AN EPIDEMIOLOGICAL INVESTIGATION OF LOW BACK PAIN IN A FORMAL BLACK SOUTH AFRICAN TOWNSHIP

Dissertation submitted in partial compliance with the requirements for the Master's Degree in Technology: Chiropractic, in the Department of Chiropractic at the Technikon Natal.

by

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I, Anthony Grey van der Meulen, declare that this dissertation represents my own work, both in conception and execution.

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This dissertation is dedicated to my grandfathers,

William Crocker and Henry van der Meulen.

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ABSTRACT

Epidemiological studies on low back pain (LBP), conducted in a number of countries, strongly suggest that LBP is internationally a very common condition, imposing a significant social and economic burden on society. It however appeared that the epidemiology of LBP among the black population of South Africa had not yet been investigated. The purpose of this study was to determine the prevalence of LBP in the formal black South African township of Chesterville, and to assess the extent to which LBP adversely affects the lives of the residents, in order to establish the need for specialized low back care in this community. A further aim of the study was to assess the associations between certain individual factors and the prevalence of LBP.

A population-based epidemiological survey on LBP was conducted on a sample of 1 000 residents of the township of Chesterville. After a pilot survey of 25 households suggested that the characteristics of the households in Chesterville were fairly similar with respect to the objective of the study, a clustered sample of 300 lots was selected from a layout map of Chesterville. All residents, aged 13 or older, living on these lots were interviewed by the researcher until a sample of 1 000 subjects had been achieved. The total population of Chesterville is approximately 20 000; hence the sample size covers 5% of the population of study.

The lifetime incidence of LBP was 57.6% (lifetime incidence group) and the prevalence 53.1% (prevalence group). Of those subjects in the lifetime incidence group, 89.8% reported experiencing chronic (longer than 6 months duration) LBP. In 31.8% of the prevalence group, their LBP was mild and in 68.2% the pain was moderate (44.8%) or severe (23.4%). LBP occurred occasionally in 69.7% of the prevalence group, frequently in 23.2% and constantly in 7.2%. Referred lower limb pain was associated with LBP in 24.1% of the prevalence group. LBP caused difficulty bending in 77.4% of the prevalence group and 59.1% reported difficulty lifting due to their LBP. Of those subjects in the prevalence group, 53.9% (n=286) were presently receiving treatment or medication for their LBP, of whom 90.9% (n=260) were receiving allopathic medication in the form of analgesics, anti-inflammatories or muscle relaxants. The source of this medication was, in decreasing order of frequency, the local community health clinic (36.4%); chemists or shops (25.2%); public hospitals (13.6%); friends, family or employers (11.2%); private doctors (7.7%) and traditional healers (5.9%). Cross-tabulation between the presence of LBP and various individual factors, and use of the Pearson chisquare test as well as logistic regression analysis, revealed significant associations between LBP and age, gender, height, weight, body-type, physical exercise, parity and employment status.

The results of this study suggest that LBP occurs commonly among the population of Chesterville, and adversely affects the lives of many of those affected. The high prevalence of LBP in Chesterville, the high level of care-seeking for this condition and the apparent heavy reliance on drug-therapy, suggest that more specialized approaches to low back care could fulfill a valuable role in Chesterville's community health care system.

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CHAPTER 1 INTRODUCTION

Chesterville is a formal black township with a population of approximately 20 000 people. It is situated in the Durban Functional Region, approximately 15 kilometers from Durban's central business district and can therefore be regarded as an urban settlement. Chesterville was traditionally established for residence of blacks only and still has a 100% black population. Although a number of informal dwellings have recently been erected, Chesterville is still predominantly a formal township, in that it has formal houses, roads, water and electricity supply.

Black people constitute approximately 75% of the South African population (University of South Africa, 1989). About 40% of the black population live in urban areas (Calitz, 1991). Formal townships like Chesterville, on the fringe of urban centers, were established specifically and solely for settlement of black people, and it can thus be assumed that the majority of the urban black population live in such townships. Anecdotal evidence, such as from nursing sisters at Chesterville's community clinic (Sister Salim 1996) suggests that low back pain (LBP) is a common problem in Chesterville. However, a review of the related literature, as well as communications with orthopaedic surgeons (Buchan, 1996) seems to indicate that no epidemiological studies on LBP have been conducted among the black population of South Africa.

Numerous studies on LBP, conducted in countries such as the USA (Damkot et al. 1984; Reisbord and Greenland 1985; Carey, Evans et al. 1995), Sweden (Horal 1969; Svensson and Andersson et al. 1983,1990; Balagué et al. 1995), Denmark (Biering-Sørensen 1982; Leboeuf-Yde et al. 1996), Belgium (Masset and Malchaire 1994) and Russia (Toroptsova et al. 1995), strongly suggest that LBP is an extremely common condition. The findings of these researchers seem to support the statement by Cassidy and Wedge (1984: 4), that between 60% and 80% of the general population will suffer from LBP at some stage of their lives, and between 20% and 30% are suffering from it at any given time.

Although most cases of LBP are transient (Schofferman et al. 1993; Carey, Garrett et al. 1995), a number of those affected develop chronic or recurrent LBP (Horal 1969; Rowe 1969; Carey, Evans et al. 1995) which frequently produces disability or limitation of activity (Rowe 1969; Nagi et al. 1973; Roncarati and McMullen 1988; Balagué et al. 1995). Research has also indicated that LBP is a leading cause of work-absence (Rowe 1969; Frymoyer et al. 1980; Carey, Evans et al. 1995; Carey, Garrett et al. 1995) and physician-visits (Nagi et al. 1973; Frymoyer et al. 1980; Cherkin and Deyo 1993; Carey, Evans et al. 1995). It therefore appears that LBP is an international phenomenon, commonly affecting all population groups and imposing a significant social and economic burden on society.

Townships such as Chesterville have traditionally been underprivileged, and the residents of these communities have been subject to unique socio-economic and psycho-social conditions. In general, their exposure and access to health services has been limited due to physical (e.g. transport) and financial constraints. It has been found by a number of

researchers (Nagi et al. 1973; Reisbord and Greenland 1985; Carey, Evans et al. 1995) that people in lower socio-economic classes report LBP more frequently than those in upper socio-economic classes. It has also been reported that the prevalence of LBP, level of disability experienced and the chronicity of LBP are complicated by socio-economic (Volinn et al. 1988; Sanderson et al. 1995) and psychological stresses (Frymoyer et al. 1980; Schofferman et al. 1993; Burton et al. 1995). Such stresses are likely to be experienced by the residents of Chesterville, suggesting that the prevalence of LBP and its impact on the population could well be significant.

As noted by Kelsey et al. (1992: 538), most epidemiological investigations on LBP have been conducted in Scandinavia, where little racial heterogeneity exists. The majority of evidence however seems to suggest that the prevalence of LBP among blacks and whites is roughly equal (Nagi et al. 1973; Reisbord and Greenland 1985). Mijiyawa (1993) similarly found that LBP among the black population of West and Southern Africa is as common as in Europe.

The purpose of this study was to determine the prevalence of LBP in the township of Chesterville, and to assess the extent to which LBP adversely affects the lives of the residents, in order to establish the need for specialized low back care in this community. The data obtained from this study should provide valuable information regarding the prevalence of LBP in Chesterville, the nature of LBP experienced and help indicate those people who are most affected. A further aim of this study is to determine the frequency and level of disability experienced due to LBP, the effect of LBP on occupation as well as obtaining information on the level and nature of care-seeking for LBP. This study should

also provide information concerning associations between LBP and various individual factors (age, gender, anthropometry, smoking, physical exercise, parity and employment status) which may help in the identification of possible risk factors.

Due to the similar physical, socio-economic and psycho-social conditions experienced by the inhabitants of townships such as Chesterville, the results of this study may also be representative of the many other formal black townships throughout South Africa. More rational and effective health care management strategies are needed for LBP (Lee 1994). By helping to establish the magnitude of the problem of LBP in Chesterville and thus the need for low back care, this study may be an important step towards the development of strategies which could be directed at the prevention and more effective management of LBP in this and other similar communities.

CHAPTER 2 REVIEW OF THE RELATED LITERATURE

2.1 Introduction

A review of the related literature as well as communications with orthopaedic surgeons (Buchan 1996) seems to indicate that no epidemiological investigations on LBP have been conducted among the black population of South Africa. However, studies conducted in various other countries (Horal 1969; Gyntelberg 1974; Biering-Sørensen 1982; Svensson and Andersson 1983; Damkot et al. 1984; Reisbord and Greenland 1985; Masset and Malchaire 1994; Toroptsova et al. 1995; Leboeuf-Yde et al. 1996) suggest that LBP is an extremely common disorder affecting the majority of people at some stage of their lives.

Although studies by Schofferman et al. (1993) and Carey, Garrett et al. (1995) suggest that LBP is often a benign self-limiting condition, it seems that a substantial proportion of those who develop LBP suffer from chronic or recurrent pain (Horal 1969; Rowe 1969; Carey, Evans et al. 1995), which often results in long-term disability or limitation of activity (Rowe 1969; Nagi et al. 1973; Roncarati and McMullen 1988; Balagué et al. 1995). People with LBP frequently seek medical attention for this problem (Nagi et al. 1973; Gyntelberg 1974; Frymoyer et al. 1980; Cherkin and Deyo 1993; Carey, Evans et al. 1995), and a number of researchers (Cherkin and Deyo 1993; Lee 1994) have identified a need for improved health care management for this common ailment. This may be particularly relevant in South African

township populations, as it has been found that LBP and its associated disability are experienced more frequently by people in lower socio-economic classes (Nagi et al. 1973; Gyntelberg 1974; Reisbord and Greenland 1985; Carey, Evans et al. 1995).

Although LBP has over the years been the focus of much epidemiological research, the magnitude of the problem in formal black South African townships has not yet been investigated.

2.2 The lifetime incidence and prevalence of low back pain

Prevalence and incidence are measures of the magnitude of the problem of LBP. Prevalence is defined as a measure of the number of people in a given population who have a symptom or disease at a particular time. Consequently, the one-year prevalence of LBP is a measure of all those with LBP identified over a one-year period, regardless of whether the problem began during or before the study period. Point-prevalence indicates the number of people with LBP at a specific point in time. Incidence is the rate at which healthy people develop a new symptom or disease over a specified period of time. The lifetime incidence of LBP therefore reflects the number of people who develop LBP at some stage during their lifetime. (Borenstein et al. 1995: 22.)

Horal (1969) conducted a study on a random sample of inhabitants of Gothenburg, Sweden. A group of people who had been sick-listed for low back disorders (probands) was selected and compared to a group of controls (matched for age and sex) who had not been sick-listed

for LBP. A total of 212 matched pairs were studied. On some occasion, intense pain or ache in the lumbar spine had been experienced by 83.3% of the probands and 63.8% of the controls. The prevalence of LBP at the time of examination was 50.9% in the probands and 26.4% in the controls. In this study, the control group is more likely to be representative of the general population as the probands only included subjects with a history of low back trouble, who were thus more likely to suffer from LBP.

In a Danish study by Gyntelberg (1974), of 4 753 male residents of Copenhagen, aged 40 to 59, it was reported that 25.7% of the men had experienced LBP during the year of observation. The one-year prevalence of LBP in this study is similar to that (31.5%) reported by Toroptsova et al. (1995), but considerably lower than was found by Masset and Malchaire (1994), who reported that just over half of a sample of 618 male factory workers in Belgium had suffered from LBP during the previous year.

Another Danish study was conducted by Biering-Sørensen (1982), who studied 928 male and female residents of Glostrup, aged exactly 30, 40, 50 and 60 years old. The lifetime incidence of LBP, defined as "any pain or trouble with the lower part of the back", was 62% and the one-year prevalence, 44.9%.

Svensson and Andersson (1983) studied a sample of 940 men aged 40 to 47 years old, which was randomly selected from the census register to represent the male population of that age in the city of Gothenburg, Sweden. LBP was defined as all conditions of pain, ache, stiffness or fatigue localized to the lower back. The lifetime incidence of LBP was 61% and the prevalence (those with current symptoms or problems occurring at least once a month) 31%.

Another Swedish study, using the same definitions of LBP, was conducted by Svensson et al. (1990) on a random sample of 1 746 women aged 38 to 64 years. The lifetime incidence of LBP in this study was 66% and the prevalence 35%.

In an American study by Damkot et al. (1984), 303 men 18 to 55 years old were interviewed, of whom 66% reported a history of, or presently experiencing moderate (44%) or severe (22%) LBP, while Balagué et al. (1995) reported the lifetime incidence of "non-specific LBP" in a sample of 615 Swiss schoolchildren, aged 12 to 17, to be 51%.

Many researchers have investigated the prevalence of LBP among industrial workers. Masset and Malchaire (1994) studied a sample of 618 male blue-collar workers, younger than 40 years of age, from two major steel industries in Belgium. The lifetime incidence of low back trouble; including the definitions "common LBP", "lumbago" and "low back fatigue"; was 68.9%, while the prevalence during the last year was 50.6% and during the week prior to the interview 24.4%. Toroptsova et al. (1995) investigated 701 workers (men and women) aged 18 to 65 years from a machine-building factory in Russia. Subjects who reported pain lasting more than 24 hours in the area below the 12^{th} rib and above the gluteal fold were considered to have LBP. The lifetime incidence of LBP was 48.2%. The prevalence of LBP during the past year was 31.5% and the point-prevalence at the time of questioning was 11.5%.

The lifetime incidence (48.2% to 83.3%) and prevalence (11.5% to 50.9%) rates for LBP vary quite widely among the studies mentioned above. This is may be due in part to differences in the nature of the sample populations, such as the age group, as well as the different definitions of LBP used by the researchers. For example, one would expect the

lifetime incidence of LBP in a sample of schoolchildren (Balagué et al. 1995) to be lower than that among a group of adults in their forties (Svensson and Andersson 1983). Furthermore, a study in which LBP is defined as an episode lasting more than 24hrs (Toroptsova et al. 1995), or one which only includes episodes of severe LBP (Horal 1969), is likely to have a lower incidence than a study which includes all episodes of LBP (Svensson and Andersson 1983). Incidence and prevalence rates may also be affected by the method of data collection. Svensson and Andersson (1982) found that lifetime incidence rates based on interviews tend to be an underestimation. In a random sample of Swedish men aged 40 to 47 years, Svensson and Andersson (1982) found an 11% difference between the lifetime incidence rate obtained from interviews (61%) and that obtained from insurance records (72%). This difference occurred because some of the subjects had forgotten that they had been sicklisted for LBP. Svensson et al. (1990) similarly state that, due to the problem of recall, data on lifetime incidence must be considered to be lower than the actual values, but state that prevalence data is quite accurate.

2.3 The natural history of low back pain

2.3.1 Often a self-limiting condition

The findings of Dixon (1973), Bergquist-Ullman and Larsson (1977) and Schofferman et al. (1993) suggest that many episodes of LBP are transient, resolving spontaneously or with conservative care. Dixon (1973) states that of those individuals who consult family doctors with LBP, 44% are better within a week and 86% are better in a month; while Bergquist-Ullman and Larsson (1977) found that 35% of LBP patients recovered in a month, 70% within 2 months and 86% within 3 months.

Carey, Garrett et al. (1995) conducted a prospective observation of 1 555 patients presenting to various practitioners (primary care physicians, orthopaedic surgeons and chiropractors) with acute LBP. Only patients who had not received previous care for their pain were included in the study. The majority of patients experienced rapid improvement regardless of which practitioner they visited or the type of treatment received. The mean period to functional recovery was 16 days, and only 5% of the patients had not reported functional recovery by the end of the 6-month study period.

Toroptsova et al. (1995) studied a random sample of 701 (339 men and 362 women) Russian factory workers. Of the 221 workers who had experienced LBP at some time during the previous year, 88.2% reported that the episode had lasted less than 2 weeks.

2.3.2 The recurring nature of LBP

Although it seems from the findings of the above-mentioned researchers that many cases of LBP enjoy a quick, uncomplicated recovery, the results of a number of other studies suggest that a significant proportion of those affected by LBP suffer from frequent or recurrent episodes, which may develop into a chronic debilitating health problem. Horal (1969) reported on the prevalence of recurring or persistent LBP in subjects with LBP in Gothenburg, Sweden. Such symptoms occurred in 90% of the probands (group of subjects who had previously been sicklisted for LBP) who had LBP, and 66.7% of the controls (subjects who had not previously been sicklisted for LBP) with LBP. In this study 12% of the probands were experiencing almost constant LBP. Furthermore, in a study of 500 men referred for orthopaedic opinion because of LBP, Rowe (1969) found that the episodic nature of LBP was an outstanding feature of the history in 85% of the subjects. More than half of the men in the study reported experiencing acute attacks of disabling LBP of 3 to 10 days duration occurring at intervals of 3 months to two or three years.

In a random sample of the population of Gothenburg, Sweden, Nagi et al. (1973) found that 18% of the population reported often being bothered with LBP. Similarly, Biering-Sørensen (1982) reported that 17% of subjects who had experienced LBP in the preceding year, complained of daily pain; while Reisbord and Greenland (1985), in a study of 2 762 Americans, found the prevalence of frequent LBP, experienced in the year prior to the interview, to be 18%.

An investigation by Svensson and Andersson (1983) on a random sample of 940 Swedish men from 40 to 47 years of age, further suggests that LBP is often characterized by frequent or recurring episodes. At the time of the examination, 31% of the men were experiencing ongoing pain or symptoms occurring at least once a month, and 16% of the men reported ongoing pain either daily or occurring at least twice a week. In a study of 928 inhabitants of Glostrup, Denmark, Biering-Sørensen (1983) reported that among those with a history of LBP, 23% to 31% experienced pain daily or at least once per week.

More recently, Hurwitz (1994) reported that of a sample of 290 patients presenting to practitioners with LBP, 76.5% had a long history of pain or experienced recurrent problems. Toroptsova et al. (1995) found that among a sample of 338 Russian factory workers with a history of LBP, 65.4% reported experiencing occasional episodes of LBP and 22.8% complained of frequent pain, of which 10.1% had symptoms every month and 12.7% had several episodes each week.

The findings of Horal (1969), Balagué et al. (1995) and Masset and Malchaire (1995) suggest that between 4% and 12% of people with LBP experience constant or almost constant pain.

2.3.3 Chronic low back pain

The definition of chronic LBP seems to vary among different authors and researchers. Cassidy and Wedge (1984: 4) define chronic LBP as pain that has persisted for longer than 6 months. It has been found by Horal (1969), Bergquist-Ullman and Larsson (1977) and Carey, Garrett et al. (1995) than only 5% to 7% of people who develop LBP still report having pain or functional limitation after 6 months.

Carey, Evans et al. (1995) in their study of chronic LBP in North Carolina, classified subjects as "chronic" if they were functionally limited for more than 3 months or had more than 25 spells in the last year. In this random telephone survey of 4 437 subjects in North Carolina (Carey, Evans et al. 1995) it was found that chronic LBP affected 3.9% of the adult population.

Damkot et al. (1984) studied LBP in a sample of 303 men aged 18 to 55 years old. Sixty-six percent of the men had experienced or were experiencing moderate to severe LBP. Of these men, only 27% had LBP for 5 years or less, 27% for 6 to 10 years, 28% for 11 to 20 years and 17% for 21 years or longer. Thus, in this study, at least 73% of men who reported LBP at the time of the investigation were chronic LBP sufferers.

These studies suggest that even though most episodes of LBP are likely to resolve spontaneously, a number of people who develop LBP suffer from frequent recurrences or even constant pain. These recurring episodes often affect the individual for many years and may progress into a chronic, even life-long state. It seems likely that LBP of this nature could seriously impair the lifestyles of the people affected, resulting in a deteriorating quality of life.

2.4 The nature of onset of LBP

In many cases of LBP the onset is gradual, and there is often no convincing relationship between the onset of low back attacks and an obvious enciting event (Rowe 1969). In a study lasting ten years, of 2 000 male employees at the Kodak Works Company, Rowe (1969) found that only 15 % of the men with LBP could clearly relate the onset of their LBP to a definite injury and a further 20% could make a possible connection between backache and some unaccustomed activity. Bergquist-Ullman and Larsson (1977), in their study of 217 LBP patients in Copenhagen, similarly found that in the majority (56%) of cases, the pain had started gradually.

The prevalence of accident-related onset, as reported in studies by Frymoyer et al. (1980) and Hurwitz et al. (1994), is however a lot higher than that reported by Rowe (1969). Frymoyer et al. (1980) found that 19.4% of people with LBP reported a gradual onset, and 54.7% related the onset to a specific precipitating event such as lifting, falling or a motor vehicle

accident; while Hurwitz et al. (1994) found that in 34% of cases of LBP, the pain started due to an injury.

Damkot et al. (1984) found a clear difference between subjects with severe LBP and those with moderate LBP when investigating the relationship between the onset of LBP and a specific or sudden incident. Of the 303 men interviewed, 201 stated that they were presently experiencing or had previously experienced moderate or severe LBP. The pain was reported to have started suddenly by 70.6% of those with severe LBP, while only 37.8% of the moderate LBP group related the onset of LBP to a specific and sudden event. Damkot et al. (1984) suggest that this difference may be due to the mechanical overload applied to the back, which is more likely to occur with LBP of acute onset, resulting in more severe pain or ongoing symptoms.

2.5 The intensity of low back pain and the frequency of referred limb pain

When investigating the intensity of LBP in general population samples, Svensson and Andersson (1983) reported that severe LBP, at the time of examination, was experienced by 16% of Swedish men, and Damkot et al. (1984) found that severe LBP, either presently or at some stage, was experienced by 22% of American men and moderate LBP by 44%.

In an American study, which included 399 subjects with LBP, Frymoyer et al. (1980) found that mild pain was reported by 30%, moderate pain by 46% and severe pain by 24% of those with LBP. Svensson and Andersson (1982) similarly reported, in a study of 940 Swedish men, that mild, moderate and severe LBP accounted for 30%, 44% and 25% of cases of LBP respectively.

Damkot et al. (1984) reported that severe LBP accounted for 34% of the cases of LBP and moderate LBP for 66%. In their study of Russian factory-workers, Toroptsova et al. (1995) found that of the subjects who had experienced LBP during the previous year, 54.3% reported dull pain, 17.2% stiffness or moderate pain and 28.5% acute or severe pain. The proportion of LBP subjects reporting intense pain (67%) was however a lot higher in the study by Bergquist-Ullman and Larsson (1977). This study included only individuals with acute or sub-acute LBP, which was severe enough to seek medical attention, which may account for the high frequency of intense pain.

The frequency with which referred lower limb pain is associated with LBP varies according to the definition of referred pain used by the author. Borenstein (1995: 22) states that sciatica (pain radiating along the course of the sciatic nerve to one or both legs to below the knee) is present in about 25% of those with low back problems. Horal (1969) similarly found that sciatica was present in 22% of people who had previously been sicklisted for LBP (probands) and in 10.7% of the subjects who had not been sicklisted for LBP (controls). The prevalence of pain radiating to the gluteal region or thigh, in a group of LBP patients, was reported by Bergquist-Ullman and Larsson (1977) to be 26%; while Svensson and Andersson (1982)

reported that of those men with LBP, about 40% had sciatica (pain radiating from the back down one or both legs).

When less specific definitions of referred pain are used (Gyntelberg 1974; Mellin and Hurri 1990; Hurwitz 1994; Toroptsova et al. 1995), the prevalence of associated lower limb pain tends to be much higher. Gyntelberg (1974) found that 42.7% of subjects with LBP experienced pains from the back radiating down the legs. Similarly, Hurwitz (1994) and Toroptsova et al. (1995) both found referred lower limb pain to be present in a large proportion of LBP sufferers. Hurwitz (1994) reported that 56.2% of patients presenting to practitioners with LBP, complained of pain radiating to the lower limb, while Toroptsova et al. (1995) found that radiation of pain to the legs occurred in 117 of the 221 subjects who had experienced LBP episodes during the previous year; a prevalence of 52.9%.

A study in Finland by Mellin and Hurri (1990) investigated the prevalence of referred limb symptoms (RLS), including pain, numbness, cramps or weakness in 338 subjects aged 36 to 55, who suffered from chronic or recurrent LBP but had no signs of nerve root affections. RLS during the "few months" preceding the study were experienced by 17% daily and 22% occasionally. Pain was the most common RLS and was experienced by 71% of these subjects. The occurrence of RLS was associated with increased levels of LBP and disability. The overall prevalence of RLS at some stage was 73%. The authors suggest, that due to the frequency of previous RLS, that RLS are transient and probably associated with exacerbations of LBP. Frymoyer et al. (1980) similarly found that the prevalence of referred limb pain was more common in subjects with severe LBP (55%) than in those with moderate LBP (29%).

It therefore appears that a considerable proportion of LBP sufferers experience moderate to severe pain and that at least one quarter of cases of LBP are associated with referral of pain into the lower limbs. The prevalence of referred limb pain seems to rise with an increase in the intensity of the LBP.

2.6 Disability due to low back pain

It seems from the findings of a number of researchers, that LBP often results in disability or limitation of activity among those affected. In an American study by Nagi et al. (1973) it was found that of a group of 203 subjects with frequent LBP, 90 (40%) had some degree of functional limitation due to their pain. Lifting and carrying was limited in 25.1%, bending or kneeling in 30.5% and walking in 15.8% of those with LBP. Bergquist-Ullman and Larsson (1977), in a sample of 217 acute and sub-acute LBP patients, found that the daily activities most limited by LBP were bending and sitting. Bending forward was associated with pain in 80% of LBP patients and sitting caused pain in 73%. Furthermore, walking was associated with pain in 40% of the LBP patients and 23% reported sleep disturbance due to their LBP.

Svensson and Andersson (1982) studied a sample of 940, 40 to 47 year old Swedish men . It was found that the men with LBP had greater difficulty sitting, standing and walking without pain for long periods of time and were less able to manage different activities of daily living when compared to men without LBP. The men with LBP also had greater difficulty lifting.

Damkot et al. (1984) interviewed 303 men aged 18 to 55 years and found that 22% of the men reported severe and frequently disabling LBP. Similarly, an episode of disabling LBP within the last month was reported by 24.3% of a random sample of Swedish schoolchildren (Balagué et al. 1995).

