LOW BACK PAIN IN THE CORPORATE WORKPLACE-
A SOUTH AFRICAN REVIEW

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Master’s Degree in Technology: Chiropractic, in the Department of
Chiropractic at the Technikon Witwatersrand.

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DECLARATION

I, Marius Ané de Wet, declare that this dissertation represents my own work, both in conception and execution. It is being submitted for the Degree of Master of Technology at the Technikon Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other Technikon or University.

Signature of Candidate: _________________________________________

Marius Ané de Wet

On this____________________day of _____________________________2003
DEDICATION

This dissertation is dedicated to:

All those people who have a dream- live your dream and you will succeed, even if it seems to be an impossible obstacle at the time.

This research is further dedicated to my family and my fiancé, Siobhan Wilcox.
ACKNOWLEDGEMENTS

I would like to sincerely thank the following people for their support and assistance with my dissertation:

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The purpose of this study was three fold:

1. To determine the life time incidence, 6 month prevalence and point prevalence of Low Back Pain (LBP) in the work environment of ABSA Bank and compare it to the rest of the world.
2. To determine whether individual factors such as age, gender, body mass index and work environment factors like main daily position and activity could be causal factors contributing to LBP.
3. To determine whether treatment is sought, the type of care sought for LBP and the cost of sick leave due to LBP to the company.

A Review of the data indicates that LBP is a condition that 60-80% of people will suffer from at some stage in their lives. Epidemiological studies have shown that simple backache has a point prevalence and 1-month prevalence of 15-30% and 30-40% respectively. (1, 2, 3)

LBP could be caused by many disorders of the spine, but for many sufferers no causative diagnosis will be made. There are a large number of occupational causes that could lead to the development of LBP. The major causes are the following: forceful lifting of heavy objects, twisting coupled with bending of the trunk, whole body vibration and heavy manual work. (60)

There are a number of causal factors of LBP that are non work related such as personal risk factors including age, gender, fitness level, trauma to the back, cigarette use and recreational activities (60).

LBP is seen to be one of the most common ailments affecting people, but most do not seek medical attention. Those patients who do seek medical attention seem to seek the help of the following specialities: physicians, chiropractors, nurses, orthopaedic surgeons, neurosurgeons, physical therapists or alternative medical practitioners. (20)
Researchers in the USA, in 1992 found that 73.1% of LBP sufferers sought medical care, while many saw a multiple variety of health care providers. Of those people who sought medical care, 64% consulted a general practitioner, 55% consulted an orthopaedic surgeon, 29% consulted a physical therapist and 25% consulted a chiropractor. (8)

A cross sectional, systematic random sample to study the incidence and prevalence of low back pain (LBP) was conducted on 355 employees of ABSA Bank and Unibank. The data was collected by the researcher by means of a personal interview. A permission letter from ABSA Bank Health Clinic (Appendix A) was used to gain access to those who needed to be interviewed in the sample group. The data was recorded on a questionnaire (Appendix B) and a low back diagram (Appendix C) was used to define LBP so that it would be easier to understand.

The results of this study showed that the lifetime incidence of LBP was 63% (225/355), the 6 month prevalence of LBP was 41% (147/355) and the point prevalence of LBP was 9.6% (34/225).

The major daily activity that was associated with the 6 month prevalence of LBP was computer type work at 93.88% (138/147); this was followed by telephonic work at 65.31% (96/147). Physical and administrative work was only reported to have caused LBP in 4.76% (7/147) and 22.45% (33/147) of the sample population.

The major daily position that was associated with the 6 month prevalence of LBP was sitting - 97.28% (143/147). This was followed by walking - 61.64% (90/147), standing - 17.69% (26/147) and lifting-t 6.57% (9/147).

Treatment was sought by 46.94% (69/147) of the sample population that suffered from LBP in the last 6 months. Treatment was sought from the pharmacy in 21.99% (31/141) of the cases. Chiropractors were consulted in 8.51% (12/141) of the cases; medical doctors were consulted in 14.89% (21/141) of the cases, physiotherapists in 17.02% (24/141) of the cases, while acupuncture and private hospitals were used by only 0.71% (1/141) of those who suffered from LBP. Biokinetics, homeopathy and
osteopathy were three other disciplines that were on the questionnaire, but none of these disciplines were made use of by the study population.

This study showed that the lifetime incidence, six month prevalence and point prevalence of LBP in the South African workplace is similar to other countries in the world and that this condition is costing the South African economy millions of rand each year due to lost working days as a result of absenteeism.

The only individual factor that seemed to be statistically significantly associated with LBP was trauma to the lumbar spine. Other factors like age, gender and race did not seem to have statistically significant effects on the prevalence of LBP. The results regarding the individual factors that could lead to LBP seem to vary between the different studies evaluated.

Just under half of those who suffer from LBP seek treatment for the condition. When evaluating what kind of treatment is used by the study population, it was seen that the majority used drugs from the pharmacy to treat the condition.
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CHAPTER 1 - INTRODUCTION.

Current data indicates that low back pain (LBP) is a condition that will affect 60-80% of the population at some stage in their life. Epidemiological studies have shown that simple backache has a point prevalence and a 1-month prevalence of 15-30% and 30-40% respectively. (1, 2, 3)

Studies that have been performed state that LBP is a self limiting condition, but many people who have suffered from LBP will experience recurring episodes, which could lead to the development of chronic LBP (4, 5, 6).

These studies have been performed in many different first world countries such as the United States of America, Canada, Japan and many European countries, but very little research could be found pertaining to the South African environment. It was due to lack of this information, that this study was performed.

The population selected for this study was that of the corporate workplace. A large South African based corporate workplace was selected, namely ABSA Bank. This is one of the largest banking institutions in the country, employing more than 30 000 staff members. This research project was conducted at the head office in Johannesburg, Central Business District, which has an employee compliment of approximately 3550 staff members. ABSA Bank was seen as a good benchmark or standard of the working environment in large financial institutions as well as other business corporations in South Africa.

The aim of this study was to determine:

1. The life time incidence, 6 month prevalence and point prevalence of LBP in the work environment of ABSA Bank and compare it to the rest of the world.

2. Whether individual factors such as age, gender, body mass index and work environment factors like main daily position and activity could be causal factors contributing to LBP.

3. Whether treatment is sought, the type of care sought for LBP and the cost of sick leave due to LBP to the company.
The results of this study should provide valuable information regarding the severity of the problem of LBP in the work environment in a South African context.

Other banking companies and similar large corporations are likely to have a similar working environment to ABSA Bank, the results of this study could be representative of the level of the problem of LBP in other similar working environments.

The ultimate goal should then be to acknowledge that LBP is a costly problem in the working environment and that it should be addressed as a matter of urgency.
CHAPTER 2 – LITTERATURE REVIEW

2.1 Introduction

Low back pain (LBP) and neck pain will affect more than 80% of the population at some point during their lifetime and has been found to be the most common cause of disability in young adults in the United States of America (USA) (1,2).

LBP is also the major cause of suffering and the second most common reason for patients to visit primary health care providers. It is estimated that 5.4 million Americans are disabled by LBP each year and that it is the second most common cause of sick leave after the common cold. The problem is so large in the USA, that it has been reported that approximately $25 billion was spent in 1995 alone. This total cost did not include further aspects like costs of disability or the cost to society. (7, 8)

Further epidemiological studies have shown that simple backache, in the USA, has a point prevalence, 1-month prevalence and lifetime prevalence of 15-30%, 30-40% and 60-80% respectively (3).

LBP in Canada has been found to be one of the most costly, debilitating disease. The reason for this unique phenomenon is still not totally understood nor generally appreciated in the medical circles and government department. (9)

Further more it has been found in many literature studies, that 70-80% of the population, in the USA, will be affected by LBP at some or other time in their lives. LBP can present with any number of different manifestations, at any time, which could affect these people. Thus it can be seen that the problem of LBP has enormous implications and effects on the medical, social and economic aspects in any country. (10, 11)

The incidence and prevalence of low back pain in the workplace in South Africa is a field in which very little research could be found. The only research that could be found regarding a similar topic was conducted among factory workers and in a township in Kwa-Zulu Natal. This research investigated the incidence and prevalence of LBP of 401 workers, while the
study performed in the township investigated the prevalence and incidence of LBP in a black community in Kwa-Zulu Natal (KZN). (12, 13)

The statistical information on the incidence and prevalence of LBP that will be used as the basis for comparison in the current study has been obtained from comprehensive studies completed in the USA (8), Canada (14) and Europe (15).

When the incidence and prevalence of a disease is studied, one looks at the magnitude of the problem. The prevalence of a disease is defined as the number of people that have a given problem or condition in a particular population at a particular time. Thus when one looks at the 6 month prevalence of low back pain, this would be all those people who have had LBP over a 6 month period, regardless of whether that person had LBP prior to the period of the study or not. The point prevalence of LBP is the number of people that suffer from LBP at a specific point in time. Incidence is the rate at which healthy individuals develop a new symptom or disease over a specific period of time. The lifetime incidence of LBP would thus reflect the number of individuals who develop LBP at some time during their lifetime. (16)

The definition of LBP that will be used throughout the study is the same as that found in many similar studies. LBP is defined as pain located in the area from under the twelfth rib downward to the inferior gluteal fold of the buttocks the pain must have lasted for more than 24 hours and could not be associated with febrile illness, menstrual periods or pregnancy. (1, 2, 7, 22, 23).

2.2 Lifetime incidence and prevalence of low back pain in different countries in the world.

2.2.1 United States of America and Canada

A retrospective study conducted in 1980 detailed all the records of a model family practice in Vermont, USA, for the period of 1975 to 1978. It was found that a total of 34.8% of patients had reported LBP. (19)
In another retrospective study conducted in North Carolina, telephonic interviews were carried out from February to April 1992. It was found that from the sample of 4437 adults, 485 adults suffered from severe LBP in 1991, this represented 11.5% of the population. In 7.6% of the adults who suffered from LBP, the condition lasted for longer than three months. (8)

A cross sectional, population based mailing study (n=1201) completed in September 1995 in Saskatchewan, Canada. This study showed that, 28.4% of the adult population was suffering from LBP (95% confidence interval, 25.6-31.1) and 84.1% (95% confidence interval, 81.9-86.3) had experienced LBP at some point in their lifetime. (14)

A retrospective study performed in Seattle during 2002 found that the annual point prevalence of LBP was approximately 15% -20%. (20)

The 6 month prevalence of LBP, in Saskatchewan, Canada is high at 8% (95% confidence interval, 6-10.4. It is important to prevent this condition because of the high economic and social costs associated with LBP. (21)

Few studies have investigated the incidence of significant low back pain in general populations. When available, such studies often differ in the assessment of pain severity. Due to this lack of consensus in measuring pain severity, this results in large differences in incidence rates in provinces of Saskatchewan, Canada. (21)

2.2.2 United Kingdom (UK)

The lifetime incidence and one-year prevalence in a cross sectional postal questionnaire study (n=2687) completed in 1991, looked at seven towns and one rural district. It was found that the lifetime incidence of LBP was 58.3% and that the one-year prevalence was 36.1%.(7)

A further retrospective study (n=900), using randomly selected case notes and self report questionnaires of primary care physicians, was compiled looking at the lifetime prevalence, one-year prevalence and point prevalence of LBP in three general medical practices in
Twickenham, Stamford and Lower Clapton in 1996. The results of this study showed a 62% lifetime prevalence, 48% one-year prevalence and a 16% point prevalence of LBP. (15) An opportunistic prospective follow-up study compiled by telephonic questionnaires (n=1455), looking at the natural history of LBP in the Bradford community. This study found that the average lifetime incidence of LBP was 59% and an annual prevalence of 41% (22).

2.2.3 Sweden

A retrospective questionnaire study conducted in Sweden among industrial workers and forest workers, found that 80% of the workers had at some time symptoms of LBP and that 55% of these workers had been incapacitated by LBP (23).

2.2.4 Nordic Population

The studies conducted on the Nordic population have found that the one-year prevalence of LBP varies a great deal. These have been reported to be 11%, 20%, 26%, 45% and 54%. (24)

A study was compiled looking at the medical records of patients on the national medical insurance system between 1995 and 1996. It was found that the one-year prevalence was 2.27% and the incidence increased with age. (25)

2.2.5 Switzerland

The monitoring of trends and determinants in cardiovascular disease project (MONICA report) is a survey that was completed between 1992 and 1993 in Switzerland, 3227 participants completed the section regarding LBP. The results of the survey showed that the one year prevalence rate for men was 20.2% in the 25-34 year range and 28.5% in the 65-74 year old range, with LBP lasting more than 7 days. Among woman the rates were 31.1% to 38.5% in the above respective age ranges. (26)
2.2.6 Netherlands

In a follow-up study of 444 adult patients, who consulted their general practitioner, the life time incidence of LBP was found to be approximately 26%, with a one-year prevalence of approximately 49% (27).

A cross sectional postal survey study (n=2035) performed on the general population between the age of 30 and 50 years, found that the lifetime incidence of LBP in the male and female populations was between 60%-65%, while the one-year prevalence was approximately 50% (24).

