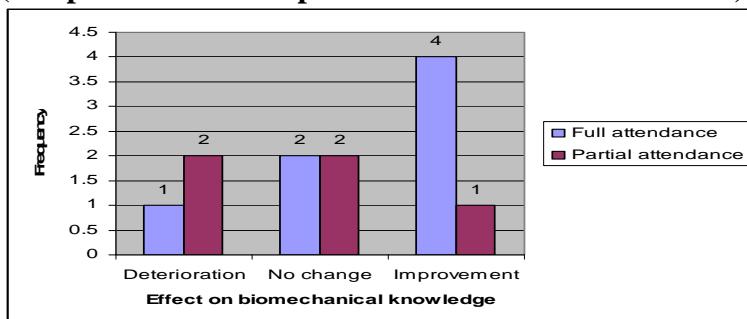
Figure 1: Effect on biomechanical knowledge according to attendance status (comparison between pre-test and post-test)



4.4.3.2 Comparison between post-test and after three months

Using t-test for two independent samples, no statistically significant difference was found between the mean of those with full attendance and the mean of those with partial attendance ($p=0.370$). Figure 2 presents the effect according to attendance status.

Figure 2: Effect on biomechanical knowledge according to attendance status (comparison between post-test and after three months)



4.5 The effect of a back education programme on back beliefs

4.5.1 Effect on back beliefs scores (comparison between pre-test and post-test)

The mean score improved from 79.92 with a standard deviation of 9.491 to 89.17 with a standard deviation of 8.943. Using the t-test for paired samples, it was found that the improvement in back beliefs, from pre-test to post-test, was statistically significant ($p=0.025$). Table 7 presents the effect on individual back beliefs scores.

Table 7: Effect on individual back beliefs scores (comparison between pre-test and post-test)

Participant number	Pre-test score (maximum is 132)	Post-test score (maximum is 132)	Effect of a back education programme
P1 (Partial attendance)	85	88	Improvement
P2 (Full attendance)	87	85	Deterioration
P3 (Full attendance)	95	105	Improvement
P4 (Full attendance)	62	100	Improvement
P5 (Full attendance)	73	100	Improvement
P6 (Partial attendance)	66	81	Improvement
P7 (Partial attendance)	75	77	Improvement
P8 (Partial attendance)	79	86	Improvement
P9 (Full attendance)	85	96	Improvement
P10 (Partial attendance)	82	80	Deterioration
P11 (Full attendance)	88	86	Deterioration
P12 (Full attendance)	82	86	Improvement

4.5.2 Effect on back beliefs (comparison between post-test and three months later)

The mean score deteriorated from 89.17 with a standard deviation of 8.943 to 83.17 with a standard deviation of 10.836. Using the t-test for paired samples, it was found that the deterioration in positive back beliefs, between post-test and after three months, was statistically significant ($p=0.005$). Table 8 presents the effect on individual back beliefs scores.

Table 8: Effect on individual back beliefs scores (comparison between post-test and after three months)

Participant number	Post-test score (maximum is 132)	After three months score (maximum is 132)	Effect of a back education programme
P1 (Partial attendance)	88	84	Deterioration
P2 (Full attendance)	85	91	Improvement
P3 (Full attendance)	105	99	Deterioration
P4 (Full attendance)	100	92	Deterioration
P5 (Full attendance)	100	99	Deterioration
P6 (Partial attendance)	81	67	Deterioration
P7 (Partial attendance)	77	79	Improvement
P8 (Partial attendance)	86	76	Deterioration
P9 (Full attendance)	96	91	Deterioration
P10 (Partial attendance)	80	72	Deterioration
P11 (Full attendance)	86	74	Deterioration
P12 (Full attendance)	86	75	Deterioration

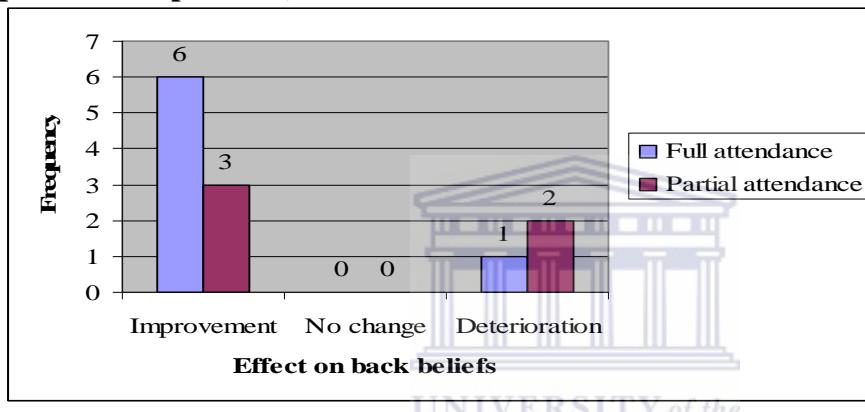
4.5.3 Effect on back beliefs according to attendance status

4.5.3.1 Comparison between pre-test and post-test

Using t-test for two independent samples, no statistically significant difference was found between participants with full attendance and those with partial attendance ($p=0.338$).

Figure 3 presents the effect according to attendance status.

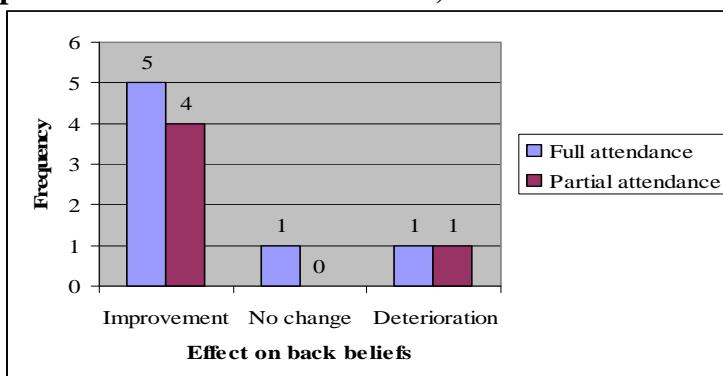
Figure 3: Effect on back beliefs according to attendance status (comparison between pre-test and post-test)



4.5.3.2 Comparison between post-test and after three months

Using t-test for two independent samples, no statistically significant difference was found between those with full attendance and those with partial attendance ($p=0.955$). Figure 4 presents the effect according to attendance status.

Figure 4: Effect on back beliefs according to attendance status (comparison between post-test and after three months)



4.6 Effect of a back education programme on occurrence of LBP and levels of disability

4.6.1 Effect on LBP occurrence comparing five weeks before and five weeks after

The proportion of LBP was 25 % (three participants out of twelve) in the five weeks before a back education programme. The proportion was the same in the five weeks after.