Valkenburg and Haanen (1982) conducted a study (known as the 'EPOZ' Study) between 1975 and 1978 on 6 584 residents of the Dutch City of Zoetermeer. Of the 3 608 subjects with a history of LBP, 34.3% had stayed in bed at some stage due to their pain. In a study conducted in the United States, Roncarati and McMullen (1988) found that a group of subjects with LBP had been confined to full bed rest for 5 or more days within the 12 months before the study started, more often than subjects without LBP. The findings of Carey, Evans et al. (1995) however suggest that most episodes of severe disability requiring bed rest are only brief, as the median number of bed-disability days during the study year, among a group of chronic LBP patients, was only 3. In this study (Carey, Evans et al. 1995), 34% of the subjects with chronic LBP considered themselves permanently disabled from employment due to their back problem. Furthermore, Masset and Malchaire (1994) found that 11% of workers in the steel industry in Belgium reported having been significantly limited in their occupation and/or domestic activities due to LBP.

Although Carey, Evans et al. (1995) suggest that periods of incapacitation due to LBP are usually brief, Burton et al. (1995) found that persisting disability of some degree is common. Burton et al. (1995) studied 252 patients seeking primary care for a new occurrence of LBP.

A LBP disability questionnaire completed one year after presentation revealed that 53% of the patients were still disabled to some extent.

2.7 Work-absence due to low back pain

Numerous investigations, including industrial and population-based studies (Rowe 1969; Svensson and Andersson 1983; Damkot et al. 1984; Masset and Malchaire 1994; Toroptsova et al. 1995) have shown that at least half of the working population will be affected by LBP at some stage during their working career and that LBP is a leading cause of work absence (Rowe 1969).

Rowe (1969) studied the entire division of the Kodak Park Works in the United States from 1956 to 1965. Over this period, lost time from work due to LBP averaged 4 hours per man per year, and was second only to upper respiratory tract infection in medical reasons for work-absence. Rowe (1969) also examined the work and medical records of 140 men aged 62 to 65 just prior to their retirement. In this group of long term employees, 35 (25%) had lost time from their job at some stage due to LBP.

Gyntelberg (1974) studied a sample of 4 753 employed males aged 40 to 49, and found that subjects with LBP had been absent from work more often than the men without LBP. This association between LBP and work absence was statistically significant. In this study, 31.6%

of the men with LBP had been absent from work at some stage during the study year because of their LBP.

Frymoyer et al. (1980) conducted a retrospective study of all patients older than 18, entering an American family practice unit between 1975 and 1978. Among a sample of 399 LBP subjects, a mean of 5.6 days had been lost from work due to LBP during the 3-year study period. In a study of patients presenting to practitioners with acute LBP, Carey, Garrett et al. (1995) found that the mean number of days of work missed in the previous month due to LBP was nearly 3; and Carey, Evans et al. (1995) reported that in a group of chronic LBP sufferers, the median number of days off work during the study year was 3.

LBP often necessitates modifications or even a total change of occupation. Valkenburg and Haanen (1982) found that 8% of the men and 4% of the women in Zoetermeer, had changed their jobs because of LBP. Masset and Malchaire (1994) reported that 1.7% of a sample of 618 industrial workers in Belgium had changed their jobs at least once due to LBP. Such forced changes in occupation could well result in financial loss to the individual. LBP also results in many cases of early retirement (Andersson et al. 1991: 98), which may also be associated with a subsequent reduction in income.

2.8 Management of low back pain

2.8.1 Level of care-seeking for LBP

The level of care-seeking among LBP sufferers is high. In fact, Nagi et al. (1973) found that there is a tendency on the part of people with persistent back pain to use health services more frequently than those who have other limiting pathologies and impairments.

The findings of Gyntelberg (1974), Biering-Sørensen (1982) and Svensson and Andersson (1982) suggest that between 32% and 60% of those who develop LBP consult physicians with this problem. The frequency with which medical attention is sought for LBP however, seems to be related to the nature of the problem and is higher in people with severe (Frymoyer et al. 1980; Deyo and Tsui-Wu 1987), frequent (Nagi et al. 1973) or chronic (Carey, Evans et al. 1995) pain. Frymoyer et al. (1980) found that 31% of subjects with moderate LBP and 67% of those with severe LBP had consulted general practitioners, while 9% with moderate and 32% with severe pain had seen an orthopaedic surgeon. According to Deyo and Tsui-Wu (1987), of those subjects who had had LBP for at least two weeks (n=1 516), 84.6% had seen a health care professional.

In an American study by Carey, Evans et al. (1995), 73.1% of people with chronic LBP had sought care within the previous year; while Frymoyer et al. (1980) found that of those subjects who had LBP, which they considered to be a significant health problem, 94.9% had consulted a physician.

Rowe (1969) studied 2 000 male employees at an industrial complex from 1956 to 1965. Over this 10-year period, 35% of sedentary workers and 47% of heavy handlers had made visits to the medical department for LBP. After consulting the medical records of 140 long-term employees, Rowe (1969) found that 50% of the men, aged 62 to 65, had received medical treatment for LBP. In another industrial study, Masset and Malchaire (1994) reported that 17% of the workers at two steel industries in Belgium had consulted a physician for LBP. Balagué et al. (1995) found that the prevalence of medical visits or treatments at some stage for LBP, in a sample of children aged 12 to 17, was 14%.

2.8.2 Source of treatment for LBP

Physicians in private practice tend to be the most common source of treatment for LBP. In a study of 1 135 people aged 18 to 65, in Columbus Ohio by Nagi et al. (1973), it was found that of the 203 subjects reporting frequent LBP, 81.1% had consulted a physician in private practice, 19.4% went to a clinic and 18.8% went to hospital to receive treatment for their LBP.

The American study by Deyo and Tsui-Wu (1987) included 1 516 individuals with LBP. General practitioners were by far the most common source of care for these LBP sufferers. In this study 58.6% of all subjects who had a history of LBP of at least two weeks duration had consulted a general practitioner; 36.9% had seen an orthopaedic surgeon; 30.6% a chiropractor and 16.1% had received care from a physiotherapist. Frymoyer et al. (1980) similarly reported that general practitioners and orthopaedic surgeons were most commonly consulted by LBP sufferers. Carey, Evans et al. (1995) found that of the people with chronic LBP who consulted physicians, 91% saw a medical doctor, 29% a physiotherapist and 25% visited a chiropractor.

2.8.3 Type of treatment for LBP

Cherkin and Deyo (1993) studied the medical records and hospital discharge data of 2 418 LBP patients, 18 years of age and older, who were hospitalized with a primary diagnosis indicating low back problems. When considering the frequency of nonsurgical treatment, the most common physical therapies were bed rest (72%), application of heat, ice or ultrasound (26%) and lumbar traction (22%). Drug therapy was very common, with 83% of patients receiving narcotic analgesics, 71% sedatives, 32% non-steroidal anti-inflammatory drugs, 25% corticosteroids and 7% sedatives (including muscle relaxants). Frymoyer et al. (1980) found that the frequencies of the most common types of treatments received by a sample of subjects with moderate and severe LBP respectively, were as follows: bed-rest (35%, 73%); muscle relaxants (17%, 53%) and prescription pain medication (12%, 58%).

A number of other studies have also shown that various medications are commonly prescribed for LBP. In a study of chronic LBP in the United States (Carey, Evans et al. 1995), pain medications or muscle relaxants accounted for 92% of all treatments for LBP, followed by back exercises (62%), massage (42%) and back injections (32%). Hurwitz (1994) reported that prescription medication for LBP had been used at least once by 55.2% of patients with LBP and over-the-counter medication by 62%. Furthermore, Carey, Garrett et al. (1995) found that patients with acute LBP presenting to various practitioners, received an average of 3 prescription or over-the-counter medications; which most commonly were non-steroidal anti-inflammatories, followed by muscle relaxants and narcotics. Elam et al. (1995) similarly found that the treatments which emergency physicians most commonly recommended for LBP were non-steroidal anti-inflammatories, followed by bed-rest, muscle relaxants and narcotic analgesics.

Hospitalization and surgery for LBP is not uncommon. In 1987, "medical back problems" were the second most common diagnosis-related group for all hospital discharges, following only normal childbirth (Deyo et al. 1991). Cherkin and Deyo (1993) reported that in 1988 there were almost 340 000 nonsurgical hospitalizations for LBP in the United States, and that 20% of patients admitted to hospital for low back problems underwent surgery within one year of admission, suggesting that many hospitalizations were presurgical. In this study (Cherkin and Deyo 1993), 49% of the patients admitted for LBP had previously been hospitalized for a similar problem and 30% had had at least one back operation. Biering-Sørensen (1982) and Svensson and Andersson (1982) reported that an average of 4% of LBP

patients had been hospitalized and 2% had undergone surgery for their LBP, while Nagi et al. (1973) reported that 18.8% of subjects with frequent LBP had been admitted to hospital and 4% had had back operations.

According to Deyo and Tsui-Wu (1987), of those subjects who had ever had LBP for at least two weeks, 30.9% had been admitted to hospital for LBP and 11.6% had undergone back surgery. Carey, Evans et al. (1995) found that 40.8% of individuals with chronic LBP had been hospitalized at some stage for their LBP, 7.5% had undergone surgery in the previous 12 months, and 22% had a history of back surgery at some stage for LBP. The frequency at which LBP results in hospitalization was further reported by Frymoyer et al. (1980) and Carey, Garrett et al. (1995) to be 7.5% and 3.5% respectively.

2.8.4 The need for improved management

The management of LBP is often associated with extreme expense due to high hospital costs, diagnostic procedures (e.g. CT and MRI scans), expensive medication and related medical costs (Elam et al. 1995; Carey, Evans et al. 1995). Volinn et al. (1988) suggest that the reliance on drugs and other treatments based on the medical model, tends to have only short-term effects as the aetiology of the problem is often not addressed. Wipf and Deyo (1995) state that highly selective evaluation is required to avoid subjecting patients to unnecessary tests and surgical procedures, as most cases of LBP, even those with radiculopathy, have a favorable prognosis and conservative management is usually sufficient.

More rational and effective health care management strategies are needed for LBP sufferers (Lee 1994), which Cherkin and Deyo (1993) suggest could be achieved through improved outpatient and home-based alternatives to hospitalization.

An understanding of the prevalence and other characteristics of LBP in a community such as Chesterville could be of great benefit in the planning and implementation of more appropriate care for this condition. It may provide an indication of whether a significant need for low back care exists in the first place, suggest what the consequent demand on the service would be and could also prove helpful in identifying those people who are most affected or would most benefit from low back care.

2.8.5 The role of chiropractic in the management of LBP

There is substantial evidence in the literature indicating the value of chiropractic in the management of LBP (Hurwitz 1994; Carey, Garrett et al. 1995; Meade et al. 1995; Triano et al. 1995).

In order to compare the effectiveness of chiropractic and medical management of LBP of musculoskeletal aetiology, Hurwitz (1994) followed 103 chiropractic patients and 187 medical patients for 3 months after their initial presentation for LBP treatment. When compared to the medical patients, the chiropractic patients were 60% more likely to have their pain resolved after 3 months and were also almost twice as likely to perceive their treatment to be successful.

Carey, Garret et al. (1995) conducted a prospective study of 1 555 patients with acute LBP presenting to various practitioners (chiropractors, primary care providers, orthopaedic surgeons and health maintenance organizations). Of those subjects who consulted chiropractors, 42.5% regarded the overall results of the treatment for LBP to be "excellent", while only 26.5% of patients who visited the other practitioners reported that the overall results were "excellent". In this study, patients who were treated by chiropractors took an average of 0.7 prescription medications during their episode of LBP, compared with 1.9 prescription medications taken by patients who consulted primary care providers, orthopaedic surgeons or health maintenance organizations.

Triano et al. (1995) conducted a randomized trial on a sample of 145 patients with untreated LBP lasting 7 weeks or longer, or having more than 6 episodes of LBP in 12 months. The aim of the study was to compare the effectiveness of chiropractic spinal manipulative therapy, a manipulation mimic and a back education programme. The manipulation group experienced a greater improvement in pain and activity tolerance. Self-reported functional levels were also higher in the manipulation group than in the manipulation mimic or back education group. The authors concluded that spinal manipulation appears to be of clinical benefit in the treatment of LBP, even in LBP exceeding 7 weeks' duration.

The British study by Meade et al. (1995) was aimed at comparing the effectiveness of chiropractic and hospital outpatient management for LBP over an extended follow-up period. A total of 741 patients, aged 18 to 64, presenting with LBP, were randomly allocated to be treated either by a chiropractor or in a hospital. At the end of a 3-year follow-up period, the patients were asked whether they thought that their allocated trial treatment had helped their

back pain. The reported improvements in pain and disability levels in those subjects treated by chiropractors were about 29% higher than in the hospital outpatients, suggesting that LBP patients treated by chiropractors derive greater benefit and long-term satisfaction than those treated by hospitals.

2.9 Individual factors associated with LBP

2.9.1 Age and gender

Rowe (1969) studied 2 000 male industrial workers over a 10-year period and found that attacks of LBP characteristically began in the late 20's or early 30's. Svensson and Andersson (1982) similarly reported that pain had first appeared before the age of 30 in 48% of a sample of men with LBP. According to Horal (1969), the age of onset of LBP was most frequently reported (i.e. in 28% of subjects with LBP) to be between the years of 30 and 39, while Carey, Evans et al. (1995) found that the mean age of onset of LBP was 36.

LBP reaches its maximum frequency and intensity in the late 30's and 40's and then tends to fade off in the 50's and become infrequent in the 60's (Horal 1969; Rowe 1969). According to Rowe (1969), more than 70% of subjects with LBP were in their 30's and 40's. A marked increase in the prevalence of LBP beginning at the age of 35 was similarly noted by Nagi et al. (1973), who reported that the prevalence of LBP among subjects aged 35 to 64 (22%)

was about 9% higher than in the 18 to 34 age group (13%). This concurs with the findings of Reisbord and Greenland (1985) who found the prevalence of LBP in people aged 35 to 64 (20%) to be 5% higher than in those aged 18 to 34 (15%).

Reisbord and Greenland (1985) reported a decrease in the prevalence of LBP in subjects 65 years of age and older (18%). This decrease in the prevalence of LBP later in life is supported by the findings of Rowe (1969) and Toroptsova et al. (1995). While Rowe (1969) found that LBP fades off in the 50's and becomes infrequent in the 60's, Toroptsova et al. (1995) reported that after the initial increase in the number of people reporting LBP until the age of 54, there is a decrease in the prevalence of LBP after 55.

The results of a number of researchers suggest that there may be a tendency for women to experience LBP more commonly than men. Reisbord and Greenland (1985) reported that the overall prevalence of LBP was 4% higher in women than in men, and in a study by Nagi et al. (1973), frequent LBP was reported by a greater proportion of females (21%) than males (14%). Balagué et al. (1995) studied a sample of schoolchildren, and found that girls tended to report non-specific LBP more frequently than boys. A higher incidence among females was also reported by Toroptsova et al. (1995). In this study on a sample of Russian factory workers, the one-year prevalence of LBP among females (34%), was 5% higher than that in males (29%) and the point prevalence (14%) was also 5% higher than in males (9%). Carey, Evans et al. (1995) reported that chronic LBP patients are more likely to be female, which further supports the proposal that the female sex is a risk factor for the development of LBP.

Nagi et al. (1973) noted that it was particularly in the over 50 age group that women were more likely to report LBP (26%) than men (17%). Biering-Sørensen (1982) similarly found that the lifetime incidence, one-year prevalence and point-prevalence rates of LBP in 60 year old women were 14%, 11% and 17% higher respectively than in men of the same age. It was also noted in this study (Biering-Sørensen 1982) that the frequency of LBP among men reached its maximum intensity in the group aged 40, while among women the prevalence rates were highest in those aged 60.

2.9.2 Anthropometry

Roncarati and McMullen (1988) studied 674 subjects in the New England region of the United States in order to identify factors associated with LBP in a general population sample. The mean height of subjects with LBP (172 cm) was greater than that among the non-LBP group (166 cm), suggesting that tallness may be a risk factor for the development of LBP. Gyntelberg (1974) similarly found that subjects taller than 181 cm had experienced LBP with a slightly higher frequency than shorter subjects.

According to Roncarati and McMullen (1988), the mean weight of people with LBP (69 kg) was 8 kilograms greater than in those without LBP (61 kg). In this study, LBP subjects were more likely to have a meso-endomorphic body frame, while non-LBP subjects tended to have an ectomorphic body frame. Orvieto, Rand et al. (1994) conducted a retrospective survey of approximately 250 000 male army recruits 17 to 18 years old. A significant association was

found between increasing LBP prevalence and increasing body-mass-index (BMI). BMI gives an indication of whether the subject is overweight or not, and Orvieto, Rand et al. (1994) therefore state that the results of their study suggest that body weight may play a role in the pathogenesis of LBP and that weight reduction could be successful in reducing or illiminating LBP. It was similarly reported in a review article by Garzillo and Garzillo (1994) that LBP is positively associated with obesity, but only with obesity in the highest quintile (i.e. a BMI of >29, where 20 is normal).

2.9.3 Physical exercise

There seems to be sufficient evidence in the literature to indicate that physical exercise, such as participation in sport, on the whole, tends to have a positive effect on LBP. Salminen et al. (1993) studied 38 fifteen-year-old schoolchildren with recurrent or continuous LBP, who were matched for age and sex with a group of asymptomatic controls. The prevalence of LBP in children who reported being physically inactive (50%) was 27% higher than among those who exercised once or twice per week (23%) and 37% higher than in the children who exercised more often than twice per week (13%). Salminen et al. (1993) concluded that a very low frequency of physical activity in the young may be a risk factor for LBP, while pursuing sports as a leisure time activity is not harmful but has positive effects on spinal mobility and trunk muscle strength. Similarly, Svensson et al. (1983) found that in a group of adult men, lower levels of leisure time physical activity were positively associated with a higher prevalence of LBP.

Mundt et al. (1993) studied 287 patients with lumbar disc herniation that were matched for age and sex with controls who had no low back problem. Physical activity in the form of participation in recreational sports did not increase the risk for LBP and herniated disc, and in fact tended to provide a degree of protection. The authors suggest that it is possible that the particular sport or number of sports played is not as critical as participation in any leisure time physical activity. Furthermore, among the group of industrial workers studied by Toroptsova et al. (1995), it was found that LBP patients were significantly less common among persons who had participated in sports activities compared with those who had not. Of the 221 people who reported LBP within the last year, 32 (14.5%) participated in sport regularly, while 189 (85.5%) did not participate in sport.

2.9.4 Cigarette smoking

A number of researchers have found a positive association between smoking and LBP. Svensson et al. (1983) studied 940 men aged 40 to 47 and found a significantly larger proportion of smokers among men with LBP than in the controls. In a study of a sample of 674 subjects from a general population in the United States, Roncarati and McMullen (1988) found that the mean number of cigarettes smoked per day by people with LBP (2.99) was approximately twice as much as by those without LBP (1.2); and the LBP group (2.54 years) had been smoking an average of 1.43 years longer than the non-LBP group (1.11 years). Toroptsova et al. (1995) however reported that the prevalence of LBP was equal in smoking and non-smoking groups, but when considering the intensity of smoking, a tendency towards LBP in the group of heavy smokers was demonstrated. Among a group of 56 smokers with

LBP, 17 (30.3%) smoked less than 10 per day, while 39 (69.7%) smoked more than 10 cigarettes per day. Toroptsova et al. (1995) therefore concluded that the intensity of smoking is a risk factor for the development of LBP, which supports the findings of Roncarati and McMullen (1988) who reported that subjects with LBP smoked approximately twice as much as those without LBP. Frymoyer et al. (1980), Svensson and Andersson (1983) and Boshuizen et al. (1993) have similarly found that smokers are more likely to have LBP than non-smokers.

Leboeuf-Yde et al. (1995) state that from the findings of previous researchers one is not able to conclude whether the association between smoking and LBP is causal or merely incidental. They therefore conducted a cross-sectional study of a representative sample of the general Danish population in order to determine whether there is a causal link between smoking and LBP. The sample population consisted of 1 370, 30 to 50 year old inhabitants of Ebeltoft Denmark. The prevalence of LBP among the smokers was 38% and among the non-smokers 21%. The authors concluded that smoking is likely to cause at least certain types of LBP, such as LBP of long duration or frequent reoccurrence, and that abstinence from smoking may be a good primary prevention measure.

2.9.5 Pregnancy and parity

LBP has been found to be particularly prevalent in multiparous women (Frymoyer et al. 1980; Svensson et al. 1990), while other studies (Östgaard et al. 1991; Östgaard and Andersson 1991; Orvieto, Achiron et al. 1994) indicate that LBP is a commonly observed symptom during pregnancy and that the risk of developing LBP in the present pregnancy is higher in women who have had a number of previous pregnancies.

A positive association between LBP and parity (number of live births) was reported by Frymoyer et al. (1980) in a sample of 2 068 women aged 18 to 55. In this study, the mean number of term pregnancies was greater in women with LBP (2.6) than in those without (1.6). Svensson et al. (1990) similarly found, in a sample of 1 749 women aged 38 to 64, that the occurrence of LBP among the older age group (50 to 64 years) was strongly related to a higher number of live births (multiparity).

In the study by Svensson et al. (1990), 24% of the women who had been pregnant reported suffering from LBP at some stage of their pregnancy, and approximately 13% of all the women with LBP stated that their LBP started during pregnancy and that the pain had continued after the delivery. Östgaard et al. (1991) followed a group of 855 pregnant Swedish women, aged 17 to 43, from the 12th week of pregnancy until childbirth. Forty-nine percent of the women complained of back pain at some stage during their pregnancy. However, 22% of the women had ongoing LBP when they became pregnant, so the true incidence rate during the present pregnancy was 27%, and the average point prevalence

throughout the pregnancy was 25%. In 13% of the women the pain was described as a minor intermittent problem, but in 36% back pain was a severe problem compromising normal, everyday life. A positive correlation was identified between parity and the presence of back pain during the present pregnancy.

Östgaard and Andersson (1991) reported that 44% of a sample of pregnant women had back pain during their present pregnancy. They found the prevalence of LBP among primagravidae to be 45.1%, while among multigravidae it was 51.5%, supporting the findings of Östgaard et al. (1991) that multiparity is associated with an increased risk for developing LBP during the present pregnancy. Östgaard and Andersson (1991) also found a statistically significant association between multiparity and longer periods of back pain during pregnancy.

In a study of 449 pregnant women from 15 to 41 weeks gestation, Orvieto, Achiron et al. (1994) reported that 246 (54.8%) experienced LBP in the present pregnancy, but further found that back care advice offered to pregnant women early in pregnancy significantly reduces or prevents LBP as pregnancy progresses, resulting in less troublesome or severe LBP during pregnancy.

2.9.6 Employment status

The results of studies by Reisbord and Greenland (1985) and Carey, Evans et al. (1995) suggest that the prevalence of LBP is higher among unemployed people than among the employed. In a sample of 2 792 subjects over the age of 18, Reisbord and Greenland (1985) found that the prevalence of LBP was 5.8% higher in unemployed subjects (22.5%) than in those who were employed (16.7%), while Carey, Evans et al. (1995) similarly found that chronic LBP patients were more likely to be unemployed.

Sanderson et al. (1995) conducted a prospective study of 269 consecutive patients attending a LBP clinic in Sheffield England between the years 1986 and 1991, and reported that the Oswestry disability scores were higher in LBP patients who were unemployed than in those who were employed. Unemployment was found to be associated with increased psychological factors influencing the patients' perception of their LBP, which may have contributed to the increased disability scores.

Volinn et al. (1988) found that the unemployment rate in the American State of Washington was significantly related to the disability rate from LBP. They concluded that disability may be a symptom of distress and that where there is a rise in job and economic insecurity, there is a greater likelihood that back pain will become disabling.

Other researchers have however put forward conflicting evidence. Nagi et al. (1973) for example, in a study of a random population sample (n=1 135) aged 18 to 64, found that the prevalence of LBP was higher among employed subjects (26.6%) than among the unemployed (22.7%).

The prevalence rates of LBP in the employed groups are likely to be affected by the type of work which the subjects do (Rowe 1969; Nagi et al. 1973; Svensson and Andersson 1983; Reisbord and Greenland 1985), which could influence the relative frequencies of LBP in the employed versus the unemployed groups. The present study will however not concern itself with the nature of the individuals employment, and will only attempt to identify a relationship between employment status (i.e. whether the subject is employed or unemployed) and the presence of LBP.

2.9.7 Socio-economic and psycho-social factors

2.9.7.1 Socio-economic factors

LBP tends to be reported more frequently by people in lower socio-economic classes than by those in upper socio-economic classes. In a Danish study of 4 753 males aged 40 to 59, Gyntelberg (1974) reported that men in lower social classes had a statistically significant increased frequency of LBP compared to those in higher social classes.

Reisbord and Greenland (1985) conducted a population-based study of 2 762 respondents and found that a higher prevalence of LBP was associated with lower levels of education and lower income. The prevalence of LBP was 12.5% higher in people with less than 9 grades of education (24.7%) than in those with more than 13 grades of education (12.2%), while it was most prevalent in subjects with an annual income of $5 000 or less (25.4%) and least prevalent in the group with an income of $20 000 or more (14.6%). Nagi et al. (1973) and Toroptsova et al. (1995) similarly found that the prevalence of LBP complaints was significantly higher in people who had low educational levels.

The findings of Carey, Evans et al. (1995) support the proposal by Reisbord and Greenland (1985) that a higher prevalence of LBP is associated with lower income. In their study of LBP in North Carolina, Carey, Evans et al. (1995) found that chronic LBP patients tended to be relatively poor when compared to the general North Carolina population. More than 50% of people with chronic LBP had an annual family income of less than $20 000, whereas only 37% of North Carolinans had an income of less than $25 000.

Volinn et al. (1988) and Sanderson et al. (1995) have reported that the unemployment rate is significantly related to the disability rate from LBP. Volinn et al. (1988) suggest that disability is a symptom of distress and that where there is a rise in job and economic insecurity, there is a greater likelihood that back pain will become disabling.

2.9.7.2 Psycho-social factors

Psycho-social and psychological factors have also been found to influence the prevalence of LBP and the effect of LBP on the individual. Frymoyer et al. (1980) and Svensson and Andersson (1983) both found a positive association between psychological factors, such as anxiety, depression and stressful life events, and the presence of LBP; while Roncarati and McMullen (1988) reported that LBP subjects had experienced more "life-change stress" (unexpected social, physical and economic changes which induced increased stress) than non-LBP subjects.

