A COMPARISON OF THE EPIDEMIOLOGY OF LOW BACK PAIN IN INDIAN AND COLOURED COMMUNITIES IN SOUTH AFRICA

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

Aadil Docrat

I, Aadil Docrat, declare that this dissertation represents my own work, both in conception and execution.

DATE:

APPROVED FOR FINAL SUBMISSION

MRS H. TILL B.Sc. (Hons), M.Sc. (US), ASAIM, Dip. Med. Ed. (UK), FICC (Hon).
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I DEDICATE THIS DISSERTATION TO MY DEAR PARENTS,
MOHAMED FAROUK DOCRAT AND FACIA DOCRAT (1952-1996),
MAY THEY BE REWARDED BY THE ALMIGHTY FOR ALL THEIR EFFORTS.

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ABSTRACT

In order to investigate low back pain in an Indian and a Coloured community in South Africa, a population-based epidemiological survey was carried out in which 1 000 subjects were interviewed (500 Indians and 500 Coloureds). Subjects were selected using the Systematic Random Sampling method. A pre-tested questionnaire, designed by the researcher, was used to elicit information about the subjects' demography, general characteristics and details regarding low back pain (incidence, prevalence, severity, disability, treatment). Only subjects 18 years or older who were permanent residents of the 2 suburbs were included in the study. The author carried out the interviews personally.

The Pearson Chi-Square statistic was used to check the strength of association between certain factors and the severity level of low back pain (10 factors were identified). The Two-Sample Unpaired t-test was conducted to check how the two race groups compared to each other with respect to the 10 factors found to be associated with the severity level of low back pain. Logistic regression analyses were done on 5 highly influential factors on the severity level of low back pain.

The lifetime incidence of low back pain was found to be 78.2% in the Indians and 76.6% in the Coloureds. The prevalence was found to be 45% among the Indians (64% in females and 36% in males) and 32.6% among the Coloureds (64% in females and 36% males). Among the Indians, 33% reported their pain as mild, 43% as moderate and 24% as severe. In the Coloured community, 40% reported their pain as mild, 28% as moderate and 23.4% as severe.

The following factors were found to be significantly ($p<0.05$) related to the severity of low back pain in both the race groups: Number of Children, Number of Pregnancies, Level of Education, Driving for long Periods, Job Vulnerability for acquiring low back pain. Gender, Lifting heavy Loads at Work and Accessibility of Health Services were found to be significantly related to the severity of low back pain among Indians only: Age and the Total Amount of Time Spent Doing Exercise per Week were significantly related to the severity of low back pain among the Coloureds only.

Logistic Regression Analysis revealed that as the number of children and the number pregnancies an individual had increased, the odds of such a person developing low back pain of a severe nature are equal to 78.1% for Indians and 74.23% for Coloureds. As an individual's level of education decreased, the odds of having severe low back pain are equal to 75.9%. For a person who drives for long periods the odds of having severe low back pain are equal 53.19%. If individuals perceived that their job made them vulnerable to developing low back pain, their odds of having low back pain of a severe intensity are equal to 65.66%.

Forty seven percent of the Indian prevalence sample indicated that they were mildly disabled, 35% moderately, 8% severely and 10% not disabled at all due to low back pain. Among the Coloureds 52% felt that they were disabled mildly, 38% moderately, 8% severely and 2% had absolutely no difficulty at all due to low back pain.

The result of this study demonstrated that low back pain is as common in the Indian and Coloured race groups of South Africa as it is among the Blacks and as reported by many

international studies. The high prevalence of low back pain indicates a need for specialized low back health care facilities in these communities. The study also highlighted factors associated with the severity level of low back pain.

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CHAPTER ONE

INTRODUCTION

Low back pain represents a major public health problem in developed countries (de Girolamo, 1991). Frymoyer et al. (1983) reported that between 60% and 80% of people are affected by low back pain at some time during their lives and according to Deyo and Tsui-Wu (1987), between 10% and 17% of adults have a low back pain episode each year.

The above findings reveal that many people are probably disabled due to low back pain and as a result would be dependent on already cash-strapped health-care systems for long term medical assistance. They could also be relying on compensation schemes and insurance payouts from employers or the government because of the inability to work or gain suitable employment. The resultant burden placed on the economy could therefore be enormous. According to de Girolamo (1991) 7 million Americans are disabled annually due to low back pain, 250 000 undergo back surgery each year and more than 250 million work days are lost each year due to low back pain. This certainly can have a ripple effect on income tax returns, the industrial sector and the heavily strained public health sector.

The direct and indirect impact of low back pain on the economy can be understood from the figures quoted by studies that have analysed medical insurance data, compensation claim data and financial information regarding loss of earnings from industry due to low back pain. In this regard Bergenudd and Nilsson (1988) reported that the financial resources allocated to

compensable low back pain are enormous and in 1976 alone, $14 billion was spent in the United States on treatment and compensation for low back injuries. This figure exceeds all other industrial injury payments combined. Webster and Snook (1990) estimated from data of a private insurance company that the total compensable cost for all low back pain in the United States in 1986 was $11 billion, and this represented a 241% increase compared with the 1980 costs.

Many epidemiological studies have been done in order to identify possible causes of low back pain to help ameliorate the problem. Frymoyer et al. (1980) reported that physical risk factors associated with an increased risk of low back pain include: heavy work, lifting, static work postures (prolonged sitting or standing), bending, twisting and vibration. Other studies have reported that factors such as pregnancy (Orvieto et al. (1994a), Ostgaard et al. (1991)), educational status (Nagi et al. (1973), Reisbord and Greenland (1985), Deyo and Tsui-Wu (1987)), family history (Matsui et al. (1997), Richardson et al. (1997)) and Body Mass Index (B.M.I.) (Orvieto et al. (1994b)) are also related to an increased frequency of low back pain.

Bergenudd and Nilsson (1988) stated that psychological and psychosocial work factors (such as monotony at work, job dissatisfaction and poor relationship with co-workers) are associated with an increased prevalence of low back pain, and Bigos et al. (1986) reported that psychological risk factors are more predictive about low back pain than any other risk factors.

As low back pain represents such a major public health problem in developed countries, de Girolamo (1991) suggests that the financial burden caused by this condition and its serious

psychosocial consequences should lead researchers and clinicians from different countries to intensify efforts aiming to prevent the occurrence of the disorder and to reduce its severe consequences. To accomplish these targets, epidemiological studies seem to be an essential tool (de Girolamo, 1991).

Due to the enormous financial and social impact of low back pain, precise data concerning its prevalence would be of great value to health care planners, investigators and policy makers. Population based data (as opposed to clinic based data) is needed to estimate what proportion of persons with low back pain exists, how many are actually seeking medical care, are hospitalized, undergo surgery or are receiving other forms of therapy. To combat such a common ailment a population strategy is called for, aiming at both the prevention of low back pain and the prevention of handicaps in those with such pain (Deyo and Tsui-Wu, 1987). According to Biering-Sørensen (1983) little is known about etiological and prognostic factors, which emphasizes the importance of epidemiological studies.

According to Anderson et al. (1991:95), epidemiological research provides three important insights into the understanding of back pain. Firstly it provides information on the magnitude of the problem and the resultant demand on medical and social resources (descriptive epidemiology), which is necessary for appropriate health resource allocation. Secondly it provides information on the natural history, which is important in counselling patients about prognosis and it provides a standard for determination of treatment effects. This is done by accumulating information regarding various stages of the condition, details about effects of the disease on the individual and outcomes of specific treatments and how the treatments affect the prevalence and incidence of the condition over time (i.e. increases or decreases it).

Thirdly, it offers the ability to determine the link between pain and individual or external factors (such as work related factors). This could allow for risk factors to be identified and eliminated.

Although many factors associated with low back pain have been investigated, the importance of racial differences appears to have received very little attention as a factor in the causation of low back pain. Deyo and Tsui-Wu (1987) reported that in the United States of America, White males have a higher risk for low back pain than non-White males. Other information regarding racial differences could not be traced prior to this study. Jayson (1992:538) stated that racial differences in the frequency of low back pain had not been adequately studied. He also reported that most epidemiological studies of low back pain had been undertaken in Scandinavia where little racial heterogeneity exists, and therefore no firm conclusions regarding race could be drawn at this time.

To date it appears as though very little epidemiological research of low back pain has been done in Africa. According to Mulimba (1990) and Mijiyawa (1993), the problem of low back pain in Africa has received very little attention as a result of which one rarely sees literature on this subject. Mulimba (1990) also adds that more emphasis has been placed on pathological disorders of the spine than on low back pain, and that in developed countries much concern has been given by researchers to low back pain, and its related disability and economic effects. The problem of low back pain is equally important in Africa but not much regard has been given to it.

Van der Meulen (1997) conducted the first epidemiological investigation of low back pain among the Black people in Africa. The research was conducted in a formal Black South African township, Chesterville, which is in KwaZulu Natal. The results of his study revealed that the prevalence, incidence, level of care-seeking, disability and other factors associated with low back pain were comparable to many similar population-based studies done in Sweden and North America.

A review of the literature has revealed that no studies to assess the impact low back pain and the factors associated with it have been undertaken among the Indian and Coloured communities in South Africa. The Indian and Coloured groups represent a significant proportion of the South African population as they are as active in the various socioeconomical, industrial and political spheres of the country as any of the other races of the country's population.

In general the relevance of international epidemiological studies of low back pain has been recognized by the World Health Organization (WHO) Scientific Group (de Girolamo, 1991). The relative importance of various external factors for back disease favours the application of international studies, because comparable people in similar occupations could be studied in different countries where different insurance systems exist (WHO report of a Scientific Group on Rheumatic Disorders, 1991).

Therefore in view of the above recommendations by the World Health Organization and other authors on the subject of low back pain, the purpose of this study was to conduct an epidemiological investigation of low back pain in two communities comprising of different

race groups, namely Isipingo Beach and Sydenham, and then to compare the results of the two investigations in order to determine the need for low back health care facilities in such communities.

Isipingo Beach is a suburb with a population of approximately 10 000 residents. It is predominantly (95%) inhabited by Indians. It lies approximately 25 kilometres south of Durban's central business district. The inhabitants of the town are mainly working class people who are either employed in one of the major industries located nearby at the industrial area of Prospecton or in the central business districts of Durban and surrounding areas (Borough offices of Isipingo, 1997).

Sydenham is located approximately 10 kilometers from Durban's central business district and has a population of approximately 20 000 inhabitants. It is predominantly made up of Coloured residents (85%). The inhabitants are also mainly working class people who are employed in the industrial areas of Springfield and Prospecton or in the central business district of Durban (Central Statistical Services, 1997).

The Indian people are divided among the Muslim, Hindu, Tamil and Christian religious denominations (Borough offices of Isipingo, 1997). The Coloureds are mainly Christian with a few Muslim people. Both the suburbs are formal towns with their respective business districts, residential areas, recreational areas and municipalities. There are tarred roads and all the residents have electricity, running water and sewerage systems. The majority of people use the public transport system on a daily basis (Central Statistical Services, 1997).

As said before, the purpose of this study was to conduct an epidemiological investigation of low back pain in the two communities comprising of different race groups, namely Isipingo Beach and Sydenham, and then to compare the results of the two investigations in order to determine the need for low back health care facilities in such communities. None of the studies reviewed analysed factors that contribute to the severity level of low back pain except that of Frymoyer et al. (1983). However, this study included an analysis of factors that were related to the severity of low back pain. The results of this study could be a source of information for future national or international studies, for policy makers and health care systems.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

2.1. Introduction

According to Mulimba (1990) and Mijiyawa (1993) the problem of low back pain in Africa has received very little attention and therefore one rarely sees literature on the subject. Mijiyawa (1993) stated that the little available data regarding the epidemiology of low back pain in Africa is usually flawed by selection bias, and Mulimba (1990) reported that most of the research done on low back pain in Africa concentrated mainly on infective disorders of the spine. Mulimba (1990) expressed the view that in developed countries a lot of emphasis is placed on low back pain because it is a major cause of disability and economic loss. This could be equally important in Africa, but not much attention has been given to this problem.

Jayson (1992:538) also reported that racial differences in the frequency of low back pain had not been adequately studied. Most epidemiological studies of low back pain have been undertaken in Scandinavia where little racial heterogeneity exists. Lau et al. (1995) stated that it would be helpful to ascertain the frequency of low back disorders in non-European countries. As stated earlier, it appears that to date no epidemiological studies on low back pain have been conducted in the Southern African region other than that of Van der Meulen (1997).

Skovron (1992) reported that although information on several risk factors of low back pain had been well established, the information in certain cases was contradictory. According to the WHO Report of a Scientific Group on Rheumatic Disorders (1991) more needs to be known about physical work loads and psychosocial factors at work, different treatment methods and sickness pay and how these factors influence the rates of absenteeism and disability due to low back pain.

According to Andersson (1981), epidemiological studies are yet to be used to their full potential in low back pain research. The natural history and clinical course of low back pain are not properly defined and difficulties in classification, diagnosis and measurement methods should not be a cause of disagreement, but should rather stimulate continued effort.

2.2. The Magnitude of The Problem

2.2.1. Low back pain in the general population

Borenstein et al. (1995:22) defined "prevalence" as a measure of the number of people in a given population who have a symptom or disease at a particular point in time (point-prevalence) or over a specified period (e.g. 1-year prevalence). "Incidence" is defined as the rate at which healthy people develop a new symptom or disease over a specified period of

time (usually lifetime incidence). Thus lifetime incidence or five year incidence of low back pain reflects the number of individuals who develop low back pain at some stage during their lifetime or within a five year period respectively.

Many of the epidemiological studies that were done on low back pain have concentrated mainly on the general adult population (some only in particular age groups) of a particular area. There were also many studies conducted on adolescents and workers in specific occupations such as in heavy industry, nursing, crane operators and assembly plant workers.

Nagi et al. (1973) carried out a survey concerning the epidemiology of low back pain in the Standard Metropolitan Area (SMSA) of Columbus, Ohio in the USA. All residents of the SMSA aged between 18-64 years were included in the study. The interviewees were selected at random by using a four stage method described in detail in the study. A total of 1 136 interviews were conducted. The selected subjects were asked questions relating to occupation, disability, treatment, pregnancies as well as back pain. One of the questions asked was whether they were "*often* bothered by pain in their back". They reported that 18% (n=203) of interviewees reported in the affirmative. This study did not give any sort of time frame for the prevalence rate reported. It would have been more informative if the reported prevalence (18%) represented the period during which the subjects experienced the back pain (i.e. point-prevalence, 1-year prevalence etc.). However, the authors indicated that the word "*often*" was used to elicit the most persistent and problematic conditions which probably indicated a lifetime-prevalence.

In northwestern Vermont, USA, the records of all subjects older than 18 who were patients at a health care centre were reviewed for the years 1975 through 1978 by Frymoyer et al. (1980). A total of 3 920 records were analysed (2 068 males and 1 852 females). Patients older than 55 were left out of the statistical analysis due to a possible increase in the frequency of osteoporosis, neoplasms and other associated medical conditions. The records of each patient in the health centre were uniformly entered on a computer system. The record included the following information for each patient (among other factors): age, gender, mechanism of low back injury, reported episodes of low back pain leading to referral to a specialist, hospitalizations for low back pain, smoking and pregnancies. They found that 11% of males and 9% of females reported an episode of low back pain during the 3-year period.

Frymoyer et al. (1983) also conducted a study on male patients who entered a family practice in Burlington, USA. All men between the ages of 18 and 55 who were patients at this medical practice from 1975 to 1978 were sent a questionnaire. The survey was carried out between January 1979 and June 1980. The questionnaire included details of symptoms associated with low back pain such as severity (no pain, moderate pain, severe pain), numbness or weakness of lower limbs, medical care, disability, past and present recreational activity, occupational demands and use of certain types of machinery in the subject's occupation. A total of 1 221 men responded to the questionnaire. They reported that of the men interviewed during the period 1979 to 1980, 69.9% reported having low back pain.

Biering-Sørensen (1982) conducted a 2 phased study (physical examination and questionnaire, followed-up by another questionnaire after 12 months of) on inhabitants aged exactly 30, 40, 50 and 60 (i.e. at the time born in 1918, 1928, 1938, 1948) of Glostrup, a municipal suburb

of Copenhagen, Denmark. The response rate was 82%, comprising 449 males and 479 women. The initial component of the study included an extensive general health examination including the lower part of the back. The participants were not informed beforehand that the study would focus on the lower back. The lower back area was limited proximally to the twelfth thoracic vertebra and the lowest ribs and distally to the gluteal folds and laterally by the contours of the trunk. The subjects were asked the following question relating to low back trouble (LBT). "Have you had pain or in other ways trouble with the lower part of your back ever/within the last 12 months/today/ ?". LBT in relation to menstruation alone was excluded.

In the second component of the Biering-Sørensen (1982) study the participants were contacted after 12 months following the initial component (physical examination) and were sent a questionnaire which elicited information about hospitalizations and LBT in the intervening 12 months since the last interview. The results of the study were tabled cumulatively and for the individual age categories (i.e. 30, 40, 50 and 60). The cumulative result (ie. of the total sample studied) will be discussed here. It was found that the point-prevalence ("LBT on the day of examination in the first component") was 13.7%, lifetime-prevalence ("LBT ever, including the day of examination") was 62%, and the one-year period prevalence ("LBT in the 12 month period after the initial examination") was 44.9%.

The Biering-Sørensen (1982) study was particularly well designed. The methods of selecting, contacting and screening of the participants were very well done. The author reported that the reason for selecting only particular age categories for this study was that it improved the possibility of studying factors of importance other than age, and the selection of the four

specific age groups facilitated studies on the effects of age and LBT. Subjects were not informed that the study would concentrate on low back trouble. This was done in order to exclude any possible bias on the part of the participants of the study.

In Gotebörg, Sweden, Svensson and Andersson (1982) selected 940 men at random from the country's census register. Only men that were between 40 and 47 inclusive were selected for the study. The total sample of men aged between 40 and 47 was 18 162. The sample selected was 5% of the total population in that age category. Information about episodes of low back pain, symptoms, demand on health services and work history was collected. Low back pain was defined as "all conditions of pain, ache, stiffness or fatigue localized to the lower back". The men were divided into two groups. One group, the 'lifetime incidence' group, consisted of men that had experienced low back pain at some point in their lives while the 'prevalence' group was made up of men that reported low back pain at the time of study or pain that recurred at least on a one-a-month basis. They found that the incidence of low back pain was 61% while the prevalence was 31.4%.

Bergenudd and Nilsson (1988) conducted a longitudinal study to ascertain the prevalence of back pain in middle aged (55 year old subjects) residents of Malmö, Sweden. A total of 575 residents of the area were selected at random and mailed a questionnaire which extracted information about back pain, job satisfaction, work loads, educational level and intensity of pain, among other factors. Subjects indicated the location of their back pain on a manikin drawing of the back. The point-prevalence of low back pain exclusively was 23% (13% in

men and 10% in women). No attempt was made to ascertain lifetime incidences of low back pain in the sample population. The results of this study were only representative of the 55 year old age category.

Heliovaara et al. (1989) carried out a survey in Finland in which 8 000 people were selected at random from the country's population register (3 637 men and 4 363 women). Only people aged 30 or over were included in the selection. The selected people were invited to undergo a general physical examination and an interview which elicited information about low back pain, sciatica, functional disability, working conditions, leisure-time activities and other factors relating to musculoskeletal disease. Their results revealed that 76.3% of men and 73.3% of women reported having low back pain at some point in their lifetime (incidence) and that 19.4% of men and 23.3% of women reported experiencing back pain during the month preceding the study (one-month prevalence).

Walsh et al. (1992a) tried to assess the geographical variation of low back pain and its related disability in Britain. They executed a cross-sectional survey in which information was collected by postal questionnaire. The study was conducted in seven different towns and one rural district of Britain. The total population of these areas ranged between 17 000 and 35 000. Subjects were selected at random from the patient registers of local general practitioners in these areas. A random sample of 5% of people aged 20-59 was chosen from each of the patient registers in the 8 respective areas of study. These selected individuals were sent a postal questionnaire which contained questions about low back symptoms and associated disability at any time in the interviewees' life. Low back pain was defined as "pain in an area between the twelfth ribs and the gluteal folds, which lasted for more than 24hrs

and which was not associated exclusively with febrile illness, menstrual periods or pregnancy". They found that the lifetime incidence of low back pain was 58.3% and the one-year-prevalence was 36.1%. These figures represented the cumulative incidence and prevalence figures of all eight areas of study. When the 8 towns were considered individually, the lifetime-incidence of low back pain varied from 54.4% to 61.9% and the one-year-prevalence ranged from 31.9% to 39.7%. The authors of the study considered these variations as minor compared to the differences found in the rates of people seeking attention for low back pain as well as the disability associated with low back pain in the different areas that were studied.

Lau et al. (1995) conducted a study in order to compare the prevalence characteristics of low back pain between Britain and Hong Kong. A cross-sectional survey was done in both areas and information was collected by interviewing people that were 18 years of age and older. The areas of study were randomly selected housing blocks where all people that were eligible for study were included. The subjects were asked whether they had ever experienced low back pain lasting for more than a day, or whether they had suffered from such pain within the 12 months preceding the study. The lower back was defined as the area between the lower costal margins superiorly and the gluteal fold inferiorly. The results revealed that the lifetime incidence of low back pain in Hong Kong was 39.7% and in Britain it was 55.1%. The one-year-prevalence in Hong Kong was found to be 22.1% while in Britain it was reported as 34.2%. It seems as though Britain has more people suffering from low back pain than Hong Kong. The authors also found that there were more people in Britain that were involved in occupations involving heavy lifting compared to Hong Kong. This could be a partial explanation for the varied results.