Table 9 presents the effect on individual LBP status.

Table 9: Effect on individual LBP status (comparison between five weeks before and five weeks after)

Participant number	LBP in five weeks before	LBP in five weeks after	Effect of a back education programme
P1 (Partial attendance)	No	No	No change of LBP status
P2 (Full attendance)	No	No	No change of LBP status
P3 (Full attendance)	Yes	Yes	No change of LBP status
P4 (Full attendance)	Yes	Yes	No change of LBP status
P5 (Full attendance)	No	No	No change of LBP status
P6 (Partial attendance)	Yes	Yes	No change of LBP status
P7 (Partial attendance)	No	No	No change of LBP status
P8 (Partial attendance)	No	No	No change of LBP status
P9 (Full attendance)	No	No	No change of LBP status
P10 (Partial attendance)	No	No	No change of LBP status
P11 (Full attendance)	No	No	No change of LBP status
P12 (Full attendance)	No	No	No change of LBP status

4.6.2 Effect on LBP occurrence comparing three months before and three months after

The proportion of LBP was 25 % (three participants out of twelve) in the three months before a back education programme. The proportion went up to 33.33 % (4 participants out of twelve) in the three months after. However, Z-test for the difference between two proportions showed that there is no statistically significant difference between the two proportions (p-value=0.344). Table 10 presents the effect on individual LBP status.

Table 10: Effect on individual LBP status (comparison between three months before and three months after)

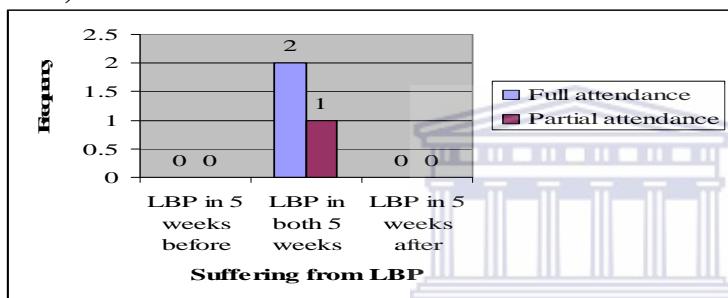
Participant number	LBP in three months before	LBP in three months after	Effect of a back education programme
P1 (Partial attendance)	No	Yes	Deterioration of LBP status
P2 (Full attendance)	No	No	No change of LBP status
P3 (Full attendance)	Yes	Yes	No change of LBP status
P4 (Full attendance)	Yes	Yes	No change of LBP status
P5 (Full attendance)	No	No	No change of LBP status
P6 (Partial attendance)	Yes	No	Improvement of LBP status
P7 (Partial attendance)	No	No	No change of LBP status
P8 (Partial attendance)	No	Yes	Deterioration of LBP status
P9 (Full attendance)	No	No	No change of LBP status
P10 (Partial attendance)	No	No	No change of LBP status
P11 (Full attendance)	No	No	No change of LBP status
P12 (Full attendance)	No	No	No change of LBP status

4.6.3 Effect on LBP occurrence according to attendance status

4.6.3.1 Comparison of five weeks before and five weeks after

Z-test for difference between two proportions showed that there is no significant difference in LBP proportions between the group of participants with full attendance and the group of those with partial attendance in LBP status five weeks after back education ($p=0.623$). Figure 5 presents the effect on LBP occurrence in five weeks.

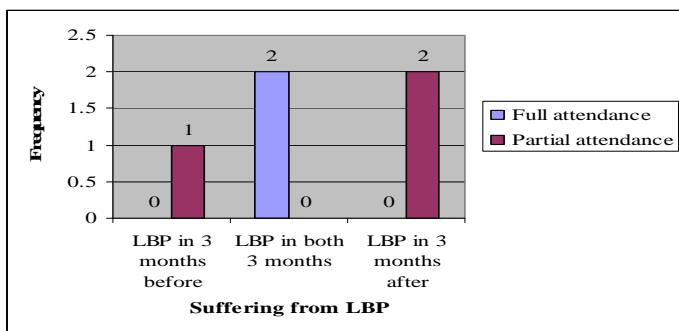
Figure 5: Effect on LBP occurrence (comparison of five weeks before and five weeks after)



4.6.3.2 Comparison between three months before and three months after

Z-test for difference between two proportions showed that there is no significant difference between participants with full attendance and those with partial attendance in LBP status three months after back education ($p=0.074$). Figure 6 presents the effect on LBP occurrence in three months.

Figure 6: Effect on LBP occurrence according to attendance status (comparison between three months before and three months after)



4.6.4 Effect on low back disability comparing five weeks before and five weeks after

The mean percentage of disability was 29.91 % (standard deviation equal to 10.87 %) in 5 weeks before a back education programme. The mean percentage of disability improved up to 22.89 % (standard deviation equal to 20.00 %) in five weeks after. However, t-test for paired samples showed that there is no statistically significant difference between the two mean percentages of disability (p-value=0.315).

Table 11 presents the effect on individual percentages of disability.

Table 11: Effect on individual percentages of disability (comparison of five weeks before and five weeks after)

Participant number	% of disability in five weeks before	% of disability in five weeks after	Effect of a back education programme
P1 (Partial attendance)	NA	NA	NA
P2 (Full attendance)	NA	NA	NA
P3 (Full attendance)	17.50	00.00	Improvement
P4 (Full attendance)	34.44	31.71	Improvement
P5 (Full attendance)	NA	NA	NA
P6 (Partial attendance)	37.78	36.96	Improvement
P7 (Partial attendance)	NA	NA	NA
P8 (Partial attendance)	NA	NA	NA
P9 (Full attendance)	NA	NA	NA
P10 (Partial attendance)	NA	NA	NA
P11 (Full attendance)	NA	NA	NA
P12 (Full attendance)	NA	NA	NA

4.6.5 Effect on low back disability comparing three months before and three months after

The mean percentage of disability was 14.55 % (standard deviation equal to 2.50 %) in the three months before a back education programme. The mean percentage of disability deteriorated up to 31.67 % (standard deviation equal to 23.96 %) in the three months after. However, t-test for paired samples showed that there is no statistically significant difference between the two mean percentages of disability (p-value=0.683).

Table 12 presents the effect on individual percentages of disability.