Schofferman et al. (1993) conducted a retrospective study of 101 consecutive patients who had undergone multidisciplinary evaluation for persistent LBP at a spine center in the United States. Multiple childhood psychological traumas, such as physical and sexual abuse, emotional neglect and abandonment, were present in a high proportion of chronic LBP patients. The authors concluded that multiple psychological traumas might predispose a person to LBP, contribute to the persistent nature of LBP, as well as to disability and failure to respond to treatment. Burton et al. (1995) similarly concluded that persisting symptoms in low back trouble might be due more to psycho-social influences than to medical factors. Burton et al. (1995) studied 252 patients who presented to primary care physicians for LBP. The patients underwent a psycho-social assessment by interview and their outcome was assessed one year later using a back pain disability questionnaire. It was found that psychological variables were the most powerful predictors regarding the likelihood of progression to chronicity in acute and sub-acute cases of low back trouble.

Balagué et al. (1995) found that psychological factors such as tiredness, poor self image and a general lack of interest in activities in a sample of 615 schoolchildren, were significantly associated with a higher prevalence of non-specific LBP and greater medical care utilization for LBP. In this study, children with the poorest psychological scores reported the highest prevalence of LBP (54%), while children with the best psychological scores reported the lowest prevalence of LBP (16.3%).

Approximately 80% of the population of Chesterville is unemployed (Cockhead 1990), suggesting that economic stress is probably a common problem in this community. Unemployment and low income are two of the factors which have been found to be associated with a higher prevalence of LBP. It also seems likely that other factors, which tend to be positively associated with a higher prevalence of LBP, such as low levels of education and psychological stresses, are experienced by the inhabitants of formal black townships. This suggests that the prevalence of LBP and the extent to which it adversely affects the lives of the people in these communities could well be significant.

2.10 Summary

Epidemiological studies conducted on LBP in a number of countries strongly indicate that LBP is an international phenomenon, which commonly affects all population groups. Although many cases of LBP are transient, a substantial proportion of people who develop this condition suffer from recurrent pain, which quite often progresses into a chronic pain state with associated disability, limitation of activity, work-absence and economic loss.

The age of onset of LBP is most commonly in the 20's and 30's and the prevalence of LBP tends to be at its greatest in the middle-aged, becoming less frequent in the elderly. Some researchers have found the prevalence of LBP among women, especially elderly women, to be higher than in men of the same age. Other individual factors, which have been identified as possible risk factors for the development of LBP; include tallness, obesity, cigarette smoking, low levels of physical exercise and multiparity. The problem of LBP seems to be complicated by socio-economic and psycho-social factors; such as unemployment, low income, low educational level, physical abuse, neglect and abandonment; and in general, LBP occurs more frequently in lower socio-economic classes.

More rational and effective health care management strategies are needed for LBP sufferers, who frequently seek medical attention for this problem. In order for such strategies to be implemented among South African Township populations, it is important to establish the magnitude of the problem so that appropriate health services can be planned.

CHAPTER 3 MATERIALS AND METHODS

3.1 Study design

A population-based epidemiological survey on low back pain (LBP) was conducted on 1 000 residents of the formal black South African township of Chesterville. The data was collected by means of interviews (Appendix A: covering letter; Appendix B: interview questionnaire), which were conducted by the researcher with the assistance of a Zulu-speaking interpretor. The questionnaire used was constructed by the researcher, but some of the questions were based on the Oswestry Back Disability Index (Appendix C) and some on a census questionnaire (Wegner 1994). A pilot survey of 25 households suggested that the characteristics of the households in the area of study were fairly similar with respect to the objective of the study. Following this finding, a clustered sample of 300 lots was selected from a layout map of Chesterville (Appendix D). All residents 13 years of age and older, living on these lots, were interviewed until a sample of 1 000 subjects had been achieved. The total population of Chesterville is approximately 20 000, hence the sample size covers 5% of the population of study.

In this study, LBP was defined as any condition of pain, ache or stiffness (Svensson et al. 1990), as perceived by the individual, located between the posterior lower rib cage and the gluteal folds on the posterior aspect of the thighs (Andersson et al. 1991: 95). The "lifetime incidence" group included all subjects who reported experiencing at least one

such episode of LBP at some stage of their life, while the "prevalence group" included those subjects who had LBP at the time of the interview or reported ongoing pain, which occurred at least on an occasional basis.

3.2 Statistical analysis

The data was analyzed by determining the mean of certain factors and by construction of bar-charts, pie-charts and frequency tables. Where appropriate, the association between various factors was established through cross-tabulation, use of the Pearson chisquare test and logistic regression analysis.

The questionnaire was post-coded (Appendix E: questionnaire coding system) to facilitate statistical analysis. However, actual values for the continuous variables, age, height and weight were used for logistic regression analysis (Appendix F: description of variables and their levels).

3.2.1 The Pearson chisquare test for the strength of association between two factors

Suppose that a random sample of size n is obtained. The observations in the random sample may be classified according to two criteria. Using the first criterion, each observation is associated with one of the r, rows. Using the second, each observation is associated with one of the c, columns.

Let $0_{i\,j}$ be the number of observations in row, r and column, j in an r by c contingency table. For each of the tests involving the dichotomous explanatory variables, the number of rows, r is equal to 2. Also, the number of columns, c is 2.

The following 2 assumptions are made:

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

2. Each observation may be classified into exactly one of r different categories according to one criterion, and into exactly one of c different categories according to a second criterion.

Any two factors that are strongly associated with each other are interdependent. On the other hand, if they are not associated with one another, they are said to be independent. The test for the independence of two factors A and B can be established by the null hypothesis H_0 as follows:

H_0: Factors A and B are independent or not strongly associated with each other.

The alternative hypothesis H_1 states the contrary of what the null hypothesis does:

H_1: Factors A and B are significantly associated with each other.

In the process of testing the null hypothesis, one of two types of errors can be made. Type 1 error is rejecting a true null hypothesis. Type 2 error is accepting a false null hypothesis. The probability of Type 1 error is denoted by α. The probability of Type 2 error is denoted by β. The level of significance of the test is equal to α, and in this study, the value of α is fixed at the 5% level for all tests.

Decision rule:

At the α level of significance, reject H_0 if the calculated (observed) Pearson chisquare value exceeds the tabulated chisquare value; and accept H_0 if the calculated (observed) Pearson chisquare value is less than or equal to the tabulated chisquare value.

The calculated chisquare value is given as follows:

$$X^2_{cal} = \frac{\sum \sum (0_{ij} - E_{ij})^2}{E_{ij}} \qquad (1)$$

$i = 1, \ldots, r$
$j = 1, \ldots, c$

where

$$E_{ij} = \frac{n_{i.} \, n_{.j}}{n} \qquad (2)$$

In (1) and (2),

0_{ij} is the observed frequency in cell i, j

E_{ij} is the expected frequency in cell i, j

$n_{i.}$ is the sum of observed frequencies in row i

$n_{.j}$ is the is the sum of observed frequencies in row i

n is the sum of all observed cell frequencies

$i = 1, \ldots, r$ and $j = 1, \ldots, c$

r is the number of rows

c is the number of columns

Tabulated chisquare values are read from the chisquare table using values of α and the degrees of freedom, df.

$x^2_{tab} = x_\alpha{}^2(df)$ where

$df = (r-1)(c-1)$ = the degrees of freedom of the chisquare statistic

Two-by-two contingency tables:

A special case arises when there are only 2 rows and 2 columns. In this case, df = (r-1) (c-1) = (2-1) (2-1) = 1. If $\alpha = 0.05$, then the tabulated chisquare value becomes 3.841. Thus, the null hypothesis is rejected if the observed chisquare value exceeds 3.841. The null hypothesis is accepted if the observed chisquare value is less than or equal to 3.841.

Alternative decision rule:

The null hypothesis is rejected if the p-Value is less than $^{\alpha}/_{2} = 0.025$, and the null hypothesis is accepted if the p-Value is greater than or equal to 0.025, at the $\alpha = 0.05$ level of significance.

Limitations of the two-by-two chisquare test:

In cases where there are several factors in the model, simple two-by-two chisquare tests will not be good enough to analyze the complex interactions that arise among the various levels of the factors. Considering only two factors at a time simplifies the analysis, but also avoids the effect of all other external factors, some of which could in fact be influential. This may lead to conflicting findings whereby an interaction effect between two factors could be both significant and insignificant depending on the presence or absence of a third influential factor.

This limitation could be avoided by the use of the logistic regression model or the log-linear model. The logistic regression model is better than the log-linear model in this particular study because it does not result in a loss of information in the process of breaking down age, height and weight into categories.

3.2.2 The logistic regression model

The logistic regression model was used to perform the regression of a dichotomous dependent variable Y on a set of 8 explanatory (independent) variables. The explanatory variables, x_1, x_7, x_5, x_4, x_{11}, x_3, x_2 and x_6 (Appendix F) were selected for logistic regression analysis after screening was done using results from chisquare tests. High values of the Pearson chisquare statistic, or low p-Values, were used as criterion for selection. The explanatory variables are a combination of continuous (x_1, x_4, x_3) and discrete variables. Y is taken as 'the presence of LBP', where Y = 1 if LBP is present, and Y = 0 if not (Appendix F).

The backward elimination procedure was used to identify factors that strongly effect the prevalence of LBP. The optimum logistic regression model (Table 4.12) contains all 8 variables selected for logistic regression analysis.

The estimated logistic regression model is given as follows:

$$\Pr(y = 1) = \frac{1}{1 + e^{-Z}}$$

where: $Z = \hat{\beta}_0 + \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2 + \hat{\beta}_3 x_3 + \hat{\beta}_4 x_4 + \hat{\beta}_5 x_5 + \hat{\beta}_6 x_6 + \hat{\beta}_7 x_7 + \hat{\beta}_8 x_8$

where: $\hat{\beta}_0, \ldots, \hat{\beta}_8$ are estimated regression coefficients in the optimum logistic regression model.

The odds that a person has LBP as x_i varies from a low level to a high level are given by:

$\text{Exp}(\hat{\beta}_i)$, $i = 1, \ldots, 8$.

For example, when x_1 (Appendix F) changes from a low level to a high level (i.e. with increasing age), the odds that a person has LBP are increased by a factor of 1.0092 (Fig. 4.11).

The adequacy (how well the logistic regression model fits the data) is measured using the classification table for the dependent variable Y. The overall percentage of correct classification in this study is 63%.

3.2.3 Statistical package used for analysis

The statistical package SPSS/PC Plus, Version 5.0 was used for data analysis in this study.

CHAPTER 4 THE RESULTS

4.1 DEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE POPULATION

4.1.1 Gender distribution

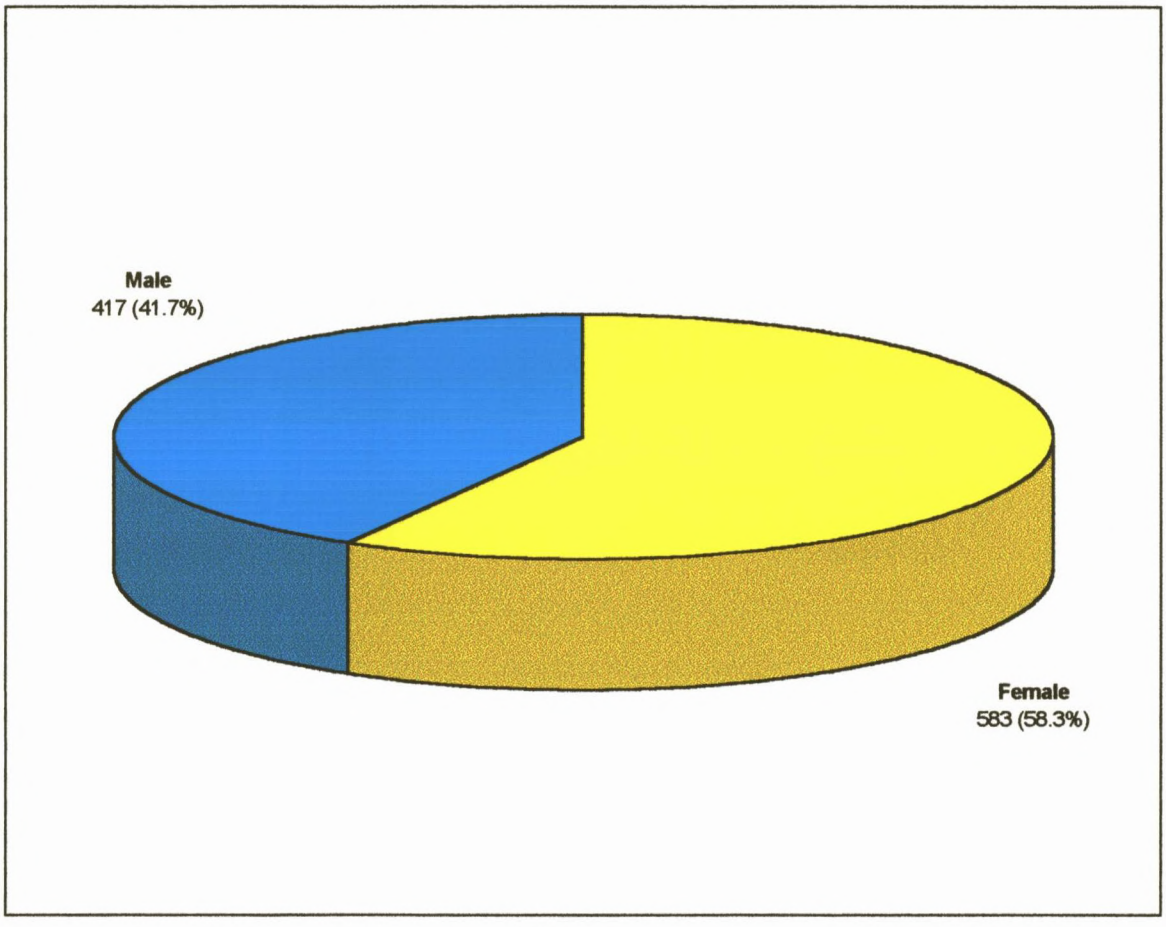

Fig 4.1 Gender distribution of sample population (N=1 000)

A total of 1 000 subjects were included in the study, which consisted of 583 females and 417 males.

4.1.2 Age distribution

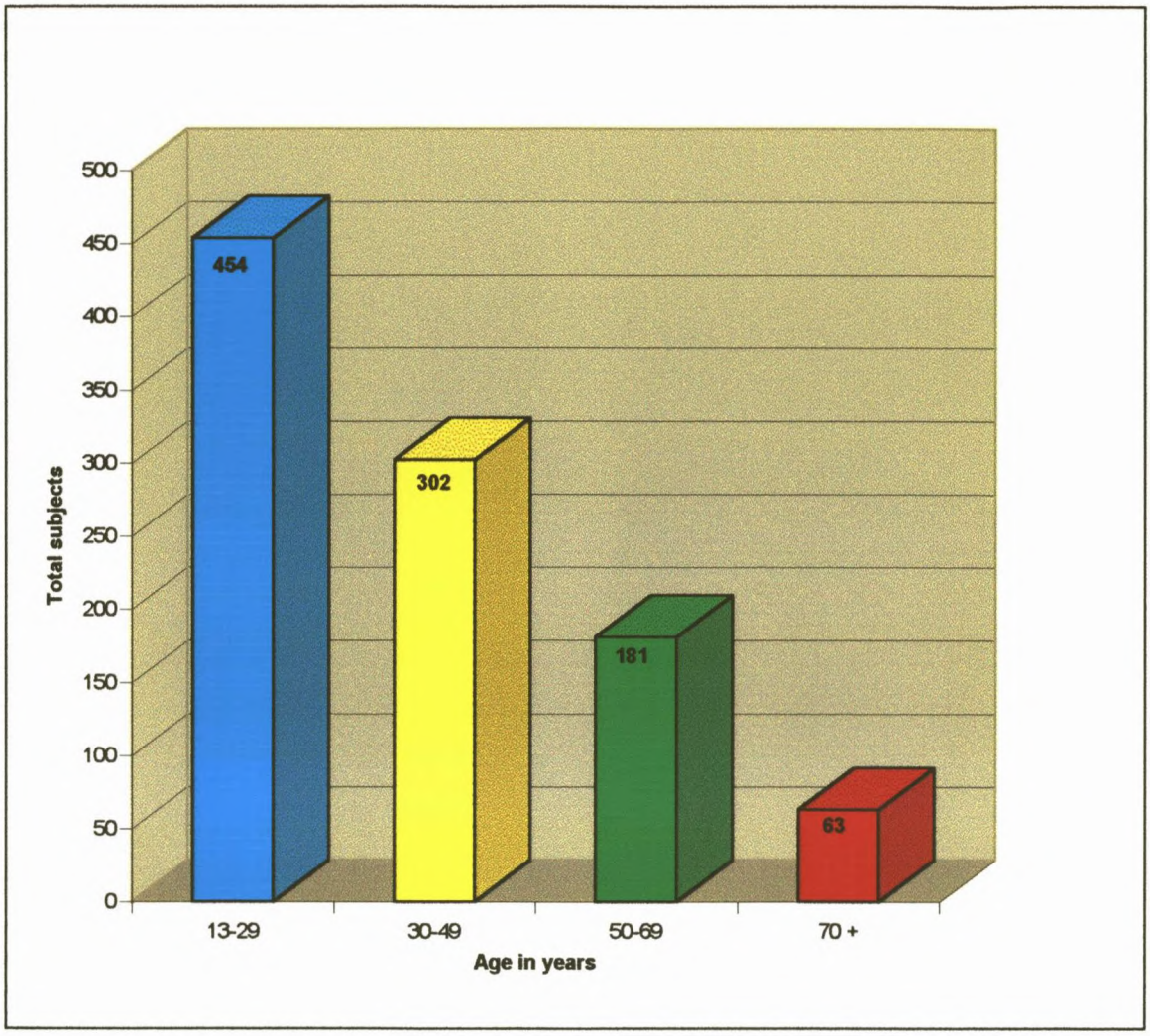

Fig. 4.2 Age distribution of sample population (N=1 000)

The majority of subjects, 45.4% (n=454), were in the 13 to 29 year old age-group.

The youngest subject was 13 years old and the oldest 92 years old.

The mean age was 36.9 years.

4.1.3 Age and gender distribution

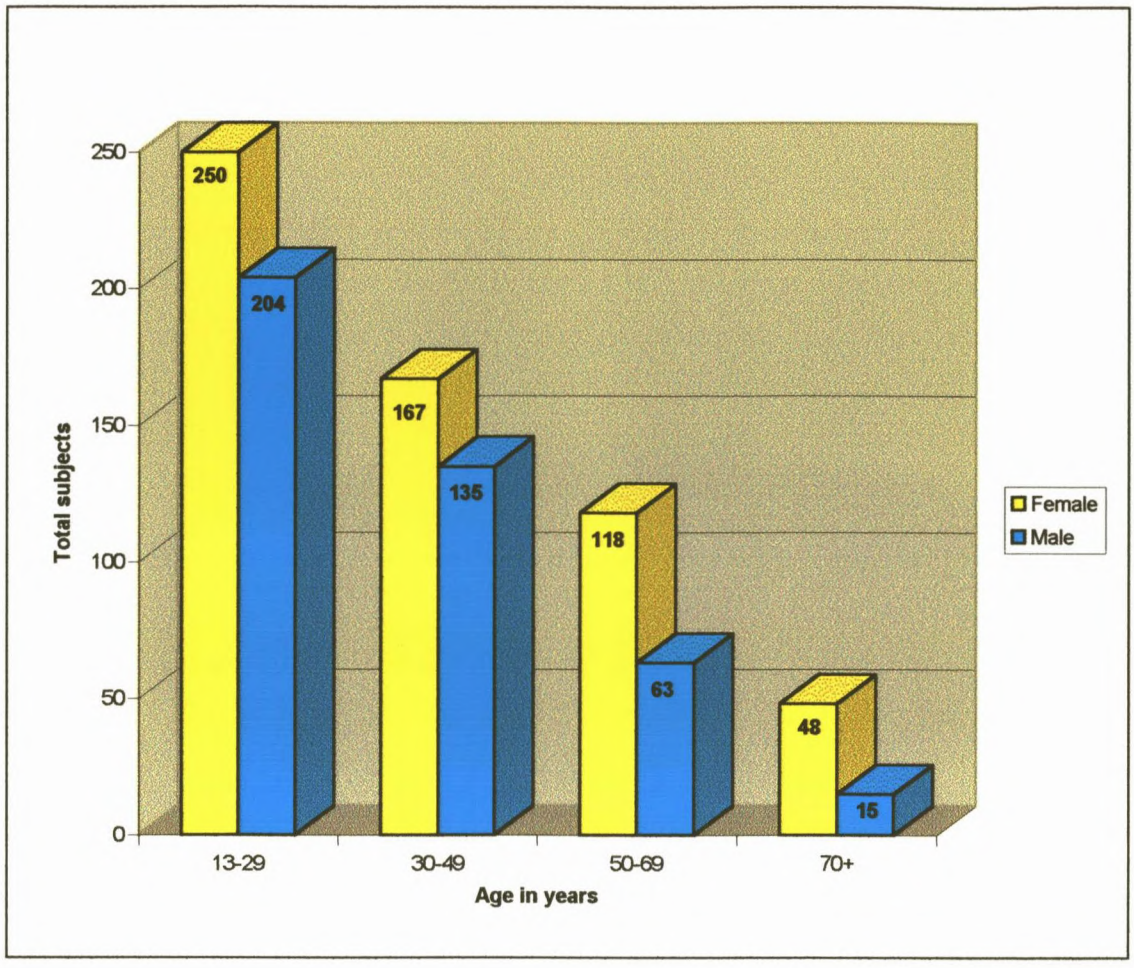

Fig. 4.3 Age and gender distribution of sample population (N=1 000)

Each of the four age groups consisted of relatively more females than males.

4.2 THE LIFETIME INCIDENCE OF LOW BACK PAIN

4.2.1 Total lifetime incidence of LBP

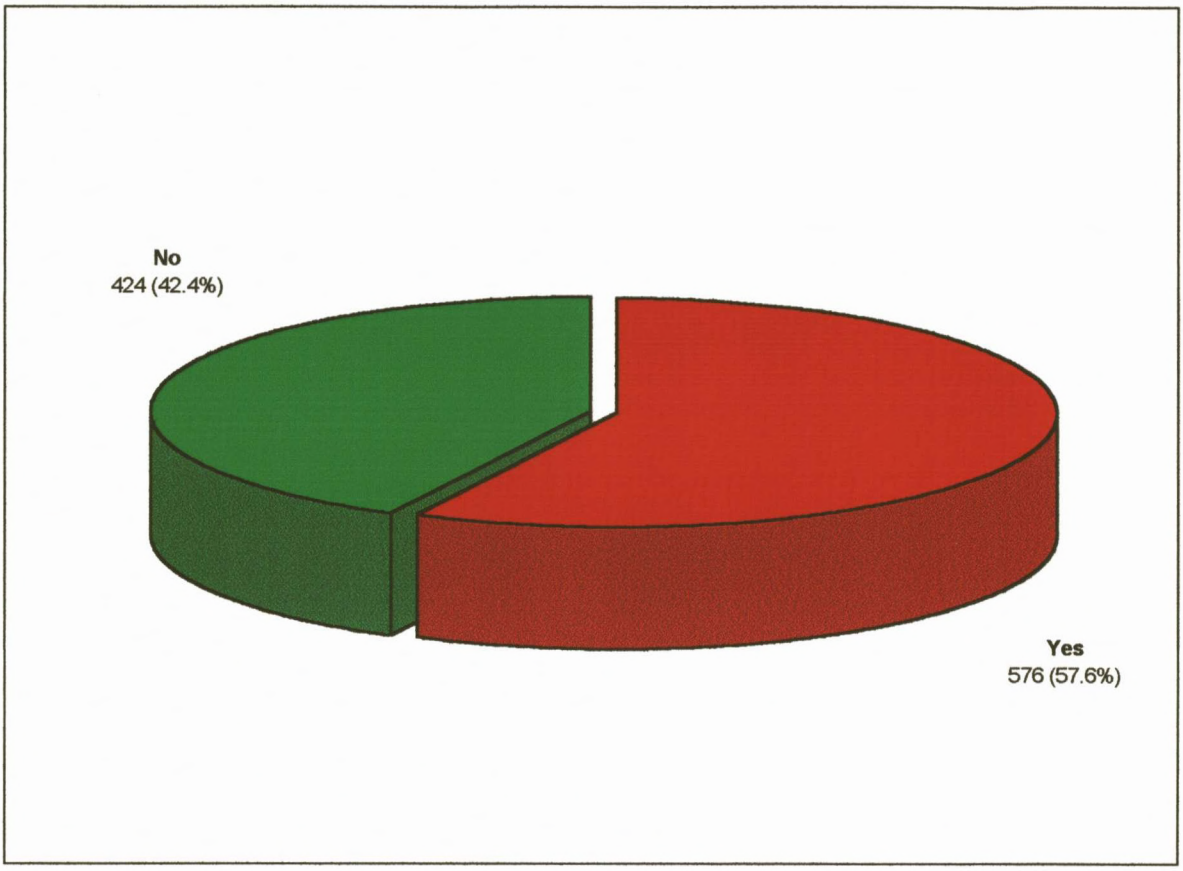

Fig. 4.4 Total lifetime incidence of LBP in the sample population (N=1 000)

The lifetime incidence of LBP in the sample population was 57.6% (n=576).