The MORGEN study looked at the effect of LBP on the working and non-working populations. The one-year prevalence of LBP was 44.4% and 45.8% respectively for the working and non-working male population, and 48.2% and 55.0% for the same female populations. (17)

A cross-sectional data form from a population-based study, performed in 2003 found that LBP was the top self-reported musculoskeletal pain, with a point prevalence of 26.9% (28).

2.2.7 Japan

In 1992 a Japanese retrospective questionnaire study (n=3042) was completed looking at the prevalence of LBP in different jobs in a manufacturing company. The study found that the rate of LBP was linked to the kind of work the employee was performing. Low risk work was defined as sedentary jobs while high-risk work was that needing high physical activity. The point prevalence of LBP among all the workers was 29.9%. The point prevalence varied a great deal between the different physical work demands, from 18.3%-40.9% and the lifetime incidence was 60.5%. There was not a significant statistical difference between the male and female employees, except in the lifetime prevalence where physical labour played a role. (29)

2.2.8 Other Countries

A cross-sectional study (n=499), performed in 19 Tibetan villages found that the point prevalence of low back pain was 34.1%, and the one-year prevalence was 41.9%. This study
suggested that LBP is likely to be an important and under recognised problem in rural societies like Tibet. (30)

The aim of a cross-sectional study (n=898), performed in Bulgaria was to estimate the prevalence rates of LBP. The result was that 25.8% of the studied population suffered from LBP. Age and gender were seen to be significant risk factors for LBP. (31)

2.2.9. Summary of Incidence and Prevalence Rates in the Different Countries
(As covered in the literature review)

Table 2.1 Summary of Incidence and Prevalence Rates in the Different Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Lifetime Incidence</th>
<th>Six Month Prevalence</th>
<th>One Year Prevalence</th>
<th>Point Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>34.8% (19)</td>
<td>15- 20% (20)</td>
<td>1 month: 30-40% (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.5% (8)</td>
<td></td>
<td>15- 30% (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>60- 80% (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>80% (1,2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>84.1% (14)</td>
<td></td>
<td>28.4% (14)</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>58.3% (7)</td>
<td>36.1% (7)</td>
<td>16% (15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>62% (15)</td>
<td>48% (15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>59% (22)</td>
<td>41% (22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>80% (23)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nordic</td>
<td>11%, 20%, 26%, 45%, 54% (24)</td>
<td>2.27% (25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>20.2 -28.5%, 31.1 -38.5% (26)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nederland</td>
<td>49% (27)</td>
<td>26% (27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>44.4%, 48.2% (17)</td>
<td>26.9% (28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>60.5% (29)</td>
<td></td>
<td>29.9% (29)</td>
<td></td>
</tr>
<tr>
<td>Tibet</td>
<td>41.9% (30)</td>
<td></td>
<td>34.1% (30)</td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>25.8% (31)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 Natural History of Low Back Pain

2.3.1 Self Limiting Condition

The review of different literature has found that acute episodes of LBP usually resolve or improve within a few weeks (4).

Acute episodes of LBP will normally resolve in approximately 6 weeks in 90% of patients. However, 75% of these patients may experience LBP and associated disability 1 year after the initial consultation. (1, 32)

Research has found that 98% of LBP cases are caused by mechanical factors and that only 2% of the problems are caused by malignancy, infection or visceral disease. In 85% of the cases, no specific cause for LBP can be found and 90% of the patients with uncomplicated, mechanical LBP recover within 6 weeks and a further 5% of patients recover in 12 weeks. Fifty percent of patients, who suffer from sciatica, recover in 1 month with conservative treatment i.e. exercise, manipulation and medication. (33)

2.3.2 Recurrence of Low Back Pain

As seen in the previous section regarding the self limitation of LBP, the research shows that there is a substantial recurrence rate. One study found that 25-50% of the cases had a recurrence within a year, while the lifetime recurrence was 85 %. (5, 6)

A retrospective questionnaire study performed on the general population found that the previous occurrence of LBP was the strongest anthropometric predictor for future occurrences of LBP (34).

2.4 Referred Limb Pain

Referred limb pain is an indication that the patient possibly has LBP with associated sciatica and or compression of the lumbar sacral nerve roots (35).
A cross sectional population based postal questionnaire study performed in the Netherlands found that in most cases the pain was described as continuous or recurrent and mild, and that in 30% the complaints about pain were accompanied by limitations in daily living (28).

A questionnaire study performed in a black formal settlement in 1995, Kwa-Zulu Natal - South Africa, reported that 24.1% of the population studied suffered from referred limb pain that was associated with the LBP (13). Other studies that were performed found that sciatica was associated with LBP in 22%-25% of the cases (16).

### 2.5 Disability Due to Low Back Pain

The prevalence of LBP has been seen to have changed little over the last years, but there has been a fourfold increase in the disability that is associated with LBP since the latter part of the 1970’s. (36, 37)

In the UK, LBP causes 3-6% of disability in the population per year, while 120 million days were lost in 1996/7, due to certified incapacity from LBP (11, 38).

### 2.6 Sick Leave Due to Low Back Pain

A retrospective study that was performed in 1975 found that 3.6% of all the sick leave that was taken from 1969-1970 was due to low back pain in Great Britain. The average amount of sick leave taken in the male population was 32.6 days. Further studies have found that 25% of all working men were affected by LBP and that one in 25 changed their jobs due to LBP in 1971. (39)

Researchers found in a stratified random telephonic survey study, looking at a population sample in North Carolina, USA, in September 1992, that the median for the amount of days off work was 3 days, with a mean of 20 days due to LBP (8).

A French prospective observational study performed between 1994 and 1995 found that among the economically active patients, 82% were put on sick leave, in the primary health care setting, for their LBP of less than 48 hour duration. The mean duration of sick leave
taken was 8.4 days, with a 4 day variance either way, and 18.6% were reported as having work-related low back pain. (40)

The review of records in 1968 from industry in Washington, USA, found that employees with chronic LBP problems, that were absent from work for more than six months, only had a 50% chance of returning to productive employment. (23)

The general bureau of statistics in the Netherlands, reported that 21% of sick leave was due to musculoskeletal disorders and that 32% of permanent disability was due to the same condition. Back pain constituted the largest part of the musculoskeletal disorders category. Almost 2% of the candidates interviewed stated that they were absent from work due to LBP in the last two months, while 4% considered LBP to be a chronic disabling disease. (41)

A cohort study was performed in California, USA, looking at 850 claims of workers compensation due to LBP between July-December 1997. The study found that there was a significant difference between the self-reported and administrative duration of LBP. The number of days off work reported by the two different groups ranged between 142 to 334 days. (42)

The one-year incidence of work incapacity due to LBP in 1999 was found to be between 2%-8% in North America and Western Europe (43). It was also found that there was an approximately 3.5 times higher incidence of incapacity in females than males, and that 74.2% of the workers in Quebec, Canada, who took sick leave due to LBP only returned to work one month later (44).

2.7 Low Back Pain Management

2.7.1 Care Seeking for Low Back Pain

LBP is seen to be one of the most common problems people suffer from, but most do not seek medical attention. Those patients who do seek medical attention seem to seek the help of the following specialities: physicians, chiropractors, nurses, orthopaedic surgeons, neurosurgeons, physical therapists or alternative medical practitioners. (20)
The MUSIC-Nortälje study was a 2 year follow up study (n=1700) performed between November 1993 and November 1996. The aim of this study was to determine the care seeking behaviour for low back pain. The results were that approximately 5% of the Swedish population sought care for low back pain. Fifty percent of the patients sought care from physicians and physical therapists, while the remainder of the patients sought care from alternative caregivers such as chiropractors. The treatment provided by the alternative caregivers was not subsidised in Sweden, at the time of the study. This treatment cost twice as much as seeing a physician and 5-6 times the cost of physiotherapist. The alternative caregivers offered prompt treatment, where as the treatment service from physicians and physiotherapists took much longer due to longer waiting lists and weeks of treatment delay. It was found that more men went to alternative caregivers than woman. It was thought that the time aspect might be more important to the male population of this study. The female population sought slightly more care for LBP than the male population. It was impossible to say whether this reflected anything regarding different physical or psychological aspects between the populations. (45)

LBP is a pervasive problem and represents the second most frequent reason why people seek medical attention, but almost 66% of people who suffer from LBP do not seek medical attention (46).

2.7.2 Source of Treatment

In a stratified random telephonic survey performed in the USA during 1992, researchers found that 73.1% of LBP sufferers sought medical care, while many saw a variety of providers. Of those people who sought medical care, 64% consulted a general practitioner, 55% consulted an orthopaedic surgeon, 29% consulted a physical therapist and 25% consulted a chiropractor. It was further found that computerised tomography scans were used in 37% of the cases, magnetic resonance imaging scans in 25% and surgery in 10.4% of the cases. (8)

Studies performed in the USA and UK in 1990 and 1993 respectively found that proportionately more people in the UK seek medical care for their LBP than in the USA. There are a greater number of chiropractors in the USA than in to the UK but even so, 40%
of patients seek care from chiropractors for their LBP in these two countries. The level of chiropractic care is similar in USA and the UK. (3)

A survey completed in the Saskatchewan community in September 1995 showed that 25% of individuals with neck or back pain sought care from health providers. Patients sought care from a medical doctor in 31.6% of cases, chiropractic care in 28.8% of the cases, chiropractic and medical care together in 7.9% of cases, physiotherapy in 1.9% of cases, while the remainder of treatments were made up of the different combinations of the mentioned disciplines. (2)

A telephonic interview study performed in the UK found that a high proportion of patients examined with disc herniations in the study (76%) made a satisfactory recovery with aggressive conservative care. It was further found that recovery was accompanied by a resolution of the disc herniation and only a small number of the patients needed surgical decompression. (35)

2.7.3 Treatment / Management

2.7.3.1 Activity versus Bed Rest

The preferred treatment for LBP in the past had been bed rest, but it has been found that patients with LBP that return to normal activity as soon as possible will have the most rapid recovery, and as a result of this early return to work, will cost the company less in terms of lost productivity. Patients should be educated so as to ensure that they understand that by staying active they can recover from back pain and that activity is more effective than bed rest. Patients should also be made aware that the increase in pain, that is sometimes felt, does not mean that more harm is being done to the spine. If the patient has such severe symptoms that they are not able to move, then bed rest should be restricted to 1-3 days, if the bed rest is prolonged it will increase the duration of disability. (47)

A randomised controlled trial was performed in the USA during 2001, comparing bed rest and normal activity for patients with LBP. The study found that those patients that were treated while continuing with normal activity, had an equivalent amount of pain as those treated with bed rest for a period of 4 days. (48)
A cohort study that was performed on military recruits found that those who maintained physical activity within tolerable levels recovered from the LBP better than those who were prescribed a period of bed rest (53).

2.7.3.2 Drug Treatments

Paracetamol given in regular doses of up to 3-4g/day, usually provides sufficient analgesia for LBP. This could be substituted with a non-steroidal anti-inflammatory drugs (NSAID) if the results of the paracetamol are insufficient. A paracetamol and opioid combination could be used, but there is no clear evidence that this combination works better than paracetamol alone. (49, 50)

Opiods should not be used as far as possible and if they are used they should not be used for longer than 2 weeks. Muscle relaxants may be of help if muscle spasm is present, however this drug should not be used for longer than a week. (49)

A study performed in France showed that management for LBP consisted primarily of rest and pharmacotherapy, mainly analgesics, NSAID’s and muscle relaxants (40).

The NSAID’s have a large range of side effects that include the following: gastric symptoms, gastro-intestinal tract bleeding, headaches, confusion and other central nervous system symptoms, aggravation of hypertension, oedema, decreased platelet aggregation, mild elevation of liver enzymes, increased cretonne levels and interstitial nephritis (51).

2.7.3.3 Treatment/Management

Data regarding the effect of exercise in LBP varies a great deal. The conclusion is that there are no specific effects of exercise therapy in those patients who suffer from acute LBP, but exercise combined with other treatment modalities such as manipulation, massage, electrical stimulation and traction, appear to be the superior treatment protocol for chronic LBP (52).

A study that was performed comparing 5 groups of intervention for LBP, manipulation, medication, rest, physiotherapy and placebo, found that the manipulation was the most
effective treatment for acute LBP (53). Spinal manipulation is an established method of care for LBP, especially in the acute stages of recovery (54).

2.8 The Role of Chiropractic in the Treatment of Low Back Pain

There is substantial evidence in the literature that shows the value of chiropractic treatment in the management of LBP (55, 56, 57, 58).