Table 12: Effect on individual percentages of disability (comparison between three months before and three months after)

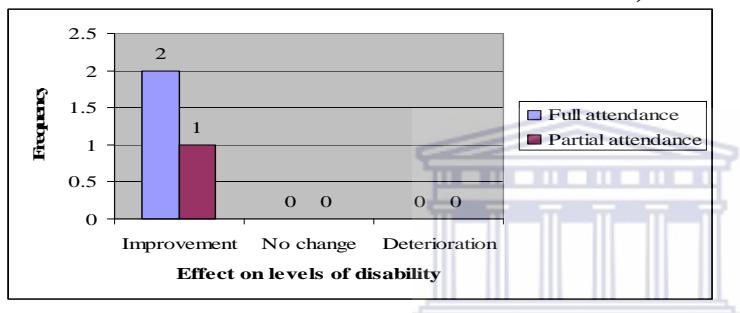
Participant number	% of disability in three months before	% of disability in three months after	Effect of a back education programme
P1 (Partial attendance)	NA	13.33	Deterioration
P2 (Full attendance)	NA	NA	NA
P3 (Full attendance)	14.12	8.89	Improvement
P4 (Full attendance)	17.24	48.89	Deterioration
P5 (Full attendance)	NA	NA	NA
P6 (Partial attendance)	12.29	0.00	Improvement
P7 (Partial attendance)	NA	NA	NA
P8 (Partial attendance)	NA	55.56	Deterioration
P9 (Full attendance)	NA	NA	NA
P10 (Partial attendance)	NA	NA	NA
P11 (Full attendance)	NA	NA	NA
P12 (Full attendance)	NA	NA	NA

4.6.6 Effect on levels of disability according to attendance status

4.6.6.1 Comparison between five weeks before and five weeks after

T-test for two independent samples showed that there is no significant difference between those with full attendance and those with partial attendance in terms of mean percentage of disability five weeks after back education ($p=0.201$). Figure 7 presents the effect according to attendance status.

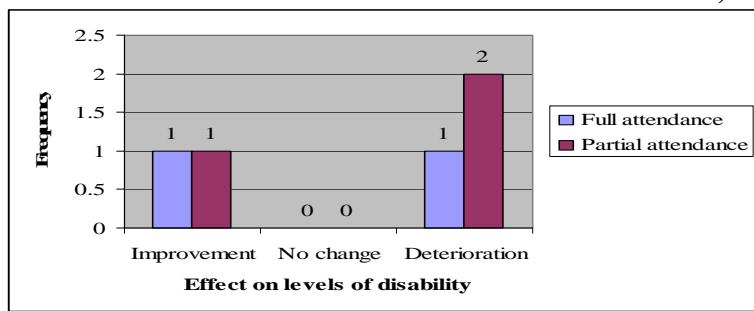
Figure 7: Effect on levels of disability according to attendance status (comparison between five weeks before and five weeks after)



4.6.6.2 Comparison between three months before and three months after

T-test for mean differences between two independent samples showed that there is no significant difference between those with full attendance and those with partial attendance in terms of mean percentage of disability three months after back education ($p=0.286$). Figure 8 presents the effect according to attendance status.

Figure 8: Effect on levels of disability according to attendance status (comparison between three months before and three months after)



4.7 Perceptions of a back education programme

The mean rating of presentations made during the back education was 25.29. The standard deviation was 3.40. The mean rating of the quality of the back education as a whole was 8.14 with standard deviation of 0.90. The mean rating of the content of the back education was 23.29 with a standard deviation of 3.25. The mean rating of the presenters was 11.86 with a standard deviation of 1.68. The rating of a back education programme was good with a mean of 80% together with a standard deviation of 8.81.

Table 13 presents individual ratings of back education.

Table 13: Individual ratings of back education programme

	Rating of presentations (Max was 30)	Rating of quality of the back the back education (Max was 10)	Rating of the content of the back education (Max was 30)	Rating of presenters (Maximum was 15)	Total rating (Max was 85)	Total rating in %
P2	30	8	24	12	74	87 %
P3	24	8	23	12	67	79 %
P4	30	10	29	15	84	99 %
P5	24	8	24	12	68	80 %
P9	24	8	24	12	64	75 %
P11	24	8	20	10	62	73 %
P12	21	7	19	10	57	67 %

Open comments given by the participants showed that back education presentation was clear and understandable and it improved the knowledge of those who had previous back education.

Chapter five: Discussion

5.1 Introduction

This chapter presents the discussion of the findings by objectives and the limitations of the study.

5.2 Discussion by objective

This section discusses the findings on biomechanical knowledge, back beliefs, occurrence of LBP, low back disability, and a back education programme perceptions in the light of the previous findings.



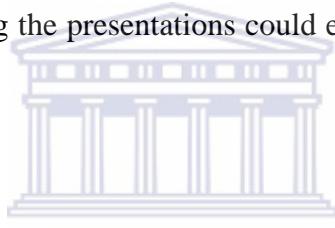
5.2.1 Effect of a back education programme on biomechanical knowledge

This study found that a back education programme did not improve the biomechanical knowledge from pre-test up to post-test. However, this is in contrast with another study which found that back education programme improved biomechanical knowledge of employees (Kim et al., 2004). This can be related to the fact that adults have persisted in the use of wrong biomechanical patterns obtained from years of use. Therefore, it becomes hard to improve their biomechanical skills (McGill, 2004).

Furthermore it was observed that biomechanical knowledge did not significantly improve after three months. This situation could be explained by the fact that employees do not

always implement the biomechanical skills taught in a back education programme (Carton, 1987, Daltroy et al., 1997 & Rabinowitz, Bridger & Lambert, 1998). Therefore, their biomechanical knowledge does not improve.

Lack of prior consultation of participants to know how participants wanted to be taught could explain the lack of improvement of knowledge. Ng'uurah and Frantz (2004) highlighted that lack of evaluation of the specific needs of the group could explain the failure of many health education programmes. Moreover the same authors reported that the poor methods used during health education could lead to lack of positive results. Therefore the fact that participants did not get the chance to themselves practice taught techniques and exercises during the presentations could explain the lack of improvement in knowledge (Maher, 2000).



5.2.2 Effect of a back education programme on back beliefs

Back beliefs among employees at the industry improved significantly after they were provided back education programme. These findings are in agreement with other studies which state that a back education programme significantly improved back beliefs of the general population (Buchbinder et al., 2001, Waddell, O'Connor, Boorman & Torsney, 2007 & Werner, Ihlebæk, Lærum, Wormgoor & Indahl, 2008) and among employees (Cunningham et al., 2008).

The present study indicates that the improvement was short-lived since the after three months evaluation indicated the participants' back beliefs had deteriorated. Cherkin et al. (1996) found that the improvement in back beliefs could be totally lost after a certain period of time. The reason behind the volatility of this change could be the lack of

reinforcements sessions to keep up what was acquired during intervention (Buchbinder et al., 2007).