Van der Meulen (1997) conducted an epidemiological investigation of low back pain in a formal Black township in Chesterville, KwaZulu Natal, South Africa. A random clustered sample of 1 000 people aged 13 years or older were interviewed in the township. The author conducted personal interviews with the residents. The questionnaire extracted demographic information and details of low back pain such as lifetime incidence, prevalence (pain at the time of interview or at least on an occasional basis) age of onset, severity, disability, level of care, cost of care, source of treatment, work absence, job loss, bed rest etc. This was the first study of its kind done among Blacks in the Southern African region. The participants were all Zulu speakers and the author conducted the study using an interpreter. Thus a possible source of error (misunderstanding of language) was avoided.

Van der Meulen's (1997) study revealed that the lifetime incidence of low back pain was 57.6% while the prevalence was 53.1%. The lifetime incidence among Black females (61.7%) was found to be higher than that of Black males (51.8%) ($p=0.001$). A significant association between gender and lifetime incidence was found. The lifetime incidence increased from 42.5% in the 13 to 29 age category and peaked at 78.5% in the 50-69 age group. A significant association was also found between age and lifetime incidence.

Van der Meulen (1997) found that the prevalence of low back pain was 56.4% among the Black females and 48.4% among Black males. Gender was found to be significantly associated with low back pain prevalence and the female gender was more at risk of developing low back pain. The prevalence of low back pain was highest in the 50 to 69 age

category at 75.1%, and lowest in the 13-29 age group at 38.8%. A significant association was also found between age and low back pain prevalence in that older subjects were more prone to developing low back pain.

2.2.2. Low back pain in industry

According to Rowe (1969) low back disability is the top item in compensation payments and ranks second only to upper respiratory infections in payouts for sickness. This places an enormous financial burden on industry. Mulimba (1990) has expressed the view that in developing countries a lot of emphasis is placed on low back pain because it is a major cause of disability and loss in the economic sector. The findings of these authors indicate that low back pain is prevalent in the industrial spheres of a country. The following articles presented represent a few of the many epidemiological studies on low back pain that were conducted in industries all around the globe. It makes evident the extent of the problem in industry.

Masset and Malchaire (1994) conducted a study on 618 male blue-collar workers, all younger than 40, in two major steel industries in Belgium. The age limit was used to minimize the effect of age on the functional capacities that the authors investigated. Each individual selected underwent an interview in order to elicit general demographic information, details of social life, job characteristics and information about episodes of low back pain. The results showed that at the time of the interview 66% of subjects had experienced low back pain at

some point in their lives (lifetime-incidence). The one-year prevalence of low back pain was found to be 50%. The one-week prevalence (7 days prior to interview) was also determined and was found to be 25%.

In Russia Toroptsova et al. (1995) studied a sample of 701 workers (339 men and 362 women) at a machine-building factory in the country. Each interviewee completed a questionnaire. The questionnaire detailed information about the subjects' profession, anthropometry, smoking habit, work activities and details of low back pain. Low back pain was defined as pain below the twelfth rib proximally to the gluteal folds distally. The lifetime-prevalence of low back pain was found to be 48.2% (49.3% in men and 47.2% in women). The one-year prevalence of low back pain was found to be 31.5% (29.2% in men and 33.7% in women).

Matsui et al. (1997) carried out a survey at a manufacturing company in Toyama city, Japan. They interviewed 3 042 employees at the manufacturing concern. The individuals performed a variety of job classifications ranging from sedentary work to heavy manual work. The questionnaire contained information about the individuals' job classification and activities, anthropometry and detail about low back pain. They found that the lifetime-incidence of low back pain among all the workers was 60.5% (63.7% in men and 47.6% in women). The point-prevalence on the day of study was 29.9% (30.6% in men and 26.9% in women).

These reviews show that low back pain is relatively common in the general population and in industry in many parts of the world.

2.2.3. Low back pain in children and adolescents

Olsen et al. (1992) interviewed 1 242 (641 male and 601 female) pupils from the 7th to 9th grade at a school in the USA (aged 11 to 17). The questionnaire they used detailed demographic information and details of low back pain such as age of onset, severity, recurrence, disability, and medication. The lifetime incidence was found to be 30.4% and the one-year prevalence was 22%. They also reported that in the 15 year old age group, Black children had a higher prevalence of low back pain than Whites (47% vs 31%, $p<0.05$).

Salminen et al. (1993) surveyed 1 377 pupils, aged 14 and in the 8th grade, at all schools in Turku, Finland. The students were asked about details of low back pain which was defined as a "pain, ache or uncomfortable feeling" at a location that was demonstrated by a drawing. The study only assessed the point-prevalence of continuous or recurrent low back pain which was found to be 7.8%. Ebrall (1994) interviewed 610 male students (aged 12 to 19) from two secondary schools in Melbourne, Australia. The questionnaire elicited demographic information, and details of low back pain (lifetime-incidence, point-prevalence, disability, chronicity, onset, duration). The lifetime-incidence of low back pain in this sample of adolescent males was found to be 40.3% (n=246) and point-prevalence was reported as 16.7% (n=102).

Balagué et al. (1995) investigated the pupils of two secondary schools in Fribourg, .Switzerland. A total of 615 pupils aged between 12-17 were interviewed. The questionnaire elicited information about the subjects' demography, back pain history (such as onset,

disability, level of care) and psychosocial history (depression, anxiety, happiness, abuse etc). They reported the prevalence of low back pain as follows: 26% of the children reported never having low back pain at all, 26% had low back pain back pain once, 44% several times and 4% reported that they continuously suffered from low back pain. Girls reported non-specific low back pain more frequently than boys.

Taimela et al. (1997) interviewed 1 171 children (594 girls and 577 boys, aged between 7 to 16) at 45 different schools in Finland. The pupils were asked if low back pain interfered with their school work or leisure activities during the 12 months preceding the study (one-year prevalence). The study revealed that 9.4% of girls and 10.1% of boys reported positively to the question (one-year prevalence). The prevalence of low back pain was found to be low among 7 and 10 year olds (1% and 6% respectively) but it increased with age to 18% among 14 and 16 year old adolescents. There were 26% of boys and 33% of girls that reported recurrent and chronic low back pain and this level was found to increase with increasing age (i.e. more of the older pupils reported recurrent and chronic low back pain).

2.3. Risk Factors For Low Back Pain

According to Frymoyer et al. (1983), although low back pain is the most common disabling musculoskeletal symptom, there is still very little understanding of the risk factors associated with its development. Skovron (1992) also reports that even though there have been many

epidemiological studies done in order to establish the risk factors for developing low back pain, very few have actually been identified in prospective studies and our understanding of them is still very limited.

Reisbord and Greenland (1985) provide a very interesting suggestion regarding some risk factors. They are of the opinion that some components identified as risk factors could be indirectly related to some other aspect of low back pain. Care-seeking for low back pain is used as an example. They explain that if an individual's family income is low, or if they do not have sufficient access to health services or even possibly because of their age and gender, these factors may prevent them, in some way, from seeking care for low back pain which predisposes them to becoming chronic sufferers of low back pain. Thus the likelihood of such bias makes it difficult to assess the role of such variables as risk factors.

The following factors have been identified in some studies as potentially related to the development of low back pain.

2.3.1. Educational status

In the study by Nagi et al. (1973) described earlier, it was found that as the number of grades of school completed by an individual increased, the prevalence of low back pain decreased (below grade 8 the prevalence was 29.5% and for grade 13 or higher it was 11.8%). Nagi et al. (1973) conducted the study on adults that had already completed school

(at different levels). Similar findings were reported by Reisbord and Greenland (1985) (below grade 8 the one-year prevalence was 24.7% and for grade 13 or higher it was 12.2%). In the latter study Reisbord and Greenland (1985) interviewed a random sample of 2 792 people (over 18 years of age) in Dayton, Ohio, USA. Their data collected included sociodemographic information such as age, race, gender, occupation, educational status, level of income and details of back pain.

The Deyo and Tsui-Wu (1987) study also reported results in concurrence with the above two earlier studies. Deyo and Tsui-Wu (1987) analysed data from the NHANES II survey which was carried out in America. This survey was conducted on the civilian population of the USA. A sample of 27 801 subjects was interviewed. They analysed the profiles (demographics, age, height, weight, educational status, occupation, race, income level, low back pain of more than 2 weeks duration) of 10 404 adults over the age of 25 and found that 1 516 reported having lower back pain at some time (lifetime incidence (13.8%), one-year prevalence (10.3%)). It was reported that the prevalence (one-year) of low back pain decreased as the educational status of individuals increased from elementary or none (17.3%) to high school (14.4%) and college (11.2%).

2.3.2. Cigarette smoking

Much controversy exists in the literature regarding smoking as a risk factor for developing low back pain. Many studies have found a positive association between smoking intensity and low back pain while others have reported no direct association.

Leboeuf-Yde et al. (1996) conducted a survey on the general population in Denmark. The aims of their study were to investigate whether there existed a causal link between smoking and low back pain, whether smoking is uniquely associated with symptoms in the lumbar spine and the role of respiratory problems in the possible link between smoking and low back pain. The study consisted of 1 370 men and women aged 30 to 50 all selected at random and who were interviewed by means of a questionnaire which elicited demographic information and details of low back pain episodes. They analysed smoking habit in relation to low back pain, Body Mass Index (B.M.I.) and respiratory illness. They found that the prevalence of low back pain among smokers was 38% and among non-smokers it was 21%.

The results of the above study also revealed that smoking is likely to be associated with certain types of low back pain such as chronic and recurrent low back pain and low back pain coupled with other types of musculoskeletal disorders. They also found that smokers with lower B.M.I's. were more likely to experience more low back pain and other musculoskeletal problems than those with a heavier build. However, the authors suggest that more studies with larger sample sizes are required to substantiate the latter conclusion.

The Leboeuf-Yde et al. (1996) study also reported a link between smoking, respiratory problems and low back pain. However, they were unable to establish if the smoking caused respiratory problems which in turn caused low back pain or if it was separately related to the development of low back symptoms. The authors also commented that it is unclear whether cessation of smoking will lead to a decrease or total resolution of the musculoskeletal symptoms including low back pain once they have been established.

Toroptsova et al. (1995) conducted a study of low back pain on 701 workers, as described earlier, in an industrial enterprise in Russia. They found the prevalence of low back pain to be equal among smokers and non-smokers. However, when they analysed the intensity of smoking in relation to low back pain, it was found that out of the 56 smokers in the I year prevalence group (n=152), 17 subjects who smoked fewer than 10 cigarettes a day had a prevalence of 30.3% while those that smoked more had a prevalence of 69.7%. They therefore concluded that smoking intensity is related to the development of low back pain.

Roncarati and McMullen (1988) reported that smoking intensity was related to an increased prevalence of low back pain. They studied a sample of 674 individuals (all over 18 years of age) selected at random from sports clinics, physical therapy clinics, universities, and high schools in Boston, Massachusetts, USA. They also reported that the individuals in the prevalence group smoked double the number of cigarettes as those without low back pain.

Van der Meulen (1997) found that the prevalence of low back pain in smokers was 5.4% higher than in non-smokers (56.9% vs 51.5%). Of the subjects that smoked and reported having low back pain, the prevalence was the highest (63.2%) in those that smoked between 10 to 19 cigarettes per day. The prevalence in smokers smoking for 10-19 years was 62.9%, the highest prevalence reported for the "duration of smoking" variable of study. However,

Van der Meulen (1997) reported that no significant association could be demonstrated between any of the above factors (smoking habit, intensity of smoking and duration of smoking) and low back pain prevalence.

According to Leboeuf-Yde et al. (1996), although the topic of smoking and low back pain has been under study for the past 20 years, it is still uncertain as to whether there is a positive association between smoking and low back pain, and if such an association exists, whether it is direct or incidental. More studies specifically directed at and specially designed to investigate the link between smoking and low back pain are required to address this question.

2.3.3. Exposure to vehicular vibration

Vehicular vibration is the vibration that is transmitted to the whole body of the operator of mechanical vehicles or even passengers of such vehicles as trucks, buses, automobiles, cranes, tractors etc. The literature (Frymoyer et al. (1983)) refers to "whole-body vibration" i.e. vibration of the entire body as a result of the action of the engine of the vehicle. The vibration occurs at a particular frequency and is transmitted to the human body, thereby causing the skeletal frame and other structures to absorb the vibratory action. The Frymoyer et al. (1983) study described earlier, investigated the severity of low back pain according to the type of vehicle driven. A total of 1221 men were sent a questionnaire which elicited information about occupational demands and the use of certain types of machinery in the subject's occupation (among other details). The table below depicts their results. It shows that in both categories (moderate and severe) the automobile driver had the highest

prevalence of subjects in all of the categories followed by the light truck driver, motor cyclist, heavy truck driver, tractor driver, heavy equipment operator, and lastly bus driver in descending order of magnitude.

Table 1. Type of motor vehicle driven in relation to severity of low back pain.

A subject may have operated more than one motor vehicle. [Table from Frymoyer et al.(1983)].

TYPE OF MOTOR VEHICLE	NONE n=368	MODERATE n=565	SEVERE n=288
Automobile	85.6%	88.1%	89.5%
Motorcycle	15.5%	16.8%	15.0%
Bus	3.5%	2.5%	4.9%
Light truck	39.0%	39.8%	44.8%
Heavy truck	14.7%	14.2%	15.7%
Tractor	13.1%	12.3%	15.4%
Heavy equipment	7.9%	7.6%	8.0%

The authors of the above study did not attempt to give an explanation as to why the automobile driver has the highest number of individuals in both categories of pain intensity as opposed to operators of other types of "heavy machinery" such as heavy trucks, bus drivers and tractor drivers. One would expect that heavy truck drivers, tractor operators and bus drivers would make up the majority in the moderate and severe categories as opposed to automobile drivers and motor cyclists. One can only speculate that there were probably a higher number of automobile drivers, motor cyclists and light truck drivers that were interviewed in the sample and hence their observed majority in the results. However, since this is only speculative, other reasons could exist for the apparent dilemma. Only detailed studies will provide plausible explanations.

In the retrospective study done by Frymoyer et al. (1980) in northwestern Vermont, USA, it was reported that individuals who were exposed to vibration, vehicular (driving) or otherwise (heavy tools or machinery), had a significantly higher level of low back pain than those who were not. They concluded that exposure to whole-body vibration could be a significant risk factor for developing low back pain.

Similar findings were reported in a more recent study by Matsui et al. (1997). The study was conducted in a manufacturing concern where 3042 workers were interviewed. They found that exposure to vibration as a result of the driving of motor vehicles was associated with a higher prevalence of low back pain among the workers. Damkot et al. (1984) who studied occupational factors and low back pain also reported that exposure to vibration was associated with an increased prevalence and severity of low back pain (especially in truck drivers). However, Masset and Malchaire (1994) found no association between whole-body-vibrations and an increased prevalence of low back pain in the study they carried out on the employees of 2 steel industries in Belgium.

2.3.4. Employment activities (work-load etc) and body postures

Damkot et al. (1984) published a detailed study entitled "The Relationship Between Work History, Work Environment and Low Back Pain in Men". They interviewed 303 men (aged 18 to 55, selected at random from the records of a general medical practice), regarding past and present episodes of low back pain and details of the interviewees' occupations. The aim

of their study was to find out the relationship between the past and present episodes of low back pain and occupational activities such as lifting, pulling-pushing, body posture and type of occupation. The questionnaire detailed information about working environment, postures, lifting of loads, recreational activities, details of low back pain episodes such as onset of symptoms and intensity. The subjects were divided into groups according to pain severity, i.e. "no pain", "moderate pain", "severe pain" according to how the subjects described their pain intensity.

The above study found that in the "no low back pain" group 23% of subjects lifted objects by bending their backs, 35% by bending the legs, and 42% by using the back and legs to lift objects. In the "moderate pain" group, 25% lifted using the back, 43% used their legs, and 33% used both legs and back. The pattern of results in these two groups was found to be similar. However, in the "severe pain" group only 17% lifted using their backs, 58% used their legs to lift and 25% used both the back and legs together. One would have expected that those in the "severe pain" group would have the highest rates of incorrect lifting. The total contrary to this was reported.

However, Damkot et al. (1984) found that instructions on how to lift had been given to 70.2% of the "no pain" group, 82.6% of the "moderate pain" group and to 92.6% of the "severe pain" group. It is thus evident why 58% of the "severe pain" group used their legs to lift and only 17% used their backs. (More individuals in the severe group lifted in the correct manner than in the other 2 groups). A possible reason, as the authors suggested, for this apparent paradox could be that many of those that suffered from severe low back pain may have sought treatment sooner for their low back pain, as a result of which they received

the advice on how to lift correctly. They also proposed that the lifting instructions given to those in the "severe pain" group could have been given incorrectly.

The above findings of Damkot et al. (1984) are in concurrence with what Bergenudd and Nilsson (1988) found in their study of 575 residents (middle aged (55) male and females), of Malmö, Sweden. They reported that subjects with moderate or heavy physical demands in their jobs experienced more back pain than those belonging to the group with only light physical demands ($p<0.01$). According to the authors of this study, working load could cause symptoms in various parts of the body, particularly the lower back. Frymoyer et al. (1980) also reported that lifting and carrying were associated with an increased prevalence of low back pain in both men and women.

More recently, the Matsui et al. (1997) study done at a manufacturing concern in Toyama city, Japan, reported a clear correlation between physical work demands and low back pain prevalence in male subjects. They found a point-prevalence of 18.3% in male sedentary workers as opposed to 39.0% in those doing heavy manual work. In addition, Masset and

Malchaire (1994) also found, from their study conducted at 2 steel industries in Belgium, that heavy work done by the shoulders and vehicle driving was associated with an increased risk of low back pain.

The Damkot et al. (1984) study also assessed "pushing-and-pulling" exposure while at work. They measured this variable objectively by multiplying the weight of pushed objects (i.e. kilograms) by the number of pushing efforts required each day (i.e. how many times per day

the weight was pushed). The result was called "weightday units". It was reported that out of the 59 subjects that were required to push and pull objects as part of their occupations, those in the "no pain" group (n=21) averaged 326 weightday units, 28 in the "moderate pain" group averaged 532 weightday units, and 10 in the "severe pain" group averaged 1 612 weightday units. These differences were found to be significant (p=0.03). It is evident that although there were fewer people in the severe pain group, their weightday units of pushing-pulling were triple that of the "moderate pain" group and quadruple that of the "no pain" group. Similar results were also reported by Frymoyer et al. (1980) who found pulling and pushing to be associated with an increased prevalence of low back pain.

With regard to body posture at work the Damkot et al. (1984) study found that 40% of the "no pain" group, 36% of the "moderate pain" group and 59% of the "severe pain" group were required to do stretching and reaching as part of their daily work. These figures were significant (p=0.04). They also reported that respondents in the severe low back pain group were more likely to reach with the arms fully extended than were those in the other two groups. This factor was also significant (p=0.01). In addition they also found that individuals in the "severe pain" group spent less time seated compared with the other two groups ("moderate pain" and "no pain").

The Damkot et al. (1984) study described above was well designed and well analysed. However, the results were only representative of males between the ages of 18-55. Their sample size of 303 individuals was not very large compared to other studies that analysed

similar factors (Bergenudd and Nilsson (1988), Matsui et al. (1997), Masset and Malchaire (1994), Macfarlane et al. (1997)). A larger sample size and the inclusion of females would have rendered the results more widely applicable and perhaps more conclusive.

In a recent study on employment and physical work activities as predictors of future low back pain, Macfarlane et al. (1997) conducted a study on 1 412 people (18 to 75 years of age) in northwest England. These people were chosen at random from the medical records of a general medical practice. Two important inclusion criteria for subjects in the study were that they should be employed and should be free of low back pain. The study was conducted in two stages.

In the first stage of the above study, all the selected subjects answered a questionnaire which elicited demographic information and which specifically concentrated on employment activities (lifting, digging/shovelling, standing, sitting, driving a car, lorry, digger or tractor). Secondly, after one year the computerized medical records of the general practice were analysed to check if any of the subjects had sought treatment for low back pain. These subjects were then contacted and requested to answer another questionnaire detailing information about the low back pain episodes experienced in the follow-up year. For the remainder of the sample, a second questionnaire was mailed to enquire about low back pain development in the follow-up year.

The above (Macfarlane et al. (1997)) study found that there was an increased risk of a new episode of low back pain in those whose jobs involved lifting, pulling or pushing objects of more than 25 lbs. These recent results were similar to those of Damkot et al. (1984) and

Frymoyer et al. (1980) discussed earlier. The Macfarlane et al. (1997) study was representative of males and females of a wider age group (18-75) and it had a large sample size. The conclusions drawn from it were therefore relatively strong. However, in the study conducted by Masset and Malchaire (1994), no association was found between an increased prevalence of low back pain and factors such as physical work load, postures and movements of the trunk.

2.3.5. Pregnancy and low back pain

Orvieto et al. (1994a) investigated 449 healthy pregnant women (19 to 43 years of age), selected at random, that were attending a pregnancy clinic in Tel Aviv, Israel. All the women had completed a minimum of 14 weeks of gestation at the time of the study. The women answered a once off questionnaire at their time of presentation to clinic. The questionnaire contained general demographic information, details of low back pain in the past (during pregnancies or otherwise) and during the pregnancy at the time of study, characteristics of the low back pain (onset, severity, duration and location) and obstetrical history (caesars, epidurals, breech presentation).

They found that 54.8% (n=246) of the women interviewed were suffering from low back pain at the time of the study. The results also revealed that low economic standard as well as the existence of low back pain before the first pregnancy and during past pregnancies were associated with an increased risk of developing low back pain during pregnancies. They

also reported that age, number of prior pregnancies, gestational age, average maternal height, and Body Mass Index (B.M.I.) (B.M.I. = weight (kgs) divided by the square of the height (m)) were not associated with an increased risk of low back pain during pregnancy.