A retrospective cohort study (n=290) was performed comparing the medical and chiropractic management of patients with muscular-skeletal conditions over a 3 month duration. The result was that the chiropractic patients were 60% more likely to have their pain resolved within 3 months, compared to the medical group. The chiropractic group reported that they were twice as likely to perceive their treatment as being successful. (55)

A further study conducted in North Carolina where 208 practitioners were randomly selected from 6 states. The study looked at the various treatments received by 1555 patients for acute LBP. Of the patients who received chiropractic care, 42.5% regarded the results of their treatment as “excellent”, while only 26.5% of patients who visited orthopaedic surgeons and health maintenance organisations, regarded the results of their treatment as “excellent”. This study further showed that the satisfaction of treatment was greatest among those patients who had received chiropractic care. The return to work, functional and complete recovery times were similar from the different chiropractors. (56)

Studies were performed comparing the effect of chiropractic manipulation, a manipulation mimic (placebo) and a back education program, in patients who had suffered from LBP for longer than 7 weeks or had more than 6 episodes of LBP in the last 6 months. The results showed that the group who received the chiropractic manipulation had the greatest improvement in pain and activity tolerance. Self reported functional levels were also reported to be higher in the manipulation group. The authors of this research concluded that chiropractic spinal manipulation appeared to be of clinical benefit for the treatment of LBP. (58)
Another study compared the results of treatment for LBP by a hospital outpatient department to that of chiropractic care. The patients were randomly assigned to one of two groups and after a 3 year follow up period the patients were asked whether the treatment they received had helped their LBP. The results showed that the improvements in pain and disability were about 29% higher in the chiropractic group than in the hospital outpatient group. This result suggested that patients derive greater benefit and long term satisfaction from chiropractic treatment. (57)

A case study compared the effect of conservative therapy in the prevention of recurrent spinal surgery. This study showed that a regimen that combines spinal manipulative therapy, considered the most effective way to alleviate LBP, with exercise that isolates the low back muscles and increases their strength may eliminate low back problems and resulting radicular symptoms. This combination has been proven to have long lasting results. (59)

2.9 Possible Causes of Low Back Pain

LBP could be caused by many disorders of the spine, but for many sufferers no causative diagnosis will be made. There are a large number of occupational causes that could lead to the development of LBP. The major causes are the following: forceful lifting of heavy objects, twisting coupled with bending of the trunk, whole body vibration and heavy manual work. (60)

2.9.1 Daily Activity

LBP due to different workplace factors is well described in the literature. Static work posture, as found when workers are seated or standing for long periods of time, may contribute to the increased incidence of LBP. (60)

Prolonged periods of sitting have been implicated as a causal factor for low back pain according to the Magora study. This study shows that the incidence of LBP of those individuals who sit for periods of more than four hours daily are similar to those who have physically demanding jobs. (61, 62). Other contributing factors could be that the prolonged
periods of sitting could contribute to the insufficient nutrition of the intervertebral discs; this is partially due to the increased intra-discal pressure that is seen during sitting (23, 63).

Features of pathology related to LBP can be seen on plain film X-Rays and MRI scans, but there relationship to the associated symptoms are unclear and often the specific cause of the back pain remains unclear (64, 65).

LBP in a Japanese industrial factory was greatly related to the kind of physical activity the person’s job required. Those that had a job with great physical demand had double the point prevalence of LBP than those who had a sedentary job, 39.0% versus 18.3%. (29)

A cross sectional questionnaire survey study that was performed on Philippine workers in industry revealed that LBP was found to effect work performance and was 14 times more likely to occur after the initial working sessions started. Standing, bending, leaning and carrying were also found to be significant factors that could lead to LBP. (66)

### 2.10 Individual Factors Associated with Low Back Pain

There are a number of causal factors for LBP that are non work related such as age, gender, body mass index (BMI), fitness level, spinal trauma, cigarette use and recreational activities (60).

#### 2.10.1 Age and Gender

Although LBP can occur at any age, the peak prevalence age for LBP to occur has been found to be between the ages of 45 and 49 years (1).

LBP in the pre-adolescent age group is a rare occurrence and if it does occur in this age group, it is indicative of a serious underlying pathology. Little difference in the prevalence of back pain has been found between men and women, but the male population is at greater risk from work related back pain. (7)
A study conducted in Norway in 1996 found that there was an increased incidence of absenteeism from work due to LBP, for longer than two weeks, with an increase in patients age (25).

LBP is common over all demographic strata in the USA, and for persons younger than 45 years of age, LBP and other spinal disorders is the leading cause of activity limitations (60).

2.10.2 Body Mass Index (BMI)

The BMI is determined as a ratio between the height and weight. The BMI is determined as follows: weight in kilograms divided by the height in meters squared. The BMI is used in adults as an indicator of the nutritional status of an individual. The BMI categories are as follows: normal category has a BMI value less than 25, obese category is between 25 – 30 and very obese category greater than 30. (51)

There are different studies regarding the significance of BMI and the prevalence of LBP, as seen in the three statements below:

1. A study performed by the Israeli defence force, examined 250 000 male recruits age 17-18 years old and found that the prevalence of LBP rose with an increase in BMI. This may suggest that BMI could have a role in the pathogenesis of LBP. (67)

2. A French study using descriptive questionnaires (n=7129) found that there was a significant association between the BMI and male workers, suffering from LBP. (68).

3. An American data survey study found that there was greater prevalence of LBP with an increase in BMI, but that the prevalence rose substantially in the more obese group (69).

The conclusion that can be drawn from these studies is that there is a relationship between the increase in BMI and LBP.
2.10.3 Trauma

Trauma to the low back could result in future mechanical and psychological problems, even after the initial injury has healed. Some cross sectional studies have shown that back accidents or trauma can be a causal factor for LBP. A general population study suggested that 16.5% of sciatica and 13.7% of mechanical back pain was the result of trauma. (70)

Light trauma to the spine could produce an inflammatory reaction. The resolution of the inflammation may be harmful to the joint, unless full range of motion is restored. The soft tissue is flexible and elastic with a good vascular supply compared to scar tissue which can be stiff and poorly vascularised. There are 3 stages of healing, the first is the inflammatory stage, followed by the reparative stage and the last stage is the toughening stage. The inflammatory stage is characterised by swelling and local tenderness. The reparative stage is characterised by local heat, redness and diffuse tenderness. The final stage is characterised by palpable thickening and indurations in the area of reaction; with tenderness progressively diminishing. It is due to this that each trauma requires treatment in order to eliminate pain, tenderness, swelling and immobility. (71)
CHAPTER 3 – METHODOLOGY

3.1 Study Design

A cross sectional, systematic random questionnaire based study to determine the incidence and prevalence of low back pain (LBP), was conducted on 355 employees of ABSA Bank and Unibank. The data was collected by the researcher by means of a personal interview. A permission letter from ABSA Bank Health Clinic (Appendix A) was used to gain access to those who needed to be interviewed in the sample group. The data was recorded on a questionnaire (Appendix B) and a low back pain diagram (Appendix C) was used to explain the region in questions regarding LBP to those who did not understand.

The different employment levels found in ABSA Bank were grouped as follows:
A-Semi unskilled workers,
B-Tellers/clerk,
C-Technical specialists,
T-Overseers,
M-Management,
P-Professionals,
S-Super specialists,
E-Executives,
F-Top management.

The different employment levels were grouped into 4 groups, namely;
Group 1- A-Semi unskilled workers, B-Tellers/clerk,
Group 2- C-Technical specialists, T-Overseers,
Group 3- M-Management, P-Professionals,
Group 4- S-Super specialists, E-Executives, F-Top management.
These groups were evaluated for LBP in the different employment levels.
3.2 Sample Group

Subjects for the study were drawn from current employees of ABSA Bank South Africa head office in Johannesburg. A number of these employees were located in Unibank in Midrand. Unibank is owned by ABSA Bank. The selected employees would be partaking in the study on a voluntarily basis and would have to sign a consent form (Appendix D). The details of those employees who partook in the study will remain anonymous, in order to prevent possible discrimination by the employer.

3.3 Sample Size

The sample size needed for the study was determined by the Epi-info 6.0 statistic program. The sample size was determined for an estimated 50% incidence and prevalence rate of low back pain, with a 5% accuracy level and 95% confidence interval.

The total population of the ABSA Bank head office was 3550 employees at the time of the study; thus a stratified random sample of 355 employees were drawn from an alphabetical employee’s list.

3.4 Sample Selection

The employees of ABSA Bank head office were arranged alphabetically and divided into groups of 10 people. The number 4 was then randomly selected from a hat and this number was then selected in each of the groups of 10, such as numbers 4, 14, 24, 34 and so forth, were then selected from the employees list, until the total sample population was selected. Two further lists were selected from the employees list. This time number 3 and 5 were selected and the two additional sample lists were compiled as for the first list. These two additional lists were used to select participants for the study if those selected on the first list were not available.
3.5 Procedure

The subjects that were selected on list one were then located and interviewed. The subjects were informed that the study was voluntary and that the information that was given during the interview could possibly be published. The participants were guaranteed that their personal information would remain confidential. This guarantee was needed to ensure that those who participated in the study would not be subjected to possible discrimination due to their low back pain. The researcher would only use the personal information if needed to contact the particular participant regarding information given on the questionnaire. The questionnaire was filled out by the researcher during a personal interview. Also included in the questionnaire was a Numerical Pain Rating Scale (NPRS). The weight of the participants was measured with a standard bathroom scale and their height with a measuring tape. The definition for LBP was the same as described in the literature review and the area of LBP was shown to the participants by means of a pain diagram (Appendix C).

3.5.1 Reliability of Measurement Tool

3.5.1.1 Numerical Pain Rating Scale (NPRS)

The NPRS contains 11 numbers (0-10), 0 representing no pain and 10 representing excruciating pain. The participant circles the appropriate number that represents their level of pain. (72)

Research found that the NPRS, when asking patients to report their current pain levels, to be the most responsive of the measurements if compared with the Visual Analogue Scale (VAS). It was also suggested because of the relative ease of use, scoring of the 11-point scale and the obvious advantages of using responsive evaluative measures. This scale is recommended for pain intensity measurement in most types of outcome studies. (73)

Further research also recommended the NPRS over the VAS because of its simplicity (74).
3.6 Statistical Analysis

The results of the questionnaires were coded as per Appendix E and entered into a computer. The variables used for the logistic regression were coded as stated in Appendix F.

Where appropriate the associations between the various individual risk factors and outcome variables were done by means of two-way tabulation. The Pearson chi-square test was used to determine the uni-variables and logistic regression analysis to determine the multi-variable factors. The logistic regression analysis was used to determine the value of the different risk factors. A brief summary of the Pearson chi-square test and logistic regression analysis follows.

3.6.1 The Pearson Chi-square Test for the Association between Two Factors

If a random sample of size n was obtained in a specific sample population and the observation in this random sample may be grouped according to 2 criteria. The first criterion is that each observation is associated with one of the r, rows. The second criterion is that each observation is associated with one of the c, columns.

The following two assumptions are made:

1. The sample of n observations is a random sample and each observation has the same probability as every other observation of being grouped in row i and column j, independently of the other observations.

2. Each observation may be grouped into exactly one of the r different groups according to a second criterion.

Pearson’s chi-square test is used to test the hypothesis:

$H_0$: Factors A and B are independent against the alternative hypothesis.

$H_1$: Factors A and B are dependant in a contingency table.
In the process of testing the null hypothesis, two types of errors can be made:
Type 1 error is rejecting the $H_0$ when it holds. Type 2 error is accepting $H_0$ when $H_1$ holds. The probability of a Type 1 error is denoted by $\beta$. And the probability of a Type 2 error is denoted by $\beta$.

3.6.2 The Logistic Regression Model.

The logistic regression model was used to perform the regression of the dichromotous outcome, 6 month prevalence of LBP, against a set of 15 independent variables, also called covariates. These variables were selected for logistic regression after each individual variable was evaluated against an outcome in a chi-square test. The variables that were selected were those with a small p-value and the other variables were selected by the researcher, being those variables that had particular interest for the study.

The logistic regression model is given as follows:

$$P(\text{LBP}) = \frac{e^z}{1 + e^z}$$

Where: $Z = \beta_1 \text{(Age 30-49)} + \beta_2 \text{(Age 50-69)} + \beta_3 \text{(Gender- female)} + \beta_4 \text{(Coloured)} + \beta_5 \text{(Indian)} + \beta_6 \text{(White)} + \beta_7 \text{(BMI-obese)} + \beta_8 \text{(BMI-very obese)} + \beta_9 \text{(Trauma)} + \beta_{10} \text{(Telephonic work)} + \beta_{11} \text{(Computer work)} + \beta_{12} \text{(Physical work)} + \beta_{13} \text{(Sitting)} + \beta_{14} \text{(Standing)} + \beta_{15} \text{(Walking)}$

Where: $\beta_1, \beta_{15}$ are estimated regression coefficients in the optimum logistic regression model

The odds ratio that a person has LBP when exposed to a risk factor ($x = 1$) relative to when not being exposed ($x = 0$) is:

$\text{Exp}(\beta_i), i = 1, \ldots, 15$
The odds ratio for LBP when in age category 30 – 49 years relative to the 19 – 29 year category is 1.45 and for the 50 – 69 year category it is 1.99.

The odds ratio for LBP when looking at the gender category is that the female population relative to the male population has an odds ratio of 1.34.