Another reason to explain the lack of long-term effects of a back education programme could be the low prevalence of LBP on the setting which could have led to the lack of internalisation of the messages conveyed since LBP could be not a threat to them. Participants with full attendance showed better immediate improvement in back beliefs than those with partial attendance. Linton and Andersson (2000) came up with similar findings that attending instruction was better than not attending in terms of improvement in back beliefs among LBP patients. Furthermore, Henrotin, Cedraschi, Duplan, Bazin and Duquesnoy (2006), in their review, found that pamphlets without direct contact do not improve back beliefs.



5.2.3 Effect of a back education programme on the occurrence of LBP and disability

The present study also found out that a back education programme does not reduce the occurrence of LBP or the levels of disability among employees of a certain industry in Cape Town. This study concurs with previous studies that stated that a back education programme does not reduce the occurrence of LBP (Van Poppel et al. 1998 & Jensen, 2006) or the levels of disability (Gordon et al., 2007). The failure could result from other unchangeable factors like previous episodes, age, and genetics that strongly lead to the occurrence of LBP (Snook, 2004).

In all the three phases of evaluation, furthermore, nobody reported to be off work before or after a back education programme. This could be a result of the absence of disability

compensation in Africa (Louw et al., 2007a) that makes the continuation of occupational duties almost obligatory (Pfingsten, 2001).

5.2.4 Perceptions of a back education programme

Participants had high appreciation of a back education programme. The same was reported in other studies (Shi, 1993, Daltroy et al., 1997, Kim et al., 2004 & Coudeyre et al., 2006).

5.3 Limitations of the study

It is important to mention the limitations of the present study

- The present study had a small sample. It is anticipated that a bigger sample would have added a lot of quality to the present study.
- The follow-up could only go up to three months. Should it have been longer, more changes would have been observed.

However, all in all, since there seem to be no other similar studies published on the continent, the current study deserves some credit. It gives a picture of how employees working in small-scale industries in Africa would respond to a back education programme.

Chapter six: Conclusions

6.1 Introduction

This chapter presents conclusions and recommendations of the study.

6.2 Conclusions

The present study managed to meet all the study's objectives. It found that a back education programme can not improve biomechanical knowledge among employees at an industrial setting in Cape Town, South Africa. However, back beliefs are improved immediately after a back education programme although the improvement is usually for a short duration. Furthermore, a back education programme can not reduce LBP occurrence and disability levels among employees at this industrial setting in Cape Town, South Africa. No employee has reported to have been off work because of LBP either before a back education programme or after. However, the programme was found to be interesting by the participants who reported that they were satisfied with what they learned from a back education programme.

6.3 Recommendations

The present findings indicate that a back education programme could assist in changing of the back beliefs. Together with a consideration of the benefits of change in back beliefs expressed in the most recent literature, the following proposals are recommended:

- Researchers are called upon to make similar studies using a larger sample and with longer period of follow-up.
- Future studies should revise the content of a back education programme
 - Meanwhile, the biopsychosocial back education programme should gain more ground in Africa. More emphasis should be put on the prevention of low back disability rather than LBP itself as decades of implementing back education have been generally fruitless.



References

Airaksinen, O., Brox, J.I., Cedraschi, C. Hildebrandt, J., Klaber-Moffett, J., Kovacs, F. et al. (2006). European guidelines for the management of chronic nonspecific low back pain. *European Spine Journal*, 15, S192–S300.

Andersson, G.B. (1981). Epidemiologic aspects on low-back pain in industry. *Spine*, 6(1), 53-60.

Andrews, K. (2004). *Ten tips for improving posture and ergonomics*. Retrieved on 28th September 2008 from www.spine-health.com/wellness/ergonomics/workplace-injuries-and-ergonomics-article-index.



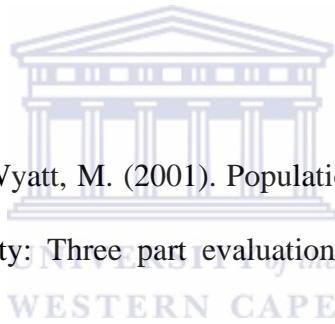
Barnes, R., Birch, J., Cloete, M.M., Joubert, L., Usher, A.C. & Nel, M.M. (2007). The incidence of work-related low back pain among currently practicing physiotherapists in Bloemfontein. *South African Journal of Physiotherapy*, 63(1), 9-13.

Berger, P. (2007). Perspectives on physiotherapy guidelines for chronic low back pain. *South African Journal of Physiotherapy*, 63(3), 15-21.

Bishop, P.B. & Wing, P.C. (2006). Knowledge transfer in family physicians managing patients with acute low back pain, a prospective randomized control trial. *Spine Journal*, 6(3), 282-8.

Borkan, J.M.; Koes, B., Reis, S. & Cherkin, D. C. (1998). A report from the second international forum for primary care research on low back pain: reexamining priorities. primary care. *Spine*, 23(18):1992-1996.

Brox, J.I., Storheim, K., Grotle, M., Tveito, T.H., Indahl, A. & Eriksen, H.R. (2007). Systematic review of back schools, brief education, and fear-avoidance training for chronic low back pain. *Spine Journal, epublication*. Retrieved on 19 January 2008 from [http://www.sciencedirect.com/science?_ob=GatewayURL&_origin=inwardhub&_urlvers ion=4&_method=citationSearch&_piikey=S1529943007007000](http://www.sciencedirect.com/science?_ob=GatewayURL&_origin=inwardhub&_urlversion=4&_method=citationSearch&_piikey=S1529943007007000).



Buchbinder, R., Jolley, D. & Wyatt, M. (2001). Population based intervention to change back pain beliefs and disability: Three part evaluation. *British Journal of Medicine*, 322(7301), 1516-1520.

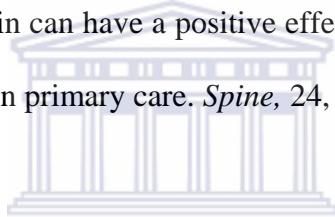
Buchbinder, R. & Jolley, D. (2007). Improvements in general practitioner beliefs and stated management of back pain persist 4.5 years after the cessation of a public health media campaign *Spine*, 32(5), E156-62.

Burn, L. (2000, June, 1-15). Backache and neck pain. Melbourne, Victoria, Australia: *Oxford University Press*, pp.1- 21.

Burton, A.K., Balagué, F., Cardon, G., Eriksen, H.R., Henrotin, Y., Lahad, A. et al. (2004). European guidelines for prevention in low back pain. *Best Practice & Research Clinical Rheumatology*, 19(4), 541-555.