4.2.2 Gender of subjects and the lifetime incidence of LBP

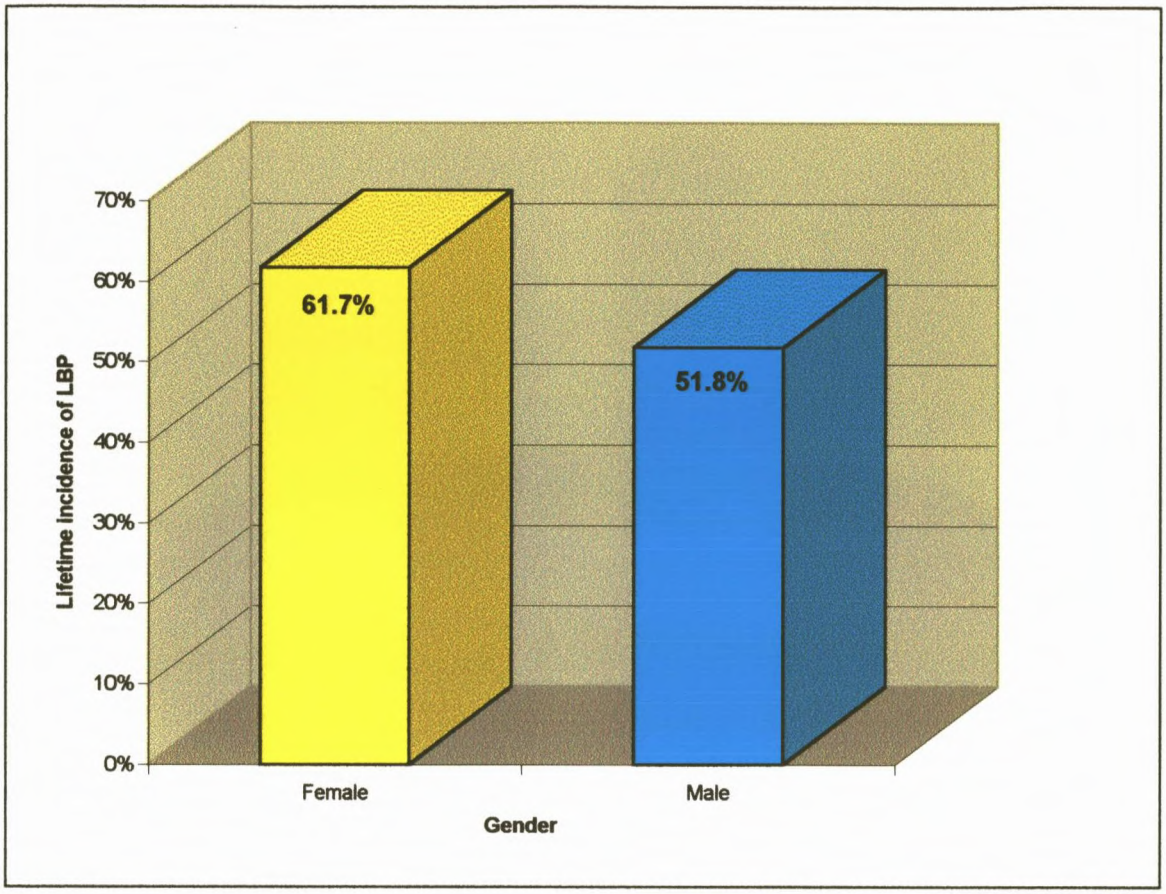

Fig. 4.5 Lifetime incidence of LBP according to gender

The lifetime incidence of LBP among women (61.7%) was 9.9% higher than that in men (51.8%).

Results from chisquare test:

$\alpha = 0.05$; $p = 0.001$; Calculated chisquare = 9.84372; Tabulated chisquare = 3.841

The calculated chisquare value (x^2_{cal} = 9.84273) was greater than the observed chisquare value (x^2_{tab} = 3.841). It was therefore concluded that there was a significant association between the gender of subjects and the lifetime incidence of LBP, at the $\alpha = 0.05$ level of significance.

4.2.3 Age of subjects and the lifetime incidence of LBP

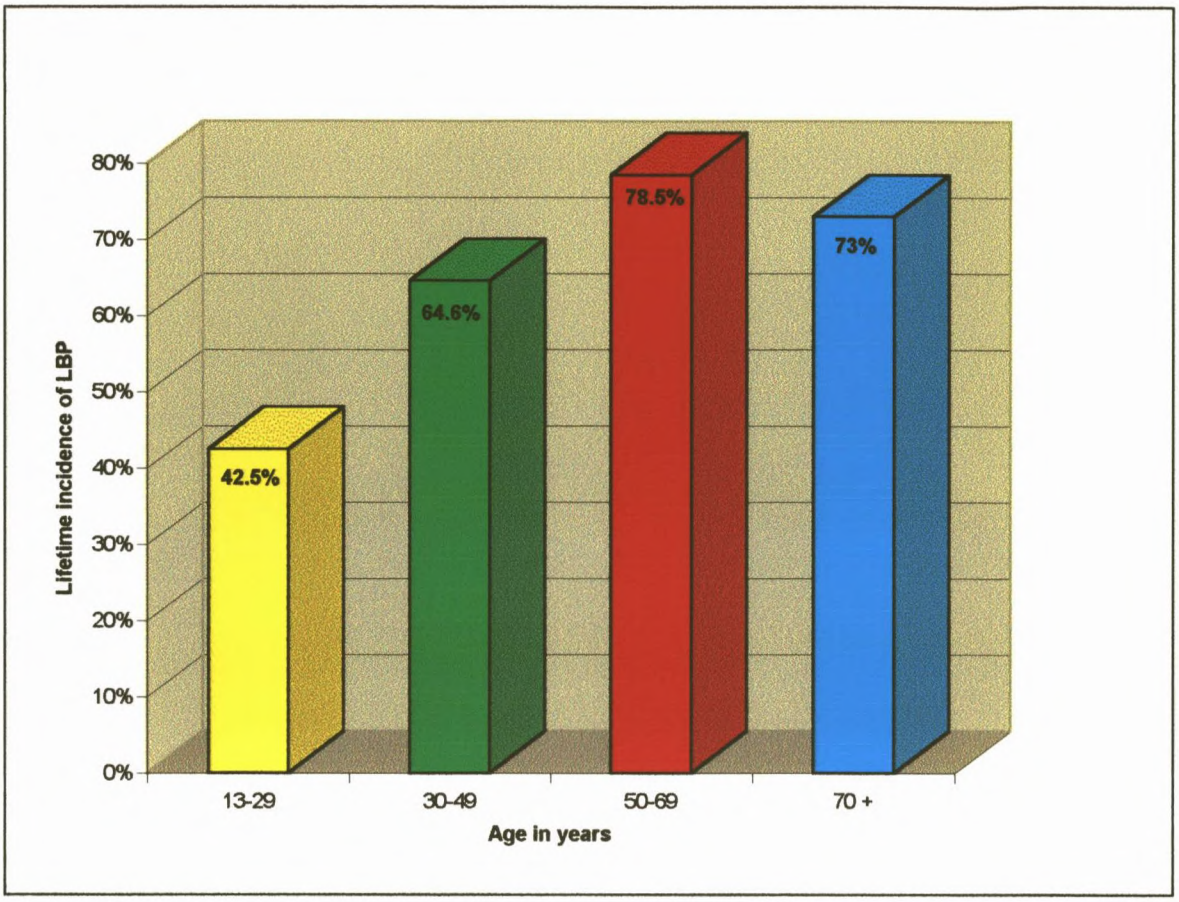

Fig. 4.6 Lifetime incidence of LBP according to age

The lifetime incidence of LBP was lowest in the 13 to 29 year old age-group, at 42.5%; increased with age to peak in the 50 to 69 year old age-group, at 78.5% and then dropped off slightly to 73% in the group aged 70 and older.

Results from chisquare test:

$\alpha = 0.05$; $p = 0.000$; Calculated chisquare = 86.68873; Tabulated chisquare = 7.815

The calculated chisquare value (x^2_{cal} = 86.68873) was greater than the observed chisquare value (x^2_{tab} = 7.815), which indicates that there is a strong association between age and the lifetime incidence of LBP, at the $\alpha = 0.05$ level of significance.

4.2.4 Age of onset of LBP

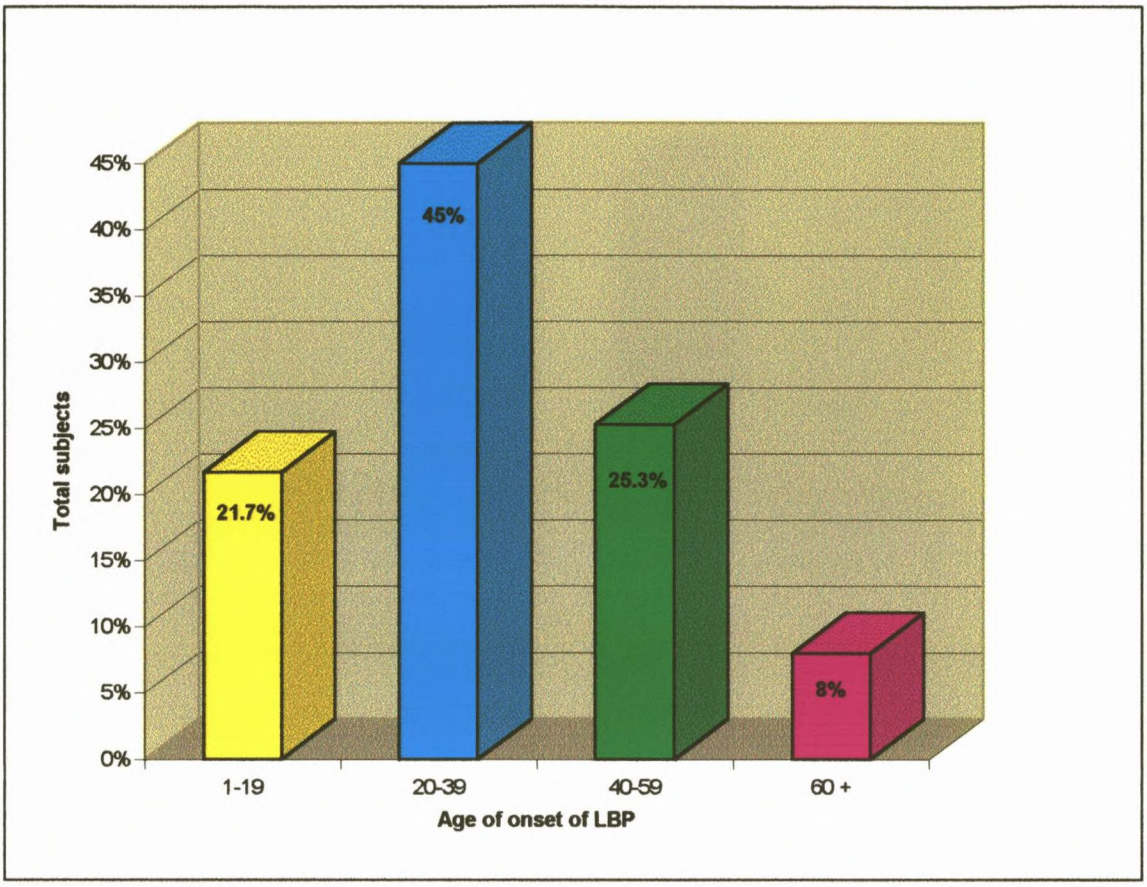

Fig. 4.7 Age of onset of LBP in the lifetime incidence group (n=576)

It was reported by 45% (n=259) of those with a history of LBP (n=576), that their LBP started during the ages of 20 to 39.

The mean age of onset of LBP was 33.3 years old.

4.2.5 Nature of onset of LBP

Table 4.1 Nature of onset of LBP in the lifetime incidence group (n=576)

Nature of onset of LBP	Total
Gradually over time	484 84%
Sudden (without accident)	56 9.7%
Sudden (due to accident)	36 6.3%
Column total	576 100%

The majority of subjects, 84% (n=484), in the lifetime incidence group (n=576) reported that their LBP had started gradually. Only 6.3% (n=36) could relate the onset of their LBP to an accident of any kind.

4.2.6 Duration of LBP

Table 4.2 Duration of LBP in the lifetime incidence group (n=576)

Duration of LBP	Total subjects
< 6 months	59 10.2%
6 months - 9 years	350 60.8%
10 - 19 years	107 18.6%
20 years +	60 10.4%
Column total	576 100%

Chronic LBP (longer than 6 months duration) was reported by 89% (n=517) of subjects in the lifetime incidence group (n=576).

4.3 THE PREVALENCE OF LBP

4.3.1 The overall prevalence of LBP in the sample population

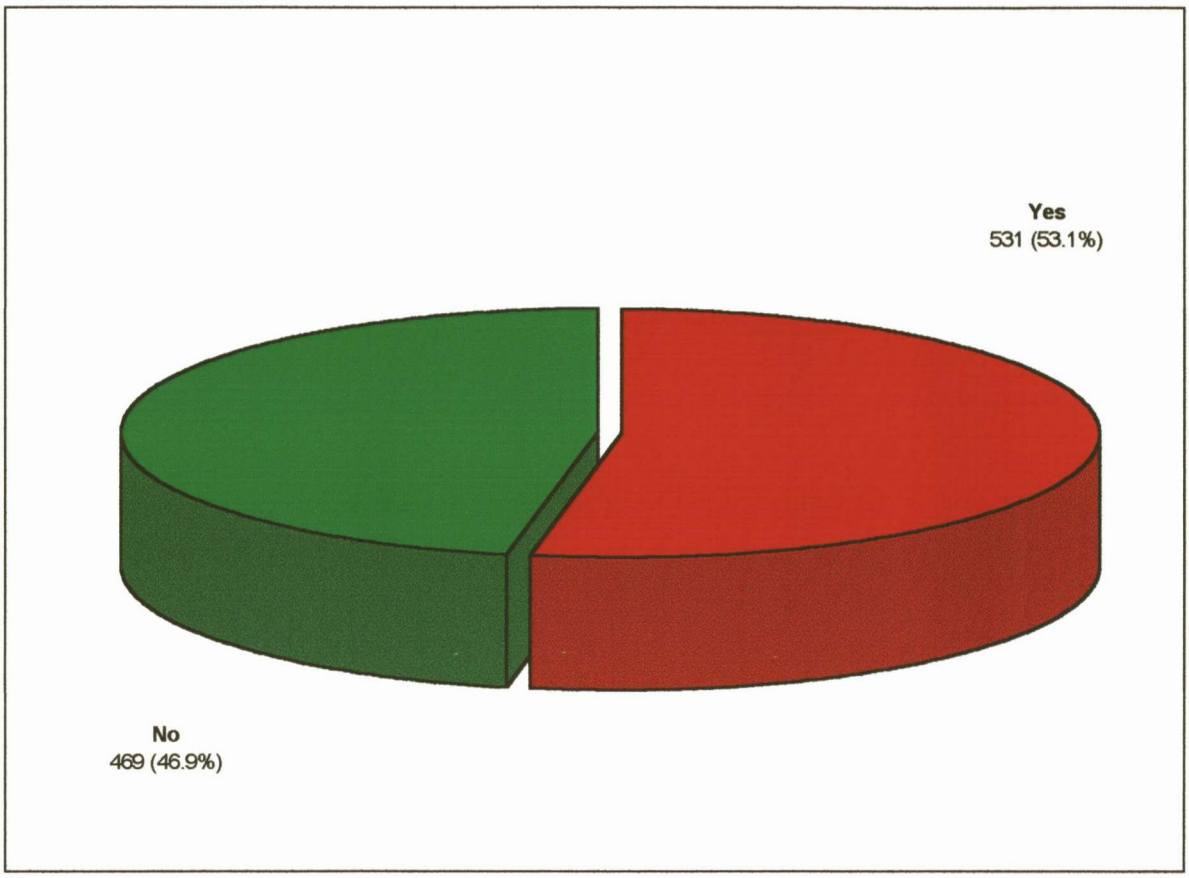

Fig 4.8 Prevalence of LBP in the sample population (N=1 000)

The prevalence of LBP in the sample was 53.1% (n=531).

4.3.2 Intensity of LBP

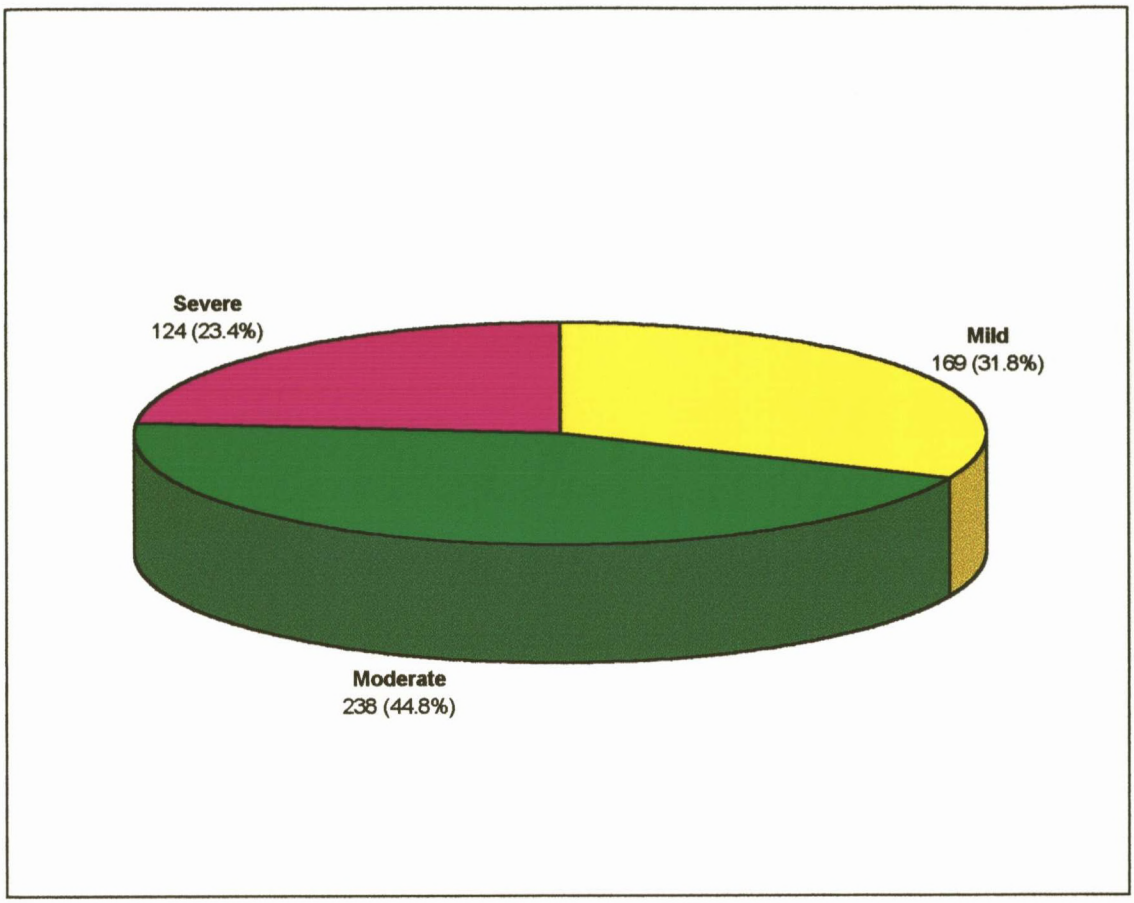

Fig. 4.9 Intensity of LBP in the prevalence group (n=531)

The majority, 76.6% (n=407), of the subjects who reported presently experiencing LBP (n=531), said that their pain was either mild (31.8%) or moderate (44.8%). Severe pain was reported by 23.4%.

4.3.3 Frequency of LBP

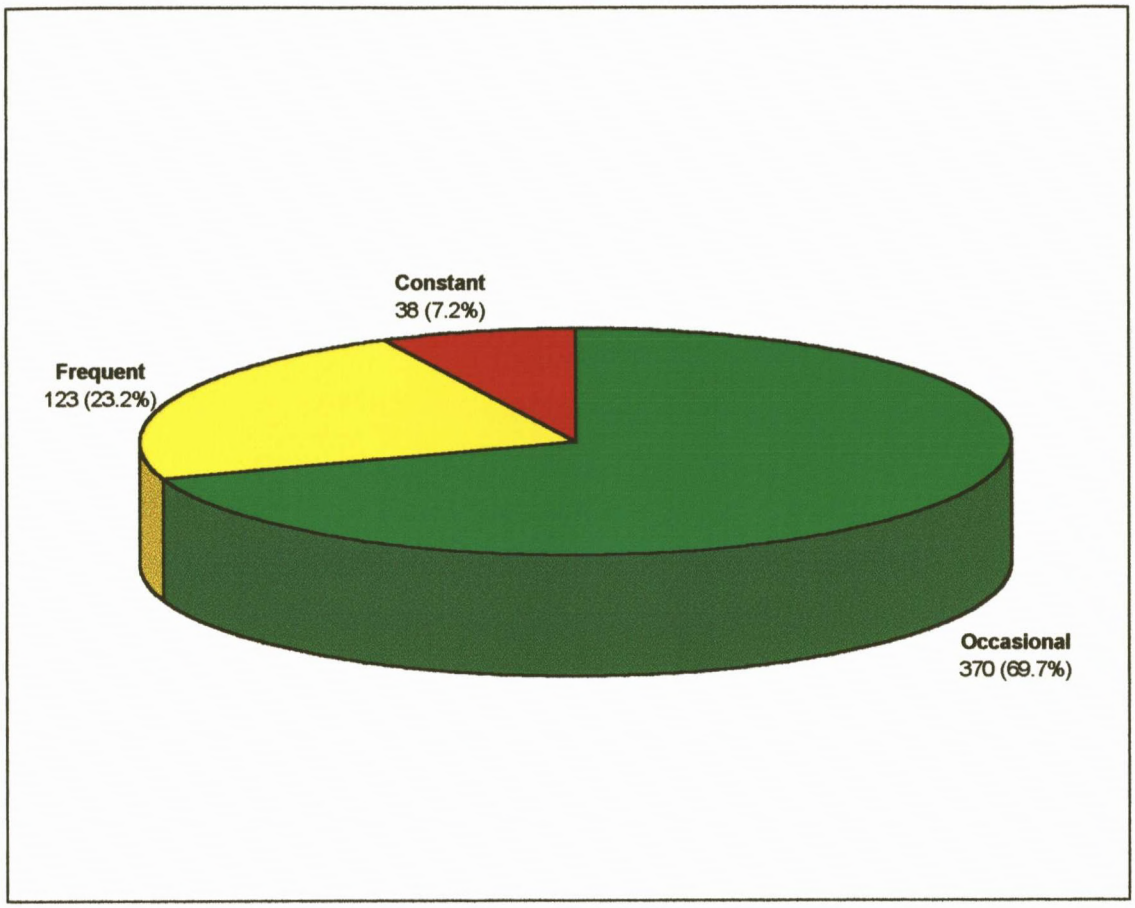

Fig. 4.10 Frequency of LBP in the prevalence group (n=531)

Occasional LBP was reported by 69.7% of those in the prevalence group, frequent LBP by 23.2%, and 7.2% complained of constant LBP.

4.3.4 Intensity and frequency of LBP

Table 4.3 Intensity and frequency of LBP in the prevalence group (n=531)

Intensity of LBP	Frequency of LBP			Row total
	Occasional	Frequent	Constant	
Mild	150 28.2%	17 3.2%	2 0.4%	169 31.8%
Moderate	182 34.3%	51 9.6%	5 0.9%	238 44.8%
Severe	38 7.2%	55 10.4%	31 5.8%	124 23.4%
Column total	370 69.7%	123 23.2%	38 7.2%	531 100%

Cross-tabulation between the intensity and frequency of LBP, revealed that "occasional-moderate" (34.3%) and "occasional-mild" (28.2%) LBP were reported most frequently by subjects with LBP. "Frequent-severe" pain, reported by 10.4% of the prevalence group, was also a relatively common complaint.

4.3.5 Referred lower limb pain

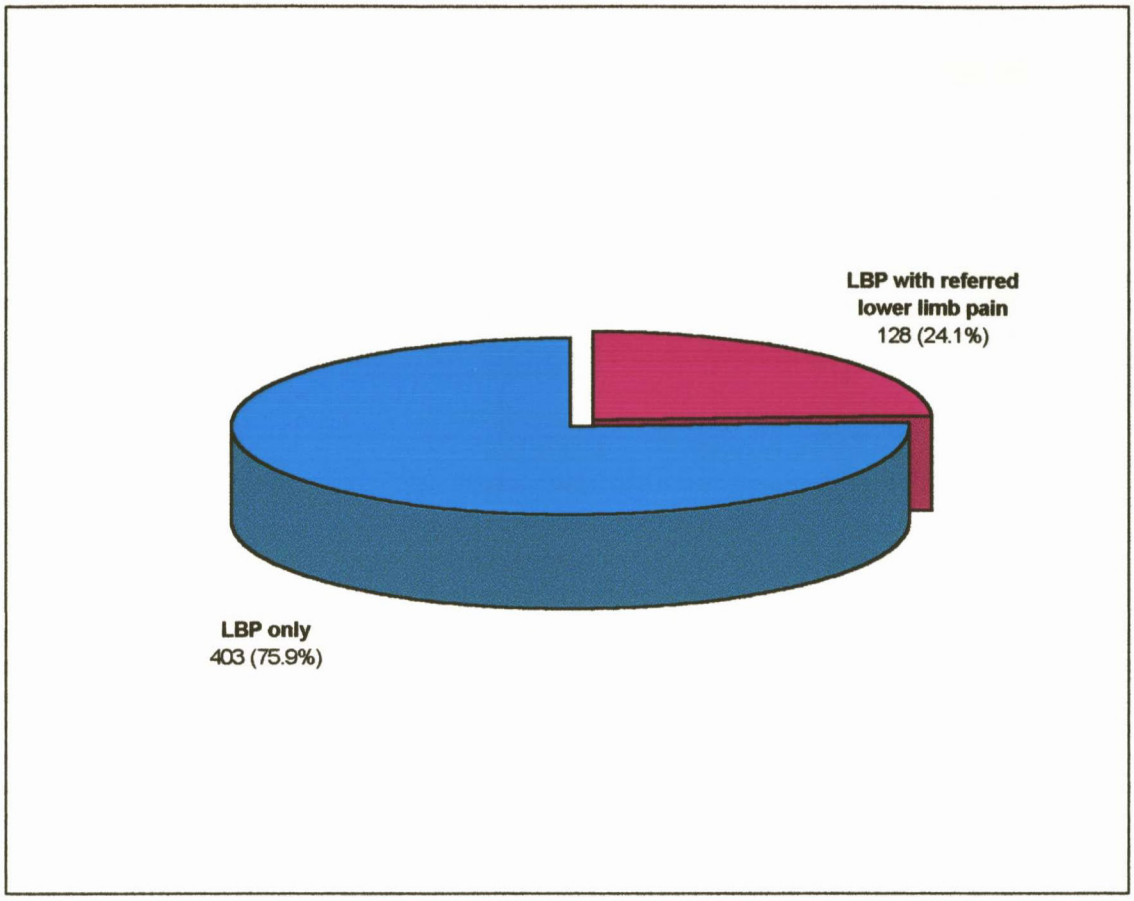

Fig 4.11 Association of referred lower limb pain with LBP in the prevalence group (n=576)

Nearly one quarter (24.1%) of the subjects in the prevalence group reported that their LBP was associated with referred lower limb pain.