The odds ratio for LBP when in race - coloured relative to race – African is 1.03 and for the race – Indian is 2.24 and for race – white it is 0.81. Odds ratios are summarised in Table 4.1.

3.6.3 Statistical Package Used for Analysis

The data was analysed with the use of Strata Version 7, statistical package.
CHAPTER 4 – RESULTS

4.1 Demographic Characteristics of the Sample Population

4.1.1 Gender Distribution

A total of 355 subjects were included in this study. The sample group consisted of 52% (186/355) females and 48% (169/355) males.

Figure 4.1 Gender Distribution of the Sample Population (n=355)
4.1.2 Race Distribution

The race distribution of the sample group was 68% (239/355) White, 17% (61/355) African, 9% (32/355) Coloured and 6% (23/355) Indian.

Figure 4.2 Race Distribution of the Sample Population (N=355)
4.1.3 Age Distribution

The age of the population was recorded in true age years and then divided into the above age group categories.

The majority of the sample population, 61.69% (219/355) were in the 30-49 year old age group, followed by the 19-29 year old age group, 27.89% (99/355), while the smallest age group was the >50 year old category, 10.42% (37/355).

The youngest subject was 20 years old and the oldest was 62 years old.

The mean age was 36.6 years old.

Figure 4.3 Age Distribution of the Sample Population (n=355)
4.1.4 Age and Gender Distribution

Figure 4.4 Age and Gender Distribution of the Sample Population

The age of the population was recorded in true age years and then divided into the above age group categories.

Each of the categories consisted of relatively similar numbers of males and females in each category, except the 19-29 year old category, where the female population represented 63.27% (62/98) of the total category.
4.1.5 Body Mass Index (BMI)

The Body Mass Index (BMI) was determined as follows: 

\[
\text{BMI} = \frac{\text{weight in kg}}{\text{height in m}^2}
\]

The majority of the sample population 47.89% (170/355) were in the normal category with a BMI of less than 25.

The Obese category formed 33.80% (120/355) of the sample population.

The Very obese category formed 18.31% (65/355) of the sample population.

Figure 4.5 Body Mass Index of the Sample Population (n=355)
4.1.6 Company Level Distribution

![Pie chart showing the distribution of company levels.](image)

**Figure 4.6 Company Level Distribution of the Sample Population (n=355)**

The Management and Professional category was the largest 41% (144/355) in the sample population.

The Clerks and Overseers formed 33% (117/355) of the sample population.

The Super specialists and Executives formed 8% (29/355) and the semi-skilled category formed 18% (65/355) of the sample population.
4.2 The Lifetime Incidence of Low Back Pain

4.2.1 Total Lifetime Incidence of LBP

The lifetime incidence of LBP was 63% (225/355) in the sample population.

Figure 4.7 Total Lifetime Incidence of LBP of the Sample Population (n=355)
4.2.2 Age and Lifetime Incidence of Low Back Pain

Figure 4.8 Ages and Lifetime Incidence of LBP of the Sample Population (n=355)

The age of the population was recorded in true age years and then divided into the above age group categories.

The lifetime incidence of LBP was distributed over all the age categories. There was a slightly larger incidence of LBP in the 30-49 year old category at 65.60% (143/219) and the 19-29 year old category had the lowest incidence at 59.60% (59/99).

The age categories do not differ significantly (p=0.612, chi-square test) with respect to the lifetime incidence of LBP.
4.2.3 Age of Onset of Low Back Pain

The age of onset of LBP was recorded in age categories of 10 years, 0-9, 10-29, 30-39, 40-49, 50-59, and 60-69. The above categories were compiled after coding into the above categories.

It was found that 74.67% (168/255) of the sample population that suffered from LBP were between the ages of 30-49 years old.
4.3 Six Month Prevalence of Low Back Pain

4.3.1 Total 6 Month Prevalence of LBP

The 6 month prevalence of LBP in the sample population was 41% (147/355). The total of the sample population was 355.
4.3.2 Referred Lower Limb Pain and 6 Month Prevalence of Low Back Pain

Of the total sample population of 147 that suffered from LBP in the last 6 months, it was reported that 20% (29/147) suffered from LBP with associated radiations/ referred pain into the lower limb.

Figure 4.11 Referred Lower Limb Pain and 6 Month Prevalence of LBP of the Sample Population (n=147)
4.3.3 Number of Episodes of Low Back Pain in the Last 6 Months

![Bar chart showing the number of episodes of LBP in the last 6 months.]

**Figure 4.12 Numbers of Episodes of LBP in the Last 6 Months of the Sample Population (n=147)**

The number of episodes of LBP was recorded in days from 1-14 and then 15+ days and then divided into the above categories.

The total of the sample population was 147.

There were two categories that had similarly high values, category 1-5 episodes and 15+ episodes.

Category 1-5 episodes had 36.05% (53/147) of the sample population that experienced 1-5 episodes of LBP in the last 6 months.

Category 15+ episodes had 38.78% (57/147) of the sample population that experienced 15 or more episodes of LBP in the last 6 months.
4.4 Point Prevalence of Low Back Pain

4.4.1 Total Point Prevalence of Low Back Pain

![Pie chart showing the prevalence of Low Back Pain (LBP)](Image)

**Figure 4.13 Total Point Prevalence of LBP of the Sample Population (n=355)**

The point prevalence of LBP in the sample population was 9.6% (34/355) in a sample population size of 355.
4.4.2 Duration of Pain Experienced in the Point Prevalent Population

The duration of the LBP was recorded in days and then divided into the above categories.

The largest portion of the point prevalent population, 71% (24/34) experienced LBP for between 1-5 days on average if they had an episode of LBP.

The second largest group was those who had LBP for 15 days or more, 18% (6/34).

The two smallest groups were those who suffered from LBP episodes of 6-10 days, 12% (4/34) and group 11-14 days reported no incidence of LBP.

Figure 4.14 Duration, in Days, of Pain Experienced of the Point Prevalent Population (n=34)
4.5 Individual Factors Associated with 6 Month Prevalence of Low Back Pain.

4.5.1 Gender and 6 Month Prevalence of Low Back Pain

![Pie chart showing gender distribution in the sample population]

Figure 4.15 Gender and 6 Month Prevalence of LBP in the Sample Population (n=147)

The size of the 6 month prevalence of LBP of the sample population was 147.
The distribution of the population was 55% (81/147) female and 45% (66/147) male.

There was no significant association between the gender distribution categories and the 6 month prevalence of LBP. (p=0.418, chi square test)
4.5.2 Age and 6 Month Prevalence of Low Back Pain

The age of the population was recorded in true age years and then divided into the above age group categories.

The 6 month prevalence of LBP in the age category 19-29 years was 36.36% (36/99).
The 6 month prevalence of LBP in the age category 30-49 years was 42% (92/219).
The 6 month prevalence of LBP in the age category 50-69 years was 51.35% (19/37).

There was an increase of 5.64% in the 6 month prevalence of LBP between the age category 19-29 and 30-49 years.

There was an increase of 9.35% in the 6 month prevalence of LBP between the age category 30-49 and 50-69 years.

There was no significant association between the age categories and the 6 month prevalence of LBP. (p=0.293, chi square test)
4.5.3 Age and Gender and 6 Month Prevalence of Low Back Pain

The age of the population was recorded in true age years and then divided into the above age group categories.

The 6 month prevalence of LBP was highest in the females aged 19-29 with 69.44% (25/36) of the population experiencing LBP, this was closely followed by the males aged 50-69 with 63.16% (12/19) of the population.

The largest population difference between the female and male 6 month prevalence of LBP was noted in the 19-29 year old category. The second largest difference between the male and female 6 month prevalence of LBP was noted in the 50-69 year old age category.

Figure 4.17 Ages and Gender and 6 Month Prevalence of Low Back Pain of the Sample Population (n=147)
4.5.4 Race and 6 Month Prevalence of Low Back Pain

The 6 month prevalence of LBP was evenly spread through all the different racial classifications (39.34%-43.75%), except in the Indian population that had approximately 20% greater prevalence of LBP than the other racial categories.

The African race category had a 6 month prevalence of LBP of 39.34% (24/61).
The Coloured race category had a 6 month prevalence of LBP of 43.75% (14/32).
The Indian race category had a 6 month prevalence of LBP of 60.87% (14/23).
The White race category had a 6 month prevalence of LBP of 39.75% (95/239).

There was no significant association between the race categories and the 6 month prevalence of LBP. (p=0.277, chi square test)
4.5.5 Body Mass Index (BMI) and 6 Month Prevalence of Low Back Pain

The Body Mass Index (BMI) was determined as follows: BMI = (weight in kg divided by height in m squared).

The 6 month prevalence of LBP was the highest in the sample population with a very obese BMI at 44.67% (29/65).

The 6 month prevalence of LBP was the lowest in the sample population with a normal BMI at 40.00% (68/170).

The 6 month prevalence of LBP increased approximately 5% from the normal to the very obese categories.

There was no significant association between the BMI categories and the 6 month prevalence of LBP. (p=0.780, chi square test)

Figure 4.19 Body Mass Index (BMI) and 6 Month Prevalence of LBP in the Sample Population (n=147)
4.5.6 Trauma to the Low Back and 6 Month Prevalence of Low Back Pain

Figure 4.20 Trauma to the Low Back and 6 Month Prevalence of LBP in the Sample Population (n=147)

The number of the population that had experienced LBP and had trauma to their backs, was 22% (32/147).

There was a significant association between trauma to the back and the 6 month prevalence of LBP. (22% versus 78%; p<0.001, chi square test)
4.5.7 Surgery to the Low Back and 6 Month Prevalence of Low Back Pain

Only 1% (1/147) of the sample population, that had LBP in the last 6 months, had surgery to the low back.

There was no significant association between the surgery to the lumbar spine and the 6 month prevalence of LBP. (p=0.137, chi square test)
4.6 Individual Factors Associated with the Point Prevalence of Low Back Pain.

4.6.1 Gender and Point Prevalence of Low Back Pain

The size of the point prevalence of LBP of the sample population was 34. The distribution of the population was 62% (21/34) female and 38% (13/34) male.

There was no significant association between the gender distribution categories and the point prevalence of LBP. (p=0.136, chi square test)
4.6.2 Age and Point Prevalence of Low Back Pain

The age of the population was recorded in true age years and then divided into the above age group categories.

The point prevalence of LBP in the age category 19-29 years was 4% (4/99).
The point prevalence of LBP in the age category 30-49 years was 12% (26/219).
The point prevalence of LBP in the age category 50-69 years was 11% (4/37).

There was an increase of 8% in the point prevalence of LBP between the age category 19-29 and 30-49 years. There was a decrease of 1% in the point prevalence of LBP between the age category 30-49 and 50-69 years.

There was no significant association between the age categories and the point prevalence of LBP. (p=0.111, chi square test)
4.6.3 Age and Gender and Point Prevalence of Low Back Pain

The age of the population was recorded in true age years and then divided into the above age group categories.

The point prevalence of LBP was highest in the females aged 19-29 with 100% (4/4) of the population experiencing LBP, this was followed by the males aged 50-69 with 75% (3/4) of the population.

The largest population difference between the female and male point prevalence of LBP was noted in the 19-29 year old category. The second largest difference between the male and female point prevalence of LBP was noted in the 50-69 year old age category.

Figure 4.24 Age and Gender and Point Prevalence of Low Back Pain in the Sample Population (n=34)
4.6.4 Race and Point Prevalence of Low Back Pain

The point prevalence of LBP was varied from 6.56% to 17.39% through the different racial classifications. The Coloured and Indian population had the largest point prevalence of LBP (15.63% and 17.39%) and the lowest point prevalence of LBP was in the African and White populations (6.56% and 8.79%).

The African race category had a point prevalence of LBP of 6.56% (4/61).
The Coloured race category had a point prevalence of LBP of 15.63% (5/32).
The Indian race category had a point prevalence of LBP of 17.39% (4/23).
The White race category had a point prevalence of LBP of 8.79% (21/239).

There was no significant association between the race categories and the point prevalence of LBP. (p=0.302, chi square test)
4.6.5 Body Mass Index (BMI) and Point Prevalence of Low Back Pain

The Body Mass Index (BMI) was determined as follows: $\text{BMI} = \frac{\text{weight in kg}}{\text{height in m}^2}$.

The point prevalence of LBP was the highest in the sample population with a very obese BMI at 15.4% (10/65).

The point prevalence of LBP was the lowest in the sample population with a normal BMI at 8.2% (14/170).

The point prevalence of LBP increased approximately 7% from the normal to the very obese categories.

There was no significant association between the BMI categories and the point prevalence of LBP. (p=0.259, chi square test)
4.7 Working Environment Factors Associated with 6 Month Prevalence of Low Back Pain

4.7.1 Sick Leave Taken for Low Back Pain

Figure 4.27 Sick Leave Taken for LBP in the Sample Population in the Last 6 Months (n=147)

Sick leave was taken by 18% (26/147) of the sample population for LBP in the last 6 months.
4.7.2 Number of Sick Leave Days Taken, due to Low Back Pain, in the Last 6 Months

The number of days of sick leave taken was recorded in days from 1-14 and then 15+ days and then divided into the above categories.