Burton, A.K., Waddell, G., Burtt, R. & Blair, S. (1996). Patient educational material in the management of low back pain in primary care. *Hospital for Joint Diseases*, 55(3), 138-141.

Burton, A.K., Waddell, G., Tillotson, K.M. & Summerton, N. (1999). Information and advice to patients with back pain can have a positive effect, a randomized controlled trial of a novel educational booklet in primary care. *Spine*, 24, 2484-2491.



Cardon, G. & Balagué, F. (2004). Low back pain prevention's effects in schoolchildren: What is the evidence? *European Spine Journal*, 13(8), 663-679.

Cardon, G. M., De Clercq, D.L. R. & De Bourdeaudhuij, I.M.M. (2002). Back education efficacy in elementary schoolchildren: a 1-year follow-up study: Health services research. *Spine*, 27(3), 299-305.

Carlton, R. (1987). The effects of body mechanics instruction on work performance. *American Journal of Occupational Therapy*, 41, 16-20.

Cedraschi, C., Robert, J., Perrin, E., Fischer, W., Goerg, D. & Vischer, T.L. (1996). The role of congruence between patient and therapist in chronic low back pain patients. *Journal of Manipulative Physiology and Therapy*; 19(4), 244-9.

Cherkin, D.C., Deyo, R.A., Street, J.H., Hunt, M. & Barlow, W. (1996). Pitfalls of patient education. Limited success of a program for back pain in primary care. *Spine*, 21(3), 345-55.

Chew-Graham, C. & May, C. (1999). Chronic low back pain in general practice, the challenge of the consultation. *Family Practice*, 16(1), 46-49.

Clairbornw, N., Vandenburgh, H., Krause, T.M. & Leung, P. (2002). Measuring quality of life changes in individuals with chronic low back conditions: a back education programme evaluation. *Evaluation and Programme Planning*, 25, 61-70.

Chou, R.; Qaseem, A., Snow, V., Casey, D., Cross, S.T., Shekelle, P. et al. (2007). Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American college of physicians and the American pain society. *Annals of Internal Medicine*, 147, 478-491.

Coudeyre, E., Givron, P., Vanbiervliet, W., Benaïm, C., Hérisson, C., Pelissier, J. et al. (2006). The role of an information booklet or oral information about back pain in reducing disability and fear-avoidance beliefs among patients with subacute and chronic

low back pain: A randomized controlled trial in a rehabilitation unit. *Annales de Réadaptation en Médecine Physique*, 49(8), 600-8.

Cunningham, C.G, Flynn, T.A, Toole, C.M, Ryan, RG, Gueret, PW, Bulfin, S. et al. (2008). Working Backs Project--implementing low back pain guidelines. *Occupational Medicine (London)*, pre-published abstract.

Daltroy,L.H., Iversen, M.I., Larson, M.G., Lew,R., Wright, E., Zwerling, C. et al (1997).

A controlled trial of an educational program to prevent low back injuries. *The New England Journal of Medicine*, 337(5), 322-328.

Daynard, D., Yassi, A., Cooper, J.E., Tate, R., Norman, R. & Wells, R. (2001). Biomechanical analysis of peak and cumulative spinal loads during simulated patient-handling activities: A substudy of a randomized controlled trial to prevent lift and transfer injury of health care workers. *Applied Ergonomics*, 32(3), 199-214.

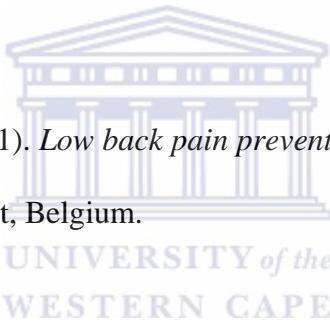
Dekenah, G. (2006). Ergonomic risk: Getting back to basics can avoid back pain. *Risk management*, 2(2), 32

Department of Statistics (2008). *Course manual of applied statistics 501 module taught from February 2008 to June 2008*. University of the Western Cape, Cape Town, South Africa.

Dey, P., Simpson, C.W.R., Collins, S.I., Hodgson, G., Dowrick, C.F., Simison, A.J.M. et al. (2004). Implementation of RCGP guidelines for acute low back pain: A cluster randomized controlled trial. *British Journal of General Practice*, 54, 33-37.

Deyo, R.A. & Weinstein, J. M. (2001). Low back pain. *The New England Journal of Medicine*, 344(5), 363-370.

Deyo, R.A. (1998). Low back pain. *Science in America*, 279, 29-33.



Doumont, D. & Libion, F. (2001). *Low back pain prevention within the hospital and peer education*. Health education unit, Belgium.

Ehrilch,G.E. (2003). Low Back Pain. *Bulletin of World Health Organization*. Philadelphia. Retrieved in March 2007 from <http://deposit.ddb.de>.

Frank J.W., Brooker, A.S., DeMaio, S.E., Kerr, M.S., Maetzel, A., Shannon, H.S. et al. (1996). Disability resulting from occupational low back pain part II: What do we know about secondary prevention? A review of the scientific evidence on prevention after disability begins. *Spine*, 21, 2918-2929.

Frank, J., Sinclair, S., Hogg-Johnson, S., Shannon, H., Bombardier, C., Beaton, D. et al. (1998). Preventing disability from work-related low-back pain: New evidence gives new

hope if we can just get all the players onside. *Canadian Medical Association Journal*, 158 (12), 1625-1631.

Fullen, B.M., Baxter, G.D., O'DonoVan, B.G., Doody, C., Daly, L. & Hurley, D.A. (2008). Doctors' attitudes and beliefs regarding acute low back pain management: A systematic review. *Pain*, 136(3), 388-96.

George, S.Z., Childs, J.D., Teyhen, D.S., Wu, S.S., Wright, A.C., Dugan, J.L. et al. (2007). Rationale, design, and protocol for the prevention of low back pain in the military trial. *BioMedCentral Musculoskeletal Disorders*, 8: 92.

Ghelfof, E.L.M., Vinck, J., Vlaeyen, J.W.S., Hidding, A. & Crombez, G. (2005). The differential role of pain, work characteristics and pain-related fear in explaining back pain and sick leave in occupational settings. *Pain*, 113, 71-81.

Goossens, M.E.J.B., Vlaeyen, J.W.S., Hidding, A., Kole-Snijders, A. & Evers, S.M.A.A. (2005). Treatment expectancy affects the outcome of cognitive-behavioural interventions in chronic pain. *Clinical Pain*, 21, 18-26.

Goubert, L., Crombez, G., De Bourdeaudhuij, I. (2004). Low back pain, disability and back pain myths in a community sample, prevalence and interrelationships. *European Journal of Pain* 8, 385-394.