4.3.6 Effect of LBP on daily activities

Table 4.4 Degree of difficulty experienced performing daily activities due to LBP by subjects in the prevalence group (n=531)

Daily activity	Degree of difficulty experienced			
	None	Mild	Moderate	Severe
Personal care	399 75.1%	63 11.9%	39 7.3%	30 5.6%
Sitting	278 52.4%	134 23.2%	88 16.6%	31 5.8%
Standing	259 48.8%	137 25.8%	90 16.9%	45 8.5%
Walking	297 55.9%	110 20.7%	68 12.8%	55 10.4%
Bending	120 22.6%	167 31.5%	145 27.3%	99 18.6%
Lifting	217 40.9%	113 21.3%	118 22.2%	83 15.6%
Sleeping	321 60.5%	72 13.6%	71 13.4%	66 12.4%
Social life	455 85.7%	16 3%	29 5.5%	31 5.8%

Most (77.4%) of the subjects with LBP reported some degree of trouble with bending. The other activities that were also associated with difficulty in more than half of the prevalence group were lifting (59.1%) and standing (51.2%).

4.3.7 Bed-rest for LBP

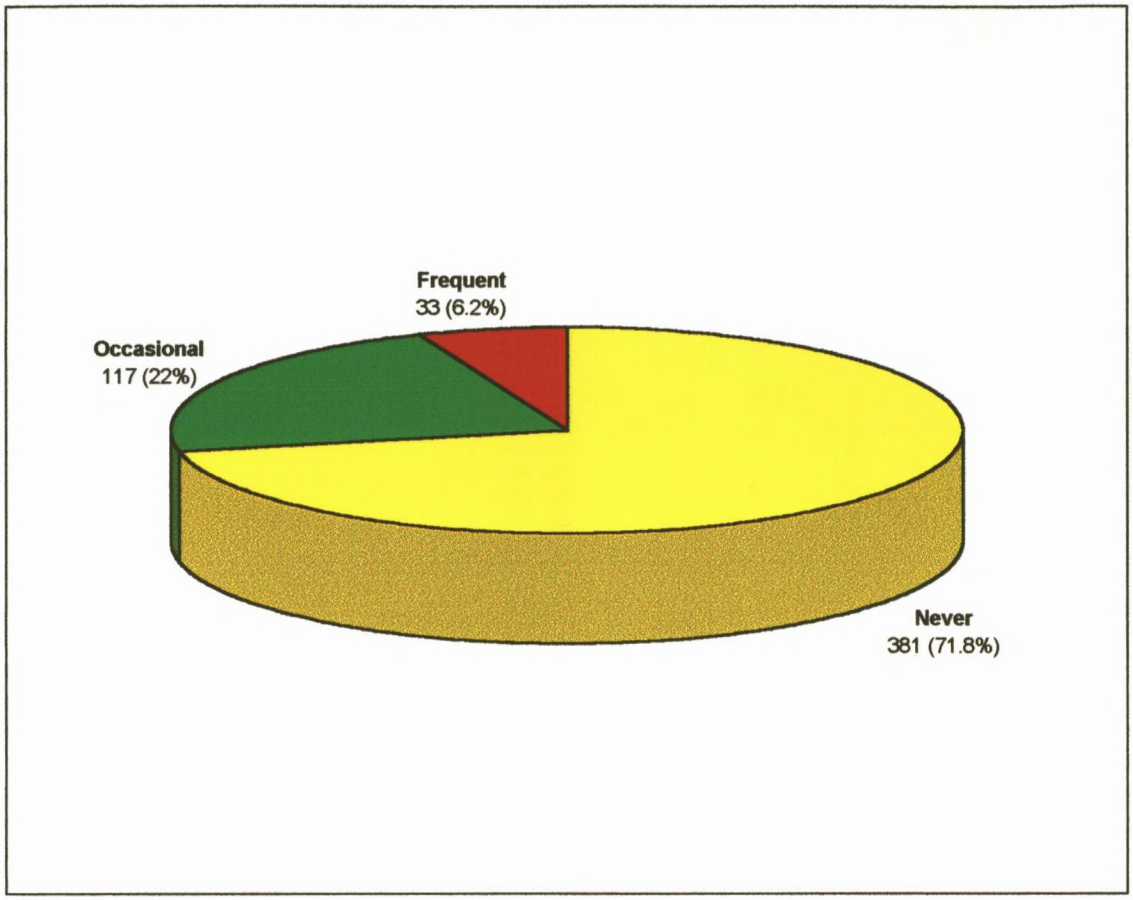

Fig. 4.12 Bed-rest for LBP among subjects in the prevalence group (n=531)

Among those subjects with LBP, 22% reported that they had occasionally needed bed-rest for their pain, 6.2% had frequently required bed-rest, but most (71.8%) stated that they had never needed bed-rest for their LBP.

4.4 INDIVIDUAL FACTORS ASSOCIATED WITH THE PREVALENCE OF LOW BACK PAIN

4.4.1 Gender of subjects and the prevalence of LBP

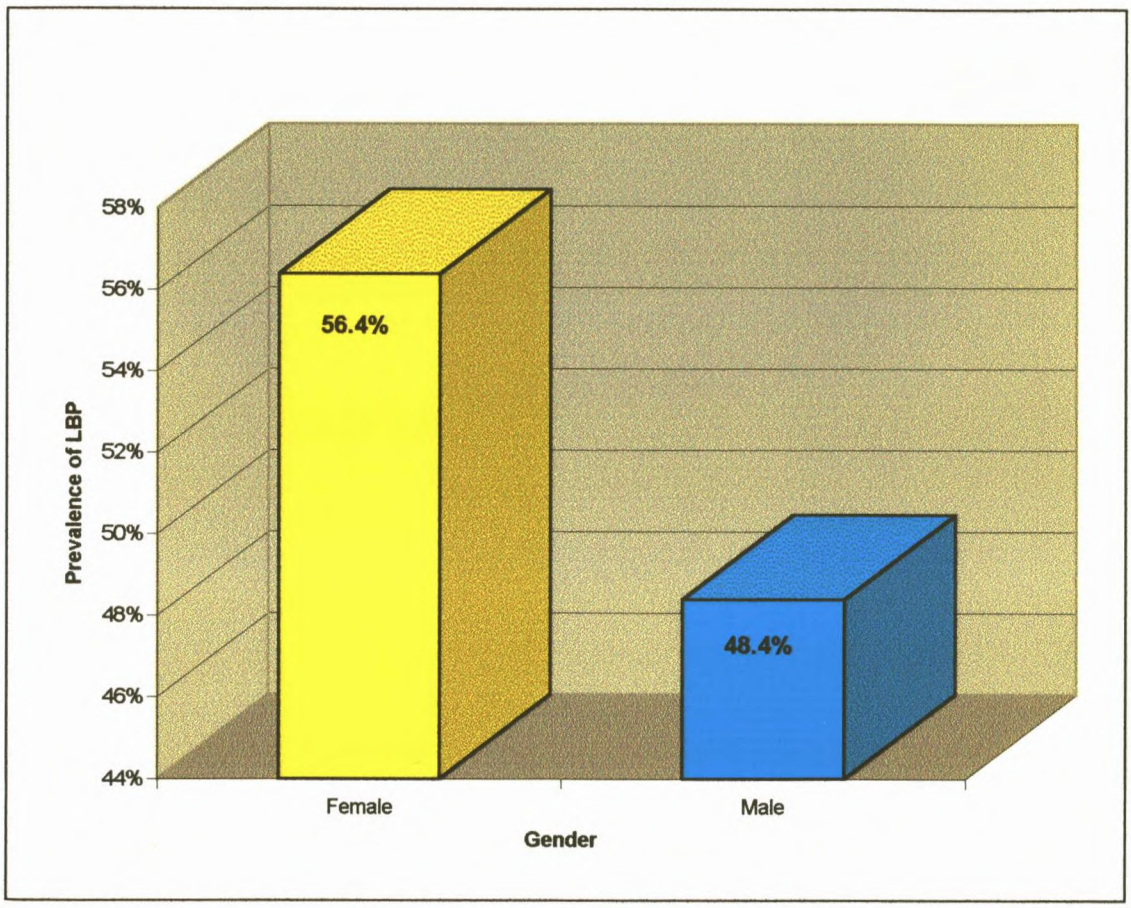

Fig. 4.13 The prevalence of LBP according to gender

The prevalence of LBP among women (56.4%) was 8% higher than that in men (48.4%).

Results of chisquare test:

$\alpha = 0.05$; $p = 0.012$; Calculated chisquare = 6.23361; Tabulated chisquare = 3.841

The calculated chisquare value ($x^2_{cal} = 6.23361$) was greater than the observed chisquare value ($x^2_{tab} = 3.841$). It was therefore concluded that there was a strong association between gender and the presence of LBP, at the $\alpha = 0.05$ level of significance.

Results of logistic regression analysis:

$\hat{\beta} = 0.2917$; S.E = 0.1072 Exp $(\hat{\beta}) = 1.3387$

Gender = x_2 (Appendix F) where, 1= female
0 = male

The results indicate that as x_2 varies from a low level to a high level (in females), the probability that the person has LBP is increased by a factor of 1.3387. The female population is thus significantly more likely to have LBP than the male population in the area of study.

4.4.2 Age of subjects and the prevalence of LBP

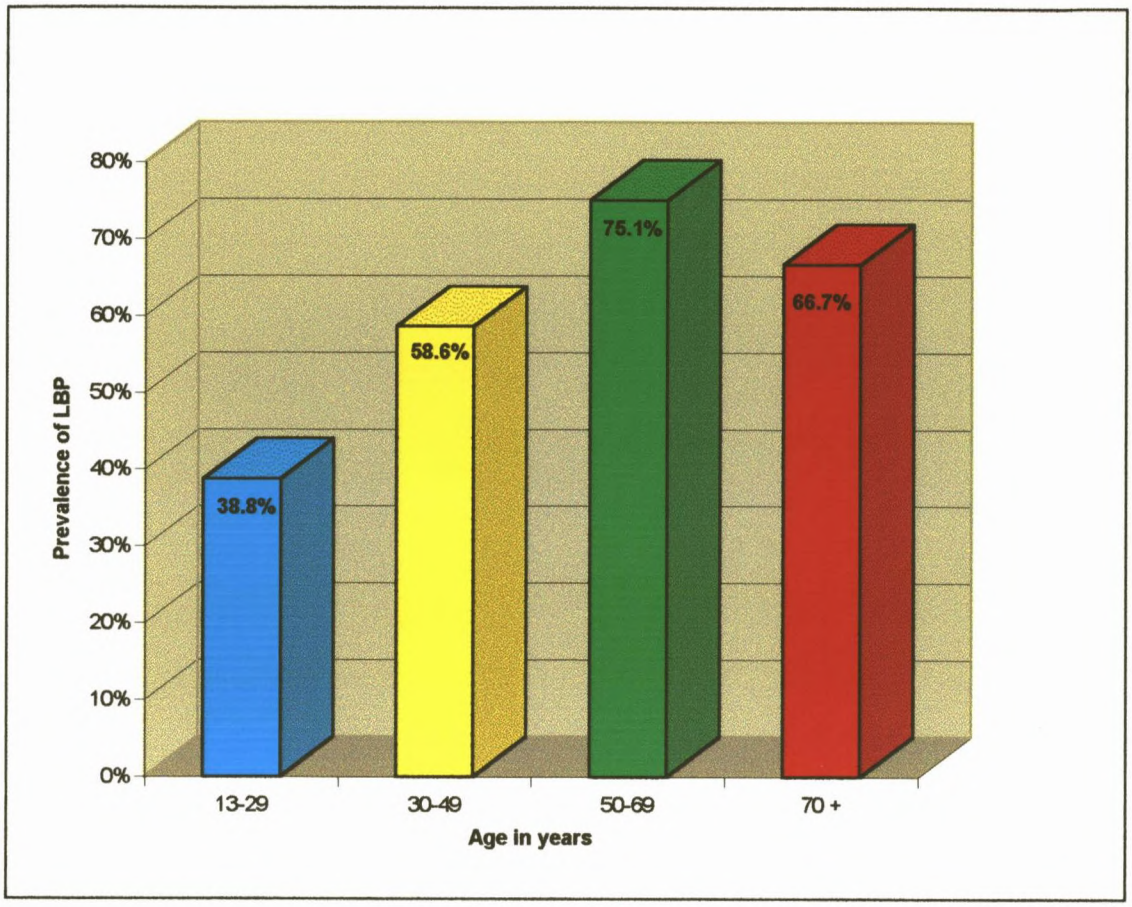

Fig. 4.14 Prevalence of LBP according to age

The prevalence of LBP was lowest in the group aged 13 to 29 (38.8%), increased with age and peaked in the 50 to 69 year age-group (75.1%), and then decreased in those aged 70 and older (66.7%).

Results of chisquare test:

$\alpha = 0.05$; $p = 0.00$; Calculated chisquare = 81.08904; Tabulated chisquare = 7.815

The calculated chisquare value ($x^2_{cal} = 81.08904$) was greater than the observed chisquare value ($x^2_{tab} = 7.815$). It was therefore concluded that there was a strong association between age and the prevalence of LBP, at the $\alpha = 0.05$ level of significance.

Results of logistic regression analysis:

$\hat{\beta} = 0.091$; S.E = 0.0041 Exp $(\hat{\beta}) = 1.0092$

Age in years = x_1 (Appendix F)

The results indicate that as x_1 varies from a low to a high value (with increasing age), the probability that the person has LBP is increased by a factor of 1.0092. This indicates that the risk of having LBP increases significantly with increasing age, among the population in the area of study.

4.4.3 Age and gender of subjects and the prevalence of LBP

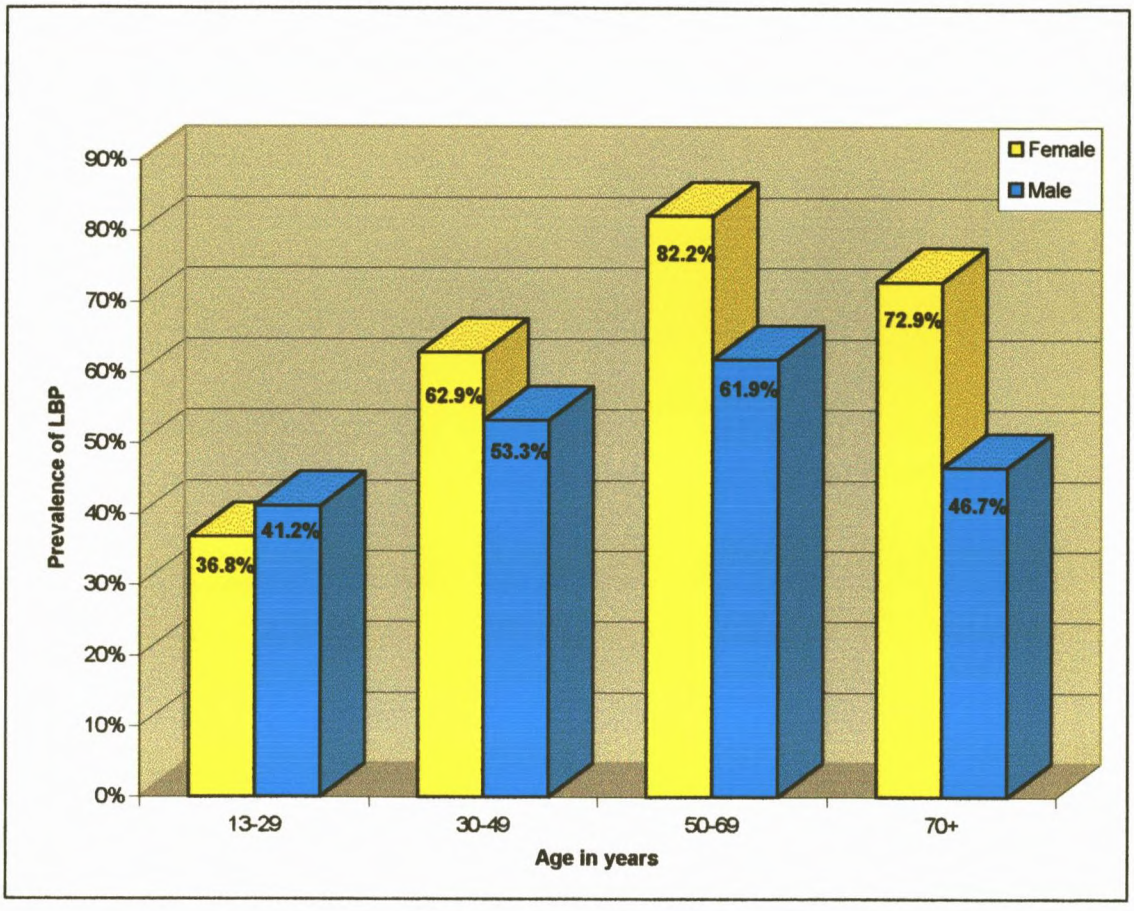

Fig. 4.15 Prevalence of LBP according to age and gender

The prevalence of LBP was greatest in females aged 50 to 69 (82.2%) and lowest in the females aged 13 to 29 (36.8%). The greatest difference in the prevalence of LBP between males and females was noted in those subjects 70 years of age and older, where the prevalence of LBP in women (72.9%) was 26.2% higher than that in men (46.7%).

The chisquare test or logistic regression analysis was not attempted on these age-gender subgroups of the sample population.

4.4.4 Height of subjects and the prevalence of LBP

Table 4.5 Prevalence of LBP according to height

Presence of LBP	Height			Row total
	133-154 cm	155-174 cm	175 cm +	
Yes	121 63.7%	354 50.6%	56 50.9%	531 53.1%
No	69 36.3%	346 49.4%	54 49.1%	469 46.9%
Column total	190 19%	700 70%	110 11%	1000 100%

Cross-tabulation between height and the presence of LBP revealed that the majority of subjects, 70% (n=700), measured 155-174 cm in height, and 50.6% (n=354) of them had LBP. The prevalence of LBP was lowest in this group and highest (63.7%) in the group measuring 133-154cm.

Results of chisquare test:

$\alpha = 0.05$; $p = 0.005$; Calculated chisquare = 10.55595; Tabulated chisquare = 5.991

The calculated chisquare value ($x^2_{cal} = 10.55595$) was greater than the observed chisquare value ($x^2_{tab} = 5.991$), which indicated a significant association between height and the presence of LBP, at the $\alpha = 0.05$ level of significance.

Cross-tabulation (Table 4.5) showed that the prevalence of LBP was greatest (63.7%) in the shortest group of subjects. The strong association between height and LBP identified by the chisquare test, thus suggests that shorter people are more likely to have LBP than taller people.

Results from logistic regression analysis:

$\hat{\beta} = -0.303$ S.E. = 0.0077 $\text{Exp}(\hat{\beta}) = 0.9701$

Height in centimeters = x_3 (Appendix F)

The results show that as x_3 varies from a low to high value (with increasing height), the probability that the person has LBP increases by a factor of 0.9701. This indicates that taller people are more likely to have LBP than shorter people in the population of study.

The opposing conclusions drawn from the chisquare test and logistic regression analysis regarding the association between height and the prevalence of LBP, probably represents one situation where the chisquare test has proved somewhat unreliable, as was referred to in Chapter 3: "Limitations of the chisquare test". The results from logistic regression analysis were therefore relied upon in this situation.

4.4.5 Weight of subjects and the prevalence of LBP

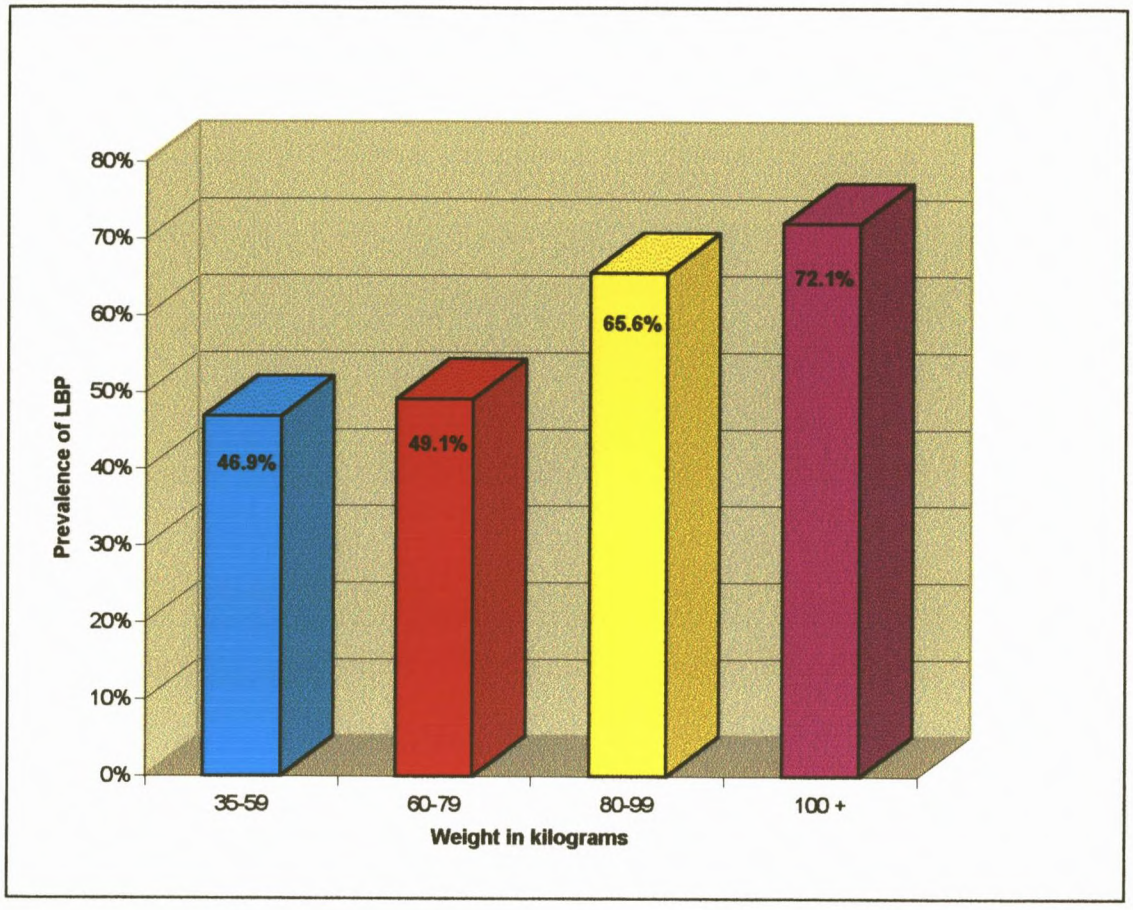

Fig. 4.16 Prevalence of LBP according to weight

The prevalence of LBP was lowest (46.9%) in the group weighing 35-59 kg and highest (72.1%) in the group weighing 100kg or more.

Results of chisquare test:

$\alpha = 0.05$; $p = 0.000$; Calculated chisquare = 28.83873; Tabulated chisquare = 7.815

The calculated chisquare value ($x^2_{cal} = 28.8387$) was greater than the observed chisquare value ($x^2_{tab} = 7.815$). It was therefore concluded that there was a strong association between weight and the presence of LBP, at the $\alpha = 0.05$ level of significance.

Results of logistic regression analysis:

$\hat{\beta} = 0.0039$ S.E = 0.0039 Exp $(\hat{\beta}) = 1.0039$

Weight in kilograms = x_4 (Appendix F)

The results indicate that as x_4 changes from a low to high value (with increasing weight), the probability that the person has LBP increases by a factor of 1.0039.

Results from the chisquare test and from logistic regression analysis, thus both show that heavier people are more likely to suffer from LBP than lighter people, in the population of study.

4.4.6 Body-type of subjects and the presence of LBP

Table 4.6 Prevalence of LBP according to body-type

Presence of LBP	Body-type			Row total
	Ectomorphic	Mesomorphic	Endomorphic	
Yes	30 66.7%	314 46.9%	187 65.4%	531 53.1%
No	15 33.3%	355 53.1%	99 34.6%	469 46.9%
Column total	45 4.5%	669 66.9%	286 28.6%	1000 100%

Cross-tabulation between body-type and the presence of LBP indicated that most subjects, 66.9% (n=669), were mesomorphic in build and 46.9% (n=314) of them had LBP. The prevalence of LBP was lowest in this group, higher among endomorphs (65.4%) and highest among the ectomorphs (66.7%).

Results of chisquare test:

$\alpha = 0.05$; $p = 0.000$; Calculated chisquare = 30.86428; Tabulated chisquare = 5.991

The calculated chisquare value ($x^2_{cal} = 30.86428$) was greater than the observed chisquare value ($x^2_{tab} = 5.991$), which indicates that there is a strong association between body-type and the presence of LBP, at the $\alpha = 0.05$ level of significance.

Results of logistic regression analysis:

$\hat{\beta} = -0.2798$ S.E = 0.0861 Exp $(\hat{\beta}) = 0.7559$

Body-type = x_5 (Appendix F) where, 1 = endomorphic or ectomorphic

0 = mesomorphic

The results indicate that as x_5 changes from a low to high value (for endomorphs or ectomorphs)), the probability that the person has LBP increases by a factor of 0.7559.

The results of the chisquare test and logistic regression analysis were thus similar; indicating that those individuals in the population of study who have endomorphic or ectomorphic builds, are more likely to have LBP.