Of the total population that had suffered from LBP in the last 6 months, 19.04% (28/147) took sick leave.

The majority of the population that took sick leave for LBP, took between 1-5 days- 71.43% (20/28).

The second largest number of days sick leave taken for LBP was the 6-10 day group; 21.43% (6/28).

There was a significant association between days of sick leave taken and the 6 month prevalence of LBP. (p=0.008, chi square test)
4.7.3 Time of Day Low Back Pain Occurred in the Last 6 Months

The time of the day that the LBP occurred in the sample population in the last 6 months was mainly at variable times 46.23% (68/147).

The time of day at which LBP occurred were all approximately the same, morning-14.29% (21/147), afternoon-14.97% (22/147), night-10.88% (16/147) and constantly-13.63% (20/147).

There was no significant association between the time of the day the LBP occurred and the 6 month prevalence of LBP. (p=0.390, chi square test)
4.7.4 Geographical Location Where Low Back Pain is Experienced

![Geographical Location Where LBP is Experienced in the Sample Population](image)

**Figure 4.30 Geographical Location Where LBP is Experienced in the Sample Population**

The majority of the episodes of LBP occurred at home as well as at the work place 67.35% (99/147).

LBP at home accounted for 19.05% (28/147) of the episodes.

LBP at the work place accounted for 13.60% (20/147) of the episodes.

There was no significant association between the geographical location that LBP occurred at and the 6 month prevalence of LBP. (p=0.434, chi square test)
4.7.5 Company Level and 6 Month Prevalence of Low Back Pain

The management and professional company level was the level of the sample population that had the highest 6 month prevalence of LBP, 40.82% (60/147).

This was followed closely by the clerk and overseer company level, 34.01% (50/147).

The semi skilled, executive and super specialist company levels were those with the least LBP in the 6 month prevalence group of the sample population, 17.69% (26/147) and 7.48% (11/147) respectively.

There was no significant association between the company level and the 6 month prevalence of LBP. (p=0.949, chi square test)
4.7.6 Main Daily Activity and 6 Month Prevalence of Low Back Pain

Figure 4.32 Main Daily Activity and 6 Month Prevalence of LBP in the Sample Population (n=147)

The major daily activity that was associated with the 6 month prevalence of LBP was computer processing - 93.88% (138/147); this was followed by the use of the telephone - 65.31% (96/147).

Physical work was reported to have caused LBP in 4.76% (7/147) of the sample population.

Administrative work was reported to have caused LBP in 22.45% (33/147) of the sample population.

Meetings were reported to have caused LBP in 2.72% (4/147) of the sample population.
4.7.7 Major Daily Positions and 6 Month Prevalence of Low Back Pain

The major daily position that was associated with the 6 month prevalence of LBP was sitting at 97.28% (143/147).

The second highest daily activity that was associated with LBP was walking at 61.64% (90/147).

Standing and lifting were reported to cause LBP in 17.69% (26/147) and 6.57% (9/147) of the sample population respectively.

Figure 4.33 Major Daily Positions and 6 Month Prevalence of LBP in the Sample Population (n=147)
4.8 Working Environment Factors Associated with the Point Prevalence of Low Back Pain

4.8.1 Company Level and Point Prevalence of Low Back Pain

![Company Strata Categories](image)

Figure 4.34 Company Level and Point Prevalence of Low Back Pain in the Sample Population (n=34)

The management and professional company level was the level of the sample population that had the highest point prevalence of LBP, 50% (17/34).

This was followed by the clerk and overseer company level, 32.35% (11/34).

The semi-skilled, executive and super specialist company levels were those with the least LBP in the point prevalence group of the sample population, 14.71% (5/34) and 2.94% (1/34) respectively.

There was no significant association between the company level and the 6 month prevalence of LBP. (p=0.494, chi square test)
The major daily activity that was associated with the point prevalence of LBP was computer processing - 97.05% (33/34); this was followed by the use of the telephone - 73.53% (25/34).

Physical work was reported to have caused LBP in 5.88% (2/34) of the sample population.

Administrative work was reported to have caused LBP in 14.71% (5/34) of the sample population.

Meetings were reported to have caused LBP in 2.94% (1/34) of the sample population.
The major daily position that was associated with the point prevalence of LBP was sitting at 91.18% (31/34).

The second highest daily activity that was associated with LBP was walking at 61.76% (21/34).

Standing and lifting were reported to cause LBP in 29.41% (10/34) and 11.76% (4/34) of the sample population respectively.
4.9 Pain Intensity When Low Back Pain is Experienced in the Life Time Incidence Population

Figure 4.37 Pain Intensity When LBP is Experienced in the Life Time Incidence Population of the Sample Population (n=210)

The pain intensity scale was measured from 0-10, where 0 was equal to no pain and 10 was the most excruciating pain ever experienced. The pain intensity was then divided into the above 3 categories.

The majority of the sample population experienced pain intensity from 5-7 out of 10 -54% (114/210).

The second highest category was the intensity from 1-4 out of 10 -35% (74/210). The intensity, 8-10 out of 10, category was only experienced by 11% (22/210) of the sample population.

The total of this sample selection, n=210, does not coincide with the total n-value of the lifetime incidence population size (n=225) due to interviewer errors.
4.10 Treatment for Low Back Pain

4.10.1 Is Treatment Sought for Low Back Pain in the 6 Month Prevalence Group

The 6 month prevalence sample size for LBP was 147 individuals.

Treatment was sought by 46.94% (69/147) of the sample population that suffered from LBP in the last 6 months.

Figure 4.38 Is Treatment Sought for LBP in the 6 Month Prevalence Group of the Sample Population (n=147)
Figure 4.39 Type of Treatment Sought for LBP in the Sample Population

The majority of individuals who sought treatment for LBP, in the last 6 months, made use of the pharmacy- 21.99% (31/141).

Medical doctors were consulted in 14.89% (21/141) and physiotherapists in 17.02% (24/141) of the cases. These were the second most popular choices for the treatment of LBP in the last 6 months.

Chiropractic treatment was used by 8.51% (12/141) of those who suffered from LBP in the last 6 months. Acupuncture and private hospital treatment was used by only 0.71% (1/141) of those who suffered from LBP in the last 6 months.

Biokinetics, homeopathy and osteopathy were three other disciplines that were on the questionnaire, but none of these three disciplines were used by the study population.
4.10.3 Satisfaction of Treatment for Low Back Pain?

The 85.5% (59/69) of the sample population that made use of treatment for their LBP in the last 6 months, reported that were happy with the treatment they received and that the treatment was helping for the LBP.
4.11 Summary of the Results from Logistic Regression Analysis.

4.11.1 The Optimum Logistic Regression Model

<table>
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<th>Variables</th>
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<th>Odds Ratio (OR)</th>
<th>95% Confidence Interval for OR</th>
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<td>0.81</td>
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<td>0.56</td>
</tr>
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<td>4.98</td>
<td>2.41</td>
</tr>
<tr>
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<tr>
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<td>1.43</td>
<td>0.86</td>
</tr>
</tbody>
</table>

The co-efficient (β) was determined by the following formula:

\[ \beta = \ln \text{ (Odds Ratio)} \]

4.11.2 The Estimated Logistic Regression Model

The Estimated Logistic Regression Model can be written as:

\[ Z = \beta_1 \text{ (Age 30-49)} + \beta_2 \text{ (Age 50-69)} + \beta_3 \text{ (Gender- female)} + \beta_4 \text{ (Coloured)} + \beta_5 \text{ (Indian)} + \beta_6 \text{ (White)} + \beta_7 \text{ (BMI-obese)} + \beta_8 \text{ (BMI-very obese)} + \beta_9 \]
(Trauma) + $\beta_{10}$ (Telephonic work) + $\beta_{11}$ (Computer work) + $\beta_{12}$ (Physical work) + $\beta_{13}$ (Sitting) + $\beta_{14}$ (Standing) + $\beta_{15}$ (Walking)

And the co-efficients $\beta_1, \beta_2 \ldots, \beta_{15}$ are given in Table 4.1.

From the above logistic regression model, the probability of suffering from LBP can be determined for any person of the study area. For example, a person with the following details (coded from Appendix F):

- Age 37 years, thus category 30-49. Yes = 1, No = 0
- Gender is female Male = 0, Female = 1
- Race is white Yes = 1, No = 0
- BMI is normal Yes = 1, No = 0
- Had no trauma to the back Yes = 1, No = 0
- Does telephone work Yes = 1, No = 0
- Does computer work Yes = 1, No = 0
- Does no physical work Yes = 1, No = 0
- Does sit for most of the day Yes = 1, No = 0
- Does not stand most of the day Yes = 1, No = 0
- Does not walk most of the day Yes = 1, No = 0

The formula for the estimated probability for LBP will look as follows:

First the value of $Z$ has to be determined:

$$Z = \beta_1 (\text{Age } 30-49) + \beta_2 (\text{Age } 50-69) + \beta_3 (\text{Gender- female}) + \beta_4 (\text{Coloured}) + \beta_5 (\text{Indian}) + \beta_6 (\text{White}) + \beta_7 (\text{BMI-obese}) + \beta_8 (\text{BMI-very obese}) + \beta_9 (\text{Trauma}) + \beta_{10} (\text{Telephonic work}) + \beta_{11} (\text{Computer work}) + \beta_{12} (\text{Physical work}) + \beta_{13} (\text{Sitting}) + \beta_{14} (\text{Standing}) + \beta_{15} (\text{Walking})$$

$$Z = \beta_1 (1) + \beta_2 (0) + \beta_3 (1) + \beta_4 (0) + \beta_5 (0) + \beta_6 (1) + \beta_7 (0) + \beta_8 (0) + \beta_9 (0) + \beta_{10} (1) + \beta_{11} (1) + \beta_{12} (0) + \beta_{13} (1) + \beta_{14} (0) + \beta_{15} (0)$$

$$= \beta_1 (1) + \beta_3 (1) + \beta_6 (1) + \beta_{10} (1) + \beta_{11} (1) + \beta_{13} (1)$$

$$= 0.37 + 0.29 + (-0.21) + (-0.01) + 0.71 + 1.25$$

$$= 2.4$$
Now the probability of having LBP can be calculated:

\[
P (LBP) = \frac{e^z}{1 + e^z} = \frac{e^{2.4}}{1 + e^{2.4}} = \frac{11.02}{1 + 11.02} = 11.02
\]

Thus this person has a 92% chance to develop LBP.

One can now determine the probability for other people in the area with different variables.
CHAPTER 5 – DISCUSSION

The findings reported in the sample population are representative of the total population of ABSA Bank Head office. The randomised sample was selected, in a manner so that it represented a 95% confidence interval and a 50% chance of the occurrence of LBP.

5.1 Demographic Characteristics

The study population of ABSA Bank displayed the following ratio between males and females, 48% (169/355) males and 52% (186/355) females, which was a fairly even split (figure 4.1).

Classification of the sample population into race groups showed that the sample was divided into 68% (239/355) white, 17% (61/355) african, 9% (32/355) coloured and 6% (23/355) Indian (figure 4.2).

The age distribution of the sample population showed that the majority of the sample was between the ages of 30-49 years of age (61.69%, 219/355), the second largest age group was between the ages of 18-29 years old (27.9%, 99/355), while the smallest age group was between the ages of 50-69 years old (10.70%, 38/355). These results showed that the sample has a majority of young participants under the age of 50 years old. The youngest person that was interviewed was 20 years old; while the oldest was 62 years old and the mean age was 36.6 years of age (figure 4.3).

The age and gender of the sample population did not display an even distribution between all the different age categories. The category 18-29 years old was mainly female at 63.27% (62/98), while the males formed 36.73% (36/98). The age category 30-49 was the only category that displayed an equal distribution, with a 50.91% (112/220) male and 49.09% (108/220) female split. The oldest age category 50-69 years of age had a majority of males at 56.76% (21/37) and the females formed 43.24% (16/37). This percentage difference in the category was not as marked as the youngest age category (figure 4.4).
The Body Mass Index (BMI) showed that nearly half of the sample population had a BMI within the normal suggested range (47.69%, 170/355). The remainder of the population was divided into the obese and very obese categories. The Obese category formed 33.80% (120/355) of the sample population and the Very Obese formed 18.31% (65/355). This shows that half of the sample is within normal limits as far as their BMI ratio is concerned (figure 4.5).

The company level distribution showed that half of the sample, constituted semi skilled workers, clerks and overseers (51.28%, 182/355). The remaining 48.72% of the group consisted of managers, professionals, executives and super specialists (figure 4.6).

5.2 The Lifetime Incidence of Low Back Pain

The lifetime incidence rate of LBP in the sample population of ABSA Bank was 63% (225/355). This result is much lower than the study performed in Canada in 1995, where the lifetime incidence rate was 84.1% (14). The difference between the results of these studies could be due to the fact that the population studied in Canada was drawn from the general population by means of mailing questionnaire and the population was not selected from a specific work place environment. A Swedish questionnaire study found that 80% of forest and industrial workers had at some time experienced LBP symptoms (23). The large increase in symptoms found in this study could be due to the physical labour of these workers, compared to more sedentary work performed in the corporate environment.