Ostgaard et al. (1991a) carried out a study on 855 healthy pregnant women (aged 17 to 43) at a maternity care unit in Gotebörg, Sweden. The women were interviewed at the 12th week of pregnancy and thereafter at regular intervals till birth (weeks 16, 20, 24, 26, 28, 30, 32, 34, 36 - i.e. an average of nine subsequent intervals after week 12). At the first interview the women answered a questionnaire which elicited demographic information, low back pain details, occupational details (lifting, standing, sitting) and general medical history. At each subsequent visit, those women that suffered from low back pain during the interim period were again interviewed about the low back pain and about their activities in the interlude since the last visit. Their results revealed that the 9-month prevalence of low back pain (low back pain at some time in the pregnancy) in the study sample was 49% (n=417). However, 207 women reported having ongoing back pain before the pregnancy and when the figure was adjusted to exclude this group the 9-month prevalence became 27%. The point-prevalence (low back pain at the 9 intervals of study) ranged from 22%-28% (average-25%).

The Ostgaard et al. (1991a) study above reported that the number of previous pregnancies increased the risk of low back pain especially in the latter period of gestation ($p>0.996$). They also found that age was associated with an increased risk of developing low back pain (the younger the female the greater the risk of low back pain ($p<0.0001$)). This result was contrary to that of Orvieto et al. (1994a) with respect to these factors. The level of significance of the number of previous pregnancies and low back pain risk was also quite low

($p>0.996$). However, with respect to weight, height and B.M.I., their results were in concurrence with what Orvieto et al. (1994a) found (i.e. these factors had no relation to an increased risk of low back pain).

Ostgaard et al. (1991a) also reported that physically heavy work, lifting, twisting, forward bending, poor work satisfaction, post-work fatigue, inability to take rest breaks and constrained working postures were factors associated with increased complaints of low back pain during pregnancy.

Van der Meulen (1997) reported a significant association between the prevalence of low back pain and the number of pregnancies. The prevalence of low back pain in nulliparous Black females was 25% lower than in parous Black females. Logistic regression analysis revealed that as the number of pregnancies increased the probability of Black females developing low back pain increased by a factor of 64.61%.

2.3.6. Body Mass Index (B.M.I.) and low back pain

Orvieto et al. (1994b) carried out a retrospective study on the records of approximately a quarter million male army recruits aged 17-18 at the time of their medical draft examination. Any subject whose medical and radiological examination revealed pathology of the spine was excluded from the study. Examples of such pathologies included scoliosis, kyphosis, disc

space narrowing, Shmorl's nodes, lumbarization, sacralization, osteophytes, spondylolisthesis, neurological deficit and palpable muscle spasm.

The study population described above was then divided into 2 groups. Group one consisted of subjects without any history of low back pain, and group two was made up of subjects with a history of mild episodic low back pain, without any clinical or radiological findings. The two populations were then both separated into 3 categories according to Body Mass Index (B.M.I.) which was calculated by dividing the subject's weight (kg) by the square of his height. The categories were as follows: (A) B.M.I. smaller than 20 - underweight, (B) B.M.I. between 20 and 25 - normal weight, (C) B.M.I. more than 25 - overweight/obese.

The results of this study revealed that there was a trend towards increasing low back pain prevalence as B.M.I. increased ($p < 0.0001$). The authors suggested that by using young subjects in the study, the long-term effects of other risk factors of low back pain such as smoking, repetitive lifting and exposure to vibrations which are known risk factors of low back pain were eliminated. However, the results were only representative of males. A similar study on females should be executed to check if the results could possibly be different in the female gender. The sample size of this study was very large (approx. 250 000) and hence the conclusions were fairly convincing.

Van der Meulen (1997) found a significant association between body-type and low back pain prevalence. The prevalence of low back pain was highest among ectomorphs (66.7%) followed by endomorphs (65.4%) and lastly mesomorphs (46.9%). Logistic regression analysis

revealed that endomorphs and ectomorphs were more likely to develop low back pain by a factor of 75.59% (their odds of developing low back pain were increased by that factor).

2.3.7. Psychological and Psychosocial factors and low back pain

Psychological and psychosocial factors have been found to influence the prevalence and incidence of low back pain. The Frymoyer et al. (1980) study conducted in northwestern Vermont, USA (described earlier), reported that male patients who reported low back pain also had significantly more episodes of anxiety and depression and more were smokers and had a chronic cough. The authors proposed that patients that are anxious or depressed have a greater awareness of or greater difficulty in coping with low back pain and thus seek medical attention much sooner.

Svensson and Andersson's (1982) study revealed a positive association between anxiety, depression and stressful life-events and the prevalence of low back pain (the prevalence increased). These results were in concurrence with what Frymoyer et al. (1980) reported.

Schofferman et al. (1993) conducted a retrospective analysis of the records of 101 consecutive patients that were evaluated by a multidisciplinary panel of spine specialists for chronic low back pain. The records of all the patients contained detailed information about the patient's medical history of low back pain, surgery for low back pain and details of a psychiatric analysis that was carried out by a psychiatrist experienced at assessing chronic

pain patients. The results revealed that the records of a high proportion of patients contained information of multiple childhood psychological traumas with different combinations (one factor or a combination of a few). The psychological trauma experienced was as a result of physical and sexual abuse, emotional neglect or abuse, abandonment, and chemical dependence of the caregiver. The authors concluded that multiple childhood psychological traumas predispose the individual to developing low back pain, they contribute to making the problem become chronic and persistent, they affect the disability level of the patient and they are also related to the failure of treatment.

Sanderson et al. (1995) conducted a study on 269 consecutive patients (196 males and 73 females) attending a back pain clinic between 1986 and 1991 in England. The aim of the study was to assess the influence of employment status and compensation claims on patients experiencing low back pain. Each of the selected patients filled out a questionnaire on presentation to the clinic. The questionnaire extracted information about the patient's current and previous occupations, compensation claims and their outcomes (i.e. paid or not) and details of the low back pain episodes. They reported that unemployment and compensation claims were related to increased psychological factors which in turn affected the patients' perception of their low back pain and disability. Patients that were unemployed and claiming compensation were much more aware of their disability than those that were employed.

Burton et al. (1995) carried out a detailed study on 252 consecutive patients complaining of low back pain and who presented to an osteopathic clinic. Patients with serious pathology (organic or neoplastic disease) were excluded from the study. No distinction was made between male and female patients in this study. Each subject underwent a conventional

medical history taking and clinical examination (history of onset, duration, location, past history, range of motion, entrapment neuropathy tests, disc pathology tests, pain rating, leg pain, medication, work absence, disability). The aim of this study was to determine the value of clinical and psychosocial variables for early identification of back pain sufferers who are likely to have a poor prognosis for recovery.

In addition to the clinical examination, each subject answered a detailed questionnaire which elicited information about the individual's demography, history of back trouble, treatments received for it, and a detailed battery of psychosocial tests (nature of pain, by using the McGill pain questionnaire, distress, beliefs about pain control, fear avoidance beliefs, pain coping strategies). Thereafter the patients were treated in the usual osteopathic manner for their low back trouble. One year after their treatment, another questionnaire was mailed to the subjects. This second questionnaire recounted information about the progression of the low back trouble during the interim year and of any other interventions sought for it. It also elicited the same psychosocial information that was initially recorded on presentation one year previously. A 74% response rate was achieved from the one-year mailing.

The above study (Burton et al. (1995)) found that 18% of subjects were distressed at presentation due to their low back pain. They also concluded that psychosocial factors were apparently more influential in the persistence of back trouble than medical and clinical factors. This means that persisting symptoms of low back pain could be more related to psychosocial factors than to medical factors. They also found that patients with good pain control and coping skills were less likely to have persistent low back pain. Therefore in view of their findings Burton et al. (1995) propose that the early identification of psychosocial problems

such as depression, fears, pain coping skills and anxiety is important in the understanding and therefore the prevention of chronic and recurrent low back pain. This study was well designed and analysed in great detail. However, a larger sample size (>252) and the distinction between males and females would have made it more broadly conclusive.

Papageorgiou et al. (1997) conducted a comprehensive study to determine if work related psychosocial factors could predict the occurrence of new episodes of low back pain and if they would influence consultation behaviour (i.e. medical consultation). The study was conducted in two stages. In the first stage a postal questionnaire was sent to 7 669 adults aged 18-75, registered with two general medical practices in south Manchester, England. The questionnaire elicited information about low back pain, occupational details (job satisfaction, intercolleague relationships, satisfaction with income), social class (derived from the last or current occupational position held, i.e. Professionals-class I, Managers-class II, office, technical worker's-class IIIN, etc.). The response rate to the first stage was 4 501 (59%). This stage enabled the researchers to identify the number of people that were suffering from low back pain and how many were not. From those that were asymptomatic, only subjects that were employed were chosen for the second stage of study (called the cohort group (n=1412)).

The second stage of the study involved analysing the computerised records of the general practices 12 months after the mailing of the first questionnaire to see which of the cohort group had developed low back pain and consulted the medical practice for the new episode (n=63). For the remainder of the cohort, another questionnaire was mailed to find out if any

of them had experienced low back pain in the preceding 12 months or if they were presently suffering from low back pain (n=247).

The results of the above study revealed that individuals that were dissatisfied with their jobs were more likely to develop low back pain for which they would not seek medical help. It also revealed that the attitudes of the employees towards their jobs influenced both the development of new low back pain episodes and medical consultations. According to Papageorgiou et al. (1997) adverse psychosocial factors at work (job dissatisfaction, poor intercolleague relationships) may be implicated in as many as a quarter of all new episodes of low back pain experienced by working people.

2.3.8. Family history of low back pain as a risk factor

In the Matsui et al. (1997) study (described earlier) conducted on the employees of a manufacturing concern in Toyama city, Japan, one of the questions asked in the interview related to family history of low back pain of the interviewee. It was reported that a family history of low back pain in first degree relations proved to be a risk factor for low back pain subjects that answered positively to this question. It was also found that subjects whose parents had low back pain were more likely to experience low back pain at a younger age on average than those subjects with no such history.

Richardson et al. (1997) conducted a study to determine if a familial predisposition to lumbar disc pain and injury existed. The subjects studied were the immediate relatives of two "index groups". One index group consisted of 38 consecutive patients seen by the Section of Neurosurgery at the University of Michigan. These patients were between the ages of 21-55 years who had herniated lumbar discs confirmed at surgery. The other index group was made up of 50 consecutive patients diagnosed with upper extremity disorders in the Physical Medicine and Rehabilitation outpatient clinic at the University of Michigan. Subjects in the second index group were free of discogenic pain. The subjects of study, as they were referred to, (i.e. immediate relatives of the 2 index groups) were either the mother, father, brother, sister, son or daughter of the patients in the two index groups. They had to be 21 years or older to be eligible for inclusion in the study.

The subjects of study were sent a questionnaire which detailed demographic information and information to differentiate low back pain into that of discogenic causes or otherwise. The questionnaire was pretested and MRI studies were done on those "test subjects" who were differentiated into the discogenic low back pain group by the questionnaire. Thus it was shown to be extremely specific and sensitive for the information it was designed to extract. Those subjects of study with any existing history of low back pain were required to answer questions relating to known extrinsic (other than familial) causes of disc injury (whole-body vibrations, socioeconomic status, repetitive lifting, smoking, driving for long periods)

The results revealed that 28% of the relatives of the first index group (low back pain group) met the questionnaire's criteria for discogenic lumbar pain, whereas only 2% of the relatives of the second index group (upper extremity disorder) met the same criteria. In addition to

this, 12% of the relatives of the first index group (low back pain group) had received surgical therapy for lumbar disc pain, whereas none of the relatives of the second index group (upper extremity disorder) had received surgical therapy for lumbar disc pain. Thus, patients with surgically proven disc herniation had significantly more adult immediate relatives with a history of discogenic low back pain than did patients with upper extremity overuse injuries. The study concluded that a strong familial predisposition to lumbar disc injury existed in persons with an immediate family member who has received surgical therapy for a herniated lumbar disc. This was a very well designed and analysed study. More studies of this nature with higher numbers of subjects are required to consolidate the conclusions.

2.3.9. Low back pain in relation to other diseases and cardiovascular risks

Svensson et al. (1983) conducted a study on 940 randomly sampled men age 40 to 47. The sample was obtained from the census register of Gotebörg, Sweden. The subjects were invited to attend a medical examination and an interview. The interview elicited demographic information, details of low back pain (past and present), physical activity, stress levels, smoking, cardiovascular disease (angina, vascular claudication, dyspnoea, diabetes mellitus), exercise and details of occupation. The medical examination consisted of measurements of height, weight, blood pressure and serum cholesterol. An electrocardiogram (ECG) was also done on each subject.

The subjects were then divided into four groups. Group A consisted of subjects who had back pain at some time in their lives (lifetime-incidence), Group B consisted of subjects who at the time of study had back pain that occurred at least once a month (prevalence), Group C was made up of subjects who at the time of study were suffering from back pain either daily or recurring at least 2 times a week and Group D subjects had no back pain at all. Hence group C was subgroup of group B which in turn was a subgroup of group A. Group D was the disjunct group.

The results revealed that angina pectoris was common in group A but more common in groups B and C ($p<0.05$). Vascular claudication on exertion was common in all of the low back pain groups (i.e. except group D). Dyspnoea was reported commonly in group A ($p<0.05$) but more significantly in groups B and C ($p<0.01$). The perception of stress was common in the low back pain groups but more significantly in group B and C ($p<.0.001$, A-$p<0.05$)). Worry, tension and fatigue were also much more common among all the low back pain subjects (A,B,C $p<0.001$). No difference was found between subjects with low back pain (groups A,B,C) and asymptomatic subjects (group D) with respect to serum cholesterol, ECG findings, blood pressure and heart rate.

Univariate analysis revealed that angina, vascular claudication, dyspnoea, smoking, worry and tension, fatigue at the end of the working day, physical activity at work and at leisure time and perception of stress were correlated to low back pain. Analysis of covariance (ANCOVA) of these factors revealed that vascular claudication, smoking, high physical activity at work and frequent worry and tension were directly associated with low back pain.

2.3.10. Trauma as risk factor for future low back pain

Walsh et al. (1992b) analysed the same data that they obtained from their previously described study (Walsh et al. (1992a), see 2.2.2)) with the aim of assessing the risk of back symptoms in people admitted to hospital because of traffic accidents and falls. The questionnaire they used also elicited information about traffic accident injuries, falls and admission to hospital because of the same. There were 362 subjects that reported being admitted to hospital for a traffic accident or fall including 32 that were admitted on more than one occasion. These variables were assessed in relation to low back pain prevalence during the year in which the accident occurred, and subsequent low back pain development.

The results revealed low back pain that started in the same year of life (i.e. age) as the traffic accident or fall, lasted much longer than if it originated under different circumstances and the low back pain was more often ascribed to the injury. The authors reported that the data suggested that a person under the age of 60 who was admitted to hospital for a traffic accident or fall had a 7% chance of developing low back pain as a result of the injury. However, they argued that the link between the injury and subsequent symptoms would not always be obvious to the patient.

2.4. Racial Heterogeneity And Low Back Pain

The Deyo and Tsui-Wu (1987) study that was conducted in the USA found important racial differences in the prevalence of low back pain among Whites and Blacks. The White population had a higher prevalence of low back pain than any other ethnic group. In fact it appeared to be a race-gender interaction: White men had the highest prevalence (15.0%) and Black men the lowest prevalence (7.7%). Women of both races had an intermediate prevalence and were closer to the White male rate (White women (13.4%), Black women (14.5%).). These racial differences and gender-race subgroup differences of low back pain prevalence were found to be significant ($p<0.05$).

The Van der Meulen (1997) study conducted among Black South Africans was the only one of its kind that appeared to have been done in the Southern African region. He found that the lifetime incidence of low back pain was 57.6% and the prevalence was 53.1%. The incidence figures were not very different from the results of the Svensson and Andersson (1982) study which found an incidence of 61% in the population of Gotebörg, Sweden. However, the reported prevalence was much higher than the 31% found by Svensson and Andersson (1982). No other race groups were studied previously and hence comparisons of prevalences and incidences of low back pain in different ethnic groups were not possible.

Both Mulimba (1990) and Mijiyawa (1993) expressed, as mentioned earlier, that the problem of low back pain had received very little attention in Africa. Racial differences in the frequency of low back pain had not been adequately studied. They stated that most

epidemiological studies of low back pain had been undertaken in Scandinavia where little racial heterogeneity exists, therefore no firm conclusions regarding race could be drawn at that time. (Jayson 1992:538).

2.5. The Economics Associated With Low Back Pain

Deyo et al. (1991) reported that the estimated national cost of direct personal medical care for low back pain in 1977 was 12.9 billion US dollars and 17.9 billion dollars in 1988. These figures were obtained from the National Centre for Health Statistics. They proposed that there was little evidence that the costs were abating although there had been suggestions that surgery for the lower back (which makes up a great proportion of the costs) would be employed with increasing sensitivity. Nevertheless, laminectomy rates in the USA increased by 23%, diskectomies by 75% and a 200% rise in the spinal fusion rate between the years 1979 to 1989.

According to Frymoyer and Cats-Baril (1991) low back disorders are extremely prevalent in all societies, and probably have not decreased substantially over the past 2 decades. They propose that more subjects are reporting their disability due to low back pain and as a result there is a greater awareness of the low back pain phenomenon. The increase in the rate of disability reports has also lead to an explosion in the costs. Frymoyer and Cats-Baril (1991) estimate that the direct medical costs and indirect costs of these conditions (low back) are in the range of more than 50 billion dollars per annum in the USA, and could be as high as 100 billion dollars. The above authors explain that 75% or more of the costs can be

attributed to the 5% of people that become disabled temporarily or permanently from back pain - which seems to be a phenomenon that could be more rooted in psychosocial behaviour rather than physical disease determinants.

Carey et al. (1995a) interviewed 4 437 subjects in north Carolina in the USA. The interviews were done telephonically and each number was chosen at random. Only individuals that were 21 years of age or older were included in the study. Low back pain was defined as "pain in the back anywhere between the waist and buttocks". The interview extracted information about the individual's demography and low back pain details such as presence of leg pain, cost of treatment, source of treatments, disability level, medication etc. The study concluded that since 2.8% of the north Carolina population sought care for low back pain it was estimated by extrapolation that the state-wide cost for low back pain in the year of study was 310.7 million US dollars. This represented a 63 dollar tax on every adult in the state in order to absorb the costs generated in the treatment of low back pain.

At the time of this study it appeared as though no such information was known about the economics of low back pain in Southern Africa. The study by Van der Meulen (1997) revealed that low back pain was relatively common among the Black people of South Africa. The level of care seeking was also found to be high in his study. One can therefore only speculate about the costs of treatment for low back pain to the economy.

2.6. The Disability Associated With Low Back Pain

According to Frymoyer and Cats-Baril (1991) it seems unlikely that the prevalence and impairments produced due to low back pain have changed appreciably over the years since it began to be studied. They explain that what changed is society's perception of low back pain, mostly relating to the disability that results due to low back pain. With an increasing rate of disability, the costs have increased for industry and government, and there has been an increased utilization of health care including surgical intervention. The above authors state that disabling back pain is primarily a psychosocial phenomenon, the importance and socioeconomic consequences of which have grown incredibly during the past 30 years, and thus is the greatest cause for societal concern.

Leino et al. (1994) conducted a long-term study of low back pain on the general population of Finland. Every year from 1978 (inclusive) to 1992 (inclusive) they randomly chose a different sample of 5 000 subjects (aged 15 to 64) from the Finnish population register. These subjects were mailed a questionnaire which extracted demographic information and details about back pain such as incidence, prevalence, disability and joint pains. The questionnaire used was the same throughout the period of study.

The above study found that although the prevalence of low back pain was at a high level among the Finnish people studied, it did not change appreciably from 1979 to 1992. The authors concluded that societies' attitudes towards good health, functional capacity and pain have changed during the past few decades. They also reported that the increase in musculoskeletal morbidity may be a reflection of the development of better health care

systems in that researchers are now more likely to have statistics available from the records kept at clinics and hospitals of patients. Frymoyer and Cats-Baril (1991), Leino et al. (1994) also reported that the disability of musculoskeletal disorders has probably increased due to societies' changes in the manner in which illnesses and ill people (eg. Low back pain sufferers) are viewed and not because of changes in actual biological morbidity.

According to the World Health Organization (WHO) Report of a Scientific Group on Rheumatic Disorders (1991), Sweden had a 6 000% increase in permanent disability pensions awarded for low back problems during the period 1970 to 1987. The report also found that this figure was 5-20 times higher than those of other industrialized nations, but it reflected an improvement in insurance benefits, which are often accompanied by an increase in work absence due to low back pain. This report echoes the sentiments of Frymoyer and Cats-Baril (1991) and Leino et al. (1994), in that the increased benefits due to better insurance payouts in Sweden seem to be linked in some way to a greater rate of work absence (which is probably achieved by reporting that one is disabled due to low back pain) rather than a true rise in the disability of low back pain.

The Heliovaara et al. (1989) study done in Finland (described earlier), reported that some level of disability was present in 60% of the subjects with low back pain. The use of health services was frequent among these subjects and their needs were often unmet. They also found that 40% of subjects with sciatica or undefined low back pain had been obliged to cut down on leisure-time activity permanently due to low back pain, and a third had to reduce their everyday activity. Fifty percent of subjects reported their disability as slight, 20% as markedly limited, and 5% as severely limited.

Carey et al. (1995a) found that in the north Carolina population in the USA, 34% of subjects with chronic low back pain considered themselves to be permanently disabled due to the pain. The Sanderson et al. (1995) study reported that in their investigation, unemployed subjects and subjects involved in disability claims reported a much higher level of disability than those that were employed or those not involved in disability claims. The latter study found that employment status was an important factor in the patients' perception of their level of disability.