Gross, D.P., Ferrari, R., Russell, A.S., Battié, M.C., Schopflocher, D. & Hu, R.W. et al. (2006). A population-based survey of back pain beliefs in Canada. *Spine*, 31(18), 2142-5.

Hazard, R.G. (2007). Low back pain and neck pain diagnosis and treatment. *American Journal of Physical Medicine & Rehabilitation*, 86(1), S59-S68.

Heymans, M.W., Van Tulder, M.W., Esmail, R., Bombardier, C. & Koes, B.W. (2004). Back schools for non-specific low-back pain. *Cochrane Database of Systematic Reviews*, 4, CD000261, DOI: 10.1002/14651858, 1-41.

Hough, P.A., Van Rooyen, F.C., Bredenkamp, E., Brough, K., Ferreira, M., Myburgh, H. et al. (2006). Guidelines prescribed by general practitioners to patients with acute low back pain regarding 'return to work. *South African Family Practice*, 48(10), 15.

Ihlebæk C. & Eriksen, H.R. (2003). Are the "myths" of low back pain alive in the general Norwegian population? *Scandinavian Journal of Public Health*, 31, 395-398.

Ihlebaek, C. & Eriksen, H.R. (2004). The "myths" of low back pain, status quo in Norwegian general practitioners and physiotherapists, *Spine* 29, 1818–1822.

Indahl, A. (2004). Low back pain, diagnosis, treatment, and prognosis. *Scandinavian Journal of Rheumatology*, 33(4), 199 – 209.

Indahl, A., Velund, L. & Reikerås, O. (1995). Good prognosis for low back pain when left untampered. A randomized clinical trial. *Spine*, 20, 473–477.

Jensen, M.C., Brant-Zawadzki, M.N., Obuchowski, N., Modic, M.T., Malkasian, D. & Ross, J.S. (1994). Magnetic Resonance Imaging of the Lumbar Spine in People without Back Pain. *New England Journal of Medicine*, 331(2), 69-73.

Johnson, D. & Thompson, D. (2007). *How to prove your patients are getting better? Collecting and using clinic records: Scoring of Oswestry disability index*. University of Oklahoma, College of Allied Health, Department of Rehabilitation Science, United States.

Jordaan, R., Kruger, M., Stewart, A.V. & Becker, P.J. (2005). Prevalence and Risk Factors for Low Back Pain in Adolescents. Retrieved on 15/04/07 from www.physiosa.org.za.

Kaplansky, B.D., Wei, F.Y. & Reecer, M.V. (1998). Prevention strategies for occupational low back pain. *Occupational Medicine*, 13(1), 33-45.

Kendall, N.A.S. (1999). Psychosocial approaches to the prevention of chronic pain, the low back paradigm. *Baillière's Clinical Rheumatology*, 13(3), 545-554.

Kim, P., Hayden, J.A. & Mior, S.A. (2004). The cost-effectiveness of a back education program for firefighters: a case study. *Journal of Canadian Chiropractic Association*; 48(1), 13–19.

Kinkade, S. (2007). Evaluation and treatment of acute low back pain. *American Family Physician*, 75(8), 1181-1192.

Koes, B., Van Tulder, M., Raymond, O., Burton, A.K. & Waddell, G. (2001). Clinical guidelines for the management of low back pain in primary care: an international comparison: Health services research. *Spine*, 26(22), 2504-2513.

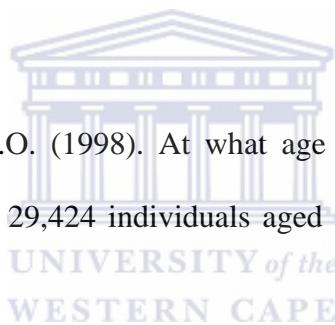
WESTERN CAPE

Koes, B.W., Van Tulder, M.W. & Thomas, S. (2006). Clinical review, Diagnosis and treatment of low back pain. *British Journal of Medicine*, 332, 1430-1434.

Krismer, M. & Van Tulder, M. (2007) Low back pain (non-specific): The low back pain group of the bone and joint health strategies for Europe project. *Best Practice & Research Clinical Rheumatology*, 21(1), 77-91.

Lahad, A., Malter, A., Berg, A.O & Deyo, R. (1994). The effectiveness of four interventions for the prevention of low back pain. *Journal of American Medical Association*, 272, 1286-1291.

Lamb, S.E., Lall, R., Hansen, Z., Withers, E.J., Griffiths, F.E., Szczepura, A., Barlow, J. et al. (2007). Design considerations in a clinical trial of a cognitive behavioural intervention for the management of low back pain in primary care: Back skills training trial. *Biomedicentral Musculoskeletal Disorders*, 8(14), 6-14



Leboeuf-Yde, C. & Kyvik, K.O. (1998). At what age does low back pain become a common problem? A study of 29,424 individuals aged 12-41 years. *Spine*, 23(2), 228-234.

Liebenson, C. (2002). What to do about yellow flags? *Dynamic Chiropractic*, 20(25), 5-8

Linton, S.J. & Andersson, T. (2000). Can chronic disability be prevented? A randomized trial of a cognitive-behaviour intervention and two forms of information for patients with spinal pain? *Spine*, 25(21), 2825-31.

Linton, S.J. & Ryberg, M. (2001). A cognitive-behavioural group intervention as prevention for persistent neck and back pain in a non-patient population, a randomized controlled trial. *Pain*, 90, 83-90.

Little, P., Roberts, L., Blowers, H., Garwood, J., Cantrell, T., Langridge, J. et al. (2001). Should we give detailed advice and information booklets to patients with back pain? A randomized controlled factorial trial of a self-management booklet and doctor advice to take exercise for back pain. *Spine*, 26(19), 2065-72.

Loisel, P., Durand, M.J., Berthelette, D., Vezina, N., Baril, R., Gagnon, D. et al. (2001). Disability prevention, new paradigm for the management of occupational back pain? *Disease Management & Health Outcomes*, 9(7), 351-360

UNIVERSITY of the
WESTERN CAPE

Louw, Q.A, Morris, L.D. & Grimmer-Somers, K. (2007). The prevalence of low back pain in Africa, a systematic review. *Bio-MediCentral, Musculoskeletal Disorders*, 8,105.

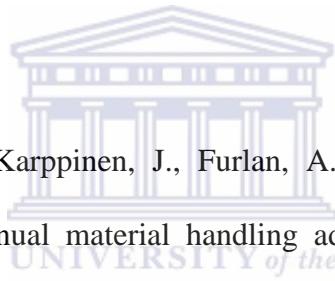
Louw, Q., Morris, L. & Sklaar, J. (2007). Evidence of physiotherapeutic interventions for acute LBP patients. *South African Journal of Physiotherapy*, 63(3), 7-14.