4.4.7 Physical exercise and the prevalence of LBP

4.4.7.1 The prevalence of LBP in subjects who exercise regularly compared to that in those who do not exercise

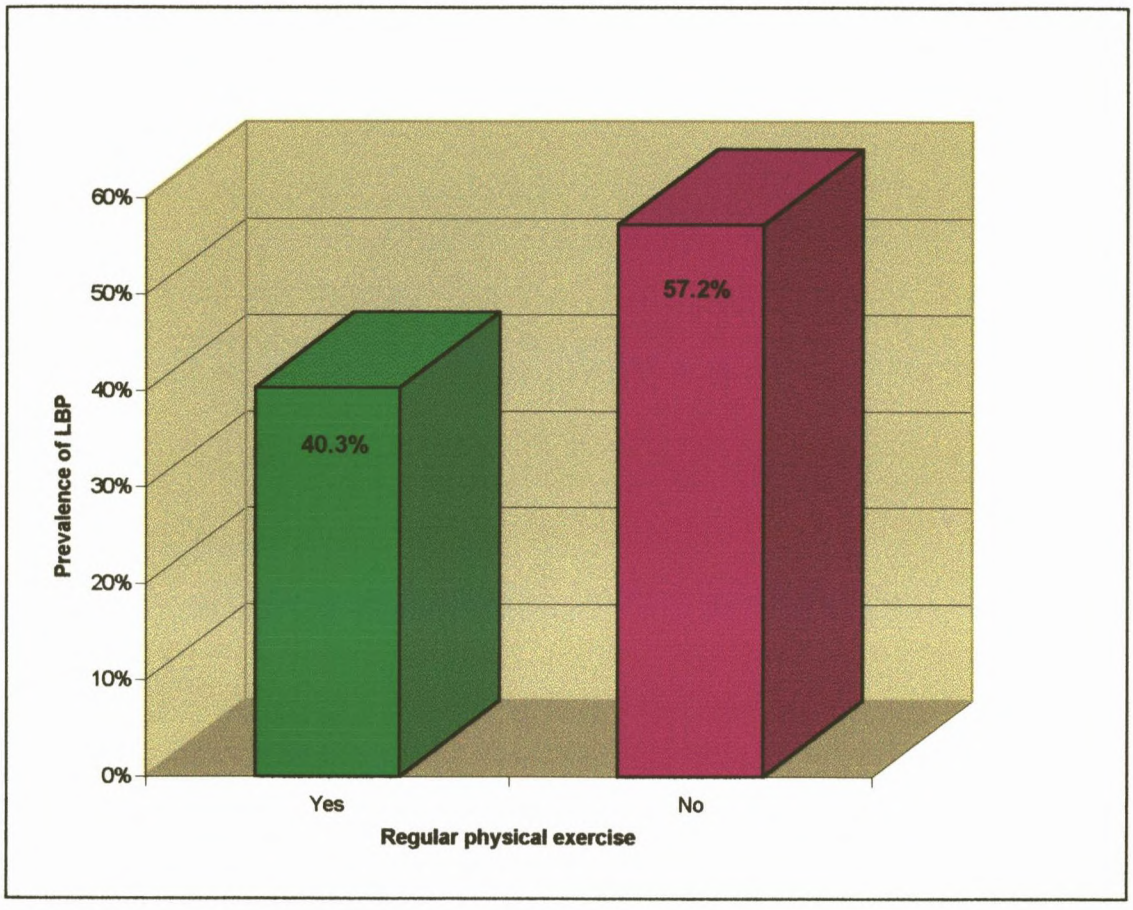

Fig 4.17 Physical exercise and the prevalence of LBP

The prevalence of LBP in the group of subjects who did not exercise (57.2%) was 16.9% higher than in those who reported exercising at least once a week (40.3%).

Results of chisquare test:

$\alpha = 0.05$; $p = 0.000$; Calculated chisquare = 22.45783; Tabulated chisquare = 3.841

The calculated chisquare value ($x^2_{cal} = 22.45783$) was greater than the observed chisquare value ($x^2_{tab} = 3.841$). It was therefore concluded that there was a strong association between exercise and the presence of LBP, at the $\alpha = 0.05$ level of significance.

Results of logistic regression analysis:

$\hat{\beta} = -0.2119$ S.E = 0.0842 Exp $(\hat{\beta}) = 0.8091$

Exercise = x_{11} (Appendix F) where, 1 = no exercise

0 = exercise

The results indicate that as x_{11} changes from a low value to a high value (in people who do not exercise), the probability that the person has LBP is increased by a factor of 0.8091.

Results from the chisquare test and logistic regression analysis thus both indicate that those people in the area of study who do not exercise, are significantly more likely to have LBP than those who do exercise.

4.4.7.2 Frequency of exercise and the prevalence of LBP

Table 4.7 Prevalence of LBP according to the frequency of exercise sessions in the exercise group (n=243)

Presence of LBP	Number of exercise sessions per week		Row total
	1-2	3+	
Yes	32 40.5%	66 40.2%	98 40.3%
No	47 59.5%	98 59.8%	145 59.7%
Column total	79 32.5%	164 67.5%	243 100%

Cross-tabulation between the frequency of exercise sessions and the presence of LBP revealed only a very small difference (0.3%) in the prevalence of LBP between subjects who exercise once or twice per week (40.5%) and those who exercise 3 or more times per week (40.2%).

Results of chisquare test:

$\alpha = 0.05$; Calculated chisquare = 0.0016859; Tabulated chisquare = 3.841

The calculated chisquare value ($x^2_{cal} = 0.0016859$) was less than the observed chisquare value ($x^2_{tab} = 3.841$). It was therefore concluded that there was no significant association between the frequency of exercise sessions and the prevalence of LBP, at the $\alpha = 0.05$ level of significance.

4.4.7.3 Duration of exercise sessions and the prevalence of LBP

Table 4.8 Prevalence of LBP according to the duration of exercise sessions in the exercise group (n=243)

Presence of LBP	Average duration of exercise sessions		Row total
	1-59 min	**60 min +**	
Yes	20 40%	77 39.9%	97 39.9%
No	30 60%	116 60.1%	146 60.1%
Column total	50 20.6%	193 79.8%	243 100%

Cross-tabulation between the average duration of exercise sessions and the presence of LBP, indicated that the prevalence of LBP in subjects who on average exercise for less than 60 minutes per session (40%), was almost exactly the same as that among those who exercise for 60 minutes or more per session (39.9%).

Results of chisquare test:

$\alpha = 0.05$; Calculated chisquare = 3.3635133; Tabulated chisquare = 3.841

The calculated chisquare value ($x^2_{cal} = 3.3635133$) was less than the observed chisquare value ($x^2_{tab} = 3.841$). It was therefore concluded that there was no significant association between the duration of exercise sessions and the prevalence of LBP, at the $\alpha = 0.05$ level of significance.

4.4.8 Smoking habit and the prevalence of LBP

4.4.8.1 The prevalence of LBP in smokers compared to that in non-smokers

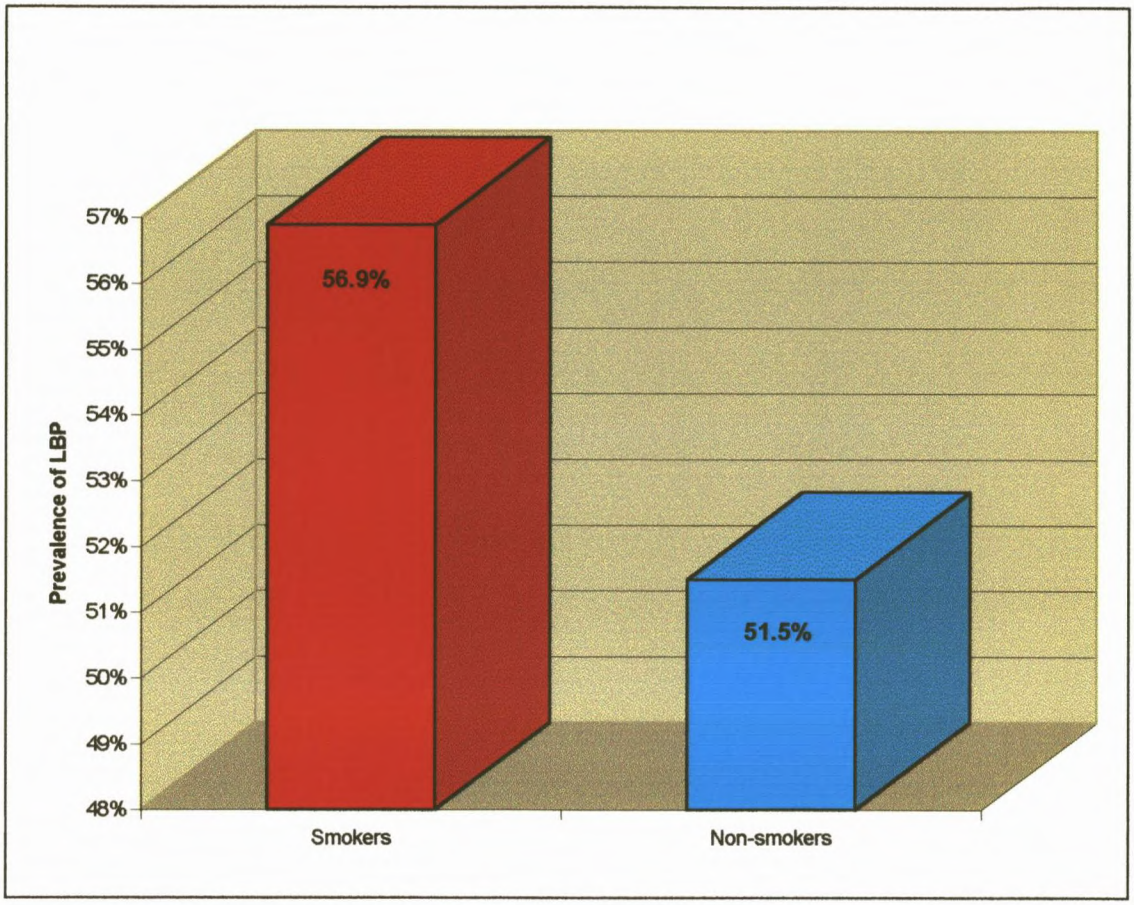

Fig. 4.18 The prevalence of LBP in smokers compared to that in non-smokers

The prevalence of LBP in smokers (56.9%) was 5.4% higher than that in non-smokers (51.5%).

Results of chisquare test:

$\alpha = 0.05$; $p = 0.176$; Calculated chisquare = 3.47312; Tabulated chisquare = 3.841

The calculated chisquare value ($x^2_{cal} = 3.47312$) was less than the observed chisquare value ($x^2_{tab} = 3.841$), which indicated that there was no significant association between smoking habit and the presence of LBP, at the $\alpha = 0.05$ level of significance.

4.4.8.2 Intensity of smoking and the prevalence of LBP

Table 4.9 Prevalence of LBP according to the intensity of smoking in the smoking group (n=293)

Presence of LBP	Number of cigarettes smoked per day			Row total
	1-9	10-19	20 +	
Yes	92 54.4%	43 63.2%	32 57.1%	167 57%
No	77 45.6%	25 36.8%	24 42.9%	126 43%
Column total	169 57.7%	68 23.2%	56 19.1%	293 100%

Cross-tabulation between the intensity of smoking and the presence of LBP revealed that most of the smokers, 57.7% (n=169), smoked 1 to 9 cigarettes per day, and 54.4% (n=92) of them had LBP. The prevalence of LBP was greatest (63.2%) in the group who reported smoking 10 to 19 cigarettes per day.

Results of chisquare test:

$\alpha = 0.05$; Calculated chisquare = 1.52964; Tabulated chisquare = 5.991

The calculated chisquare value ($x^2_{cal} = 1.52964$) was less than the observed chisquare value ($x^2_{tab} = 5.991$), which indicated that there was no significant association between the intensity of smoking and the presence of LBP, at the $\alpha = 0.05$ level of significance.

4.4.8.3 Duration of smoking and the prevalence of LBP

Table 4.10 Prevalence of LBP according to the duration of smoking in the smoking group (n=293)

Presence of LBP	**Duration of smoking**			Row total
	1-9 years	**10-19 years**	**20 years +**	
Yes	48 54.5%	44 62.9%	75 55.6%	167 57%
No	40 45.55	26 37.1%	60 44.4%	126 43%
Column total	88 30%	70 23.9%	135 46.1%	293 100%

Cross-tabulation between the duration of smoking and the presence of LBP, indicated that the prevalence of LBP was greatest in the group who had been smoking for 10 to 19 years (62.9%), and lowest in those who had been smoking for less than 10 years (54.5%).

Results of chisquare test:

$\alpha = 0.05$; Calculated chisquare = 1.33291; Tabulated chisquare = 5.991

The calculated chisquare value ($x^2_{cal} = 1.33291$) was less than the observed chisquare value ($x^2_{tab} = 5.991$), which indicated that there was no significant association between the duration of smoking and the presence of LBP, at the $\alpha = 0.05$ level of significance.

4.4.9 Parity and the prevalence of LBP

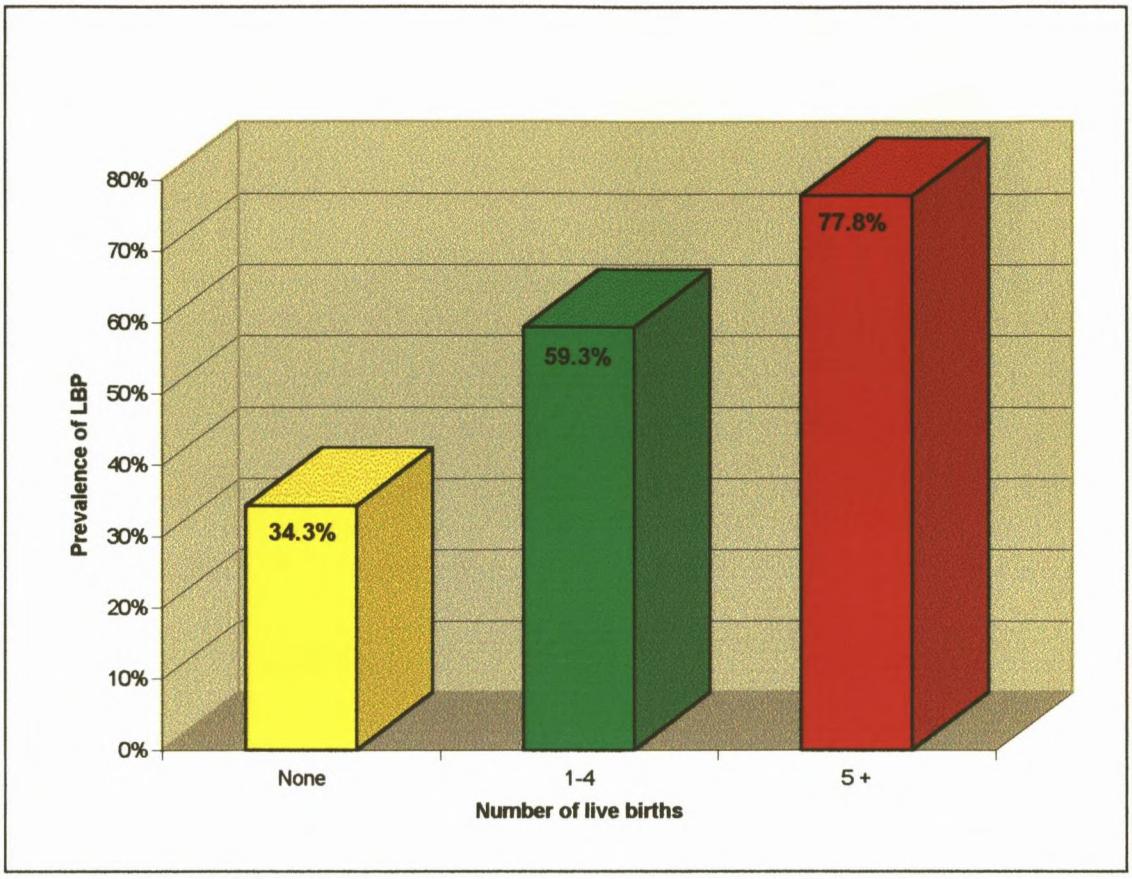

Fig. 4.19 Prevalence of LBP according to parity

The prevalence of LBP in parous women was at least 25% higher than that in nulliparous women.

Results of chisquare test:

$\alpha = 0.05$; $p = 0.000$; Calculated chisquare = 54.13006; Tabulated chisquare = 7.815

The calculated chisquare value (x^2_{cal} = 54.13006) was greater than the observed chisquare value (x^2_{tab} = 7.815). It was therefore concluded that there was a strong association between parity and the presence of LBP, at the α = 0.05 level of significance.

Results of logistic regression analysis:

$\beta = -0.4368$ S.E = 0.1049 Exp (β) = 0.6461

Parity = x_7 (Appendix F) where, 1 = ≥ 1 live birth

0 = nulliparous

The results indicate that as x_7 varies from a low level to a high level (in parous women), the probability that the person has LBP is increased by a factor of 0.6461.

The chisquare test and logistic regression analysis thus both indicate that parity is a risk factor for the development of LBP.

4.4.10 Employment-status and the prevalence of LBP

Table 4.11 Prevalence of LBP according to employment status

Presence of LBP	Employed	Unemployed	Row total
Yes	145 58.9%	386 51.2%	531 53.1%
No	101 41.1%	368 48.8%	469 46.9%
Column total	246 24.6%	754 75.4%	1 000 100%

Cross-tabulation between employment status and the presence of LBP indicated that the prevalence of LBP was 7.7% higher among employed subjects (58.9%) than among those who were unemployed (51.2%).

Chisquare results:

$\alpha = 0.05$; $p = 0.0344$; Calculated chisquare = 4.47282; Tabulated chisquare = 3.841

The calculated chisquare value ($x^2_{cal} = 4.47282$) was greater than the observed chisquare value ($x^2_{tab} = 3.841$), which suggests that there is a strong association between employment status and the presence of LBP. However, when using the alternative decision rule (i.e. accepy H_0 if $p \geq 0.025$), the results ($p = 0.0344$) suggest that there is no significant association between employment status and the presence of LBP, at the $\alpha = 0.05$ level of significance. No definite conclusions could therefore be drawn from the chisquare results. Logistic regression analysis was used and relied upon in this case.

Results of logistic regression analysis:

$\hat{\beta} = 0.1566$ S.E = 0.0787 Exp $(\hat{\beta}) = 1.1696$

Employment status = x_6 (Appendix F) where, 1 = unemployed

0 = employed

The results indicate that as x_6 changes from a low level to a high level (in the unemployed), the probability that the person has LBP is increased by a factor of 1.1696. This suggests that unemployed people are far more likely to have LBP than employed people in the area of study.

4.4.11 Summary of results from logistic regression analysis

4.4.11.1 The optimum logistic regression model

Table 4.12 The optimum logistic regression model

Variable	$\hat{\beta}$	S.E	Exp ($\hat{\beta}$) (odds ratio)
Age (x1)	0.0091	0.0041	1.0092
Parity (x_7)	– 0.4368	0.1049	0.6461
Body-type (x_5)	– 0.2798	0.0861	0.7559
Weight (x_4)	0.0039	0.0039	1.0039
Exercise (x_{11})	– 0.2119	0.0842	0.8091
Height (x_3)	– 0.0303	0.0077	0.9701
Gender (x_2)	0.2917	0.1072	1.3387
Employment status (x_6)	0.1566	0.0787	1.1696
Constant	4.6551		

4.4.11.2 The estimated logistic regression model

The estimated logistic regression model is given as follows:

Probability of LBP = 4.65 + 0.0091 (Age) – 0.4368 (Parity) – 0.2798 (Body-type) + 0.0039 (Weight) – 0.2119 (Exercise) – 0.0303 (Height) + 0.2917 (Gender) + 0.1566 (Employment status)

Using the above estimated logistic regression model, one can estimate the probability of having LBP for any person in the area of study. For example, consider a person with the following particulars (Appendix F):

Age = 45 years
Parity = 1
Body-type = 1
Weight = 67 kilograms
Exercise = 1
Height = 172 centimeters
Gender = 1
Employment status = 1

For such a person, the estimated probability that he/she has LBP is obtained as follows:

(1) First, one needs to find the value of Z:

$$Z = 4.65 + 0.0091\,(45) - 0.4368\,(1) - 0.2798\,(1) + 0.0039\,(67) - 0.2119\,(1) - 0.0303\,(172) + 0.2917\,(1) + 0.1566\,(1)$$

$$= -0.371$$

(2) Then, the probability of having LBP is equal to:

$$P(Y = 1) = \frac{1}{1 + \text{Exp}(-Z)}$$

$$= \frac{1}{1 + \text{Exp}(-(-0.371))}$$

$$= \frac{1}{1 + \text{Exp}(0.371)}$$

$$= \frac{1}{1 + 1.449}$$

$$= \frac{1}{2.449}$$

$$= 0.408$$

$$= 40.8\%$$

Thus, the probability that the above person has LBP is 41%.

Similarly, one can determine the probabilities of having LBP for other people, with various particulars in the area of study.

4.5 THE EFFECT OF LBP ON OCCUPATION

4.5.1 Frequency of work-absence due to LBP

Table 4.13 Frequency of work-absence due to LBP among subjects with a history of LBP and occupation (n=408)

Work-absence due to LBP	Total
Often	11 2.7%
Occasionally	63 15.4%
Never	334 81.9%
Column total	408 100%

Of those subjects with a history of LBP and who had been employed at some stage (n=408), 18.1% (n=74) had been absent from work at least once due to their LBP, and 81.9% (n= 334) had never missed work because of LBP.

4.5.2 Duration of work-absence due to LBP

Table 4.14 Longest duration of work-absence due to LBP (n=74)

Longest period of work-absence due to LBP	Total
≥ 1 month	5 6.8%
2-4 weeks	7 9.5%
≤ 1 week	62 83.8%
Column total	74 100%

Periods of work-absence, among those subjects who had at some stage taken time off work because of LBP (n=74), in the majority of instances (83.8%), lasted no longer than 1 week. Nearly 7% of the subjects who had missed work due to LBP reported that they had at some stage been absent for a month or longer.

4.5.3 Loss or change of occupation due to LBP

Table 4.15 Loss or change of occupation due to LBP among subjects with a history of LBP and occupation (n=408)

Loss or change of occupation due to LBP	Total
Yes	10 2.5%
No	398 97.5%
Column total	408 100%

Only 2.5% (n=10) of the 408 subjects with a history of LBP and employment, had ever changed or lost their job because of LBP.

4.6 CARE-SEEKING FOR LBP

4.6.1 Level of care-seeking for LBP

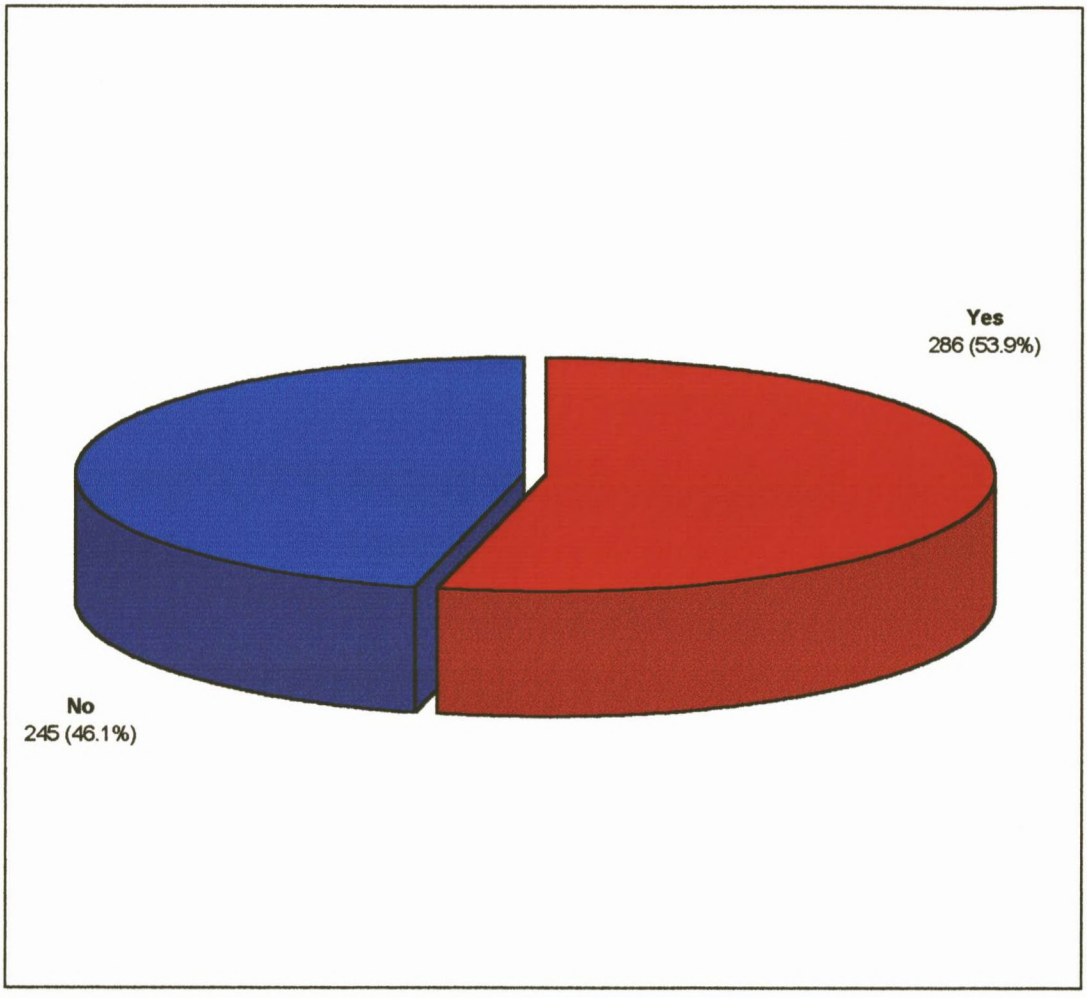

Fig. 4.20 Frequency with which subjects in the prevalence group were receiving treatment/medication for their LBP (n=531)

More than half (53.9%) of the subjects in the prevalence group were presently taking medication or receiving some form of treatment for their LBP.