2.7. Characteristics of Care-seeking For Low Back Pain

Back pain is one of the most frequent reasons for patients to visit primary care physicians and is the second most common reason for time taken off from work (Deyo et al. (1991)). The Reisbord and Greenland (1985) study (described earlier) explains that the decision to seek medical care for low back pain is dependent on: (1) the predisposition of the individual to use medical services, which is based on demographic and social characteristics as well as on attitudes about medical care and efficacy if treatment, (2) the ability to obtain medical services easily, (3) the individuals' perception of the severity of their illness.

Frymoyer and Cats-Baril (1991) pose a vexing question as to whether professionals, of all types, involved in low back pain management have become part of the low back pain problem rather than the solution. They suggest that these professionals need to be better educated about back pain so that they can conduct proper examinations enabling them to

identify specific treatable causes of low back pain syndromes. The WHO Report of a Scientific Group on Rheumatic Disorders (1991) also suggests that professionals involved in low back pain management need to be educated to avoid unnecessary radiographic examinations and not to use unproven labels for idiopathic back disease, such as "disc degeneration" etc.

The results of many studies have revealed that the frequency with which subjects seek intervention for low back pain depends on the nature or severity of the pain. Carey et al. (1995a) found that individuals with chronic low back pain sought treatment sooner and more frequently than those subjects with acute or less troublesome pain. Frymoyer et al. (1980) and Deyo and Tsui-Wu (1987) reported that subjects who described their pain as severe sought treatment more frequently than subjects with moderate or slight pain.

The type of health professional seen may also be related to certain characteristics of low back pain. Frymoyer et al. (1980) reported that 31% of subjects who described their pain as moderate and 67% as severe visited a general practitioner for medical attention while an orthopaedic surgeon was visited by 9% of subjects that described their pain as moderate and 32% as severe. This is possibly related to the accessibility of these professionals for treatment.

Carey et al. (1995a) found that in their investigation of subjects with low back pain, 2 factors were significantly associated with care seeking, (1) the subject's perception as to the

severity of low back pain and (2) the number of days spent in bed for back pain. Factors such as age, race, gender, sciatica, overall health status, employment status, insurance status and age of onset were not associated with care-seeking in any way.

Deyo and Tsui-Wu (1987) reported in the USA, that of the subjects that experienced low back pain for at least 2 weeks, 84.6% visited a Health professional for the problem. In this group of subjects 58.6% visited a Medical Doctor, 36.9% an Orthopaedist, 30.8% a Chiropractor, 13.8% an Osteopath, 7.6% and 2.5% visited Internists and Rheumatologists respectively. A subject may have visited more than one professional.

Van der Meulen (1997) found that of the subjects that sought care for low back pain from the prevalence group (53.9%), 90.9% were receiving some form of allopathic medical treatment, 5.9% received traditional "medical" care and 3.1% sought care from some other source (e.g. tablets, pills, etc. from a shop, supermarket, self-medication etc.).

Carey et al. (1995a) found that 73% of subjects with low back pain visited a health professional for the pain. Of those who sought care 91% saw a Medical Doctor, 29% a Physical Therapist, and 25% a Chiropractor. Both the above studies (Deyo and Tsui-Wu (1987) and Carey et al. (1995a)) show that Chiropractic is a relatively common source of care for subjects with low back pain. However, Van der Meulen (1997) did not report any subjects making use of Chiropractors as a source of care for low back pain in South Africa. It is possible that access to Chiropractors could be limited due to there being only relatively few practicing Chiropractors in South Africa as compared to allopathic professionals.

Hurwitz (1994) carried out a study to check the relative efficacy of Chiropractic versus Medical management of low back pain on health status in a multispecialty group practice in La Habra, California, USA. He followed the progress of 103 patients treated by means of Chiropractic care and 187 patients treated medically for 3 months after they first presented with low back pain at the practice. The study found that the chiropractic patients were 60% more likely to have their pain resolved after 3 months than the medically treated patients. Hurwitz (1994) concluded that Chiropractic care was at least as effective as medical care in reducing low back pain and functional disability of low back pain. Chiropractic patients were also twice as likely to perceive their treatment as being successful in reducing low back pain compared to medical patients.

Meade et al. (1995) conducted a study in Britain comparing Chiropractic management and hospital outpatient management for low back pain. They randomly selected 741 patients that were between the ages of 18 and 64 who presented with low back pain and in whom spinal manipulation was not contraindicated. The subjects were allocated at random for chiropractic care or hospital outpatient care. After a 3-year follow up period subjects were asked if they thought that the treatment group they had been allocated to helped their back pain. The Oswestry Pain and Disability Index scores were used as measures of outcome of patient satisfaction with the allocated treatment. The authors reported that after the 3-year follow-up period, the patients allocated to the Chiropractic group for treatment had improved by 29% more than the hospital outpatient group with respect to pain and disability due to low back pain.

According to Deyo et al. (1991), unorthodox forms of care (e.g. Reflexology, acupressure) are flourishing, new treatments appear almost daily and there is little consensus on appropriate care. They also explain that these factors point to a failure of orthodox medical care, which contributes to a crisis in health care financing and worker disability due to the non-existence of a definite streamlined system of care for low back pain. According to the above authors there should be a shift from passive care (e.g. bed rest) to treatment which gets the patient involved in the management process (e.g. rehabilitation exercise programs) and research emphasis should shift from the prevention of back pain to the prevention of back related disability.

2.8. The South African Scenario

As explained earlier, not as many details are available about the impact of low back pain in the South African context as exists about the same problem in other countries of the world (Sweden, Finland, Britain, United States of America, Denmark). The Van der Meulen (1997) study has brought to the fore the fact that low back pain is as common in Southern Africa as it is overseas. South Africa is a country undergoing tremendous change and financial constraints are prevalent in all aspects of the country's infrastructure (private sector, public sector, governmental departments etc.). The Department of Health is particularly hard pressed as a result of massive cuts in the health budget (Annual Budget Speech:Minister of Finance, 11 March 1998).

According to Deyo and Tsui-Wu (1987) due to the enormous impact on the health care system, precise data about the incidence, prevalence, disability, etc. will be of enormous value to health care planners, policy makers and investigators. This is particularly relevant in the South African context in which, as explained in the preceding paragraph, the health care system is presently undergoing radical change in order to cater for the needs of a much wider and larger population.

Deyo and Tsui-Wu (1987) suggest that their data recommend an agenda for further therapeutic and epidemiological research. They make use of the example of Chiropractic in their study, in which a high rate of use of the profession as a source of care was found, and therefore they suggest that more research is needed on the efficacy of spinal manipulative therapy for low back pain management versus the conventional medical approach. The authors also explain that such research will help to explain the variations in different management approaches and prevalence rates and this will be of enormous assistance to planners of health systems and medical reimbursement policy makers. This is also relevant in the South African context of changing private and public health care sectors.

2.9. Summary

In Africa, there is not much known about the epidemiology of low back pain as it is known overseas. Racial differences and low back pain prevalence have not been adequately studied since most such studies have been conducted in countries where little racial heterogeneity exits.

Low back pain is a very common problem in most industrialized societies. Some long term studies of the epidemiology of low back pain suggest that although the prevalence of low back pain is high, it has not varied much in the last few decades. What changed is the level of disability associated with low back pain. This change might be as a result of changing attitudes in society about illness behaviour, the development of more structured health care systems and the introduction of mechanisms of reimbursement for those disabled due to low back pain.

Van der Meulen (1997) conducted the first race related epidemiological investigation of low back pain in a formal Black South African Township. The results of this study revealed high incidence, prevalence, disability and level of care seeking rates among the Black community that was studied.

The risk factors associated with low back pain tend to be repetitive bending, twisting, lifting, driving for long periods, whole body vibration, smoking, pregnancy, employment status, educational status and psychosocial factors such as job satisfaction, intercolleague relationship,

income levels, anxiety and depression. Some authors have stated that the psychosocial factors might be more predictive than the physical risk factors. Others have stated that chronicity of low back pain could be related to the psychosocial factors.

The estimated direct and indirect costs of low back pain are enormous and run into billions of dollars in the US annually. The industrial sector, private sector and government departments are affected adversely by the effect that low back pain has on the economical spheres in the form of work days lost, loss of production, workers compensation costs, and disability pensions. A vast proportion of costs is incurred in the medical sector where it appears as though a lack of consensus in management strategies could lead to unnecessary surgery, radiography (X-ray, Computerised Tomography, Magnetic Resonance Imaging), physical therapy, and drug usage.

There is a general lack of consensus about the approach to the management of low back pain, although a high level of care seeking exists among sufferers. The majority seek care from a primary care practitioner. Chiropractic is also a common source of care for a large proportion of subjects with low back pain. It has been found to be as effective as the medical approach in the management of low back pain.

The Van der Meulen (1997) study has made known important aspects that need to be addressed when planning health care facilities and systems. This is the reason why the relevance of epidemiological studies has been sanctioned by many as a starting point to solving the problems associated with low back pain. This is particularly relevant in the South African context where new information could be of great help to planners and policy makers.

Therefore the aim of the present study was to conduct an epidemiological investigation of low back pain in two communities (Isipingo Beach and Sydenham) comprising different race groups (Indians and Coloureds) and then to compare the results of the two investigations in order to determine the need for low back health care facilities in such communities.

CHAPTER THREE

MATERIALS AND METHODS.

3.1. Study Design

The study conducted was a population-based descriptive epidemiological survey. The data were collected by means of structured interviews (according to the format of the questionnaire) with eligible subjects from the respective population groups (i.e. Indians in Isipingo and Coloureds in Sydenham.). The questionnaire (Appendix A), which was designed by the researcher, gathered general demographic information about the sample population, information regarding exposure to risk factors of low back pain and details of past and present experiences of low back pain. The questionnaire was then pretested on a sample of individuals (10) in order to weed out ambiguities, to solve any potentially problematic questions and to check the structure of the questionnaire before executing the study. No such difficulties were experienced during testing.

People eligible for inclusion in the study from both populations included any resident of Isipingo or Sydenham that was over the age of 18 inclusive at their last birthday. A total of 500 subjects per community were interviewed (i.e. 1 000 in total.) The study was conducted over a 5 month period (February 1998 to June 1998). An average of 7 people were interviewed every day. The interviews were conducted during the day and in cases where the chosen subjects were not at home or were at work, they were contacted for interview at

night or at the weekend. Subjects chosen for interview that declined to participate in the study were excluded and the next immediate household was chosen. The interviews were conducted by the researcher. The subjects were selected using the Systemic Random Sampling method explained below.

The Systemic Random Sampling method uses the following equation. $\mathbb{K}= \mathbb{N}/\mathbb{n}$ where:

$\mathbb{K}$=Sampling interval

$\mathbb{N}$=Population size

$\mathbb{n}$=Sample size (Van den Honert (1997)).

A sampling interval ($\mathbb{K}$) can be calculated using the above equation. Then assuming that there are on average 5 individuals per household, the Sampling interval ($\mathbb{K}$) will be divided by 5. The quotient obtained will indicate the number of homes, between the homes to be interviewed, that will have to be ignored.

Thus using the example of a population size 5 000 ($\mathbb{N}$=5000) and sample size 500 ($\mathbb{n}$=500),

$$\mathbb{K}= \mathbb{N}/\mathbb{n}$$

$$= 5\ 000/500$$

$$= \underline{10}$$

Then assuming that 5 people live per household, $\mathbb{K}/5=2$. Thus if house number 1 is interviewed on a particular street then the next house eligible for interview will be 2 houses away (i.e. house number 3) as determined by the Sampling interval ($\mathbb{K}$) divided by 5. At each house, only respondents over the age of eighteen inclusive were interviewed. If more than one individual over the age of eighteen lived at the home then each was assigned a

number, lots were drawn and whichever number was picked, that individual was selected for interview. This process was used until a sample of 500 people were interviewed per community.

Low back pain in this study was defined as "any type of pain, stiffness, discomfort or ache in the lower back region (from below the rib cage to the inferior gluteal crease just above the posterior thigh)". This definition was similar to the one described by Anderson et al. (1991:95). "Prevalence" of low back pain was described as low back pain at the time of being interviewed or within a month preceding the interview. "Incidence" was described as any episode of low back pain experienced within the individual's lifetime, including low back pain experienced during pregnancies for females.

The study was done assuming that the respondents answered the questions as correctly and as honestly as possible. Questions requiring answers relative to the individual's own perceptions, were taken as such (i.e severity, disability etc.). Their relative objectivity was not checked using any objective type of scale.

3.2. Statistical Analysis

Step one: Frequencies and percentages for each variable of study were obtained. The most important of these were selected (see step two) and presented in the form of graphs (Chapter four) to facilitate easy analysis of the results.

Step two: Screening of variables was done using the Pearson Chi-Square Test (discussed below) to check the strength of association between factors. The individual's severity level (Y) of low back pain was selected as a base-line and screening was done by checking which factors were significantly associated with the severity level of low back pain at the α=0.05level of significance ($p \leq 0.05$). Using this procedure, 10 important variables that were significantly associated ($p \leq 0.05$) with the severity level (Y) of low back pain were selected for further detailed analysis. The 10 important variables identified were:

X_1 - Age.

X_2 - Gender.

X_7 - No. of children.

X_8 - No. of pregnancies.

X_9 - Educational status.

$X_{15.1}$ - Occupational risk factor 1 - Lifting heavy objects.

$X_{15.4}$ - Occupational risk factor 2 - Driving for long periods.

X_{16} - Job vulnerability of getting low back pain.

X_{30} - Total amount of time spent doing exercise per week.

X_{34} - Accessibility of health services.

Step three: The Two-Sample Unpaired t-test (discussed below) was then used to check how the two race groups in the study compared to each other with respect to the 10 important variables, which significantly ($p \leq 0.05$) affected the level of severity (Y) of low back pain, identified in step two above.

Step four: Logistic Regression Analysis (discussed below) was then conducted using Y and 5 highly influential variables of study where Y is the severity of low back pain.

3.2.1. Hypothesis for Pearson's Chi-square Test for the Strength of Association Between Factors (Van Den Honert (1997)

H_0 : Factors A and B are independent from each other and no association exists.

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

α = Level of significance = 0.05.

Decision Rule

1. Reject H_0 if $P < \alpha$.

2. Accept H_0 if $P \geq \alpha$.

Screening of variables was done using the Pearson's Chi-square statistic to identify those factors that were significantly associated with Y (the severity of low back pain). This procedure revealed 10 variables that strongly affected the severity of low back pain (listed in section 3.2 above). Recoding of these 10 variables was done to reduce all categorical levels to 2.

3.2.2. Hypothesis for the Two-sample Unpaired T-test Used to Compare the Two Race Groups with Respect to the 10 Important Variables of Study

H_0: $\mu_1 = \mu_2$. (The two race groups are the same with regards to the distribution of the variable of interest.).

H_1: $\mu_1 \neq \mu_2$.(The two groups are significantly different with regard to the distribution of the variable of interest.).

α = Level of significance = 0.05.

Decision Rule.

1. Reject H_0 if $P < \alpha$.

2. Accept H_0 if $P \geq \alpha$.

Two Sample Unpaired t-Tests were done using the statistical package SPSS, following the steps below:

Step one: Check the P-value from Leven's Test For Equality of Variances. The two variances are equal if $p < \alpha$. Otherwise they are different from each other.

Step two: Compare the two population means, observing the findings obtained above in step one.

Step three: Determine the 95% confidence interval for $\mu_1 - \mu_2$, observing the finding obtained above in step one.

3.2.3. Logistic Regression Analysis

The sample size (n=1 000) of this study was relatively large enough to warrant the use of Log-Linear Analysis or Logistic-Regression Analysis. The latter was chosen since it is more informative than the former. Logistic-Regression Analysis does not demand that explanatory variables be broken down as in Log-Linear Analysis.

In this study the Logistic-Regression of Y on X_7, X_8, X_9, $X_{15.4}$, X_{16} were performed where:

*Y = Severity of low back pain.
X_9 = Educational status
X_7 = Number of children.
$X_{15.4}$ = Driving for long periods.
X_8 = Number of pregnancies.
X_{16} = Job vulnerability for acquiring low back pain.

(* The dependent variable Y is dichotomous, or has two levels).

These variables were selected after screening was done using the Pearson Chi-Square statistic as explained above. High Pearson Chi-Square statistic values, or low P-values were used as a criterion for selection.

The estimated Logistic-Regression Model is given as follows :

$$Pr\ (Y=1) = \frac{1}{1+ (e)^{-z}}$$

(Van den Honert (1997).

where: $Z = \hat{\beta}_0 + \hat{\beta}_1 X_7 + \hat{\beta}_2 X_8 + \hat{\beta}_3 X_9 + \hat{\beta}_4 X_{15.4}$

where: $\hat{\beta}_0, \ldots, \hat{\beta}_4$ are estimated regression coefficients in the optimum logistic regression model.

The odds that a person will have severe back pain or otherwise as X_i varies from a low level to a high level are given by:

$$Exp\ (\hat{\beta}_i),\ I=1, \ldots ,4.$$

Example: When the number of children (X_7) an individual has increases (i.e. X_7 varies from a low level to a high level), the odds of having severe low back pain were equal to 0.7810 or 78.10%. (see Chapter 4 for details).

After performing the Logistic Regression Analysis it was evident that all standard errors were quite small (see Chapter four for table). The **Overall Percentage of Correct Classification**

of the estimated Logistic Regression model was 89.2%. This indicates that the Logistic Regression model fitted the data quite well.

3.3. Computer Software

The statistical package, SPSS was used for data entry and analysis.

CHAPTER FOUR

THE RESULTS OF THE STUDY

4.1. Demographic and General Characteristics of the Sample Population

4.1.1.A. Age Distribution in the Indian Sample Population

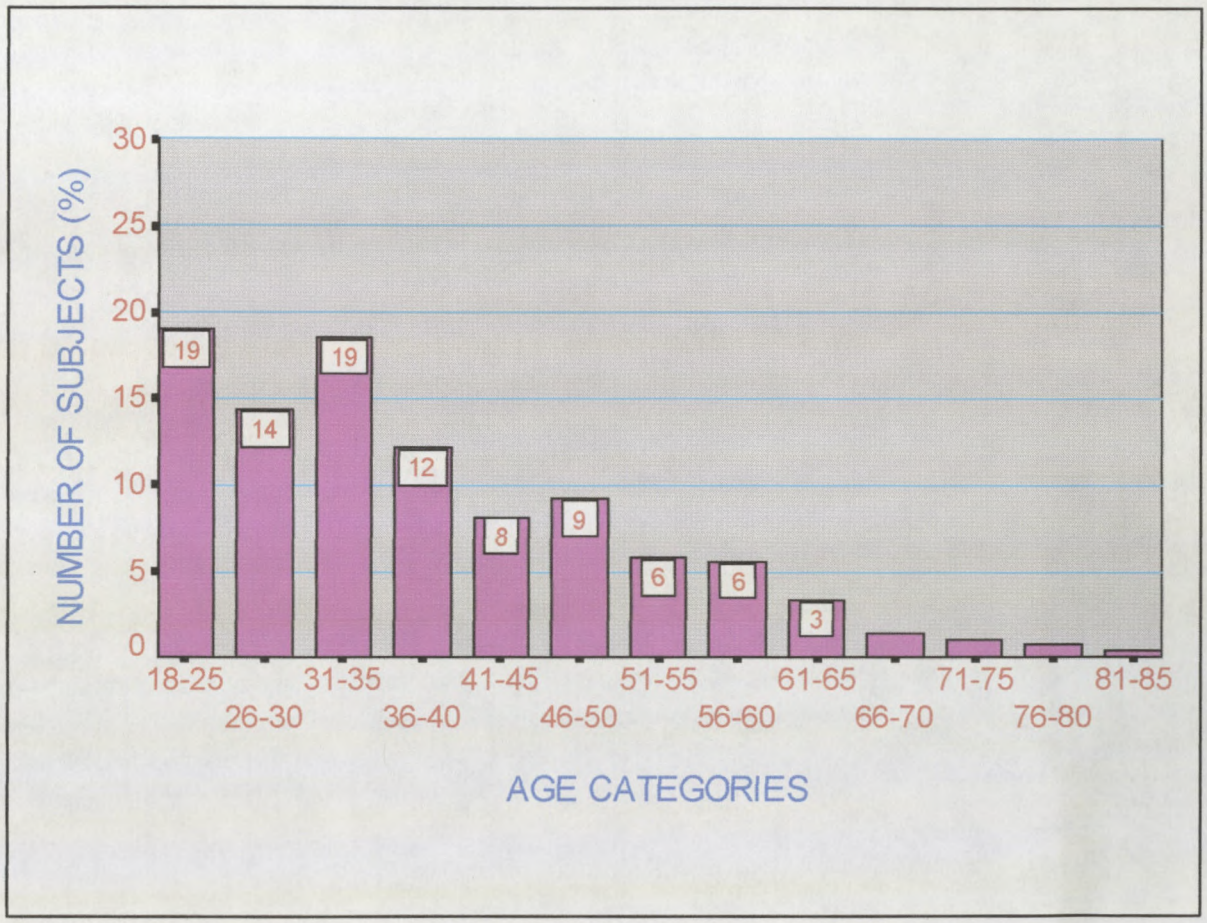

Figure 1. Age distribution of the Indian sample population (n=500)

Figure 1 depicts the age distribution of the Indian sample population (n=500). The majority of the respondents were in the 18-25 or 31-35 age groups (both age categories had a 19% distribution (n=95) respectively). The 26-30 age category had a 14% (n=72) distribution. The distribution in the remaining categories decreased steadily with increasing age.