Maher, C.G. (2000). A systematic review of workplace interventions to prevent low back pain. *Australian Journal of Physiotherapy*, 46, 259-269.

Main, C.J. & Williams, A.C. (2002). ABC of psychological medicine. Musculoskeletal pain. *British Medical Journal*, 325, 534-537.

Maniadakis, N. & Gray, A. (2000). The economic burden of back pain in the UK. *Pain*, 84, 95-103.

Marras, W.S. (2000). Occupational low back disorder causation and control. *Ergonomics*, 43(7), 880–902.



Martimo, K.P., Verbeek, J., Karppinen, J., Furlan, A. D, Kuijer, P.P.F.M., Viikari-Juntura, E. et al. (2007). Manual material handling advice and assistive devices for preventing and treating back pain in workers (Review). *The Cochrane Database of Systematic Reviews*, 4, CD 005958, DOI: 10.1002/14651858, 1-37

Mayer, T., Gatchel, R.J. & Evans, T. (2001). Effect of age on outcomes of tertiary rehabilitation for chronic disabling spinal disorders. *Spine*, 26(12), 1378-84.

McGill, S. (2002). Low Back Disorders, Evidence-based prevention and rehabilitation. Champaign(USA), Human Kinetics, .

McGill, S.M. (2004). Linking latest knowledge of injury mechanisms and spine function to the prevention of low back disorders. *Journal of Electromyography and Kinesiology*, 14(1), 43-47.

Merskey, H. & Bogduk, N. (1994). *Classification of chronic pain*. Seattle, USA: IASP press

Moffett, J.A.K., Newbrowner, E., Waddell, G., Croucher, K. & Spear, S. (2000). Public perceptions about low back pain and its management, a gap between expectations? *Health Expectations*, 3, 161-168.

Moffett, J.A.K., Chase, S.M., Portek, I. & Ennis, J.R. (1986). A controlled, prospective study to evaluate the effectiveness of a back school in the relief of chronic low back pain, *Spine*, 11, 120–122.

Moseley, G.L. (2004). Evidence for a direct relationship between cognitive and physical change during an education intervention in people with chronic low back pain. *European Journal of Pain*, 8, 39–45.

Ng'uurah, J.N. (2004). *Health education needs among individuals with low back pain*. Unpublished masters' mini-thesis, UWC, Cape Town, South Africa.

O'Sullivan, P. (2005). Diagnosis and classification of chronic low back pain disorders: Maladaptive movement and motor control impairments as underlying mechanism. *Manual Therapy*, 10(4), 242-255.

Parker, R. (2007). Physiotherapy students' assessment of psychosocial yellow flags in LBP. *South African Journal of Physiotherapy*, 63(1), 3-7.

Patrick, D.L. & Erickson, P. (1993)). Health status and health policy: quality of life in health in health care evaluation and resource allocation. New York, Oxford University Press.

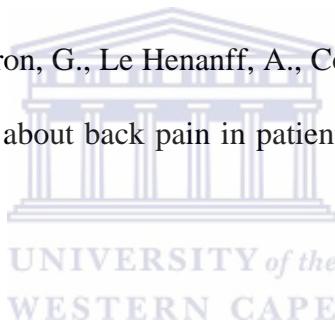
Petersen, T. (2003). *Non-Specific Low Back Pain, Classification and treatment*. University, the department of physical therapy, Copenhagen, Denmark, Lund. Retrieved in April 2007 from <http://www.fysio.dk/>

Pfingsten, M. (2001). Functional restoration--it depends on an adequate mixture of treatment. *Schmerz*, 15(6), 492-8.

Pretorius, T.B. (2007). *Inferential data analysis: Hypothesis-testing and decision-making*. Pinetown, South Africa: Reach Publishers.

Pharaoh, R. & Weiss, T. (2004). *SARPCCO Training on HIV/AIDS, Pre-course evaluation form*. Training for Peace in South Africa Project. Retrieved on 9th April 2008 from www.iss.co.za/pubs/Other/SARPCCO_HIV/Form3.pdf

Poiradeau, S., Rannou, F., Baron, G., Le Henanff, A., Coudeyre, E., Rozenberg, S. et al. (2006). Fear-avoidance beliefs about back pain in patients with subacute low back pain. *Pain*, 124, 305–311.



Rabinowitz, D., Bridger, R.S. & Lambert, M.I. (1998). Lifting technique and abdominal belt usage, a biomechanical, physiological and subjective investigation. *Safety Science*, 28(3), 155-164.

Roberts, L., Little, P., Chapman, J., Cantrell, T., Pickering, R. & Langridge, J. (2002). The back home trial, general practitioner-supported leaflets may change back pain behaviour. *Spine*, 27(17), 1821-8.

Roland, M., Waddell, G., Moffett, K.J., Burton, A.K. & Main, C.J. (2002). *The back book* (2nd ed). Norwich, UK, The stationery office.

Sanya, A.O. & Ogwumike, O.O. (2005). Low back pain prevalence amongst industrial workers in the private sector in Oyo State, Nigeria. *African Journal of Medical Sciences*, 34(3), 245-9.

Schectman, J.M., Schroth, W.S., Verme, D. & Voss, J.D. (2003). Randomized controlled trial of education and feedback for implementation of guidelines for acute low back pain. *Journal of General Internal Medicine*, 18(10), 773-80.



Shi, L. E. (1993). A cost-benefit analysis of a California county's back injury. *Public Health Reports*, 106(2): 204-211.

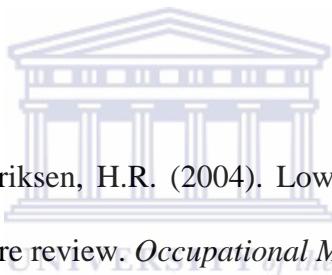
Skovron, M.L. (1992). Epidemiology of low back pain. *Baillieres Clinical Rheumatology*, 6(3), 559-73.

Smith, L. (2007). *Computer-related musculoskeletal dysfunction among adolescent school learners in the Cape metropolitan region*. Unpublished masters' thesis. Stellenbosch University, Cape Town, South Africa.

Snook, S.H. (2004). Work-related low back pain, secondary intervention. *Journal of Electromyography and Kinesiology*, 14(1), 153-160.

Swoden, M., Hatch, A., Gray, S.E. & Coombs, J., 2006. Can four key psychological risk factors for chronic pain and disability (Yellow Flags) be modified by a pain management programme? A pilot study. *Journal of Chartered Society of Physiotherapy*, 92, 43-49.