4.6.2 Type of care for LBP

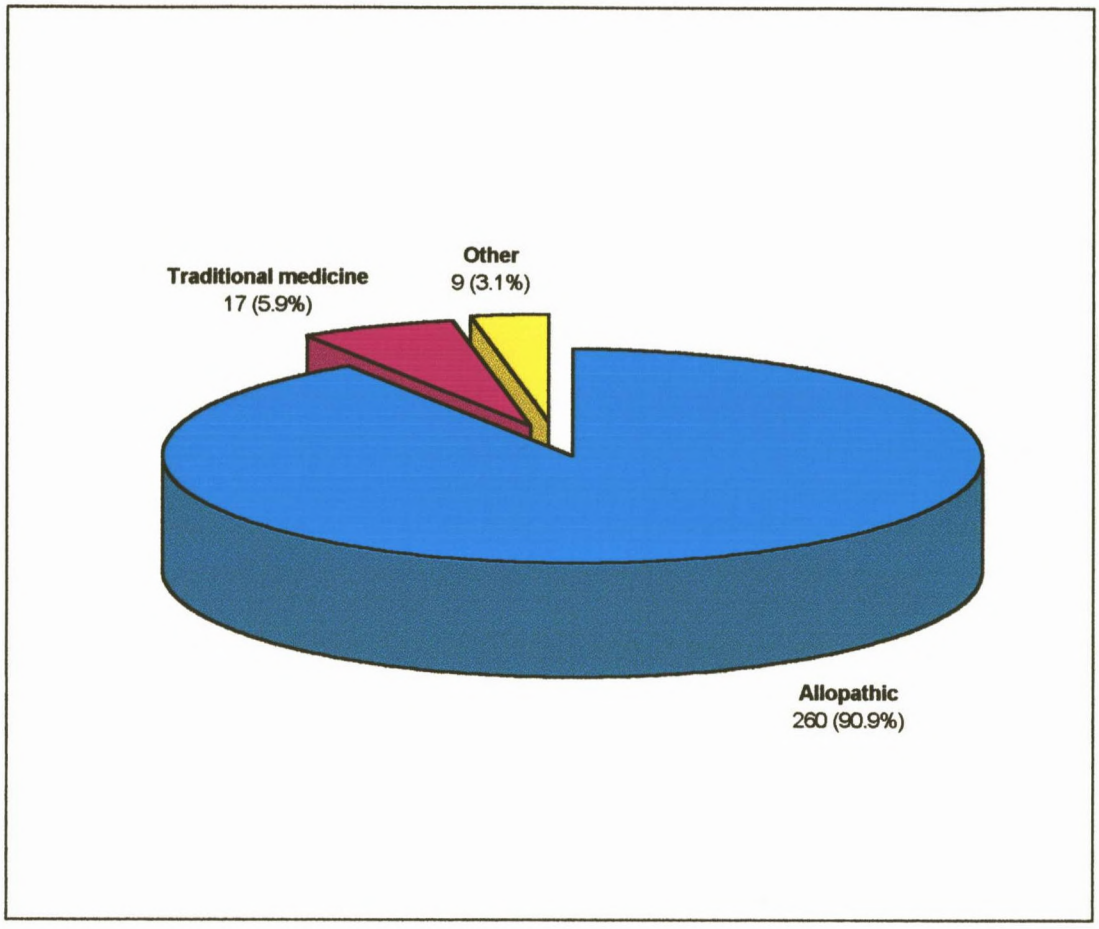

Fig. 4.21 Type of treatment/medication being received by subjects in the treatment group (n=286)

Of those subjects who were presently receiving treatment/medication for their LBP (n=286), the vast majority, 90.9% (n=260), were receiving allopathic medication, which included analgesics, anti-inflammatories and muscle relaxants. A further 5.9% (n=17) were receiving traditional medicine. Nine subjects reported receiving some other form of treatment:

2 – physiotherapy
3 – herbs
1 – Detol enema
1 – anti-biotic
1 – Calcium gluconate
1 – suppository (unknown type)

4.6.3 Source of care for LBP

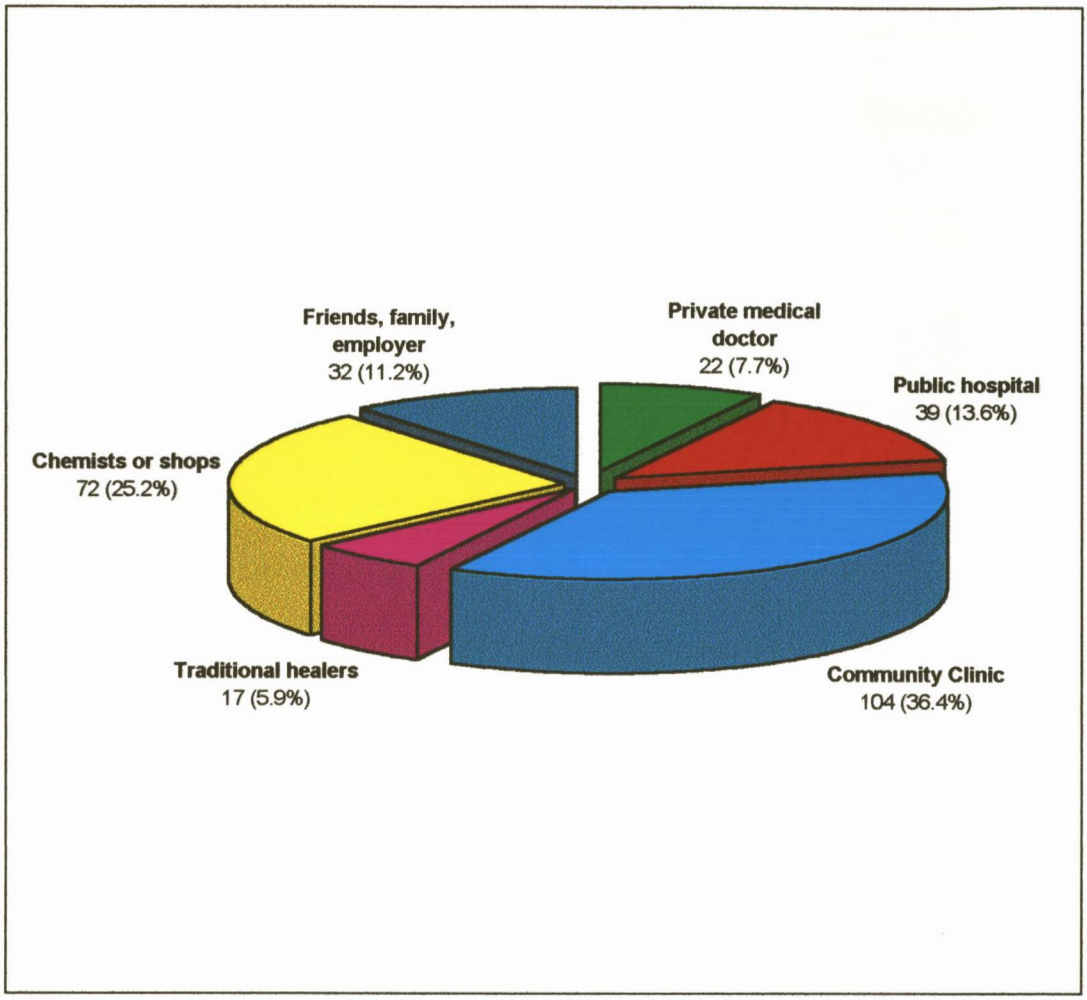

Fig. 4.22 Source of treatment/medication for LBP (n=286)

Treatment/medication for LBP was most commonly received from the local community clinic (36.4%), followed by chemists or shops (25.2%) and public hospitals (13.6%).

4.6.4 Cost of care for LBP

Table 4.16 Cost of treatment/medication for LBP (n=286)

Average cost of treatment for LBP	Total
Free	136 47.6%
R1-24	123 43%
R25-49	20 7%
R50 +	7 2.4%
Column total	286 100%

The majority of subjects who were receiving treatment/medication for their LBP, were receiving free treatment (47.6%) or were paying less than R25 per month (43%).

CHAPTER 5 DISCUSSION

5.1 The lifetime incidence and prevalence of low back pain

The lifetime incidence rate of low back pain (LBP) in Chesterville was 57.6% (Fig. 4.4). This is slightly lower than in the Swedish studies by Svensson and Andersson (1983) and Svensson et al. (1990), who also studied general population samples and used similar definitions of LBP, but reported lifetime incidence rates of 61% and 66% respectively. The lifetime incidence rate in Chesterville of 57.6% can however be regarded as an underestimation due to the problem of recall, as noted by Svensson and Andersson (1982) and Svensson et al. (1990).

The prevalence of LBP in Chesterville, 53.1% (Fig. 4.8), was considerably higher than the figures of 31% (Svensson ans Andersson 1983) and 33% (Svensson et al. 1990) found in general population samples in Gothenburg, Sweden. In these Swedish studies, the prevalence groups included individuals who were presently experiencing LBP or had pain occurring at least once a month. However in the present study, subjects with present LBP or pain occurring at least on an occasional basis, were included in the prevalence group; which may have included subjects who experienced LBP less frequently than once per month. This may be partly responsible for the higher prevalence rate in this study and therefore for the relatively small difference between the lifetime incidence (Fig. 4.4) and prevalence (Fig. 4.8) rates.

However, when considering the findings of Nagi et al. (1973), Reisbord and Greenland (1985), Toroptsova et al. (1995) and Carey, Evans et al. (1995), the high prevalence of LBP in Chesterville is not surprising. These researchers found that low socio-economic class, lower income and lower levels of education are associated with a higher prevalence of LBP. Chesterville is at an obvious socio-economic disadvantage when compared to the Swedish City of Gothenburg, and is likely to have higher levels of unemployment and lower levels of education. The higher prevalence of LBP in Chesterville is thus in keeping with the findings of the above researchers.

5.2 The intensity and frequency of low back pain

5.2.1 Intensity of low back pain

Of those subjects in the prevalence group, 31.8% (n=169) reported that their LBP was mild, 44.8% (n=238) reported moderate LBP and 23.4% (n=124) severe pain (Fig. 4.9). This strongly agrees with the findings of Frymoyer et al. (1980) and Svensson and Andersson (1982). According to Frymoyer et al. (1980), mild, moderate and severe LBP accounted for 30%, 46% and 24% of cases of LBP respectively, while Svensson and Andersson (1982) reported almost identical results. It seems a little surprising that more people report suffering from moderate LBP than from mild pain. This may be because episodes of mild LBP are more easily forgotten by the individual or considered insignificant and therefore not reported, while subjects experiencing moderate LBP, on the other hand, are more likely to remember and report their pain.

5.2.2 Frequency of low back pain

Of the subjects in Chesterville, who reported experiencing LBP (n=531), 69.7% (n=370) stated that their pain occurred only on an occasional basis, and 23.2% (n=123) reported frequent LBP (Fig. 4.10). This concurs with Toroptsova et al. (1995), who found that occasional LBP accounted for 65.4%, and frequent LBP for 22.8% of the cases of LBP. The prevalence of frequent LBP among LBP sufferers (23% to 31%), as reported by Biering-Sørensen (1983) was also similar to that found in the present study.

The 123 residents of Chesterville who reported frequent LBP (Fig. 4.10), represent 12.3% of the study population (N=1 000), which is lower than the 18% prevalence found by both Nagi et al. (1973) and Reisbord and Greenland (1985) in general population samples in Sweden and America respectively.

Constant LBP accounted for 7.2% of cases of LBP in Chesterville (Fig. 4.10). This agrees with the findings of Horal (1969), Balagué et al. (1995) and Masset and Malchaire (1995), who found that between 4% and 12% of people with LBP experience constant or almost constant pain.

5.2.3 Intensity and frequency of low back pain

Cross-tabulation between the intensity and frequency of LBP (Table 4.3) indicated that 'occasional-mild' (28.2%) and 'occasional-moderate' (34.3%) LBP accounted for 62.5% of cases of LBP, suggesting that LBP in the majority of subjects in the prevalence group was not considered a serious problem. However, 23.4% described their LBP as severe, of which 10.4% suffered from 'frequent-severe' pain and 5.8% from 'constant-severe' pain. The subjects were not asked whether they considered their LBP to be a significant health problem, but moderate LBP occurring frequently or constantly, as well as severe LBP occurring frequently or constantly, are likely to represent pain which could affect the health-status of the individual. From Table 4.3 it can be seen that a total of 26.7% (n=142) of those with LBP (n=531) were suffering from such pain (i.e. moderate or severe LBP occurring frequently or constantly). This figure (n=142) represents 14.2% of the sample population, which suggests that at least one out of every 10 residents of Chesterville, are at best, suffering from frequent episodes of moderate LBP.

5.3 Referred lower limb pain

Referred lower limb pain was reported to be associated with LBP in 24.1% (n=128) of individuals with LBP (n=531) in Chesterville (Fig. 4.11). This figure is less than half that found by Hurwitz (1994) and Toroptsova et al. (1995), who reported that referred lower limb pain was present in 56.2% and 52.9% of LBP sufferers respectively. The frequency

with which lower limb pain was associated with LBP in the present study (24.1%) is similar to the prevalence of sciatica among LBP sufferers (22% to 25%), as suggested by Horal (1969) and Borenstein (1995: 22).

5.4 The duration of low back pain

The current study did not attempt to establish the duration of individual episodes of LBP, but only how long LBP had been troubling the individual since its initial onset. Chronic LBP (LBP of at least 6 months duration) was reported by 89.8% (n=517) of subjects in the lifetime incidence group (n=576), the majority (60.8%) of whom had pain which had lasted 6 months to 9 years (Table 4.2). This concurs with the American studies by Damkot et al. (1984) and Hurwitz (1994) who both found that a long history of pain or recurrent symptoms were reported by at least 73% of Subjects with LBP. In the current study, only 45 individuals who had experienced LBP at some stage of their life, reported during the interview that they were no longer bothered by LBP, which is indicated by the difference between the number of individuals in the lifetime incidence (n=576) (Fig. 4.4) and prevalence (n=531) (Fig. 4.8) groups. This further suggests that only a small proportion of people who experience LBP at some stage are likely to be totally free from similar pain in the future, and that recurrent symptoms and chronic pain are common.

5.5 The nature of onset of low back pain

Eighty-four percent of subjects with a history of LBP, said that their LBP had started gradually over time, while in 16% the onset was sudden (Table 4.1). Only 6.3% could relate the onset of their LBP to an accident of some kind (Table 4.1). This concurs with Rowe (1969) who found that there is often no obvious relationship between the onset of LBP and a traumatic inciting event. In Rowe's study, only 15% of those with LBP could clearly relate the onset of their LBP to a definite injury. Accident-related onset of LBP has however been reported by Frymoyer et al. (1980) and Hurwitz et al. (1994) to account for 54.7% and 34% of cases of LBP respectively, which are considerably higher proportions than found in Chesterville. The study by Frymoyer et al. (1980) was however only concerned with more severe LBP for which medical attention was sought. It has been reported by Damkot et al. (1984) that severe LBP is nearly twice as likely to be associated with a specific inciting event than moderate LBP, which may be responsible for the relatively high incidence of accident-related onset in the study by Frymoyer et al. (1980).

The frequency with which LBP was reported to have started suddenly by the subjects in Chesterville should be considered an underestimation, as it is likely that a number of subjects, especially the elderly and those with a long history of LBP, may have forgotten the exact nature of onset of their LBP.

5.6 Disability due to low back pain

5.6.1 Effect of low back pain on daily activities

The extent to which LBP caused difficulty in performing daily activities is summarized in Table 4.4. The activities most frequently associated with difficulty due to LBP, in order of importance, were bending, lifting, standing, sitting and walking. Svensson and Andersson (1982) also found that LBP' patients commonly experience difficulty with these activities.

A total of 77.4% of the prevalence group reported mild (31.5%), moderate (27.3%) or severe (18.6%) difficulty with bending due to their LBP. This is similar to the study by Bergquist-Ullman and Larsson (1977), but higher than the 30.5% of subjects with LBP who reported limitations in bending or kneeling in the American study by Nagi et al. (1973).

Lifting was associated with difficulty in 50.9% and walking with difficulty in 44.1% of those with LBP in the Chestervillle study. Both these figures are higher than in the American study (Nagi et al. 1973), in which 25.1% of the subjects with LBP reported that lifting and carrying was limited and 15.8% that walking was limited due to their LBP. The frequency with which walking was associated with difficulty in the present study (44.1% of prevalence group) (Table4.4) however, agrees with the findings of Berquist-Ullman and Larsson (1977).

The frequency with which sleep disturbance was associated with LBP in the present study (39.5% of prevalence group) (Table 4.4) was nearly 17% higher than found by Bergquist-Ullman and Larsson (1977).

The activities most rarely influenced by LBP were personal care and social life. However, moderate to severe difficulty with personal care was reported by 12.9% of the prevalence group, and 11.3% said that their social life was moderately or severely affected by their LBP (Table 4.4).

5.6.2 Bed-rest due to low back pain

A total of 28.2% (n=150) of subjects with LBP (n=531) reported that since the onset of their LBP, that they had needed occasional (22%) or frequent (6.2%) bed-rest for their pain, while 71.8% reported never needing bed-rest for their LBP (Fig. 4.12). This suggests that nearly one third of cases of LBP at some stage result in considerable disability requiring bed-rest. This tends to support the findings of the large 'EPOZ' Study (Valkenburg and Haanen 1982) which found that of those people who had ever suffered from LBP (n=3 608), 34.3% had stayed in bed because of it. Roncarati and McMullen (1988) have similarly commented on the relatively high frequency of bed-rest among LBP sufferers.

5.7 The effect of low back pain on employment

5.7.1 Sample selection

The extent to which LBP resulted in work-absence in Chesterville was investigated among those subjects in the lifetime incidence group who were also presently employed or had a history of employment. This resulted in a sample of 408 subjects (Table 4.13). Only 145 of these subjects were employed and had LBP at the time of the interview (Table 4.11). The remaining 263 had experienced LBP and had been employed at an earlier stage, making poor recall more likely, especially among the elderly subjects. It was also not established in every case whether the individual had experienced LBP at the same time that they were employed. No definite conclusions can therefore me drawn regarding the effect of LBP on employment from this study.

5.7.2 Frequency of work-absence due to low back pain

Eighty-two percent (n=334) of the individuals included in this group (n=408) had never missed work because of LBP (Table 4.13), while a total of 18.1% had missed work occasionally (15.4%) or frequently (2.7%) due to their LBP. This is lower than in the study by Rowe (1969), who found that 25% of the men investigated just prior to retirement had been absent from work at some stage because of LBP.

5.7.3 Duration of work-absence due to low back pain

The majority (84%) of subjects who had missed work due to LBP had never been absent for longer than a week, 10% had been absent for 2 to 4 weeks at a time and 7% for a month or longer (Table 4.14). The short duration of most periods of work-absence agrees with the findings of Carey, Evans et al. (1995) who reported that the median number of days off work during the study year, in a group of chronic LBP patients, was 3. This suggests that most periods of severe disability requiring work-absence are brief. Carey, Garrett et al. (1995) similarly found that of a group of acute LBP patients who missed work due to their LBP, over 95% were back at work within 4 weeks, suggesting that approximately only 5% of work-absence periods due to LBP last a month or longer. This compares favorably with the results of the present study which indicate that only 7% of subjects who had missed work had been absent for a month or longer.

5.7.4 Loss or change of occupation due to low back pain

Of those subjects in the lifetime incidence group who were presently employed or had a history of employment (n=408), only 2.5% (n=10) had ever lost or changed their job because of LBP (Table 4.15). Massett and Malchaire (1994) similarly found that 1.7% of a sample of industrial workers in Belgium had changed their jobs at least once due to LBP. The 10 subjects who lost or changed their jobs in Chesterville represents 1% of the sample population. This is lower than in the Dutch city of Zoetermeer where it has been

reported (Valkenburg and Haanen 1982) that approximately 6% (4% of the women and 8% of the men) of the population had changed their jobs because of LBP.

5.8 Individual factors associated with the presence of low back pain

5.8.1 Age and gender

In the present study, the largest single group of subjects, 45.4%, were aged 13 to 29, 30.2% were 30 to 49 years of age, 18.1% were 50 to 69 years old and only 6.3% were 70 years of age or older (Fig. 4.2). Each of the four age groups consisted of relatively more females than males (Fig. 4.3). Females accounted for 58.3% of the sample population and males for 41.7% (Fig. 4.1).

The age of onset of LBP was most commonly reported, that is by 45% of subjects with a history of LBP, to have been between the ages of 20 and 39 (Fig. 4.7). This agrees with Horal (1969), who found that LBP typically began in the late 20's or early 30's and with Rowe (1969), who similarly reported that the age of onset of LBP is usually between the years of 30 and 39. The mean age of onset of LBP in the current study in Chesterville was 33.3 years old, which is similar to that (36 years old) reported by Carey, Evans et al. (1995).

The lifetime incidence (Fig. 4.6) and prevalence (Fig. 4.14) rates in the present study were lowest in the 13 to 29 year old age group, increased with age to peak in the 50 to 69 age group and then decreased in those 70 years of age and older. This variation in the frequency of LBP with age concurs with the findings of Reisbord and Greenland (1995) and Toroptsova et al. (1995), whose findings suggest that the prevalence of LBP tends to increase with age until the late 50's or early 60's but then drops off in the elderly.

The lifetime incidence (Fig. 4.6) and prevalence (Fig. 4.14) of LBP in the present study was highest in the 50 to 69 year-old age group. The findings of Horal (1969), Rowe (1969) and Roncarati and McMullen (1988) however suggest that LBP is most likely to be reported by people younger than 50, particularly those aged 30 to 49.

In the present study, the lifetime incidence of LBP in women was 9.9% higher than that in men (Fig. 4.5) and the prevalence of LBP in women, 8% higher than in men (Fig. 4.13). The chisquare test and logistic regression analysis both indicated that the above gender-distinction with regard to the lifetime incidence and prevalence of LBP was statistically significant. This concurs with Nagi et al. (1973) and Reisbord and Greenland (1985) who also found that women were significantly more likely to report LBP than men. Toroptsova et al. (1995) also found that the prevalence of LBP was higher in women, but the gender difference in this study was not statistically significant.

The prevalence of LBP in the present study was higher among women in all of the age groups, except in the 13 to 29 year-old group, where the prevalence in males was 4.4% higher than in females (Fig. 4.15). The prevalence of LBP in women aged 50 to 69 was

20.3% higher than in men of the same age; and in those aged 70 and older, the prevalence in women was 26.2% higher than in men (Fig. 4.15). The relatively high frequency of LBP in elderly women found in the present study is consistent with the findings of Nagi et al. (1973) and Biering-Sørensen (1982).

5.8.2 Anthropometry

The prevalence of LBP in the shortest group of subjects (133-154cm), was 63.7%, which is nearly 13% higher than the average prevalence in the taller subjects (51%) (Table 4.5). The prevalence of LBP among the group measuring 155 to 174 centimeters was almost identical to that in the group measuring 175 centimeters or more (Table 4.5). The chisquare test indicated that this association between height and the presence of LBP was statistically significant, at the $\alpha = 0.05$ level of significance, which suggests that shortness is a risk factor for the development of LBP. Logistic regression analysis by contrast, showed that the probability of having LBP increases with increasing height. The results of logistic regression analysis were regarded as being more reliable in this situation. This is because it did not result in a loss of information caused by dividing height into various categories, as was the case with chisquare analysis. It was therefore concluded that tallness is a risk factor for the development of LBP, which is supported by the findings of Gyntelberg (1974) and Roncarati and McMulllen (1988).

The prevalence of LBP was lowest in the lightest group of subjects and then increased with increasing weight of subjects, peaking at 72.1% in those weighing 100 kilograms or more (Fig. 4.16). This positive association between increasing weight and the presence of LBP was found by both the chisquare test and logistic regression analysis to be statistically significant, which is supported by the findings of Roncarati and McMullen (1988) and Orvieto, Rand et al. (1994).

Individuals with mesomorphic builds had the lowest prevalence of LBP (46.9%) in the present study (Table 4.6). The prevalence in this group was at least 18.5% lower than among the endomorphs (65.4%) or ectomorphs (66.7%) who had very similar prevalence rates (Table 4.6). The chisquare test and logistic regression analysis confirmed that there is a significant association between body-type and the presence of LBP, suggesting that individuals with well-balanced mesomorphic body frames are least likely to suffer from LBP. Roncarati and McMullen (1988) however found that non-LBP subjects tended to have ectomorphic body-frames and LBP subjects, meso-endomorphic frames.

5.8.3 Smoking habit

Of the 1 000 subjects in the sample population, 293 were smokers and 707 were non-smokers (Table 4.9). The prevalence of LBP in smokers (56.9%) was 5.4% higher than in non-smokers (51.5%) (Fig. 4.18), but no significant association between smoking and the presence of LBP was indicated by the chisquare test. This agrees with Toroptsova et al. (1995) who found that the prevalence of LBP was equal in smoking and non-smoking

groups. The results of the study by Leboeuf-Yde et al. (1995) however, who found that smokers were 17% more likely to experience LBP than non-smokers, suggest that there could well be a causal link between smoking and LBP.

Toroptsova et al. (1995) and Roncarati and McMullen 1988) found that the intensity of smoking is a risk factor for the development of LBP. Although the prevalence of LBP in the present study was higher among the heavier smokers (Table 4.9), this difference was not statistically significant. A positive association between the duration of smoking and a higher prevalence of LBP, as identified by Roncarati and McMullen (1988), was also not found in this study (Table 4.10).

5.8.4 Physical exercise

Regular physical exercise (at least once per week) was reported by 243 of the 1 000 subjects in the study (Table 4.7). The prevalence of LBP among subjects who exercised regularly (40.3%) was 16.9% lower than among those who did not exercise (57.2%) (Fig. 4.17). The chisquare test indicated that this association was statistically significant. Logistic regression analysis similarly showed that people who did not exercise were significantly more likely to suffer from LBP than those who did exercise. The prevalence of LBP in the exercise group remained at approximately 40% regardless of the frequency (Table 4.7) or duration (Table 4.8) of exercise sessions; and no significant association was found between the frequency or duration of the exercise session and the presence of LBP.

The protective effect of exercise on the occurrence of LBP, suggested by the results of this study, are supported by the findings of Salminen et al. (1993), Mundt et al. (1993) and Toroptsova et al. (1995). Salminen et al. (1993) however found that an increasing frequency of exercise sessions was associated with a decrease in the prevalence of LBP, which was not found in the present study.

5.8.5 Parity

The 583 women included in the sample population, consisted of 140 nulliparous women, 344 women who had had 1to 4 live births and 99 women with a history of 5 or more live births. Results from the chisquare test and logistic regression analysis both showed that there was a significant positive association between parity and the presence of LBP. The prevalence of LBP was lowest (34.3%) in nulliparous women, higher (59.3%) in women with a history of 1 to 4 live births and highest (77.8%) in those who had had 5 or more live births (Fig. 4.19). This suggests that the risk of developing LBP increases with parity, which was similarly reported by Frymoyer et al. (1980) and Svensson et al. (1990).