4.1.1.B. Age Distribution in the Coloured Sample Population

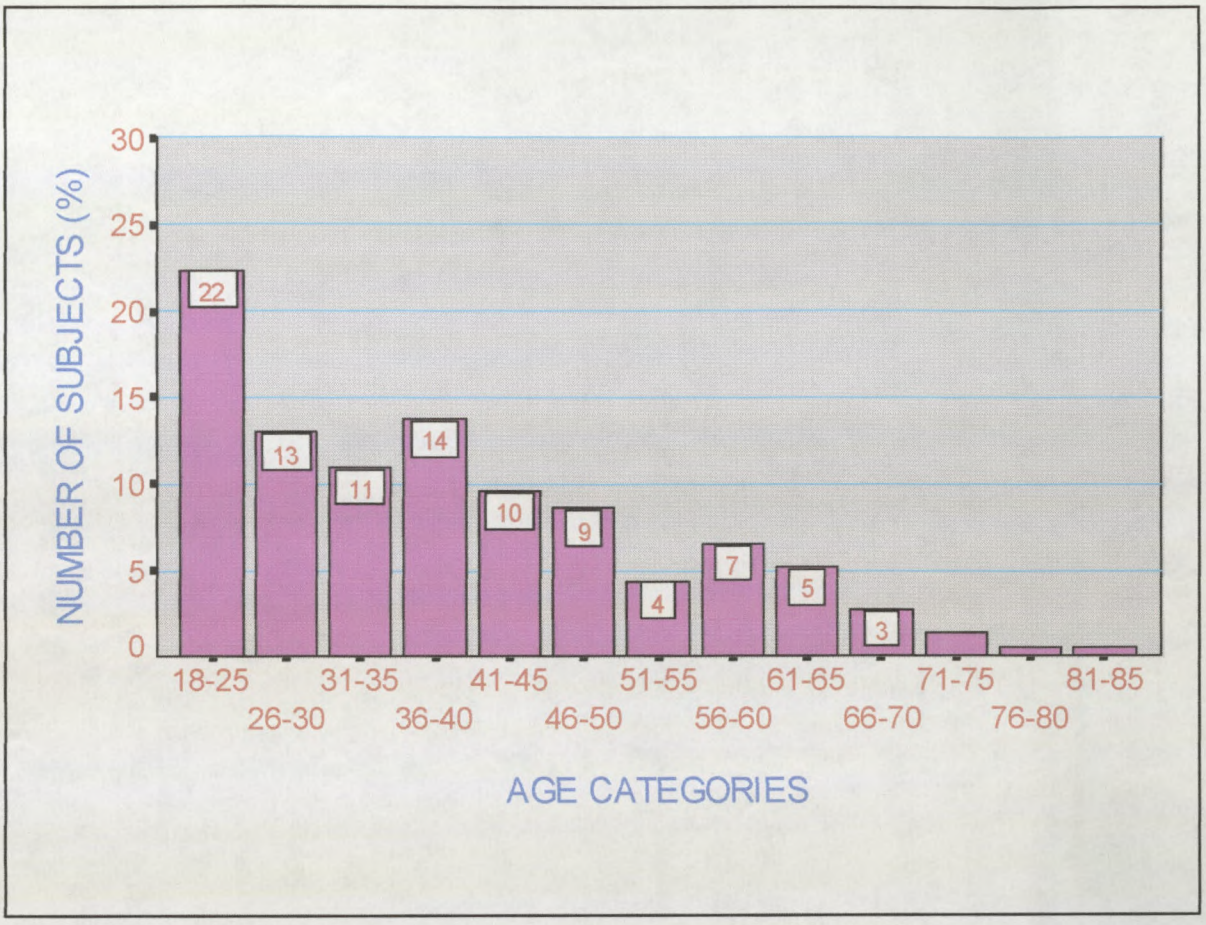

Figure 2. Age distribution in the Coloured sample population (n=500)

Figure 2 depicts the age distribution of the Coloured sample population (n=500). The majority of the subjects (22%, n=112) were in the 18-25 age category. Thereafter the age distribution decreased somewhat erratically with increasing age with a peak of 14% (n=69) in the 36-40 age category.

4.1.2.A. Gender Distribution in the Indian Sample Population

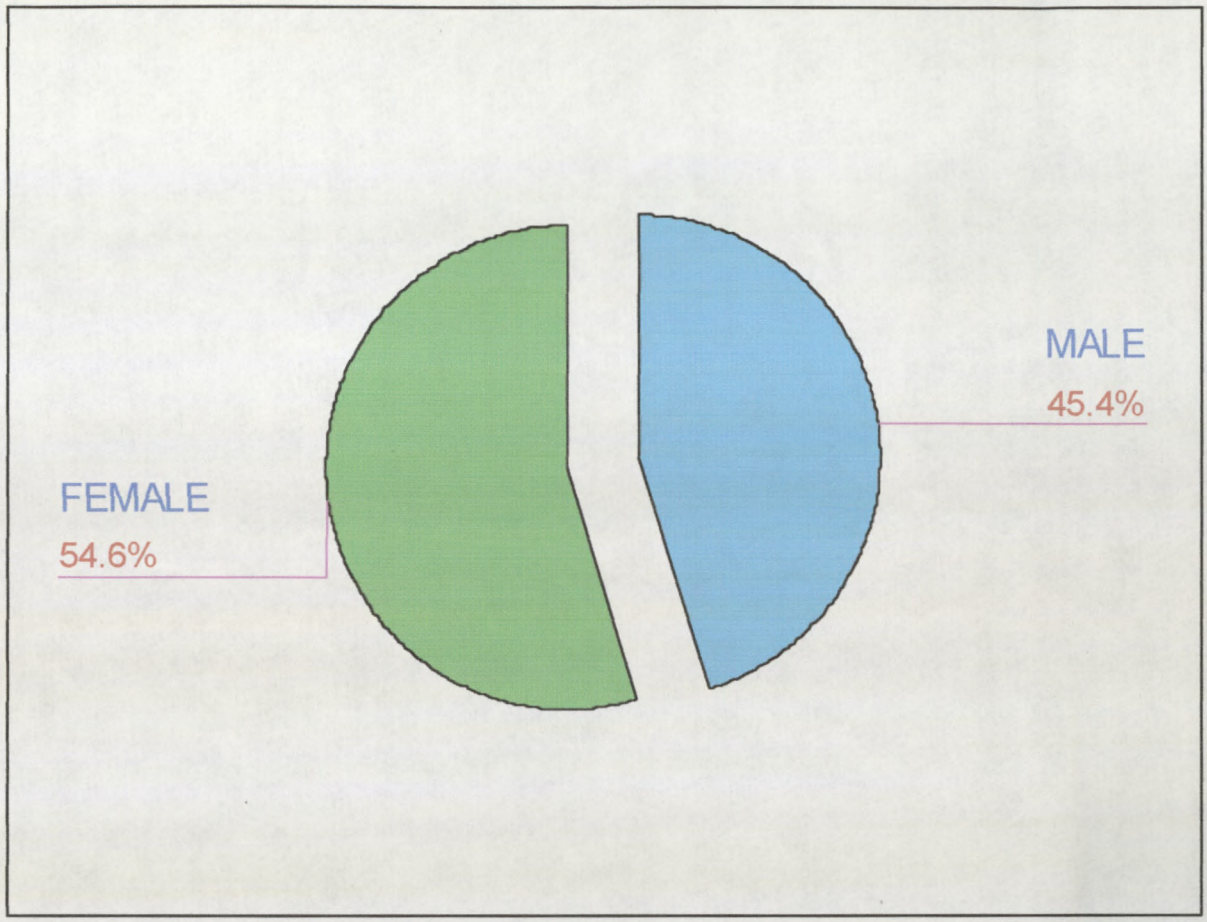

Figure 3. Gender distribution in the Indian sample population

Figure 3 depicts that the gender distribution in Indians consisted of 54.6% (n=273) females and 45.4% (n=227) males. The total sample size was 500.

4.1.2.B. Gender Distribution in the Coloured Sample Population

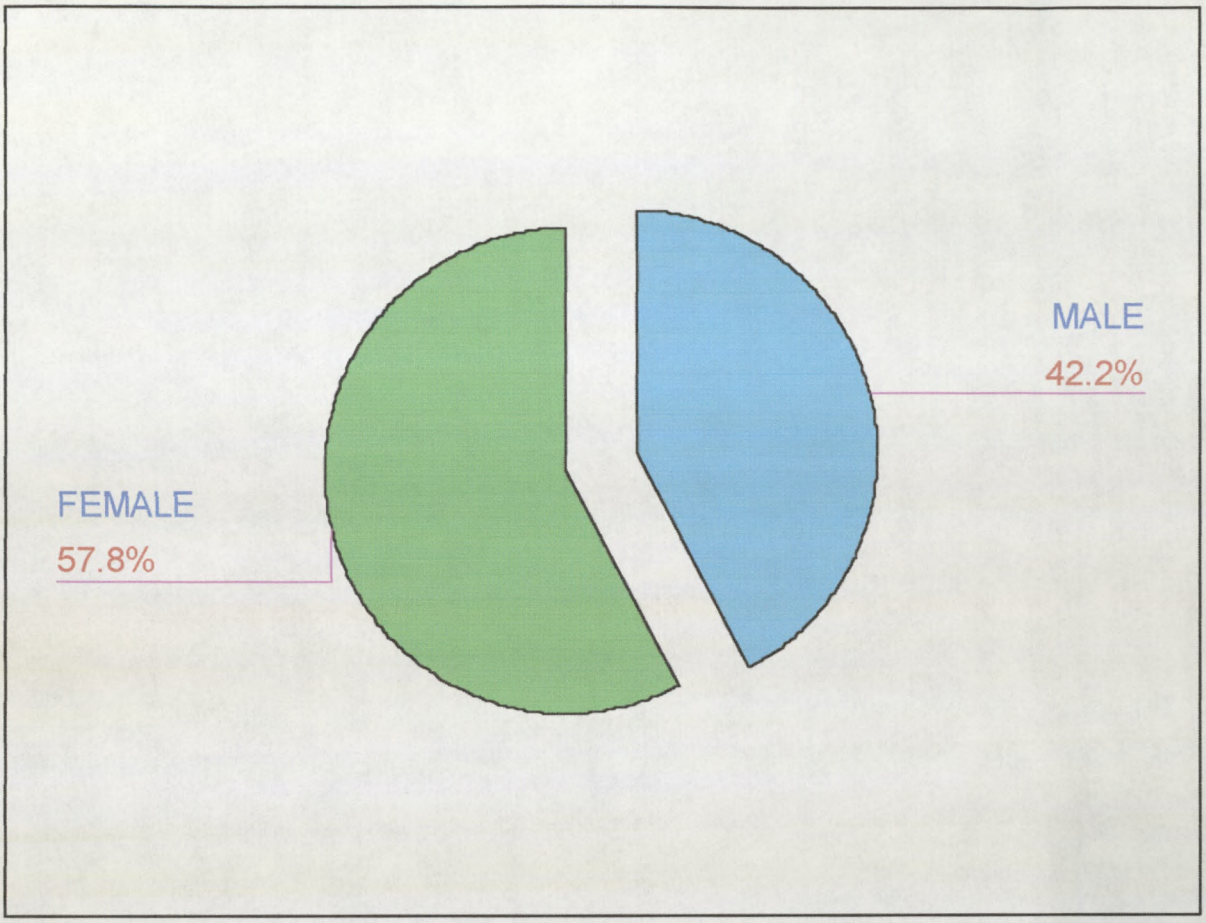

Figure 4. Gender distribution in the Coloured sample population

Figure 3 depicts that the gender distribution among Coloureds consisted of 57.8% (n=289) females and 42.2% (n=211) males. The total sample size was 500.

The gender distribution between the two groups was not very different apart from the 3.2% more females among Coloureds and the 3.2% more males among Indians.

4.2. Additional Characteristics of The Two Sample Populations

4.2.1. Marital Status

The majority of Indian subjects were married (78%, n=390). There were 15% (n=73) single, 1.4% (n=7) divorced, 0.4% (n=2) separated and 5.6% (n=28) widowed. There were no individuals cohabiting among the Indian community. The majority of Coloured subjects (41%, n=205) were married, 30,6% (n=153) were single, 9.6% (n=48) divorced, 1,4% (n=7) separated, 9.8% (n=49) widowed and 7.6% (n=38) were cohabiting.

The marital status of subjects among the Indians and Coloureds varied greatly in that the divorce rate was much higher among Coloureds; so was the number of people cohabiting. It is possible that this is a reflection of the cultural background of two race groups.

4.2.2. Occupational Status

Thirty seven percent (n=183) of the Indian subjects were employed full-time and 32% (n=162) were housewives. This formed the bulk of Indian subjects (69%, n=345). The remainder were spread between being self-employed (10%, n=50), unemployed (9%, n=43), retired, students and pensioners. The majority of Coloured subjects were employed full-time

(41%, n=204). There were very few housewives (12%, n=62) among the Coloureds because most women were employed. There were 15% (n=76) that were unemployed and 9% (n=46) employed part-time.

The most striking difference between Indians and Coloureds is that there were far fewer housewives in the Coloured sample population than in the Indian population (32%, n=162 and 12%, n=62 respectively). The Coloured sample also had a higher rate of unemployment (15%, n=76) than the Indians (9%, n=43).

4.2.3. Educational Status

In the Indian sample, 4.2% (n=21) received no formal education, 12.8% (n=64) received a primary school education, 38.6% (n=193), the majority, went to high school without completing their education, 27% (n=136) matriculated and 17.2% (n=86) went to a tertiary institution. Among the Coloureds 0.6% (n=3) did not receive any formal education, 11.4% (n=57) went to primary school only, 59.8% (n=299), the majority, went to high school without completing their education, 20.2% (n=101) matriculated and 8% (n=40) received a tertiary education. Although the Indians had more subjects that were not educated at all, the number of subjects that matriculated and the number that received a tertiary education was much higher than for the Coloured group.

4.2.4. Smoking Habit and Intensity

There were 129 smokers (25.8%) among the Indians, most (10%, n=48) of whom smoked 6-10 cigarettes per day. However, almost half the Coloureds (46.2%, n=231) were smokers. Most (15%, n=76) smoked 16-20 cigarettes per day. This indicates that more of the Coloureds were smokers and that they were heavier smokers than the Indians. There were also a higher proportion of female smokers among the Coloureds than among the Indians.

4.2.5. Number of Children.

The following table depicts the difference in the number of children per parent/s in the two sample populations.

Table 2. Number of children among parents in the two samples.

NUMBER OF CHILDREN	INDIANS (n=500)	COLOUREDS (n=500)
None	24.8% (n=124)	23.6% (n=118)
1	15.2% (n=76)	15.4% (n=77)
2	21.2% (n=106)	16.8% (n=84)
3	20.6% (n=103)	21.4% (n=107)
4	9.6% (n=48)	8.6% (n=43)
5	5.6% (n=28)	4.6% (n=23)
6	0.8% (n=4)	4.6% (n=23)
7	1.8% (n=9)	2.6% (n=13)
8	0% (n=0)	0.6% (n=3)
9	0% (n=0)	0.8% (n=4)
10	0.4% (n=2)	0.6% (n=3)
>10	0% (n=0)	0.4% (n=2)

Table 2 shows that most of the subjects in both samples did not have children (24.8% for Indians and 23.6% for Coloureds). There were 21.2% (n=106) of Indian subjects and 16.8% (n=84) of Coloureds that had 2 children. This was followed by 20.6% of Indians and 21.4% of Coloureds that had 3 children. Thereafter as the number of children increased, the number of parents decreased. Generally there were more Coloureds in each category over 5 children. Most of the respondents in both communities were between 18-25 years of age and hence were not likely to be parents at that age.

4.3. Details of Incidence, Prevalence And Severity of Low Back Pain

4.3.1.A. The Lifetime Incidence of Low Back Pain in The Indian Sample Population

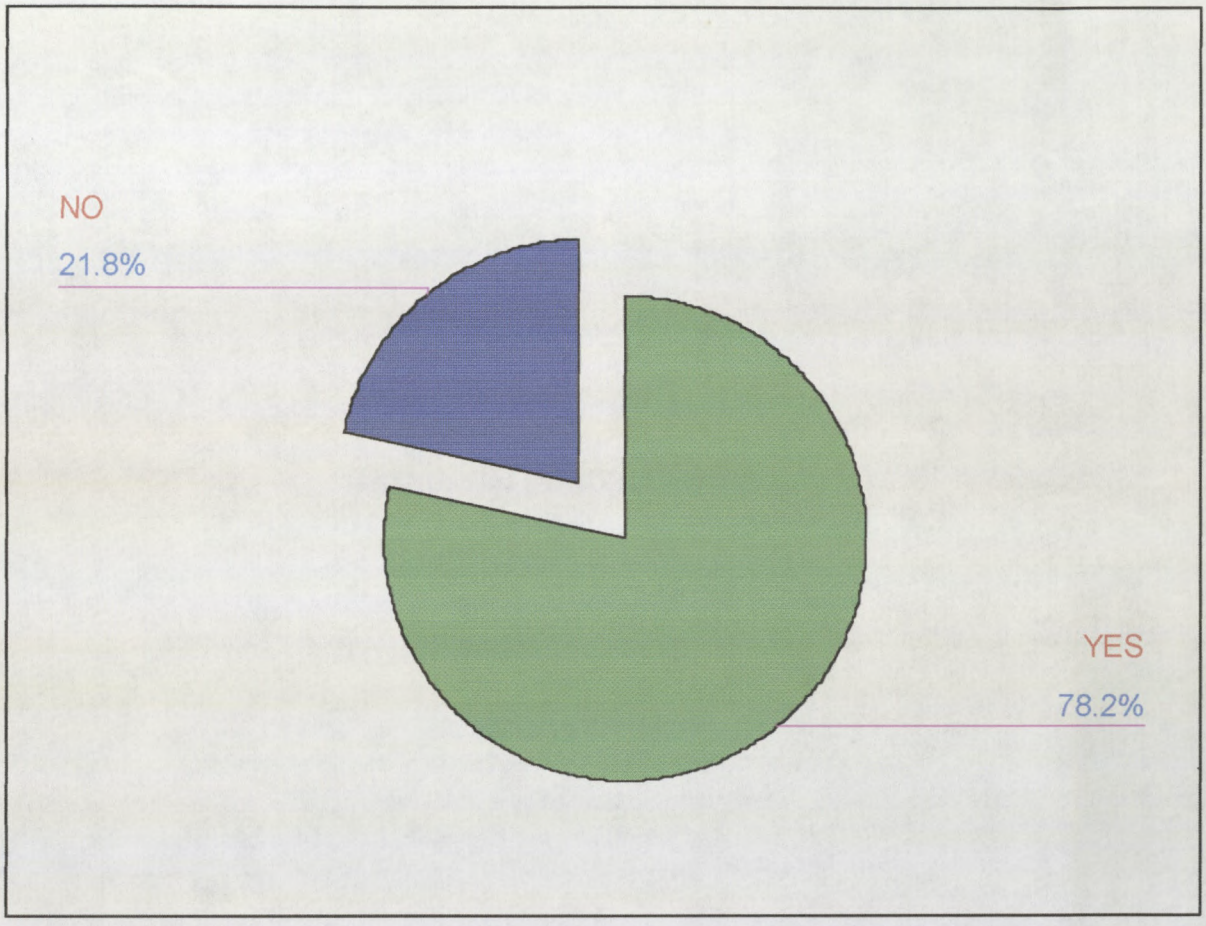

Figure 5. The lifetime incidence of low back pain in the Indian sample population

Figure 5 depicts that the total lifetime incidence of low back pain among the Indian sample population was 78% (n=391.).

4.3.1.B. The Lifetime Incidence of Low Back Pain in The Coloured Sample Population

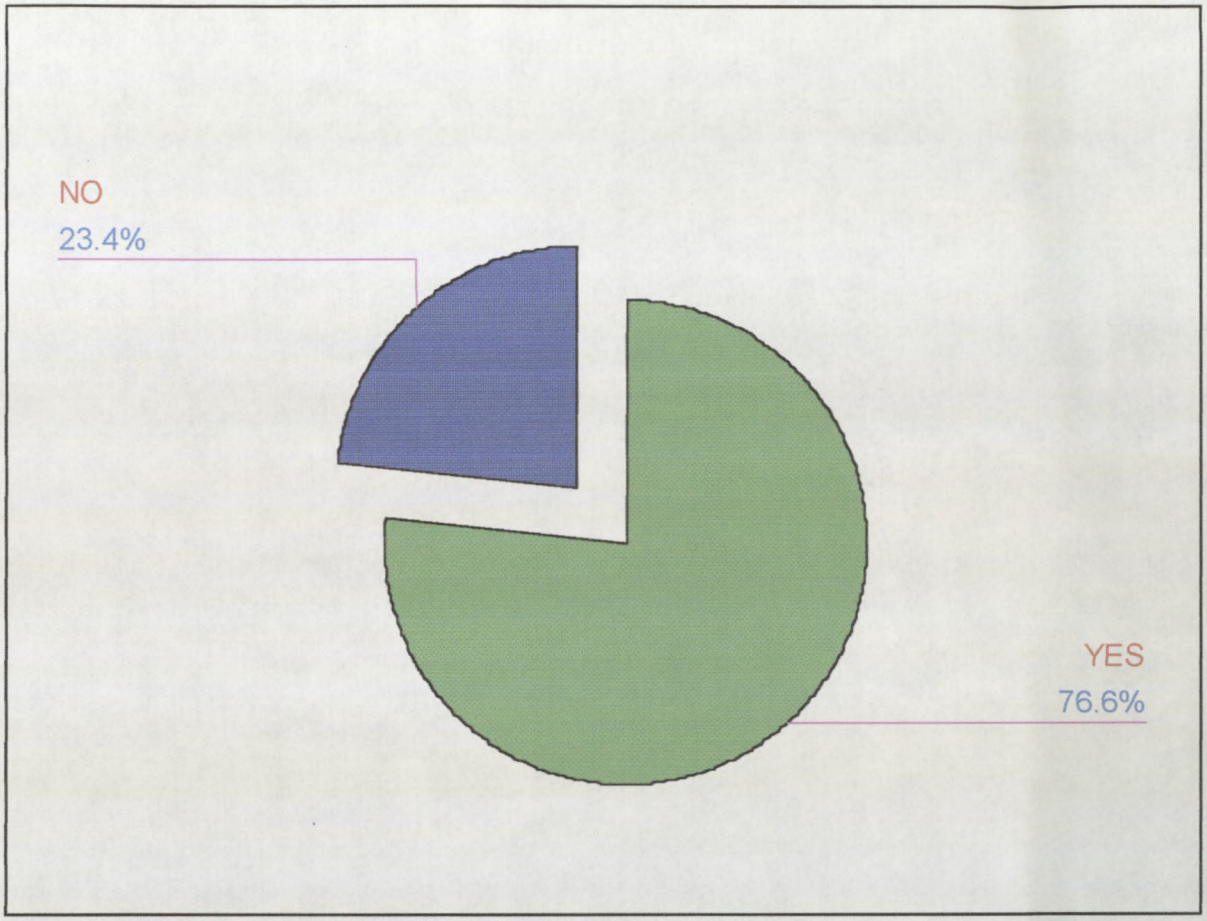

Figure 6. The lifetime incidence of low back pain in the Coloured sample population

Figure 6 depicts that the total lifetime incidence of low back pain among the Coloured sample population was 77% (n=383). The Indians had a 1% higher lifetime incidence of low back pain (i.e. 78%).