Cross sectional questionnaire studies performed in the UK and Japan had similar results to this study. The study performed in the UK found that the lifetime incidence of LBP was 58.3% in several towns and one rural district. Another questionnaire study in the UK found a 62% lifetime incidence rate in three medical practices in Twickenham, Stamford and Lower Clapton in 1996 (15). A 2 year follow up questionnaire study performed in the Bradford community reported a lifetime incidence rate of 59% (22). The questionnaire study performed in a Japanese manufacturing company found that the lifetime incidence of LBP was 60.5%, this was
in the sedentary and physical work groups. The UK studies could have similar results to this study because the populations of the towns may have had a similar kind of job as those in the banking environment, but this was not stated in the studies. The Japanese questionnaire study looked at the lifetime incidence of sedentary and physical labour workers and found a 60.5% incidence, as this is an average, it can be seen as similar to the banking environment, as they too have sedentary and physical work categories (29).

A questionnaire study that was performed on the general Nordic population between the age of 30 and 50 years found that the lifetime incidence of LBP in the male and female population was between 60%-65%, these are similar to the results obtained in this study (figure 4.8) (24).

From the results of this study it could be seen that the lifetime incidence of LBP in the workplace in South Africa is comparable to other populations across the world.

5.2.1 Age of Onset of Low Back Pain

The age of onset of the first episode of LBP was reported to be mainly between the ages of 30 to 49 years of age in 74.67% of the sample population. The youngest age category, 19-29 years, formed 13.79% (31/255) of the sample population, while the ages 50 to 69 years old was 11.56% (26/255) (figure 4.9). The results of this study showed that the majority of the population experienced LBP for the first time between 30-49 years of age. This age group is the largest proportion of the work force and with this part of the population affected to such a large degree it could affect the productivity of the company in a negative manner. LBP is not only going to result in a loss of productivity, but could increase the costs of health care.

5.3 The 6 Month Prevalence of Low Back Pain

The 6 month prevalence of this study was 41% (147/355), while the lifetime incidence was 63% (225/355).
The one year prevalence rate in two UK questionnaire studies was 48% and 41% (15, 22). The Nordic population’s one year prevalence vary a great deal, 11%, 20%, 26%, 45%, and 54% (24). A Swiss survey showed in 1992-3, that the one year prevalence was 20.2%-28.5% in males and 31.1%-38.5% in females (26).

From the above studies it can be seen that there are varying results regarding the one year prevalence of LBP in different parts of the world. The conclusion that can safely be made is that the prevalence of LBP is high all over the world, and the results vary depending on the methodologies of the different studies. This could possibly be explained as being due to poor recall.

5.3.1 Referred Lower Limb Pain

Referred lower limb pain was reported to be associated with LBP in 20% (29/147) of the people with LBP in the last 6 months (figure 4.11). These results are in line with other studies that were performed, where 20%-25% of the population had referred limb pain associated with the LBP (13, 16).

5.3.2 Number of Episodes of Low Back Pain in the Last 6 Months

This study found that the majority of the people who suffered from LBP in the last 6 months had either 1-5 episodes of LBP (36.05%, 53/147) or they had more than 15 episodes of LBP (38.78%, 57/147). The remainder of the population had between 6-14 episodes of LBP (25.17%, 37/147) (figure 4.12). The results show that those who suffer from LBP will do so regularly. This coincides with studies that show that the reoccurrence rate of LBP is as high as 25%-50% (5, 6).

5.4 The Point Prevalence of Low Back Pain.

The point prevalence of LBP in this study was 9.6% (34/355) (figure 4.13). The annual point prevalence in the USA was found to be between 15%-20% (20). The questionnaire study performed in three medical practices in the UK found that the point prevalence of LBP was 16% (15).
A further questionnaire study performed in a Japanese industrial factory found that those workers that had a sedentary job had a point prevalence of LBP of 18.3% at the time of the interview. These workers are in a similar working environment to those in the corporate workplace as this is mainly a sedentary environment, thus the results of the two studies could be expected to be similar. (29)

A mailing survey study performed in Canada in 1995 showed that 28.4% of the population had experienced LBP during the time of the study (14). These results are higher than those of this study. The ABSA study looked at the point prevalence at the time of the interview, while the Canadian study looked at the point prevalence of the study period, which was done over approximately a six week period. This could be a possible explanation for the higher prevalence in the Canadian study. The follow-up study performed in the Netherlands had a point prevalence of approximately 26% (27). A further postal questionnaire study performed in the Netherlands in 2003 found that LBP was the top self-reported musculoskeletal pain with a point prevalence of 26.9% (28). This is much higher than the results of this study, but the data of the Netherlands study was collected over a three year period, and this could explain the reason for the higher values.

5.4.1 Duration of the Low Back Pain

The majority of the sample population suffered from LBP for between 1-5 days (70.58%, 27/34) (figure 4.14). There was also a large number of the population that suffered from LBP for more than 15 days (14.63%, 6/34) (figure 4.14). Studies have shown that LBP is a self limiting condition and would resolve itself within 2 to 6 weeks (1, 4, 32). These results are similar to those found in the ABSA study. The ABSA study did not distinguish between LBP that resolved spontaneously and that which was resolved by the use of treatment such as chiropractic, physiotherapy, analgesics.

These results show that when people suffer from LBP it is normally for a prolonged period of 15 days or longer.
5.5 Factors Associated with the 6 Month Prevalence of Low Back Pain

5.5.1 Individual Factors Associated with the 6 Month Prevalence of Low Back Pain

5.5.1.1 Age and Gender

The results of the ABSA study showed a slight increase in the 6 month prevalence of LBP, however, this is not statistically significant. The 6 month prevalence of LBP was 36.73% (36/98) in the age category 19-29 years, 42.40% (92/217) in the age category 30-49 years and 51.35% (19/37) in the age category 50-69 years. These results show that there is a gradual increase in the prevalence of LBP as the age of the population increases (figure 4.16). There is a total of 14.62% increase in the prevalence from the youngest to the oldest age category (figure 4.16). The literature shows that the peak prevalence of LBP is at ages 45 to 49, and this trend can be seen in the results of the study (1). Other research further shows that there is an increase in the work absence due to LBP, with an increase of age (25).

The results of this study showed that there was no statistical significance between the gender of the population and the 6 month prevalence of LBP. The ratio was almost equal, 55.10% (81/147) female and 44.90% (66/147) male. From these results it could be said that the gender of the individual will not be a causal or risk factor for LBP (7) (figure 4.15).

A comparison can be made between age and gender. This showed a very different result (figure 4.17). There was a close to equal split in the gender prevalence of the population. However in the 19-29 year age group there is a much larger number of the female population (69.44%, 25/36) that suffered from LBP than in the male population (30.56%, 11/36) of the same age. This difference between the genders in the age category 30-49 is not as significant as in the previous category. The prevalence was 53.26% (49/92) in the female group and 46.74% (43/92) in the male group. The oldest age category, age 50-69, showed that there is a reversal from the youngest age category. The prevalence was 63.16% (12/19) in the male group and
36.84% (7/19) in the female group (figure 4.17). The trends that can be seen in the results of this study are that there is an increased prevalence of LBP, with an increase in age in the male population and the opposite occurred in the female population. This finding is comparable to research that states that the male population is at greater risk of suffering from LBP with an increase in age (7). The reason for the decline of the prevalence of LBP in the female group, in the different age categories has not been investigated. The prevalence of LBP is the greatest in the 20 to 50 year old age group because this age group is the largest part of the work force (75).

5.5.1.2 Race

The 6 month prevalence of LBP was evenly distributed over all the racial categories (40%-43.75%), except in the Indian population, displaying a 20% greater prevalence (60.87%) (figure 4.18). The conclusion that can be made from these results is that the presence of LBP is not limited to a particular racial group.

5.5.1.3 Body Mass Index (BMI)

The BMI is seen as a more reliable indicator of risk than just the height or weight of a person, as it takes both variables into account at the same time. The 6 month prevalence of LBP was 44.67% (29/65) in the very obese category; 41.672% (50/120) in the obese category and 40.00% (68/170) in the normal BMI category. There is a 5% increase in the prevalence of LBP between the normal and the very obese category (figure 4.19). These findings were seen to be statistically insignificant but the relevance of the increased BMI has a greater impact in a clinical setting as the more obese the patient, the greater the risk of LBP (68). There are different studies regarding this topic, these studies showed that there is an association between the prevalence of LBP and BMI (67, 68, 69). The results of the ABSA study might not be statistically significant but the increase seen in the study could have a clinically significant effect on LBP.

The patient with a pendulous abdomen has a longer resistance arm anterior to the spine, which places strain on the muscles of the lower back (76).
5.5.1.4 Trauma

Trauma to the lumbar spine was reported in 22% (32/147) of the population that had suffered from LBP in the last 6 months (figure 4.20). These findings were seen to be a statistically significant risk factor for the 6 month prevalence of LBP (p<0.001). Research examined, showed these results. It showed that LBP could result after trauma even if the initial injury has healed. Research evaluated showed that 16.5% of sciatica and 13.3% of mechanical LBP was due to trauma to the lumbar spine (70).

5.5.1.5 Surgery

Only 1% (1/147) of the sample population that had surgery in the past to the lumbar spine experienced LBP in the last 6 months. Thus this factor was statistically not significant as a risk factor for the prevalence of LBP (figure 4.21). It is thus hoped that other people, in the sample population, who had surgery to the lumbar spine are now symptom free.

5.5.2 Working Environment Factors Associated with 6 Month Prevalence of LBP.

5.5.2.1 Sick Leave

Eighteen percent of the population had been absent from work for LBP over the last 6 months (26/146) (figure 4.27).

A prospective observational study performed in France showed that among the economically active patients that had LBP for less than 48 hours, 82% were put on sick leave in the primary health care setting (40).

The ABSA study shows that far less people who had suffered from LBP in the last 6 months had taken sick leave, than in the French study. The French study evaluated those cases that were seen by a primary health care provider, and not all of the people in the current study were seen by a primary health care provider. The difference in the amount of sick leave taken could have resulted from the greater use of primary health care providers in the French study. (40)
5.5.2.2 Number of Days Sick Leave Taken

The ABSA study found that the majority, 71.43% (20/28), of the sample population had taken between 1-5 days leave for LBP in the last 6 months. A further 21.43% (6/28) of the population that took sick leave took 6-10 days leave and 7.14% (2/28) took more than 15 days leave (figure 4.28).

An American stratified random telephonic survey study in 1992 showed that the median of sick leave days was 3 and the mean was 20 days (8). These results are comparable to those found in the ABSA study.

A French prospective observational study in 1995 showed a mean duration of 8.4 days of sick leave was taken by patients booked off for LBP. Work-related low back pain was reported in 18.6% of the population. (40)

A Canadian study found that 74.2% of the workers in Quebec, who took sick leave due to LBP, only returned to work a month later (44). Studies performed in 1975, in the UK, found that 3.6% of sick leave was due to LBP, and that the average amount of sick leave taken was 32.6 days in the male population (39). Even though this research is very old it shows that the problem of sick leave due to LBP is not a new phenomenon. These results indicate a higher absenteeism due to sick leave in 1st world countries than is the case in the ABSA study. The time taken may also be dependant on the extent of the injury.

From the results of the ABSA study it was calculated that employees who suffer from LBP will use a minimum of 1720 days of sick leave (see calculation below). These figures result in 4.71 calendar years of work lost by the bank in one calendar year. These days could be converted to a rand value if an average cost per working day per employee were to be determined. If the average cost per day per employee is as little as R 516.33, then LBP will cost the bank a minimum of R883 495.20 per calendar year.

Calculation: In the sample population, 28 people who suffered from LBP in the last 6 months, took sick leave (figure 4.24). The minimum value from each category was
used to determine the final value. One day was used for the category 1-5 days, 6 days in the 6-14 day category and 15 days in the 15+ day’s category (figure 4.24).

From figure 4.24 it can be calculated that 20 people took 1 day, 6 people took 6 days and 2 people took 15 days, \((20 \times 1) + (6 \times 6) + (2 \times 15)\) = 86. Thus 86 days of sick leave were taken in a 6 month period. These figures represent the sample population for 6 months only. In order to determine the value over a year period, this figure must be multiplied by 2 \((86 \times 2 = 172)\). The sample population was 10% of the total population therefore to determine a value for the total population the sample group value has to be multiplied by 10 \((172 \times 10 = 1720)\). This value represents calendar days taken. In order to determine how many years were taken the total was divided by 365 \((1720/365 = 4.71)\). To determine the cost, multiply the rand value by the number of days sick leave taken \((R \ 516.33 \times 1720 = R \ 883 \ 495.20)\).