5.8.6 Employment status

The prevalence of LBP has been found to be affected by the type of work done (Rowe 1969; Nagi et al. 1973; Svensson and Andersson 1983; Reisbord and Greenland 1985). For this reason, questions regarding the nature of the individuals present and previous employment were asked during the interview (Appendix B: interview questionnaire). However, in many cases, subjects had had a variety of different jobs, and often could not accurately remember the nature or duration of these jobs; and many of the subjects who were presently employed, were employed only on a part-time basis. This resulted in difficulty with proper classification of the nature of employment. It was therefore decided to disregard the nature of the individual's employment and to classify subjects as either "employed" or "unemployed".

Three quarters (n=754) of the subjects in the sample population (N=1 000) were unemployed (Table 4.11). The prevalence of LBP in employed subjects (58.9%) was 7.7% higher than in those who were not employed (51.2%) (Table 4.11). The chisquare test produced conflicting results as to the significance of the association between employment status and the prevalence of LBP. Results from logistic regression analysis were therefore relied upon in this case. Logistic regression analysis indicated that unemployed people were significantly more likely to have LBP than employed individuals in the area of study. Reisbord and Greenland (1985) and Carey, Evans et al. (1995) similarly found the prevalence of LBP to be higher among the unemployed, which as suggested by some researchers, may be the result of greater economic (Volinn et al. 1988) or psychological (Sanderson et al. 1995) stresses in the unemployed. Nagi et al. (1973) however found that LBP was about 4% more common among employed than unemployed subjects.

5.9 Care-seeking for low back pain

5.9.1 Level of care-seeking

Of those subjects with LBP (n=531), 53.9% (n=286) reported at the time of the interview that they were presently receiving treatment or taking medication of some kind for their pain (Fig 4.20). The results of studies by Gyntelberg (1974), Biering-Sørensen (1982) and Svensson and Andersson (1982) similarly suggest that between 32% and 60% of those who develop LBP, consult physicians at some stage with this problem. The above studies were only concerned with the frequency with which physicians were consulted, while the prevalence of care-seeking in the present study also included subjects who had purchased over-the-counter medications or obtained it from friends, family or employers. Although no direct comparisons can be made with previous studies, the results of the present study suggest that the prevalence of care-seeking for LBP in Chesterville is relatively high. If the LBP subjects who had received treatment for LBP in the past had been included, the figure of 53.9% (Fig. 4.20) is likely to have been a lot higher.

5.9.2 Type of treatment

The most common forms of treatment were analgesics, anti-inflammatories and muscle relaxants, which were grouped together and labeled "allopathic treatment". Such allopathic treatment was being received by 90.9% of subjects who were presently receiving treatment for their LBP (Fig. 4.21). The frequent use of allopathic medication,

particularly pain medication and anti-inflammatory drugs in the treatment of LBP, has been reported by many other researchers (Cherkin and Deyo 1993; Hurwitz 1994; Carey, Evans et al. 1995; Carey, Garett et al. 1995; Elam et al. 1995). Carey, Evans et al. (1995) for example, reported that pain medications or muscle relaxants accounted for 92% of all treatments for LBP, which concurs with the findings of the present study.

Nearly 6% of those receiving treatment for their LBP were taking traditional medicine (Fig. 4.21). This generally consisted of a mixture of plant extracts and water, either taken orally or administered as an enema.

Nine subjects reported receiving some other form of treatment (Fig. 4.21). Two were receiving physiotherapy at a public hospital; 3 were taking herbs purchased from a health-shop; 1 had been prescribed anti-biotics, and another person was using suppositories which could not be identified. One person reported using Detol, which she administered as an enema and the remaining person was taking calcium-gluconate tablets.

5.9.3 Source of treatment

Of those subjects who were presently receiving treatment for their LBP (n=286), 36.4% (n=104) were attending Chesterville's local community health clinic, which was by far the most common source of treatment for LBP (Fig. 4.22). This is probably because of the accessibility of the clinic and its low medical fees. It is within walking distance of most residents, except the very old or disabled, and provides pensioners with free medication,

while the other patients are charged a minimal fee of about 4 Rand. The frequency with which LBP sufferers in Chesterville reported seeking care from the community clinic appears to be considerably higher than in the American study by Nagi et al. (1973) who found that only 19.4% of a sample of subjects with LBP had been to a clinic.

One quarter (25.2%) of the treatment group purchased their medications from chemists or shops (Fig. 4.22). This was the second most common source of treatment; followed by public hospitals, from which 13.6% of the LBP subjects (all outpatients) reported receiving their treatment (Fig. 4.22). Nagi et al. (1973) similarly reported that 18.8% of a group of LBP sufferers had been to hospital to receive treatment for their LBP.

Nagi et al. (1973), Deyo and Tsui-Wu (1987) and Carey, Evans et al. (1995) found that physicians in private practice, particularly general practitioners, were the most common source of care for LBP. In the present study however, only 7.7% of subjects with LBP were consulting private medical doctors. A variety of social and economic factors may be responsible for this difference. For example, it is likely that many of the residents of Chesterville cannot afford the services of general practitioners and therefore make use of more affordable and accessible services, such as the community clinic and local trading stores. Although traditional healers are very accessible in Chesterville, they accounted for the smallest proportion (5.9%) of the sources of LBP treatment. This is possibly because their services are relatively expensive, at about 30 Rand per bottle of medicine, which is far more than residents pay for medication at the clinic.

5.9.4 Cost of treatment

Nearly half (47.6%) of the subjects in the treatment group were receiving free treatment (Table 4.16). This probably represents the pensioners who were receiving free medication at the community clinic, as well as those subjects receiving medication from friends, family or employers. Fourty-three percent of the individuals who were receiving treatment were paying less than R25 per month (Fig. 4.16). This may be due in part to the low fees charged at the community clinic and the charges to the hospital outpatients, which are also relatively low (R13 to R20 per month in most cases).

Just over 90% of people in the treatment group were receiving free treatment or were paying less than R25 per month (Table 4.16). This suggests that in the majority of cases in which treatment is sought for LBP by the residents of Chesterville, the related costs are not excessive and thus do not impose a substantial economic burden on the individuals affected.

5.10 The representativeness of the sample population

In the present study, the sample was selected by choosing a clustered sample of 300 lots from a layout map of Chesterville (Appendix D) and interviewing all residents, aged 13 or older, living on these lots until a sample of 1 000 subjects had been achieved. It was decided to conduct the study on a clustered sample of lots as it was felt that this would allow residents in the area to become familiar with the presence of the researcher, thus facilitating safety and co-operation which may have been more difficult to achieve if lots throughout Chesterville had been included. Furthermore, a pilot survey of 25 households in different areas of Chesterville suggested that the characteristics of the population of Chestervillle were fairly similar with regard to the objective of the study. Although obtaining a sample which was representative of the population of Chesterville was a priority, 'systematic random sampling' is statistically a more correct method of sample selection and may have produced a sample which was more representative of the population of Chesterville as a whole. If similar studies are conducted in the future, the 'systematic random sampling' method of sample selection should be used if possible.

CHAPTER 6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The results of this study suggest that LBP occurs commonly among the population of Chesterville, and adversely affects the lives of many of those affected. This tends to concur with the findings of many other population-based epidemiological investigations conducted in other countries, among a variety of population samples. The present study thus provides further evidence that LBP is an international phenomenon, commonly affecting all population groups.

The lifetime incidence of LBP in Chesterville was 57.6%, which is only slightly lower than in the Swedish studies by Svensson and Andersson (1983) and Svensson et al. (1990).

The prevalence of LBP in Chesterville, of 53.1%, was however considerably higher than in the Swedish studies. This is possibly due to different criteria for inclusion of subjects into the prevalence group; but may also be because the residents of Chesterville are subject to greater socio-economic and psycho-social stresses. A number of researchers (Nagi et al. 1973; Reisbord and Greenland 1985; Toroptsova et al. 1995; Carey, Evans et al. 1995) have found that the prevalence of LBP in low socio-economic classes tends to be higher than in upper classes, which is in keeping with the results of the present study.

Another significant finding was the high level of care-seeking for LBP among subjects in the prevalence group. Just over half of the LBP sufferers in the present study were receiving some form of treatment for their LBP. This suggests that LBP frequently produces substantial pain or discomfort among those affected. Furthermore, many of the LBP sufferers reported that they were impeded to some extent in their ability to carry our daily activities such as bending, lifting, sitting, standing and walking, which provides further evidence that LBP adversely affects the lives of many of the people with this condition.

Of those individuals in the prevalence group, who were receiving treatment or taking medication for their pain, 90.9% stated that they were receiving allopathic medication in the form of analgesics, anti-inflammatories or muscle relaxants. It thus seems that people with LBP in Chesterville rely heavily on drug-therapy for the treatment of their LBP.

While studies conducted in other countries have found that physicians in private practice are the most common source of care for low LBP, this was not the case in Chesterville. LBP sufferers here, most frequently reported seeking care from Chesterville's community health clinic, and also commonly obtained over-the counter medication for their pain from chemists or local trading stores. This is probably because residents of Chesterville, on the whole, are less able to afford the services of private doctors. Treatment from the clinic, chemists or shops; besides being relatively cheap, is also more accessible.

When the prevalence of LBP in Chesterville (53.1%) and the level of care-seeking for this condition (53.9% of the prevalence group) are extrapolated to the general population of Chesterville (N=20 000), the results suggest that 10 620 residents of Chesterville presently suffer from LBP, of whom 5 720 individuals have LBP which is severe enough to cause them to seek treatment of some kind. This strongly suggests that LBP is a common problem among the population of Chesterville, and that the management of this condition is a matter that needs to be addressed.

The vast majority (89.8%) of individuals in the lifetime incidence group reported that their LBP had lasted at least 6 months, of whom 29% had experienced LBP for 10 years or longer. The results of this study concur with the findings of Damkot et al. (1984) and Hurwitz (1994), suggesting that LBP is often a recurrent problem and that many of those who develop this condition become chronic LBP sufferers.

In the present study, the cost to the individual associated with the treatment of LBP was generally very low. It thus seems likely that LBP does not impose a significant financial burden on those residents of Chesterville who are affected. Financial loss from to work-absence due to LBP was however not investigated.

The lifetime incidence and prevalence rates for LBP were lowest in the 13 to 29 year old age-group and then increased with age until the age of 69, after which they decreased slightly, but still remained relatively high. Those subjects aged 50 to 69 had the highest lifetime incidence and prevalence rates. These findings provide further evidence that

although increasing age is a risk factor for the development of LBP, there tends to be a slight reduction in the frequency of LBP in the elderly (Reisbord and Greenland 1985; Toroptsova et al. 1995).

The lifetime incidence and prevalence rates of LBP in women were both significantly higher than in men. Women reported LBP more frequently than men in all age groups, except in those aged 13 to 29. It was in the groups aged 50 and older that the relatively high frequency of LBP in women was particularly evident. These findings suggest that the female sex is a risk factor for the development of LBP, but that it is elderly women who are most affected.

There was a strong positive association between parity and the presence of LBP. The prevalence of LBP in nulliparous women was relatively low, but increased significantly in parous women and was particularly high in women who had had 5 or more live births.

Of those subjects with LBP, the majority (44.8%) reported the intensity of their pain to be moderate. Mild pain was reported by 31.8% of the prevalence group and severe pain by 23.4%. The relative proportions of LBP sufferers experiencing mild, moderate and severe pain found in this study are very similar to those reported in population based studies by Frymoyer et al. (1980) and Svensson and Andersson (1982).

Nearly one third of the subjects with LBP reported suffering from frequent or constant pain and the remainder stated that their LBP occurred on an occasional basis.

Approximately one quarter of LBP sufferers in the present study reported that they had associated referred lower limb pain. This concurs with the prevalence of sciatica among LBP sufferers, as reported by Horal (1969) and Borenstein (1995: 22).

There was a strong positive association between increasing weight of individuals and an increase in the prevalence of LBP. The weight of a person, unlike the body-mass-index, does not give any indication of whether the individual is overweight or not, and it can therefore not be concluded from this study that obesity is a risk factor for the development of LBP. The results only suggest that heavier individuals are more likely to suffer from LBP.

The prevalence of LBP in individuals who exercised at least once per week was significantly lower than in those who did not exercise. An increase in the frequency or duration of exercise sessions however, did not seem to have any additional protective effect on the occurrence of LBP.

Although cross-tabulation showed that the prevalence of LBP in smokers was slightly higher than that in non-smokers, this difference was not statistically significant. There were also no strong associations found between the intensity or the duration of smoking, and the presence of LBP.

It was reported by most individuals with a history of LBP, that their pain began between the ages of 20 and 39, which has similarly been reported by Horal (1969), Rowe (1969) and Carey, Evans et al. (1995).

Results from logistic regression analysis, regarding the association between the presence of LBP and height, concurred with the findings of Gyntelberg (1974) and Roncarati and McMullen (1988), suggesting that tallness may be a risk factor for the development of LBP.

Unemployment was identified by logistic regression analysis to be associated with an increased probability of having LBP, which supports the findings of Reisbord and Greenland (1985) and Carey, Evans et al. (1995).

6.2 Recommendations

More research is needed concerning the prevalence and other epidemiological characteristics of LBP in South African townships.

If investigations similar to the present study are conducted in the future, the sample should be selected using the 'systematic random sampling' method, which will probably result in a sample that is more representative of the population of study.

The high prevalence of LBP in Chesterville, particularly the high frequency of chronic LBP, as well as the present heavy reliance on drug-therapy by the LBP subjects, suggests that there is need for more specialized low back care in Chesterville. Chiropractic has been shown to be effective in the management of LBP (Hurwitz 1994; Carey, Garrett et al. 1995; Triano et al. 1995; Meade et al. 1995) and also tends to rely far less on medication (Carey, Garrett et al. 1995). It thus seems likely that LBP sufferers in Chesterville could well benefit if chiropractic care was readily available. It is therefore recommended that negotiations be commenced regarding the inclusion of Chiropractic into Chesterville's local community health care system, where it is felt it could fulfill a valuable complementary role in the management of this common ailment.

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APPENDIX A

TECHNIKON NATAL

P.O. Box 953
Durban. 4000

Berea Campus:
Telephone (031) 204-2111
Facsimile (031) 223-405

City Campus:
Telephone (031) 301-7823/9
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Pietermaritzburg Campus:
P.O. Box 11078. Dorpspruit. 3206
Telephone (0331) 42-5426/7, 42-5447
Facsimile (0331) 42-9804

Dear Respondent,

RE: RESEARCH PROJECT – MR A.G. VAN DER MEULEN

Mr A.G. van der Meulen is currently a registered chiropractic student at Technikon Natal. As part of the requirements for his Master's Diploma in Chiropractic he is required to complete a research project.

You have been included in the list of respondents by random cluster sampling and your input would be of great benefit to future health care.

We can assure you that your responses will be treated as absolutely confidential and will be used for research purposes only.

Yours sincerely

Mrs H Till
Dean: Faculty of Health Services

Mr A.G. van der Meulen
Chiropractic student

APPENDIX B

Questionnaire number: _____

AN EPIDEMIOLOGICAL INVESTIGATION OF LOW BACK PAIN IN CHESTERVILLE

Lot number: _____ **Date:** _____

Address: _____

Name: _____

---

1. What is your sex?

Female	Male

2. What is your age (in years)?

years

3. Height (in centimeters):

cm

4. Weight (in kilograms):

kg

5. Body-type:

Ectomorphic
Mesomorphic
Endomorphic

6. Present work-status:

Employed (full-time)
Employed (part-time)
Unemployed
Pensioner
Scholar
Student

7. If unemployed, what was your previous occupation and the duration of occupation?

Previous occupation: _____
Duration: _____

8. If employed, what kind of work do you do and how long have you had this job?

Present occupation: _____
Duration: _____

9. How many children have you had?
(Applicable for women only)

None	1	2	3
4	5	6	7
8	9	10 +	NA

10. Do you smoke?

Yes	No

11. Duration of smoking (in years):

1-9	20+
10-19	NA

12. Intensity of smoking (cigarettes per day):

1-9	20+
10-19	NA

13. Do you exercise regularly?
(at least once per week)

Yes	No

14. Average number of exercise sessions per week:

1	4
2	5+
3	NA

15. Average duration of typical exercise session (in minutes):

1-14	30-59
15-29	60+
	NA

16. Have you ever experienced low back pain?

No	Yes

17. At what age did you first experience low back pain?

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

18. How did you low back pain start?

Gradually over time
Sudden (not related to injury)
Sudden (related to injury)

19. How long did your low back pain last?

_____ years _____ months _____ weeks _____ days

20. Do you presently suffer from:

LBP only?
LBP with lower limb pain?
No LBP?

21. How long have you been suffering from low back pain?

_____ years _____ months _____ weeks _____ days

22. How severe is your low back pain?

Mild
Moderate
Severe
Excruciating
NA

23. How frequently do you experience low back pain?

Occasionally
Frequently
Constantly
NA

24. Do you ever experience difficulty performing any of the following activities as a result of your low back pain?

Personal care	No	Mild	Moderate	Severe	NA
Sitting	No	Mild	Moderate	Severe	NA
Standing	No	Mild	Moderate	Severe	NA
Walking	No	Mild	Moderate	Severe	NA
Bending	No	Mild	Moderate	Severe	NA
Lifting	No	Mild	Moderate	Severe	NA
Sleeping	No	Mild	Moderate	Severe	NA
Social life	No	Mild	Moderate	Severe	NA

25. Have you ever needed bed-rest for your low back pain?

Never
Occasionally
Often
NA

26. Are you presently receiving treatment or taking medication for your low back pain?

Yes	No	NA

27. What is the source of this treatment?

Community clinic
Public hospital
Private medical doctor
Traditional healer
Chemists or shops
NA

Other: _____

28. What type of treatment or medication are you receiving?

_____

_____

29. What is the average monthly cost of this treatment/medication?

R 0
R 1-24
R 25-49
R 50-99
R 100-149
R 150+
NA

30. Have you ever been absent from work due to low back pain?

Never
Occasionally
Often
NA

31. What is the longest period for which you were absent from work due to low back pain?

< 1 week
2-4 weeks
> 1 month
NA

32. Has you low back pain ever forced you to change your occupation?

Yes	No	NA

33. Have you ever lost your job as result of your low back pain?

Yes	No	NA

APPENDIX C

OSWESTRY BACK DISABILITY INDEX

PATIENT NAME:_____ FILE #:_____ DATE:_____

This questionnaire has been designed to give the doctor information as to how your back pain has affected your ability to manage in everyday life. Please answer every section and mark in each section only the ONE box which applies to you. We realise you may consider that two of the statements in any one section relate to you, but please just mark the box which most closely describes your problem.

Section 1 - Pain Intensity

- ☐ I have no pain at the moment.
- ☐ The pain is very mild at the moment.
- ☐ The pain is moderate at the moment.
- ☐ The pain is fairly severe at the moment.
- ☐ The pain is very severe at the moment.
- ☐ The pain is the worst imaginable at the moment.

Section 2 - Personal Care (Washing, Dressing etc.)

- ☐ I can look after myself normally without causing extra pain.
- ☐ I can look after myself normally but it causes extra pain.
- ☐ It is painful to look after myself and I am slow and careful.
- ☐ I need some help but manage most of my personal care.
- ☐ I need help every day in most aspects of self care.
- ☐ I do not get dressed, I wash with difficulty and stay in bed.

Section 3 - Lifting

- ☐ I can lift heavy weights without extra pain.
- ☐ I can lift heavy weights but it gives extra pain.
- ☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, for example on a table.
- ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned.
- ☐ I can lift very light weights.
- ☐ I cannot lift or carry anything at all.

Section 4 - Walking

- ☐ Pain does not prevent me walking any distance.
- ☐ Pain prevents me walking more than 1 mile (2.2 km).
- ☐ Pain prevents me walking more than 1/2 mile (1.1 km).
- ☐ Pain prevents me walking more than 1/4 mile (0.5 km).
- ☐ I can only walk using a stick or crutches.
- ☐ I am in bed most of the time and have to crawl to the toilet.

Section 5 - Sitting

- ☐ I can sit in any chair as long as I like.
- ☐ I can only sit in my favorite chair as long as I like.
- ☐ Pain prevents me from sitting more than 1 hour.
- ☐ Pain prevents me from sitting more than 1/2 hour.
- ☐ Pain prevents me from sitting more than 10 minutes.
- ☐ Pain prevents me from sitting at all.

Section 6 - Standing

- ☐ I can stand as long as I want without extra pain.
- ☐ I can stand as long as I want, but it gives me extra pain.
- ☐ Pain prevents me from standing for more than one hour.
- ☐ Pain prevents me from standing for more than 30 minutes.
- ☐ Pain prevents me from standing for more than 10 minutes.
- ☐ Pain prevents me from standing at all.

Section 7 - Sex Life

- ☐ My sex life is normal and causes no extra pain.
- ☐ My sex life is normal but causes some extra pain.
- ☐ My sex life is nearly normal but it is very painful.
- ☐ My sex life is severely restricted by pain.
- ☐ My sex life is nearly absent because of pain.
- ☐ Pain prevents any sex life at all.

Section 8 - Social Life

- ☐ My social life is normal and gives me no extra pain.
- ☐ My social life is normal but increases the degree of pain.
- ☐ Pain has no significant effect on my social life apart from limiting my more energetic interests, for example, dancing.
- ☐ Pain has restricted my social life and I do not go out as often.
- ☐ Pain has restricted my social life to my home.
- ☐ I have no social life because of pain.

Section 9 - Sleeping

- ☐ I have no trouble sleeping.
- ☐ I can sleep well only by using pills.
- ☐ Even when I take pills I have less than six hours sleep.
- ☐ Even when I take pills I have less than four hours sleep.
- ☐ Even when I take pills I have less than two hours sleep.
- ☐ Pain prevents me from sleeping at all.

Section 10 - Travelling

- ☐ I can travel anywhere without extra pain.
- ☐ I can travel anywhere but it gives me extra pain.
- ☐ Pain is bad but I manage trips over two hours.
- ☐ Pain restricts me to trips of less than one hour.
- ☐ Pain restricts me to trips under 30 minutes.
- ☐ Pain prevents me from travelling, except to the doctor or hospital.

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CHESTERVILLE
KEY
APPENDIX D
WESTVILLE
NATIONAL ROAD, N3
FOXVILLE CEMETERY
OUTER RING ROAD
N2
CHESTERVILLE
OOSTERSIG

APPENDIX E

QUESTIONNAIRE POST-CODING

X1: **Age in years** (Question 2)
1. 70 +
2. 50-69
3. 30-49
4. 13-29

X2: **Gender** (Question 1)
1. Female
2. Male

X3: **Height in centimeters** (Question 3)
1. 175+
2. 155-174
3. 133-154

X4: **Weight in kilograms** (Question 4)
1. 100+
2. 80-99
3. 60-79
4. 30-59

X5: **Body type** (Question 5)
1. Endomorphic
2. Ectomorphic
3. Mesomorphic

X6: **Employment status** (Question 6)
1. Unemployed
2. Employed

X7: **Parity** (Question 9)
1. 5+
2. 1-4
3. 0
4. NA (men)

X8: **Smoking habit** (Question 10)
1. Yes
2. No

APPENDIX E

X9: Duration of smoking in years (Question 11)
1. 20+
2. 10-19
3. 1-9
4. Never

X10: Intensity of smoking in cigarettes per day (Question 12)
1. 20+
2. 10-19
3. 1-9
4. None

X11: Physical exercise (Question 13)
1. No
2. Yes

X12: Number of exercise sessions per week (Question 14)
1. NA
2. 1-2
3. 3+

X13: Average duration of exercise sessions in minutes (Question 15)
1. NA
2. 1-29
3. 30-59
4. 60+

X14: Lifetime incidence (Question 16)
1. Yes
2. No

X15: Age of onset of low back pain in years (Question 17)
1. 1-19
2. 20-39
3. 40-59
4. 60+

X16: Duration of low back pain (Question 19)
1. 20 years +
2. 10-19 years
3. 6 months – 9 years
4. < 6 months
5. Never had LBP

APPENDIX E

X17: Nature of onset of low back pain (Question 18)

1. Sudden due to accident or injury
2. Sudden without accident or injury
3. Gradually
4. NA

X18: Frequency of low back pain (Question 23)

1. Constant
2. Frequent
3. Occasional
4. Never

X18 (recoded): Presence of LBP

1. Yes (1,2,3)
2. No (4)

X19: Severity of LBP (Question 22)

1. Severe
2. Moderate
3. Mild
4. NA

X20-X27: Present disability due to LBP (Question 24)

X20: Personal care
X21: Sitting
X22: Standing
X23: Walking
X24: Bending
X25: Lifting
X26: Sleeping
X27: Social life

1. Severe
2. Moderate
3. Mild
4. NA

X28: Bed rest due to LBP (Question 25)

1. Often
2. Occasionally
3. Never
4. NA

X29: Present treatment or medication for LBP (Question 26)

1. Yes
2. No
3. NA

APPENDIX E

X30: Type of treatment or medication for LBP (Question 28)

1. Allopathic (analgesic/anti-inflammatory tablets, injections or ointments)
2. Traditional medicine
3. Other
4. None
5. NA

X31: Source of treatment or medication for LBP (Question 27)

1. Private medical doctor
2. Public hospital
3. Community clinic
4. Traditional healers
5. Chemists or shops
6. Other (friends, family, employers)
7. NA

X32: Cost of treatment or medication for LBP per month (Question 29)

1. R50 +
2. R25-49
3. R1-24
4. R0
5. NA

X33: Sick leave due to LBP (Question 30)

1. Often
2. Occasionally
3. Never
4. NA

X34: Longest duration of sick leave (Question 31)

1. > 1 month
2. 2-4 weeks
3. < 1 week
4. NA

X35: Loss or change of job due to LBP (Questions 32 and 33)

1. Yes
2. No
3. NA

APPENDIX F

DESCRIPTION OF VARIABLES AND THEIR LEVELS
(Used for logistic regression analysis – Table 4.12)

Y = Presence of LBP	where,	1 = Yes
		0 = No
x_1 = Age in years		
x_7 = Parity	where,	1 = ≥ 1 child
		0 = Nulliparous
x_5 = Body-type	where,	1 = endomorphic or ectomorphic
		0 = mesomorphic
x_4 = Weight in kilograms		
x_{11} = Physical exercise	where,	1 = None
		0 = Yes
x_3 = Height in centimeters		
x_2 = Gender	where,	1 = Female
		0 = Male
x_6 = Employment status	where	1 = Unemployed
		0 = Employed