4.3.2.A. The Prevalence of Low Back Pain in the Indian Sample Population

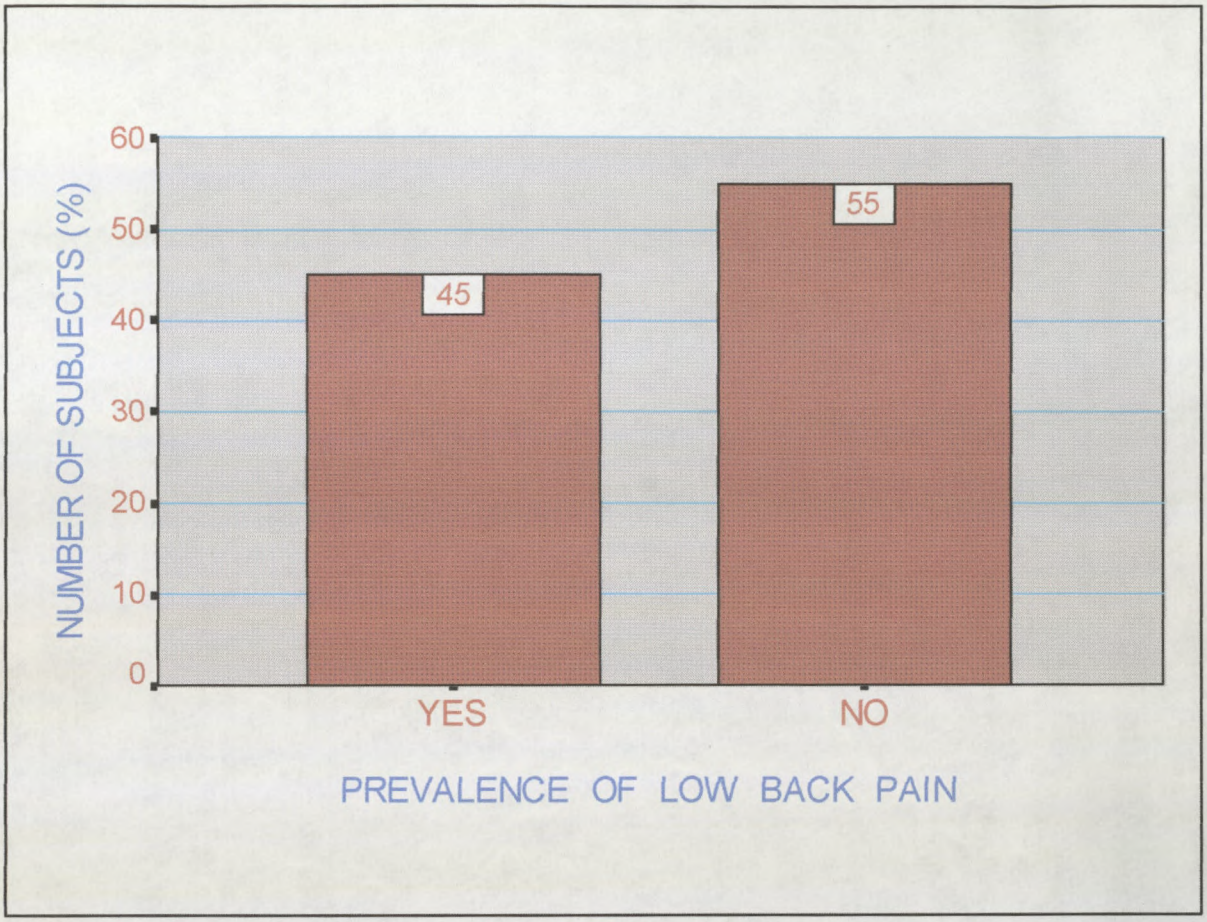

Figure 7. The prevalence of low back pain in the Indian sample population

Figure 7 depicts that a total of 225 Indian subjects reported that they were suffering from low back pain at the time of interview giving an overall prevalence of 45%.

4.3.2.B. The Prevalence of Low Back Pain in the Coloured Sample Population

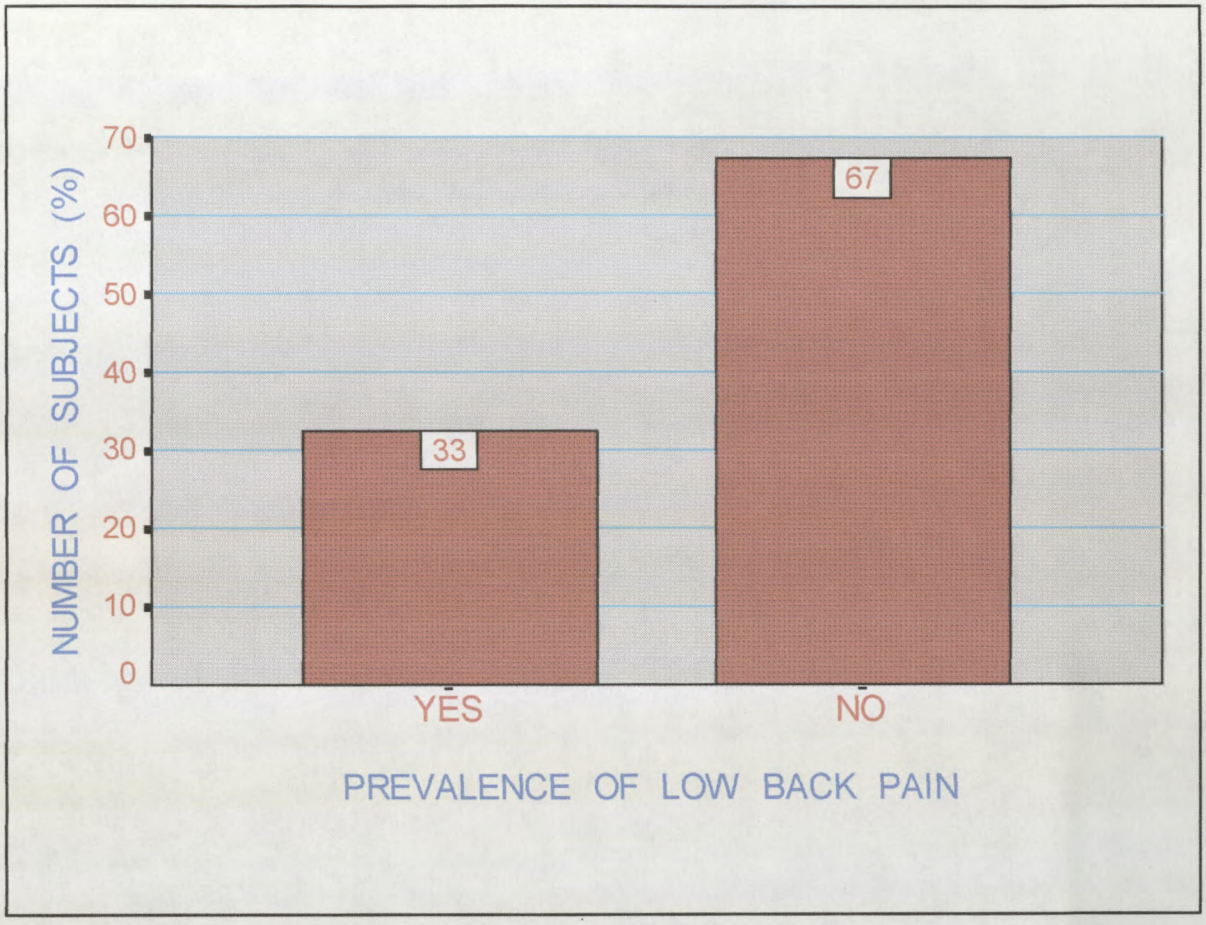

Figure 8. The prevalence of low back pain in the Coloured sample population

Figure 8 depicts that a total of 163 subjects among the Coloureds reported that they were suffering from low back pain at the time of interview thus giving an overall prevalence of 33%.

The Indians had a prevalence rate of low back pain that was 12% higher (45%) than that of the Coloureds (33%).

4.3.3.A. The Prevalence of Low Back Pain According to Age in the Indian Sample Population

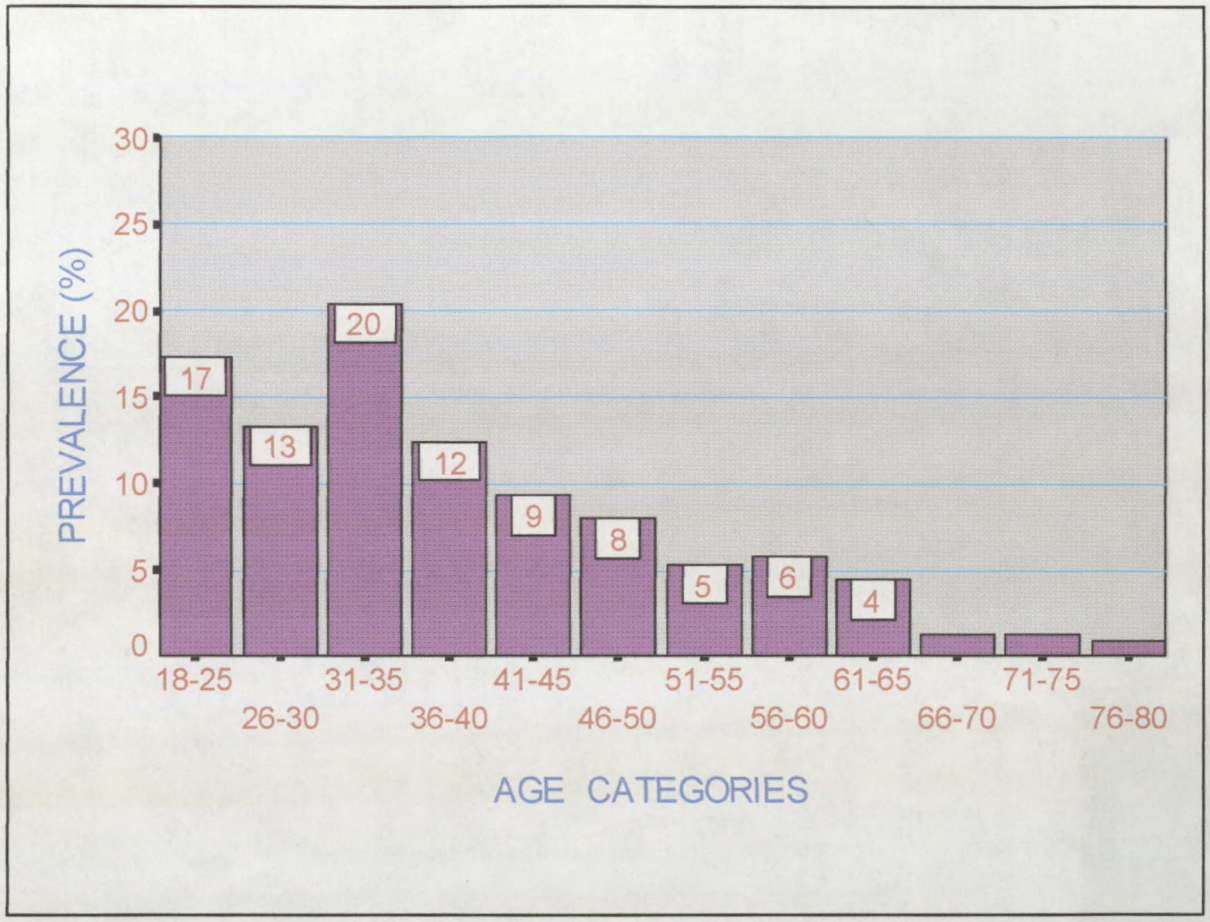

Figure 9. The prevalence of low back pain according to age in the Indians

Figure 9 depicts that most of the Indian subjects (20%, n=45) who had low back pain at the time of the interview were between 31-35. The next highest prevalence occurred in the 18-25 age category. The lowest prevalence (4%, n=9) was recorded in the 61-65 category. The rest of the groups had prevalences that decreased fairly uniformly with increasing age after the peak.

4.3.3.B. The Prevalence of Low Back Pain According to Age in the Coloured Sample Population

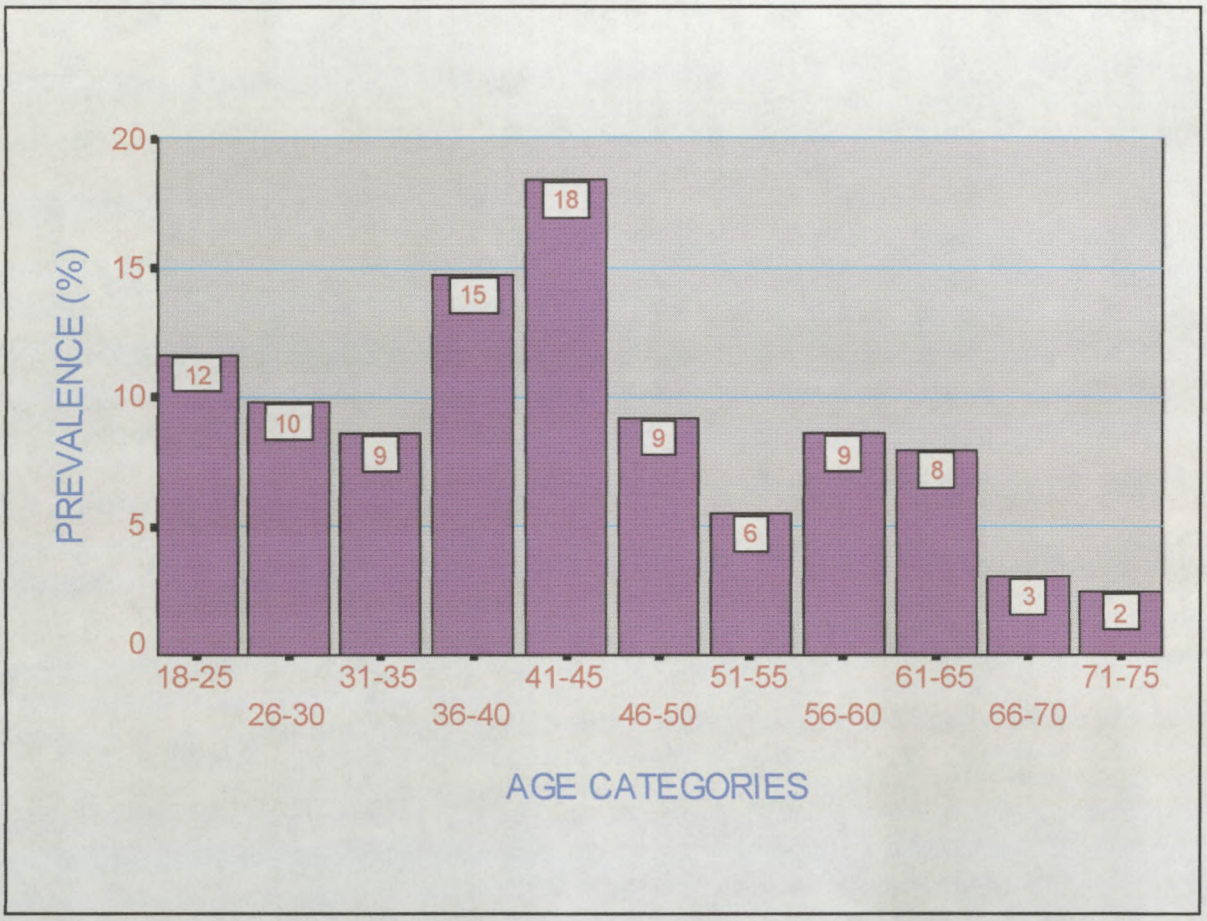

Figure 10. The prevalence of low back pain according to age in the Coloureds

Figure 10 depicts that the Coloured sample had a fair amount of subjects in most of the age categories that were suffering from low back pain at the time of the interview. In the 18-25 category there was a prevalence of 12% (n=20). Thereafter the prevalence decreased in the following two age groups but then sharply increased to peak at 18% (n=29) in the 41-45 age category. The prevalences beyond this age group decreased slightly erratically with increasing age. This distribution was very much different from that in the Indian sample in that the rise and fall of the prevalence of low back in different age categories was not as steep as in Indians.

4.3.4.A. The Prevalence of Low Back Pain According to Gender in the Indian Sample Population

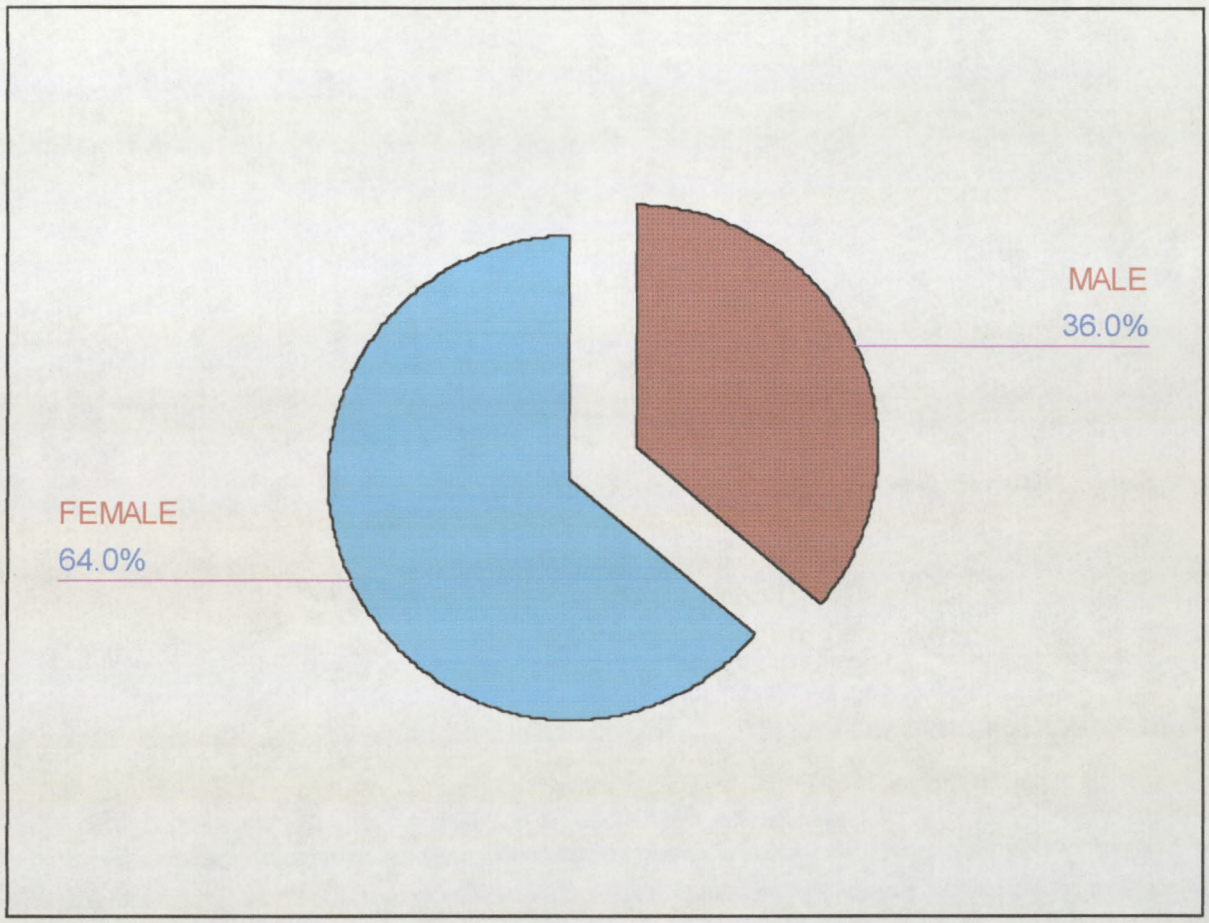

Figure 11. The prevalence of low back pain according to gender in the Indians

Figure 11 depicts that the vast majority of individuals suffering from low back pain in the Indian community at the time of the study were females (64%, n=144).