5.5.2.3 Time of Day that Low Back Pain occurs

The occurrences of LBP appeared to be highly variable, as 46.23% \((68/147)\) of the cases of LBP occurred at different times of the day in certain individuals. The remainder of the individuals reported LBP occurring at a specific time of day. These reports were evenly distributed throughout the day, with 14.29% \((21/147)\) in the morning; 14.97% \((22/147)\) in the afternoon; 10.88% \((16/147)\) at night and 13.63% \((20/147)\) constantly (figure 4.29). A cross sectional random survey questionnaire conducted in the Philippines study revealed that there was a 14 times greater chance for LBP to occur after the individual had begun the work session and that the LBP would affect the performance of the work done (66).

This research highlighted the need to decrease the prevalence of LBP in the workplace. Most patients experience their pain during working hours which are morning and afternoon, thus negatively effecting productivity. Therefore, the workplace can be regarded as a possible trigger for LBP episode.
5.5.2.4 Geographical Location of Low Back Pain

In the majority of cases people experienced LBP both in the home and in the workplace (67.35% 99/147). Further findings were that 19.05% (28/147) of sufferers experienced LBP only in the home, while 13.60% (20/147) experienced it only in the workplace (figure 4.30). These findings were not statistically significant as a risk factor for the 6 month prevalence for LBP.

5.5.2.5 Company Level

The management and professional level of the sample population showed the highest 6 month prevalence of LBP at 40.82% (60/147). This was followed closely by the clerk and overseer company level at 34.01% (50/147). The semi skilled, executive-super specialist company levels were those with the least LBP prevalence of the sample population at 17.69% (26/147) and 7.48% (11/147) respectively. There was no statistical significant association between the company level and the 6 month prevalence of LBP (figure 4.31). The managers – professionals and clerks - overseers were the two categories that had the highest prevalence of LBP; which could be due to extended periods of sitting or standing.

5.5.2.6 Main Daily Activity and Major Daily Position

The main daily activity that was associated with the 6 month prevalence of LBP was computer processing - 93.88% (138/147). This was followed by telephonic work at 65.31% (96/147). Physical and administrative work was only reported to have caused LBP in 4.76% (7/147) and 22.45% (33/147) of the sample population respectively (figure 4.32).

The major daily position that was associated with the 6 month prevalence of LBP was sitting at 97.28% (143/147). The second highest daily activity that was associated with LBP was walking at 61.64% (90/147). Standing and lifting were reported to cause LBP in 17.69% (26/147) and 6.57% (9/147) respectively in the sample population (figure 4.33).
The above results were expected, as the nature of the work environment in the banking workplace is mainly sedentary and office bound. In this kind of workplace the main position is expected to be seated. The advances that have been made in the world today regarding computers, technology and means of communication only increases the sedentary nature of the workplace, and it can only be speculated that the workplace will become more sedentary in the future.

The literature shows that the static posture that is caused due to prolonged seated or standing postures may contribute to the occurrence of LBP (60). The influence of prolonged sitting for longer than 4 hours could lead to the incidence of LBP being as high as in those people with jobs involving physical work (61, 62). Further causes of LBP due to prolonged sitting could be the reduced nutrition to the intervertebral discs and the increase in the pressure within the discs in the seated posture (23, 63). The in vivo pressures within a lumbar disc when sitting, without a support, have been found to be about 35% higher than those measured when standing. The reasons for this increased pressure in unsupported sitting postures are 1) an increase in the trunk movement when the pelvis is posteriorly rotated and the lumbar spine and torso are anteriorly rotated and 2) the deformation of the disc itself caused by lumbar spine flattening. (77)

These positions are very difficult to avoid in the banking or corporate environment. A cross sectional questionnaire survey study performed in the Philippines found that LBP would affect the work performance of the employee and that standing, sitting, bending, leaning and carrying were found to be significant factors that could lead to LBP (66).
5.6 Factors Associated with the Point Prevalence of Low Back Pain

5.6.1 Individual Factors Associated with the Point Prevalence of Low Back Pain

5.6.1.1 Age and Gender

The results of the ABSA study show a slight increase in the point prevalence of LBP, however, this is not statistically significant.

The point prevalence of LBP was 4% (4/99) in the age category 19-29 years, 12% (26/219) in the age category 30-49 years and 11% (4/37) in the age category 50-69 years. These results show that there is an 8% increase in the prevalence of LBP as the age of the population increases from the age category 19-29 years to the age category 30-49 years. The point prevalence then decreased by 1% when moving from age category 30-49 years to age category 50-69 years (figure 4.23). The literature shows that the peak prevalence of LBP is at ages 45 to 49, and this trend can be seen in the results of the study (1). Other research further shows that there is an increase in the work absence due to LBP, with an increase of age (25).

The results of this study showed that there was no statistical significance between the gender of the population and the point prevalence of LBP. The ratio was slightly higher in the female group at 62% (21/34) female and the male group at 38% (13/34). From these results it could be said that the gender of the individual will not be a causal or risk factor for LBP (7) (figure 4.22).

A comparison can be made between age and gender. This shows a very different result. There were no males who suffered from LBP in the 19-29 year age group. Thus all of those who suffered from LBP in this age group were females (4/4). There was a larger number of the female population (61.54%, 16/26) that suffered from LBP than in the male population (38.46%, 10/26) in the age category 30-49 years. The oldest age category, age 50-69, showed that there is a near total reversal from the youngest age category. The prevalence was 75.00% (3/4) in the male group and 25.00% (1/4) in the female group (figure 4.24). The trends that can be seen in the
results of this study are that there is an increased prevalence of LBP, with an increase in age in the male population and the opposite occurred in the female population. This finding is comparable to research that stated that the male population is at greater risk of suffering from LBP with an increase in age (7). The reason for the decline of the prevalence of LBP in the female group, in the different age categories has not been investigated. The prevalence of LBP was the greatest in the 20 to 50 year old age group because this age group is the largest part of the workforce (75).

5.6.1.2 Race and Point Prevalence of Low Back Pain

The point prevalence of LBP was varied over all the racial categories (6.55%-17.39%) (figure 4.25). The point prevalence was highest in the coloured and Indian groups at 15.63% (5/32) and 17.39% (4/23) respectively. The point prevalence was the lowest in the African and white groups at 6.56% (4/61) and 8.79% (21/239) respectively. The conclusion that can be made from these results was that the presence of LBP is not limited to a particular racial group.

5.6.1.3 Body Mass Index (BMI) and Point Prevalence of Low Back Pain

The BMI is seen as a more reliable indicator of risk than just the height or weight of a person, as it takes both variables into account at the same time. The point prevalence of LBP was 15.4% (10/65) in the very obese category, 8.4% (10/120) in the obese category and 8.2% (14/170) in the normal BMI category. There was a 7.2% increase in the point prevalence of LBP between the normal and the very obese category (figure 4.26). These findings were seen to be statistically insignificant but the relevance of this has a greater impact on the clinical setting as the more obese the patient, the greater the risk of LBP (68). There are different studies regarding this topic, these studies showed that there is an association between the prevalence of LBP and BMI (67, 68, 69). The results of this study might not be statistically significant but the increase seen in this study could have a clinically significant effect on LBP.
5.6.2 Working Environment Factors Associated with Point Prevalence of LBP.

5.6.2.1 Company Level

The management - professional company level was the level of the sample population that had the highest point prevalence of LBP at 50.00% (17/34). This was followed by the clerk - overseer company level at 32.35% (11/34). The semi skilled, executive and super specialist company levels were those with the least LBP prevalence of the sample population at 14.71% (5/34) and 2.94% (1/34) respectively. There was no statistical significant association between the company level and the point prevalence of LBP (figure 4.34). The managers, professionals, clerks and overseers were the two categories that had the highest prevalence of LBP; this could be due to their daily activity of increased periods of sitting or standing.

5.6.2.2 Main Daily Activity and Major Daily Position

The main daily activity that was associated with the point prevalence of LBP was computer type work at 97.05% (33/34), this was followed by telephonic work at 73.53% (25/34). Physical and administrative work was only reported to have caused LBP in 5.88% (2/34) and 14.71% (5/34) of the sample population respectively (figure 4.35).

The major daily position that was associated with the point prevalence of LBP was sitting at 91.18% (31/34). The second highest daily activity that was associated with LBP was walking at 61.76% (21/34). Standing and lifting were reported to cause LBP in 29.41% (10/34) and 11.76% (4/34) respectively in the sample population (figure 4.36).

Further causes of LBP due to prolonged sitting could be the insufficient nutrition to the intervertebral discs, due to the increase in the pressure within the discs in the seated posture (23, 63). The in vivo pressures within a lumbar disc when sitting, without a support, have been found to be about 35% higher than those measured when standing. The reasons for this increased pressure in unsupported sitting postures are 1) an increase in the trunk moment when the pelvis is posteriorly rotated and the lumbar
spine and torso are anteriorly rotated and 2) the deformation of the disc itself caused by lumbar spine flattening. (77)

These positions are very difficult to avoid in the banking or corporate environment. A study performed in the Philippines found that LBP would affect the work performance of the employee and that standing, sitting, bending, leaning and carrying were found to be significant factors that could lead to LBP. (66)

5.7 Pain Intensity (Numerical pain rating scale)

The study found that the majority of the population rated the LBP from 5-7 out of 10 (54%, 114/210). The second largest group rated the pain from 1-4 out of 10 (35%, 74/210). Only 11% (22/210) of the population reported the pain to be in the very painful, 8-10 out of 10 category (figure 4.37).

5.8 Treatment for Low Back Pain

5.8.1 Treatment Sought

Almost half, 46.94% (69/147), of the sample population sought treatment for their LBP (figure 4.38). The literature regarding this topic varies a great deal. The results vary greatly between studies, with values ranging between 5% - 73.1%, with the majority of the studies showing that care is not sought for LBP (2, 8, 20, 45, 46). The conclusions from these different results were that the greater majority of those who suffer from LBP do not seek treatment for the problem.

5.8.2 Type of Treatment Used

The majority of individuals who sought treatment for LBP in the last 6 months made use of the pharmacy. Drugs like NSAID’s and analgesics were used in 21.99% (31/141) of cases. Medical doctors were consulted in 14.89% (21/141) and physiotherapists in 17.02% (24/141) of the cases. These were the second most popular choices for the treatment of LBP in the last 6 months. Chiropractic treatment was used
by 8.51% (12/141) of the sample population. Acupuncture and private hospital treatment was used only by 0.71% (1/141) of the population studied. Biokinetics, homeopathy and osteopathy were three other disciplines on the questionnaire, but none of these disciplines were made use of as treatment options (figure 4.39).

The majority of people who suffer from LBP consult a medical doctor for treatment of the condition. The results vary greatly between studies, with values ranging between 24%- 64%. A large percentage of people, 13%- 40%, make use of chiropractic treatment. The results of the ABSA study show that the use of chiropractic treatment was possibly under utilised by the sample population compared to other studies (8.51% versus 13 -40%). (2, 3, 8)

The majority of the subjects in this study made use of the pharmacy for treatment of LBP, and this treatment can be closely related to the treatment used by medical practitioners (figure 4.39). This could possibly be due to the ease of access to a pharmacy.

5.8.3 Satisfaction of Treatment for Low Back Pain

It was reported by 85.5% (59/69) of the sample population that the care they chose to use for their treatment of LBP was effective, when the treatment was sought (figure 4.40). It is a good sign that LBP is a treatable condition and that the greater majority of the episodes of LBP can be successfully treated. The most cost effective way of doing so should be determined.
CHAPTER 6 – CONCLUSION

In this study the:
Life time incidence of LBP was 63% (225/355).
Six month prevalence was 41% (147/355).
Point prevalence was 9.6% (34/355).

The following individual factors were statistically significant factors related to the 6 month prevalence of LBP:
Trauma to the lumbar spine.

The following individual factors were not statistically significant factors related to the 6 month prevalence and the point prevalence of LBP:
Age and gender.
Race.
BMI.

The following work environment factors were statistically significant factors related to the 6 month prevalence and point prevalence of LBP:
Sitting.
Standing.

The following work environment factors were not statistically significant factors related to the 6 month prevalence of LBP:
Company Level.
Geographical location of where LBP was experienced.
Time of the day LBP was experienced.

The Company level was found not to be statistically significant factor related to the point prevalence of LBP.

In the current study treatment was sought by 46.94% (69/147) of the sample population.
The types of treatment sought included the following: pharmacy 21.99% (31/141), medical doctor 14.89% (12/141), physiotherapy 17.02% (24/141), chiropractic 8.51% (12/141), acupuncture 0.71% (1/141) and private hospital 0.71% (1/141).

This study showed that the lifetime incidence, six month prevalence and point prevalence of LBP in the South African workplace is similar to other countries in the world and that this condition is costing the South African economy millions of Rands each year due to lost working days as a result of absenteeism.

The only individual factor that seemed to be statistically significantly associated with LBP was trauma to the lumbar spine. Other factors like age, gender and race did not seem to have statistically significant effects on the prevalence of LBP. These results seem to vary pending on what studies are evaluated.