Symonds, T.L., Burton, A.K., Tillotson, K.M. & Main, C.J. (1995). Absence resulting from low back trouble can be reduced by psychosocial intervention at the work place. *Spine*, 20(24), 2738-45



Tveito, T.H., Hysing, M. & Eriksen, H.R. (2004). Low back pain interventions at the workplace, a systematic literature review. *Occupational Medicine*, 54(1), 3-13.

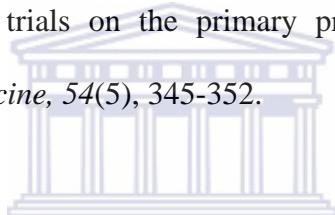
Twagirayezu, J. & Gurie, P.. (2005). *Assessment and treatment choices of physiotherapists treating non-specific low back pain in Rwanda* Unpublished masters' mini-thesis, University of the Western Cape, Cape Town, South Africa.

Tuchin, P.T. (1998). Spinal care education as a preventative strategy for occupational health & safety. A New Role for Chiropractors. *Australian Chiropractic and Osteopathy*, 7(1), 8-14.

Udermann, B.E., Spratt, K.F., Donelson, R.G., Mayer, J., Graves, J.E. & Tillotson, J. (2004). Can a patient educational book change behaviour and reduce pain in chronic low back pain patients? *The Spine Journal*, 4, 425–435.

Van Poppel MN, Koes BW, Smid T, Bouter LM. (1997). A systematic review of controlled clinical trials on the prevention of back pain in industry. *Occupational Environmental Medicine*, 54, 841-847.

Van Poppel, M.N.M., Hooftman, W.E. & Koes, B.W. (2004). An update of a systematic review of controlled clinical trials on the primary prevention of back pain at the workplace. *Occupational Medicine*, 54(5), 345-352.



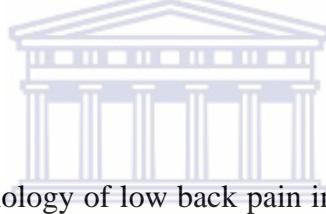
Van Tulder, M., Koes, B. & Bombardier, C. (2002). Low back pain. *Best Practice & Research Clinical Rheumatology*, 16(5), 761-775.

Van Tulder, M.W., Becker, A., Bekkering, T., Breen, A., Gil del Real, M.T., Hutchinson, A. et al. (2006). European guidelines for the management of acute nonspecific low back pain in primary care. *European Spine Journal*, 15 (2): S169–S191

Van Vuuren, B., Zinzen, E., Van Heerden, H.J., Becker, P. & Meeusen, R. (2005a). Psychosocial factors related to lower back problems in a South African's manganese industry. *Journal of Occupational Rehabilitation*, 15(2), 215-225.

Van Vuuren BJ, Becker PJ, Van Heerden HJ, Zinzen E & Meeusen R (2005b). Lower back problems and occupational risk factors in a South African's steel industry. *American Journal of Industrial Medicine*, 47(5), 451-7.

Van Vuuren, B.J., Van Heerden, H.J., Becker, P.J., Zinzen, E. & Meeusen, R. (2006). Fear-avoidance beliefs and pain coping strategies in relation to lower back problems in a South African steel industry. *European Journal of Pain*, 10(3), 233-239.



Volinn, E. (1997). The epidemiology of low back pain in the rest of the world: A review of surveys in low- and middle-income countries, epidemiology. *Spine*, 22(15), 1747-1754.

Waddell, G. & Burton, A.K. (2001). Occupational health guidelines for the management of low back pain at work: Evidence review. *Occupational Medicine*, 51(2), 124-135.

Waddell, G. & Burton, K. (2005). Concept of rehabilitation for management of low back pain. *Best Practice & Research Clinical Rheumatology*, 19(4), 655-670.

Waddell, G., Feder, G. & Lewis, M. (1997). Systematic reviews of bed rest and advice to stay active for acute low back pain. *British Journal of General Practice*, 47, 647-652.

Waddell, G., O'Connor, M., Boorman, S. & Torsney, B. (2007). Working backs Scotland. *Spine*, 32(19), 2139–2143.

Walker, B.F. (2000). The prevalence of low back pain, a systematic review of the literature from 1966 to 1998. *Journal of Spinal Disorders*, 13(3), 205-17.

Wand, B.M., Bird, C., McAuley, J.H., Doré, C.J., MacDowell, M. & De Souza, L.H. (2004). Early intervention for the management of acute low back pain, a single-blind randomized controlled trial of biopsychosocial education, manual therapy, and exercise. *Spine*, 29(21), 2350-6.

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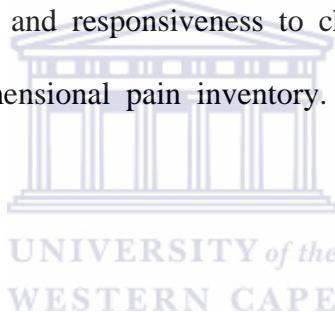
Webb, R., Brammah, T., Lunt, M., Urwin, M., Allison, T. & Symonds, D. (2003). Prevalence and predictors of intense, chronic, and disabling neck and back pain in the UK: General population: health services research. *Spine*, 28(11), 1195-1202.

Weber, M., Cedraschi, C., Roux, E., Kissling, T.R.O., von Kanel, S. & Dalvit, G. (1996). A prospective controlled study of low back school in the general population. *British Journal of Rheumatology*, 35, 178—183.

Werner, E.L., Gross, D.P., Lie, S.A. & Ihlebaek, C. (2008). Healthcare provider back pain beliefs unaffected by a media campaign. *Scandinavian Journal of Primary Health Care*, 26(1), 50-6.

Werner, E.L., Ihlebaek, C., Skouen, J.S. & Laerum, E. (2005). Beliefs about low back pain in the Norwegian general population, are they related to pain experiences and health professionals? *Spine*, 30(15), 1770-6.

Wittink, H., W., Turk, D.C., Carr, D.B., Sukiennik, A. & Rogers, W. (2004). Comparison of the redundancy, reliability, and responsiveness to change among SF-36, Oswestry disability index, and multidimensional pain inventory. *The Clinical Journal of Pain*, 20(3), 133-142.



Woodruff, S.I., Conway, T.L. & Bradway, L. (1994). The US navy healthy back program, effect on back knowledge among recruits. *Millennial Medicine*, 159(7), 475-84.

Worku, Z. (2000). Prevalence of low-back pain in Lesotho mothers. *Journal of Manipulative Physical Therapy*, 23(3), 147-54.

Zachrisson-Forssel, M. (1980). The Swedish back school. *Physiotherapy*, 66, 112–114.