4.3.4.B. The Prevalence of Low Back Pain According to Gender in the Coloured Sample Population

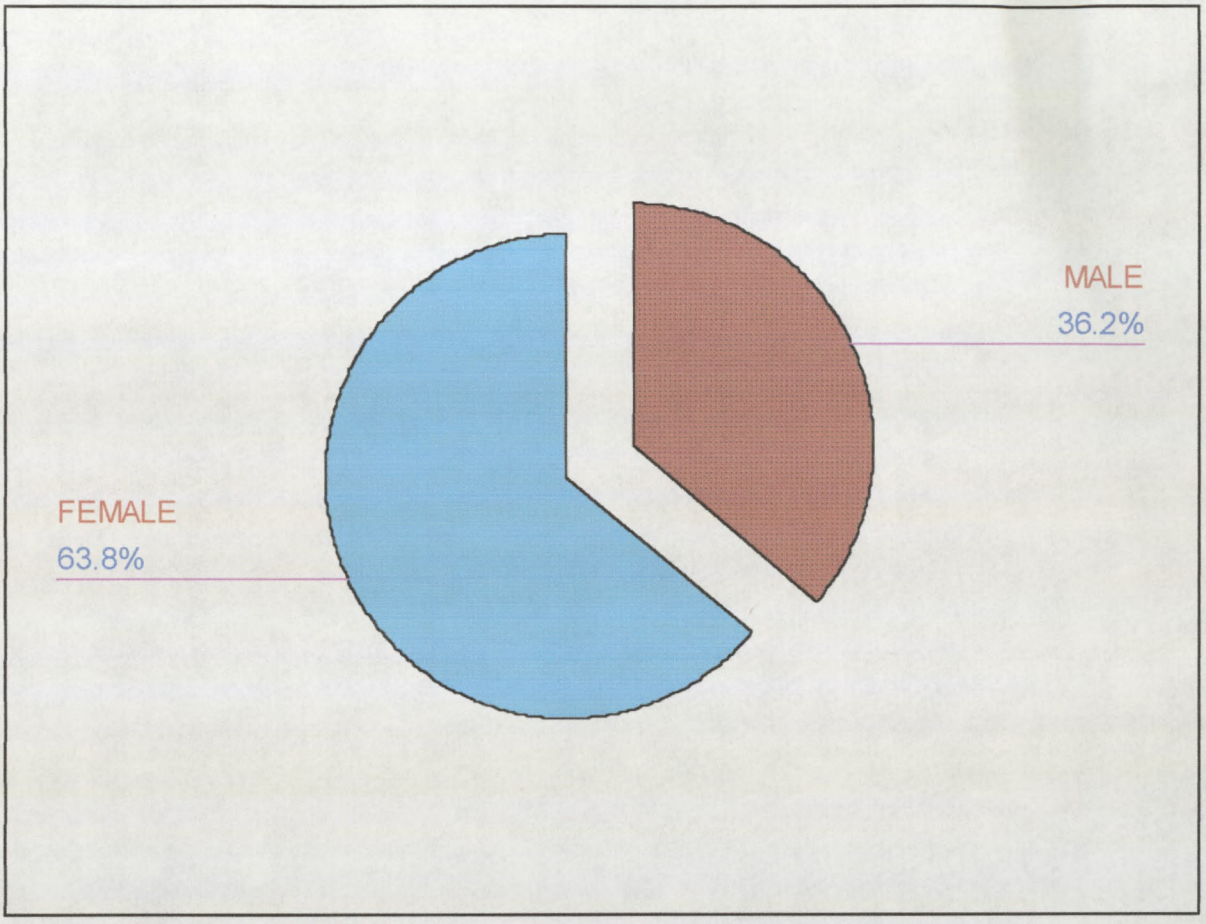

Figure 12. The prevalence of low back pain according to gender in the Coloureds

Figure 12 depicts that the vast majority of individuals suffering from low back pain in the Coloured community at the time of the study were also females (64%, n=104).

4.3.5.A. The Individual's Perception of the Severity of Low Back Pain in the Indian Sample Population

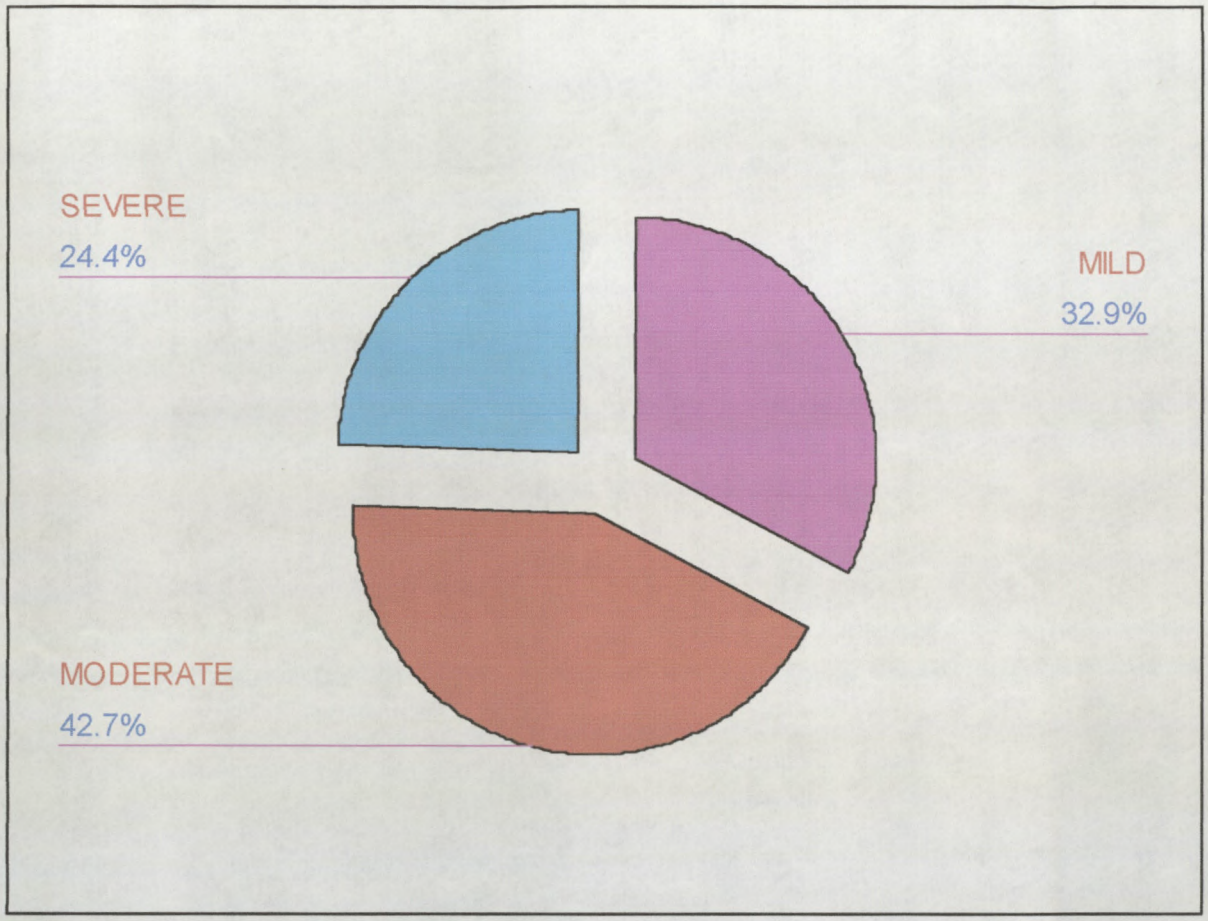

Figure 13. The severity of low back pain in the Indian sample population

Figure 13 depicts that 43% of people (n=97) described their pain as moderate, making up the majority. Thirty three percent (n=74) and 24% (n=54) described their pain as mild and severe respectively.

4.3.5.B. The Individual's Perception of the Severity of Low Back Pain in the Coloured Sample Population

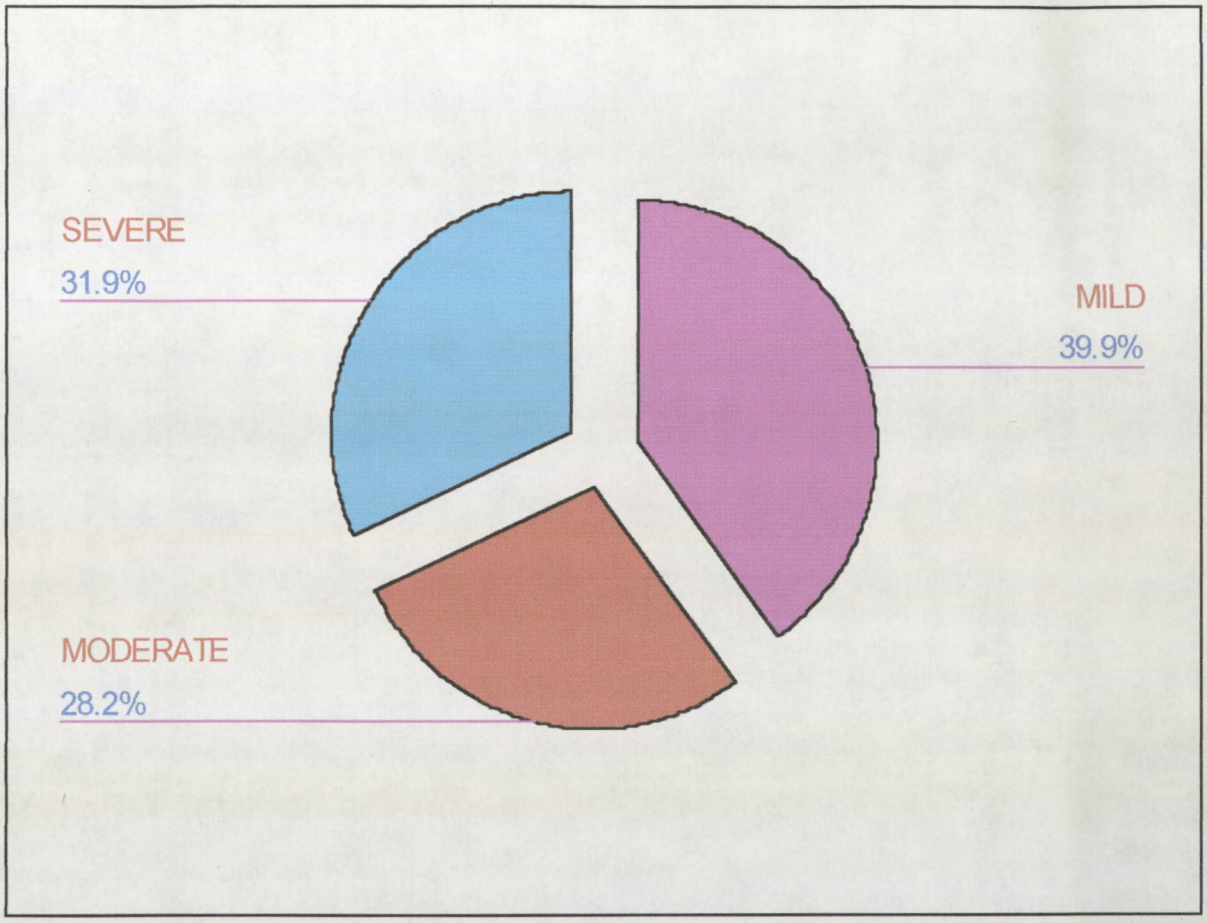

Figure 14. The severity of low back pain in the Coloured sample population

Figure 14 depicts that 28% of subjects (n=46) described their pain as moderate. Forty percent (n=65) and 32% (n=52) described their pain as mild and severe respectively. The majority in the Coloured sample occurred in the mild category while in Indians the majority occurred among the moderate category. However, the difference was relatively minor.

4.4. Factors Associated with the Severity of Low Back Pain

4.4.1.A. Age And Severity of Low Back Pain in The Indian Sample Population

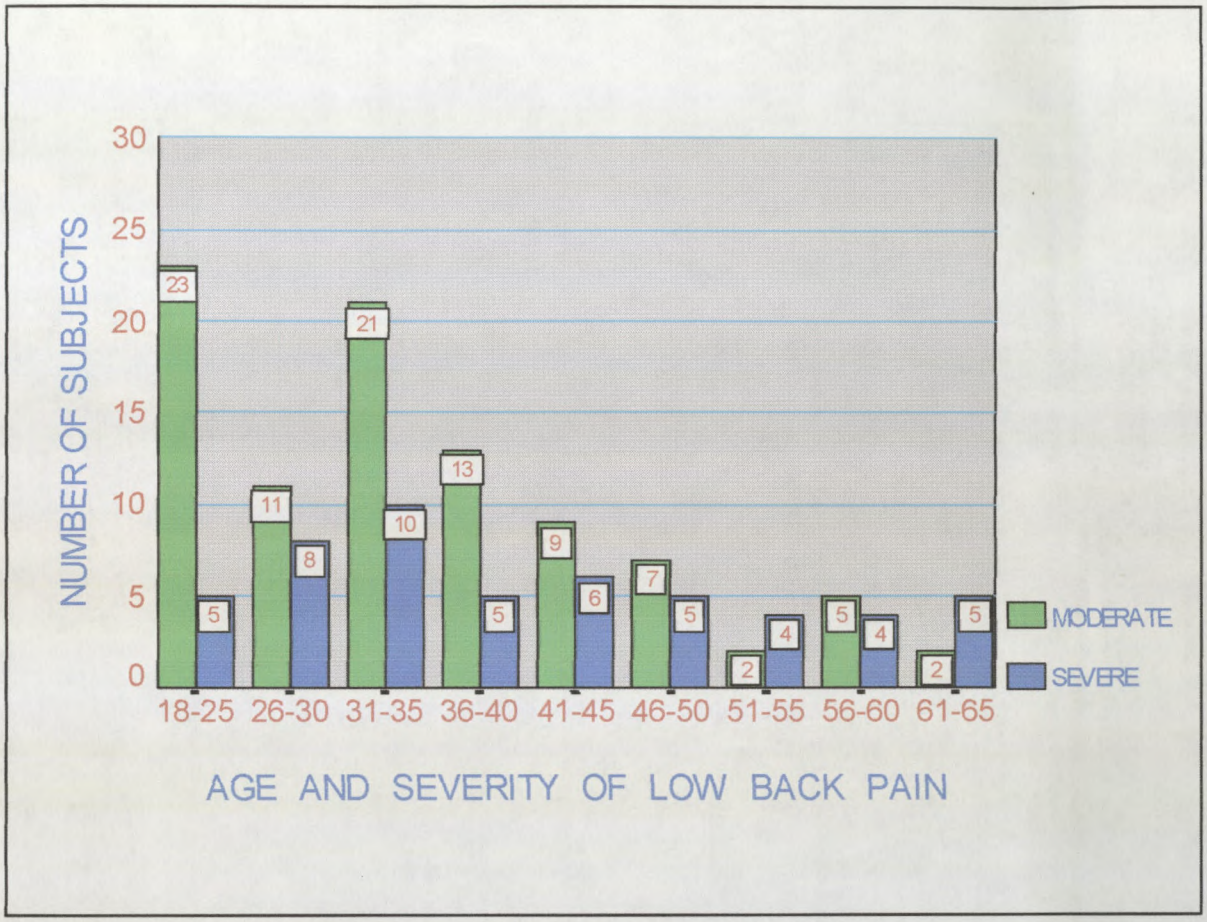

Figure 15. Age and severity of low back pain among the Indians

Figure 15 depicts that among the Indians, as age increased from 18-25 the number of individuals with moderate low back pain generally decreased (n=23, 21, 13, 9, 7, 5, 2 for the consecutive age categories up to 61-65). However, the number of individuals suffering from severe low back pain increased from 18-25 (n=5) as age increased and appears to level off and become predominant in the age categories after 41-45 and onwards. However, This finding was not significant.

4.4.1.B. Age and Severity of Low Back Pain in the Coloured Sample Population

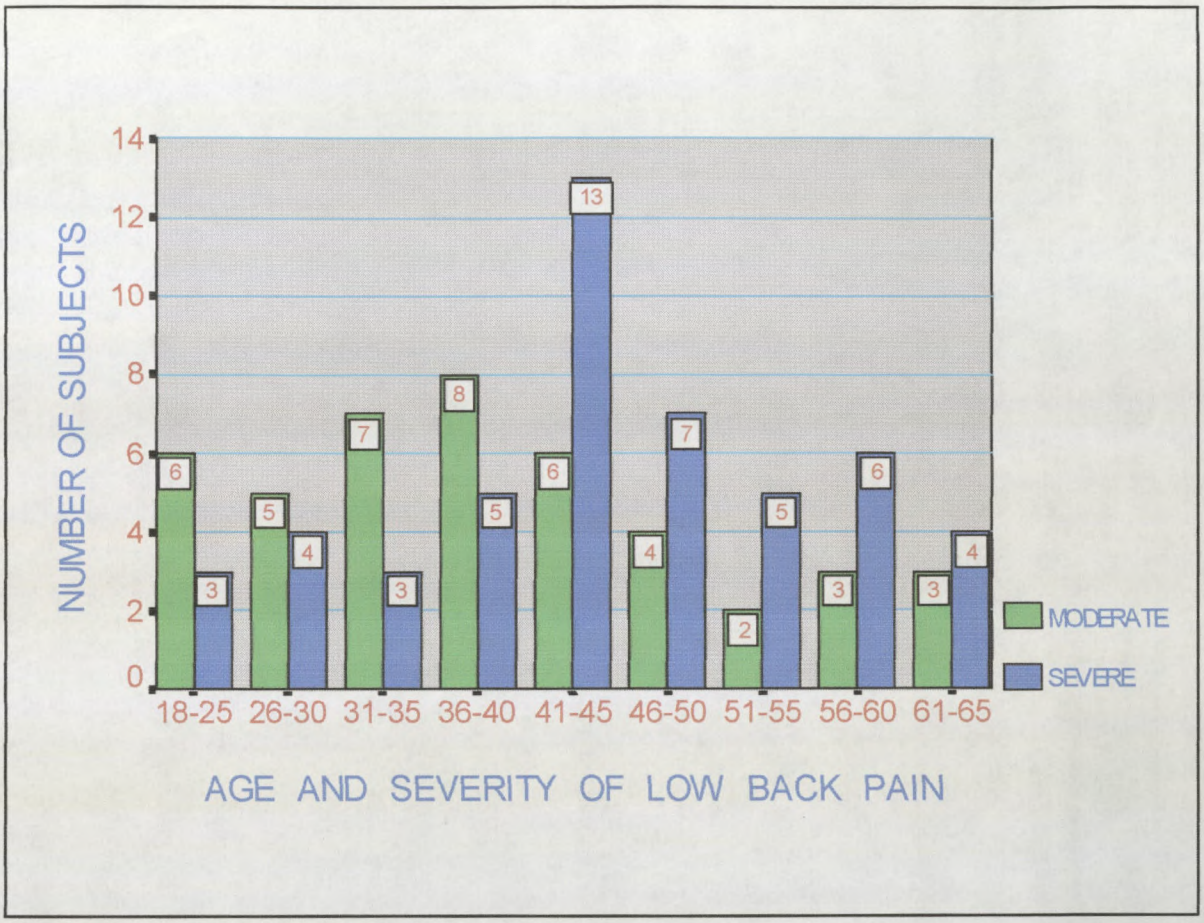

Figure 16. Age and severity of low back pain among the Coloureds

Figure 16 depicts that among the Coloureds the severity of low back pain increased slowly from the 18-25 age category (n=3) onwards and peaked sharply in the 41-45 age group (n=13). Thereafter the level dropped quickly but was more prominent and at a more constant level than moderate low back pain in the age categories after 41-45 (n=7, 5, 6, 4, for the consecutive age categories). This finding was significant.

4.4.2.A. Gender and Severity of Low Back Pain in the Indian Sample Population

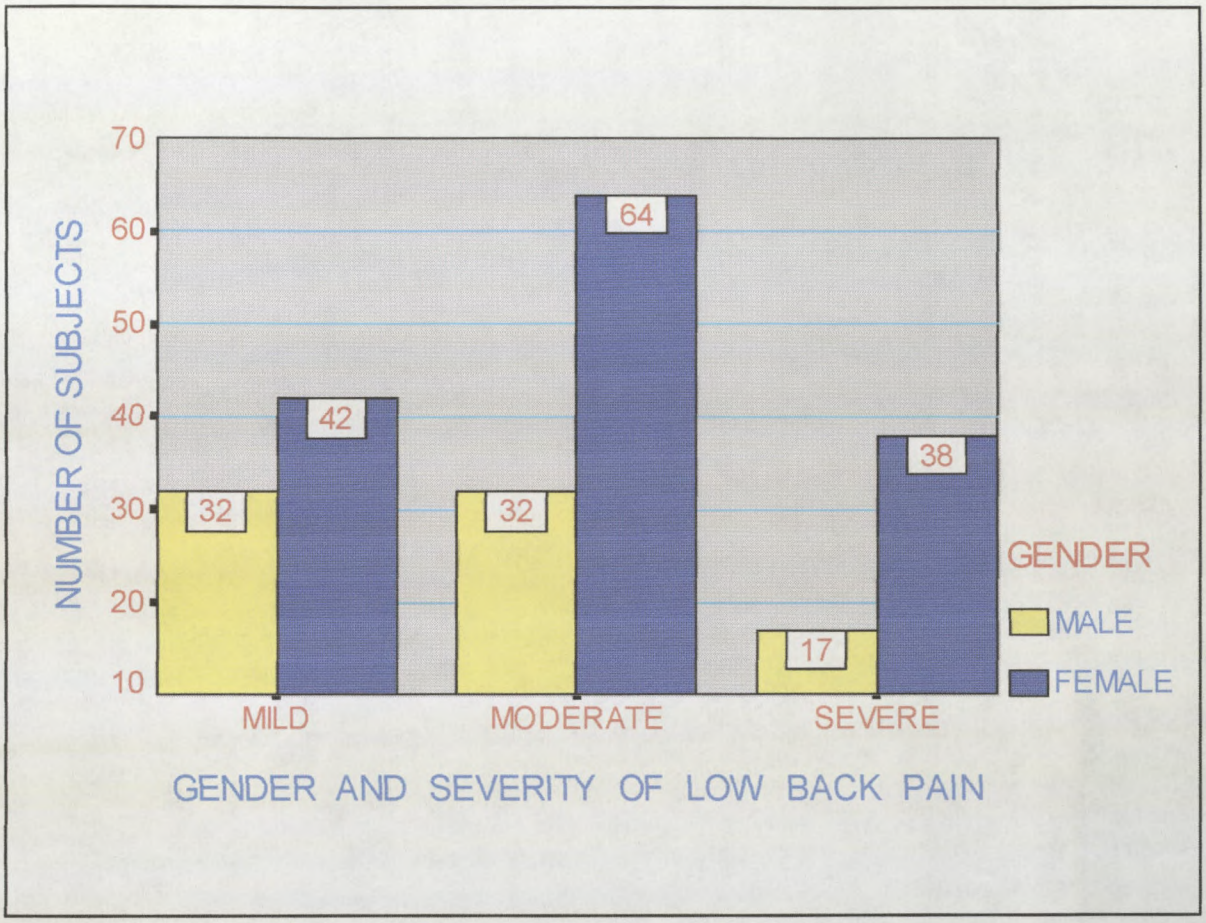

Figure 17. Gender and severity of low back pain among the Indians

Figure 17 depicts that in all categories of severity, females were the majority. However, in the severe group there were 38 females while there were half as many males (n=17). In addition, in the moderate category, there were 64 females and only 32 males. It can be concluded that the female gender is more prone to getting low back pain of a more severe nature.