Just under half of those who suffer from LBP seek treatment for the condition. If these numbers could be increased it could lead to a healthier workforce that will then lead to a more productive and happy workforce. When evaluating what kinds of treatment were used by the study population, it was found that the majority used drugs from the pharmacy to treat the condition. This is usually treating the symptoms of the condition and not the cause.
CHAPTER 7 – RECOMMENDATIONS

More research concerning LBP in the workplace needs to be performed in the South African environment. Similar institutions to the banking workplace should be targeted to see if the results would be similar.

Different working environments could be compared to determine if any particular job has a greater prevalence for LBP.

There should be a standard questionnaire set up for these kind of studies, so that similar definitions and variables are used, as then the results could be compared directly between different studies. If this can be done the results could be compared to each other.

A pilot study should be performed to ensure that the questionnaire is set up in the correct manner, to avoid ambiguous or non-specific questions.

The under usage of chiropractic care was seen in the results, patient education regarding the benefits of chiropractic care should be assessed.

Further investigation is needed to determine what other factors such as smoking exercise, parity and diet, could be possible causes of LBP.
REFERENCES


17) Picavet HSJ, Schouten JSAG and Smit HA. **Prevalence and consequences of low back problems in the netherlands, working versus non-working population, the MORGEN-study.** Public Health 1999. (113): 73-77.


APPENDICES

Appendix A- Covering letters

TO WHOM IT MAY CONCERN

Re: Permission to conduct interviews at Absa Head Office for research purposes.

Marius de Wet is currently doing his Masters Degree in the Technology of Chiropractic.

TITLE: LOW BACK PAIN IN THE CORPORATE WORKPLACE – A SOUTH AFRICAN REVIEW

Marius will be conducting a questionnaire-based interview with respondents from his random sample. The interviews will be concluded by the end of April 2003.

As research of this nature can only benefit a corporation such as Absa, it would be appreciated if you would be willing to co-operate.

Regards

Helga Dry
Consultant: Employee Wellbeing

ABS A Bank Limited/Beperk, reg No: 1986/004794/06
Secretary Secretary, WJ Spanjaard
97
12 December 2002

ATTENTION: ABSA HEALTHCARE – HELGA DRY

LOW BACK PAIN IN THE WORKPLACE RESEARCH STUDY
- MARIUS DE WET

This letter serves to confirm the following arrangement between Marius de Wet (Researcher) and ABSA Bank:

1. The employee information provided by ABSA will only be used for the research conducted and this information will remain confidential at all times.
2. There will be no costs to ABSA Bank for conducting this research study.
3. ABSA Bank will not be held liable for any injury incurred by the researcher on its premises for the duration of the study.
4. The results of this study can be used by ABSA Bank at no cost as long as reference is given to the researcher, Marius de Wet and Technikon Witwatersrand.

Should you have any queries, please contact Marius de Wet on 082 889 5770.

Yours sincerely

[Signature]

PROF. M DUTTON
RESEARCH MANAGER: DEPARTMENT OF RESEARCH
TELEPHONE NUMBER: 011 406 2466
Appendix B- Questionnaire

LOW BACK PAIN QUESTIONNAIRE

NAME: DATE: 
TEL NUMBER: EMPLOYER NR: 
May I contact you regarding this topic in the future? YES NO 

AGE: YEARS

GENDER: MALE FEMALE

RACE: African Coloured Indian White other 

HEIGHT: CM

WEIGHT: KG

1) What company strata level are you classified under? 

2) Do you have medical aid? Yes No 

3) Your MAIN daily activity consists of which of the following activities? 
Mark ALL those that are relevant 

Telephonic work Physical work

Computer work Administrative

Other (please specify):

4) Most of the working day consist of? 

Standing Yes No

Sitting Yes No

Lifting Yes No

Walking Yes No

5) Have you EVER suffered from low back pain? Yes No 

5a) At what age did you FIRST experience the low back pain? 

0-9 10-19 20-29 30-39 40-49 50-59 60-69 70-79 80-89 NA

6) In the LAST 6 MONTHS, have you suffered from low back pain? 

1 LBP 2 LBP with lower limb pain

3 NO LBP

6a) If 1 or 2, how many episodes of LBP have you had in the LAST 6 MONTHS? 

1 2 3 4 5 6 7 8 9

10 11 12 13 14 15+
7) Are you PRESENTLY suffering from LBP?
   1 LBP  2 LBP with lower limb pain  3 NO LBP

7a) If 1 or 2, is the LBP?  Constant  Intermittent

7b) How long do the episodes of low back pain last, in days?

   1  2  3  4  5  6  7  8  9
   10 11 12 13 14 15+ NA

8) Rate your current low back pain on the following scale,
   0=no pain and 10=worst pain ever

   0  1  2  3  4  5  6  7  8
   9  10

9) At which of the following times do you mainly suffer from low back pain?

   Morning  Afternoon  Night  Constantly  Varies

10) At which of the following places do you normally suffer from low back pain?
   Home  Work  Both

11) Do you think the work place is the cause of your LBP episodes?  Yes  No

12) Was it necessary to take SICK LEAVE for the latest incident?  Yes  No

12a) If YES, how many days were you off sick for the WORST INCIDENT?

   1  2  3  4  5  6  7  8  9
   10 11 12 13 14 15+ NA

13) Are you presently receiving ANY treatment for your low back pain?  Yes  No

14) What kind of the treatment do you use?

   Acupuncture  Medical doctor  Private Hospital
   Biokinetics  Osteopathy  Public Hospital
   Chiropractic  Pharmacy, etc.  Other: __________________
   Homeopathy  Physiotherapy

15) Do YOU feel that the treatment used helped your LBP?  Yes  No

16) Do you know the cause for the LBP?  Yes  No

16a) If YES, please specify the cause __________________________

17) Have you had any Trauma to the low back?  Yes  No

18) Have you undergone any surgery for the LBP?  Yes  No

19) Did your medical aid cover all the treatment costs?  Yes  No
20) Do you exercise regularly?  
Yes  No

20a) What type of exercise do you do?  
Swimming  Running  Weight training  
Cycling  Other:  

20b) Average number of exercise sessions per week?  
1  2  3  4  5+  NA

20c) Average duration of typical exercise session? (in minutes)  
1-14  15-29  30-44  45-60  60+  NA

21) Do you think the Health care clinic is beneficial?  
Yes  No

21a) If YES, what kind of disciplines would you like?  
Acupuncture  Massage therapy  Pharmacy, etc.  
Biokinetics  Medical doctor  Physiotherapy  
Chiropractic  Nurse  Other:  
Dentist  Osteopathy  
Homeopathy  Optometrist
Appendix D-Consent form

Dear Participant

The purpose of this study is to determine the number of people in the corporation that have suffered from Low Back Pain (LBP) at one of the following times:

1) At any point in your life.
2) In the last six months.
3) Currently suffering from low back pain.

You must be over the age of 18 years to be able to participate in this study. After you have been selected to participate in this study, you will have to complete a questionnaire that will be conducted by me.

All the information that will be given is strictly confidential, and your employer will only receive the final figures of the study. Your employer will not know who has completed the questionnaire. Your details are only needed for my personal use if I need to contact you at later stage regarding the study.

Participation in this study is voluntary and you are free to refuse to participate or to withdraw your consent at any time. A signed copy of the consent form will be made available to you. I have fully explained the procedures and have answered all your questions you have had to the best of my abilities.

Date: __________________________ Researcher: _____________________

I have been full informed as to my rights and as to the procedure to be followed in this study and I understand that I am able to withdraw my consent at any time. I know that any questions, which I may have, will be answered.

Date: __________________________ Participant: _____________________
Appendix E-Questionnaire post-coding

Age in years entered in a year value.
Then categorised into “age_cat” as follows:

- 0-19 years = 0
- 20-39 years = 1
- 40-59 years = 2
- 60+ years = 3

Height in centimetres entered in whole numbers.
Weight entered in kilograms.

Body Mass Index (BMI) is weight in kilograms divided by the height in meters squared.

BMI is divided into 3 categories:

- Normal (<25) = 0
- Obese (25-30) = 1
- Very obese (>30) = 2

Gender: Male = 1 Female = 2
Race: African = 1 Coloured = 2
Indian = 3 White = 4

Q1: Company strata:
- Semi Skilled = b
- Clerk = c
- Executive = e
- Top Executive = f
- Management = m
- Professional = p
- Super Specialist = s
- Overseer = t

Company strata was grouped into strata categories as follows:

- Semi Skilled = 0
- Clerk and Overseer = 1
- Management and Professional = 2
- Super Specialist, Executive and Top Executive = 3

Q3: Main daily activity
Each activity was coded individually with a yes and no option.

- Telephonic work
  - Yes = 1
  - No = 2
- Computer work
  - Yes = 1
  - No = 2
- Physical work
  - Yes = 1
  - No = 2
- Administrative work
  - Yes = 1
  - No = 2
Meetings   Yes = 1   No = 2

Q4: Most of the working day consists of what activity
   Each activity was code individually with a yes and no option.
   Standing   Yes = 1   No = 2
   Sitting    Yes = 1   No = 2
   Lifting    Yes = 1   No = 2
   Walking   Yes = 1   No = 2

Q5: Have you ever suffered from LBP?   Yes = 1   No = 2

Q5a: First age of onset?
   0-9 years = 0   10-19 years = 1   20-29 years = 2
   30-39 years = 3   40-49 years = 4   50-59 years = 5
   59-69 years = 6

These age of onset categories were then categorised further into the category
“age_1st”follows: 0-19 years = 0   20-39 years = 1
   40-59 years = 2   60+ years = 3

Q6: LBP in the last 6 months
   LBP Only = 1
   LBP with pain radiating down the legs = 2
   No LBP = 3

Q6a: How many episodes in the last 6 months?
   A scale from 1-15+ days was used and coded accordingly: 1 = 1, 2 = 2 ... 15+ = 15.

Q7: Have you got LBP at time of the interview?
   LBP Only = 1
   LBP with pain radiating down the legs = 2
   No LBP = 3

Q7a: Is the pain constant or intermittent?
   Constant = 1   Intermittent = 2
Q7b: How long do the episodes last in days?
A scale from 1-15+ days was used and coded accordingly: 1 = 1, 2 = 2 …15+ = 15.

Q8: Rate the pain intensity from 0 = no pain to 10 = worst pain ever
A scale 0 = 0, 1 = 1…10 = 10, was used for coding.

Q9: When did you suffer from the LBP?
- Morning = 1
- Afternoon = 2
- Night = 3
- Constantly = 4
- Varies = 5

Q10: Where do you suffer from the pain?
- Home = 1
- Work = 2
- Both = 3

Q11: Do you think the work place was the cause of the LBP?
- Yes = 1
- No = 2

Q12: Did you take sick leave for LBP?
- Yes = 1
- No = 2

Q12a: If yes in Q12; how many days?
A scale from 1-15+ days was used and coded accordingly: 1 = 1, 2 = 2 …15+ = 15.

Q13: Are you receiving any treatment for the LBP?
- Yes = 1
- No = 2

Q14: What kind of treatment?
- Acupuncture
  - Yes = 1
  - No = 2
- Biokinetics
  - Yes = 1
  - No = 2
- Chiropractic
  - Yes = 1
  - No = 2
- Homeopathy
  - Yes = 1
  - No = 2
- Medical doctor
  - Yes = 1
  - No = 2
- Osteopathy
  - Yes = 1
  - No = 2
- Pharmacy
  - Yes = 1
  - No = 2
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<tr>
<td>Public hospital</td>
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<td>Q15: Do you think the treatment helped?</td>
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<td>Q16: Do you know the cause of the LBP?</td>
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<td>Q17: Have you had trauma to the back?</td>
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<td>Q18: Have you had surgery to the back?</td>
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<td>Q19: Does medical aid cover all the costs?</td>
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<td>Q20: Do you exercise regularly?</td>
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<td>Q21: Do you think the health clinic is beneficial to you?</td>
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Appendix F- Description of the variables and their levels (Reference coding)
(These codes were used for the logistic regression analysis- Table 4.3)

Y = Presence of LBP (outcome) where. Yes = 1 No = 0

X1 = Age in year category 30-49 years, Yes = 1 No = 0
X2 = Age in year category 50-69 years, Yes = 1 No = 0
X3 = Gender, where Male = 0 Female = 1
X4 = Race, where Coloured, Yes = 1 No = 0
X5 = Race, where Indian, Yes = 1 No = 0
X6 = Race, where White, Yes = 1 No = 0
X7 = BMI, where Obese, Yes = 1 No = 0
X8 = BMI, where Very Obese, Yes = 1 No = 0
X9 = Trauma, if trauma was experienced Yes = 1 No = 0
X10 = Telephone work done Yes = 1 No = 0
X11 = Computer work done Yes = 1 No = 0
X12 = Physical work done Yes = 1 No = 0
X13 = Prolonged sitting Yes = 1 No = 0
X14 = Prolonged standing Yes = 1 No = 0
X15 = Prolonged walking Yes = 1 No = 0