4.4.2.B. Gender and Severity of Low Back Pain in the Coloured Sample Population

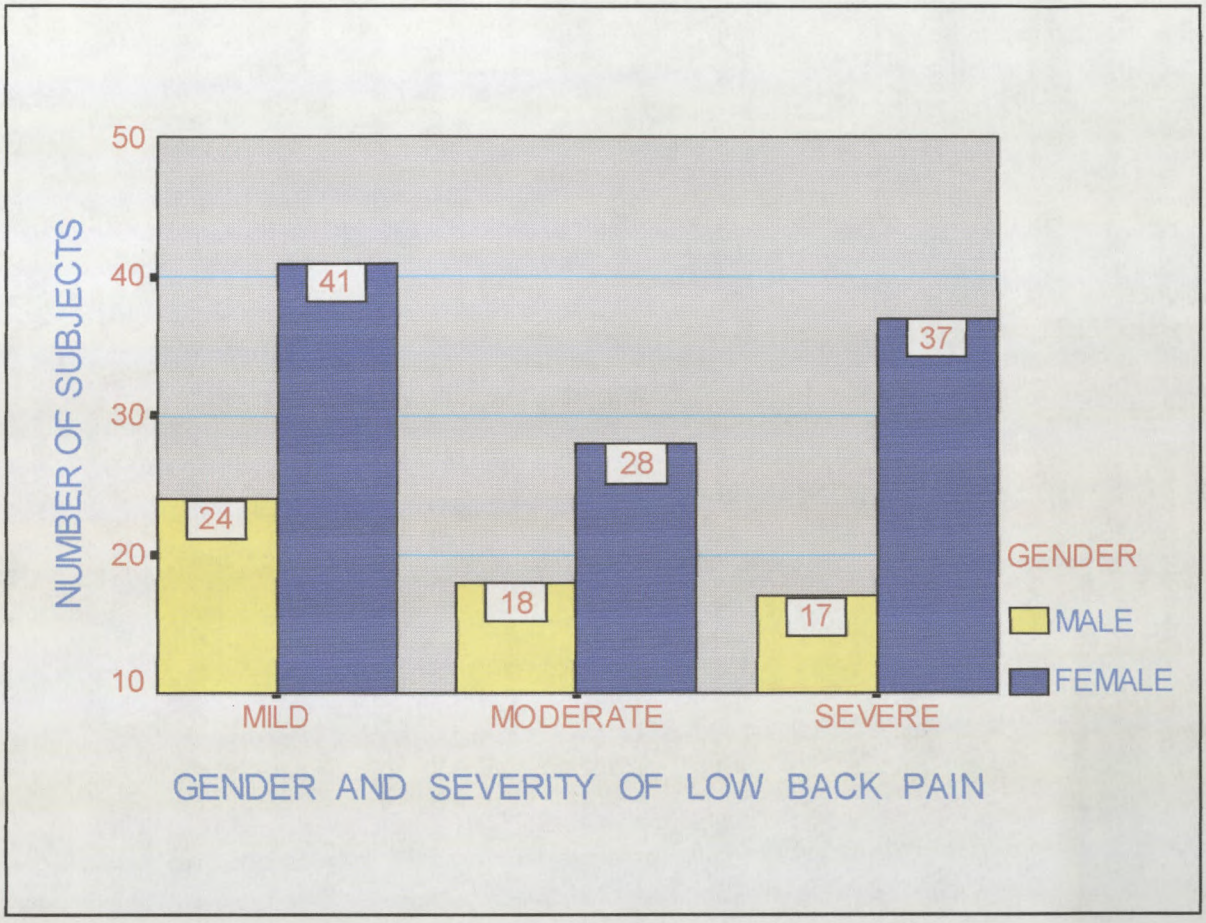

Figure 18. Gender and severity of low back pain among the Coloureds

Figure 18 depicts that among the Coloureds also, in all categories of severity, females were the majority. In the severe group there were 37 females (23%) while there were fewer than half as many males (n=17, 10%). It can be concluded that the female gender is more prone to getting severe low back pain among Coloureds also. However, this finding was not significant.

4.4.3.A. Number of Children and Severity of Low Back Pain in the Indian Sample Population

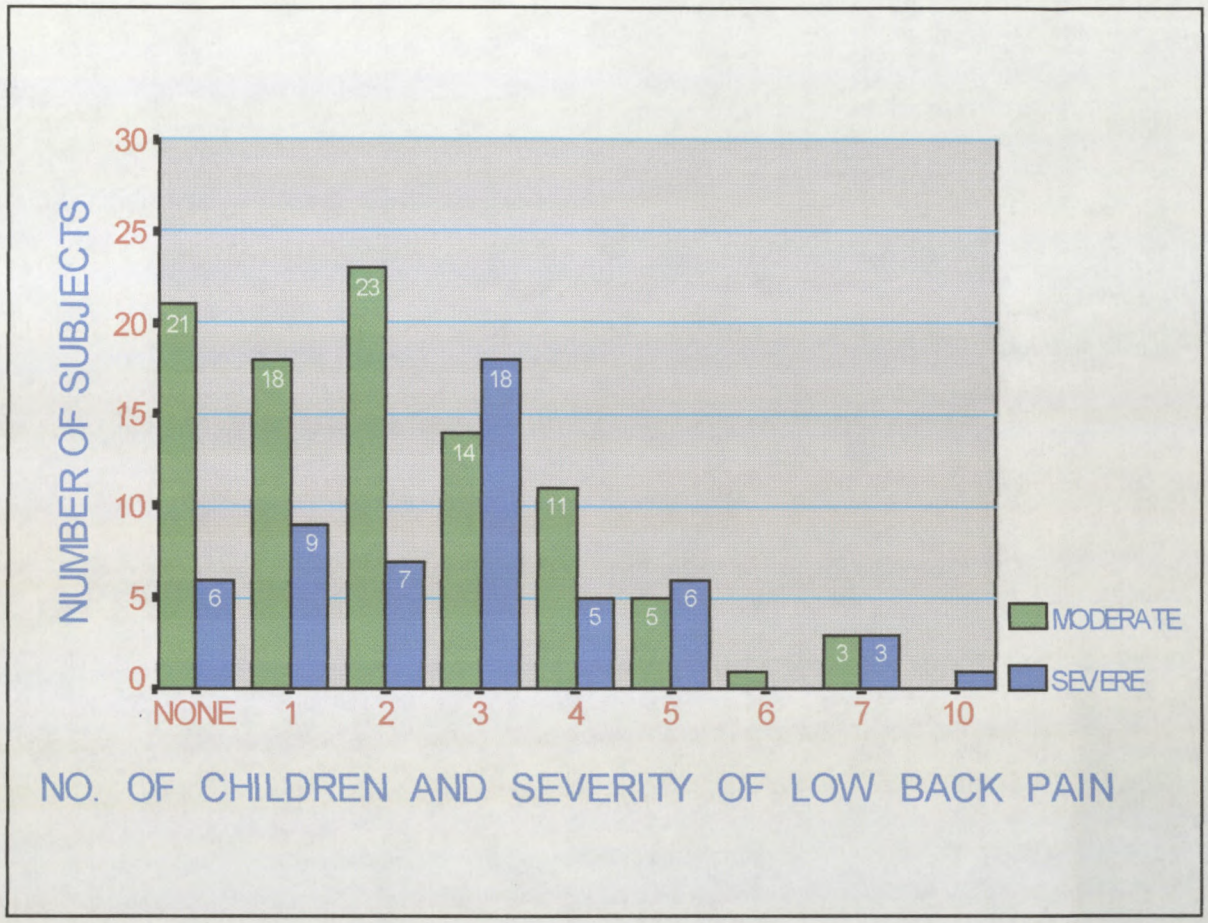

Figure 19. Number of children and severity of low back pain among the Indians

Figure 19 depicts that the number of people with severe low back pain was highest among those with 3 children (n=18) while moderate low back pain peaked in those with 2 children (n=23). It is thus evident from the graph that as the number of children increased, the frequency of people suffering from moderate pain decreased, thus making severe low back pain more common in people with more children, especially more than 3.

4.4.3.B. Number of Children and Severity of Low Back Pain in the Coloured Sample Population

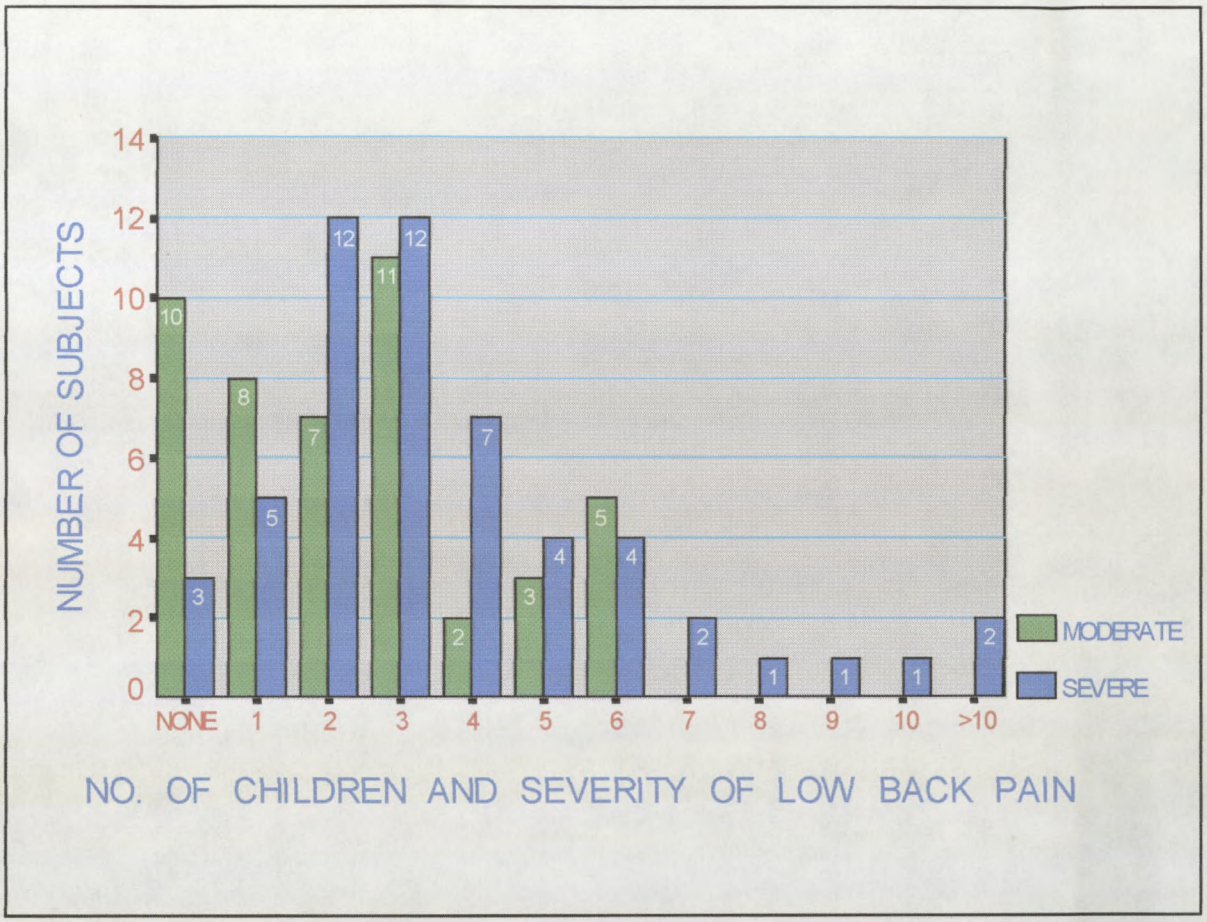

Figure 20. Number of children and severity of low back pain among the Coloureds.

Figure 20 depicts the same pattern that was noticed among the Indians. As the number of children increased, the frequency of people suffering from moderate pain decreased, thus making severe low back pain more common in people with more children, especially more than 3. Severe low back pain was reported the most in those with 2 and 3 children (n=12 for both) while moderate low back pain was reported the most in subjects with 3 children (n=11).

4.4.4.A. Number of Pregnancies and Severity of Low Back Pain in the Indian Sample Population

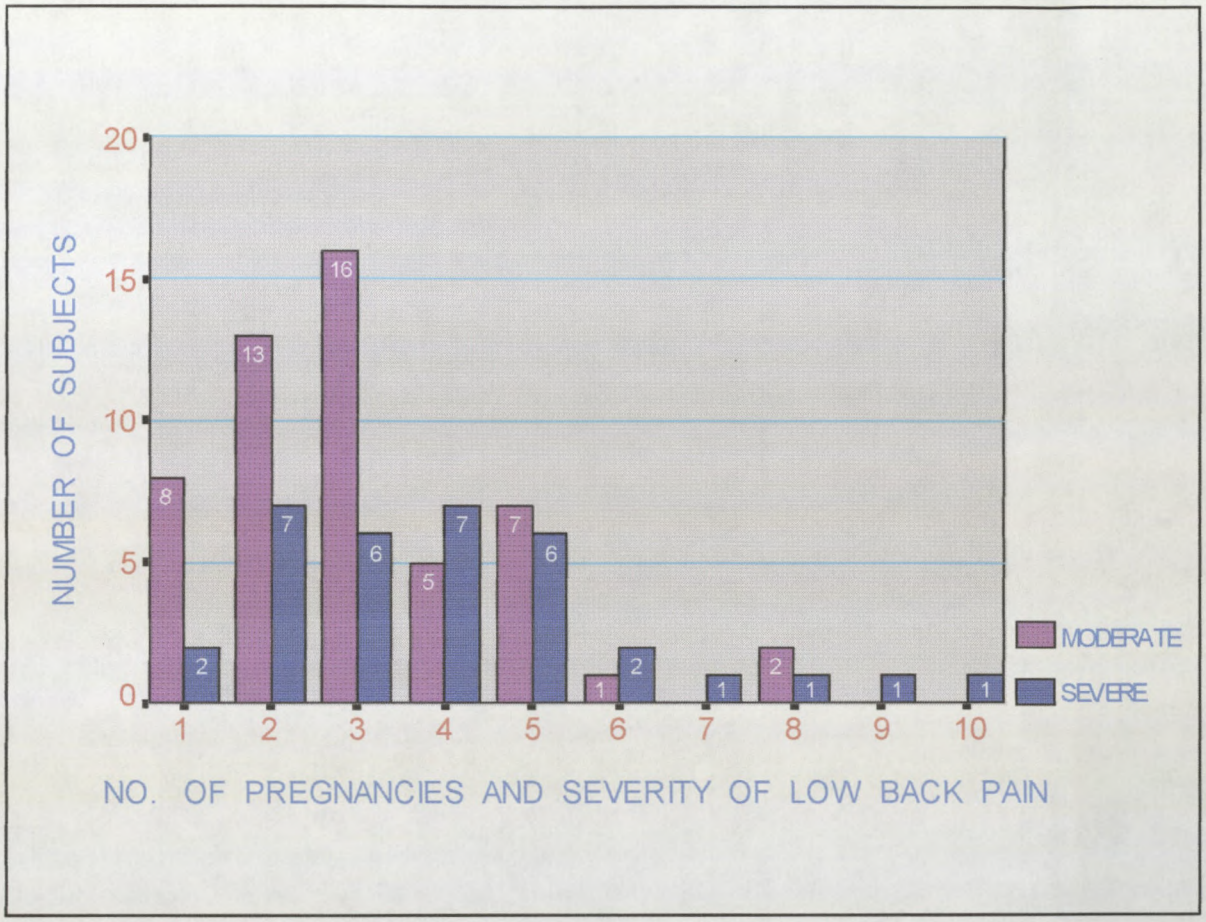

Figure 21. Number of pregnancies and severity of low back pain among the Indians

Figure 21 depicts that as the number of pregnancies increased, the frequency of people suffering from moderate pain decreased, thus making severe low back pain more common in people with more pregnancies, especially more than 4. The number of subjects with severe low back pain peaked in the region between 2 to 4 pregnancies (n=6 for 3 and n=7 for 2 and 4). Moderate low back pain peaked in those with 3 children (n=16) and decreased thereafter.

4.4.4.B. Number of Pregnancies and Severity of Low Back Pain in the Coloured Sample Population

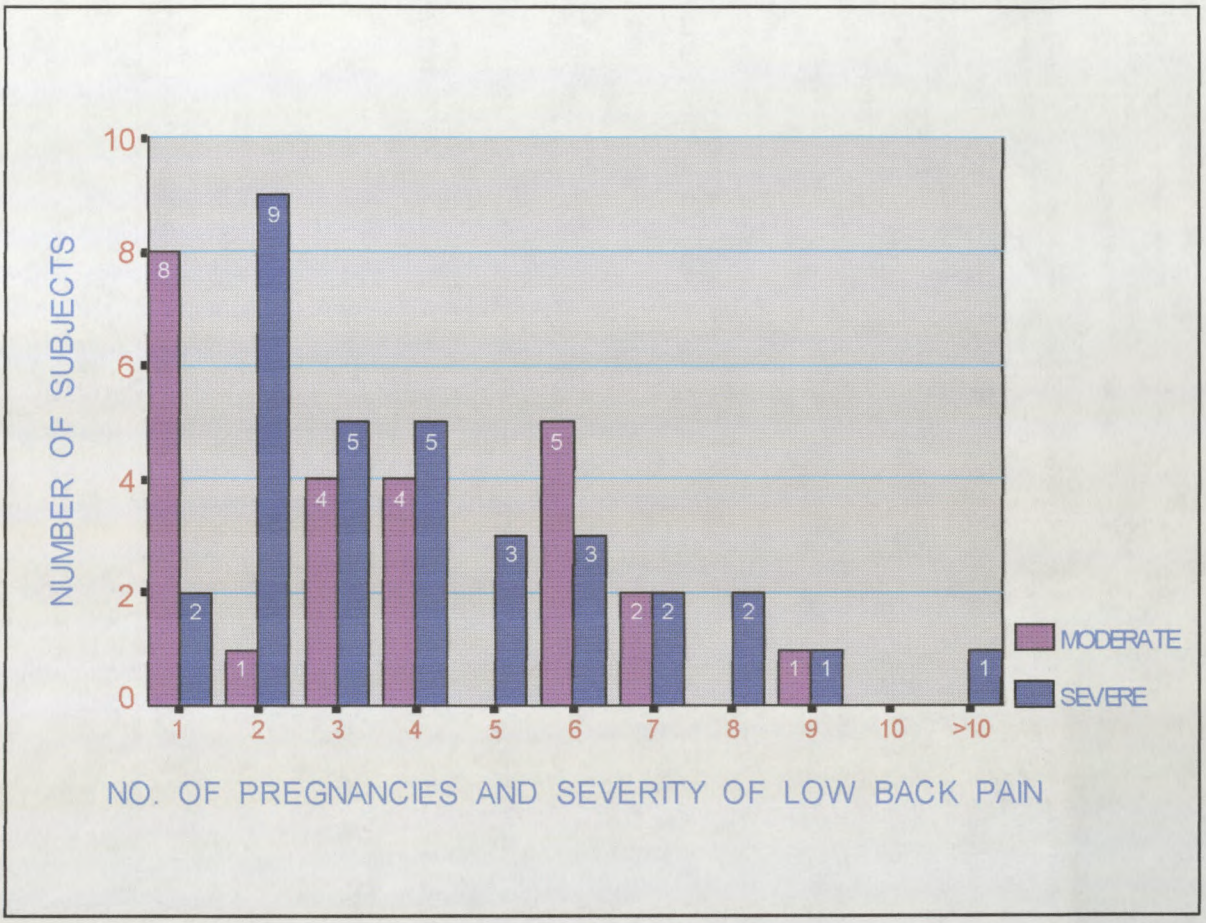

Figure 22. Number of pregnancies and severity of low back pain among the Coloureds

Figure 22 also depicts that as the number of pregnancies increased, the frequency of people suffering from moderate pain decreased, thus making severe low back pain more common in people with more pregnancies, especially more than 4. Severe low back pain peaked in those with 2 pregnancies (n=9) while moderate low back pain peaked in those with 1 pregnancy (n=8).

4.4.5.A. Job Vulnerability And Severity of Low Back Pain in The Indian Sample Population

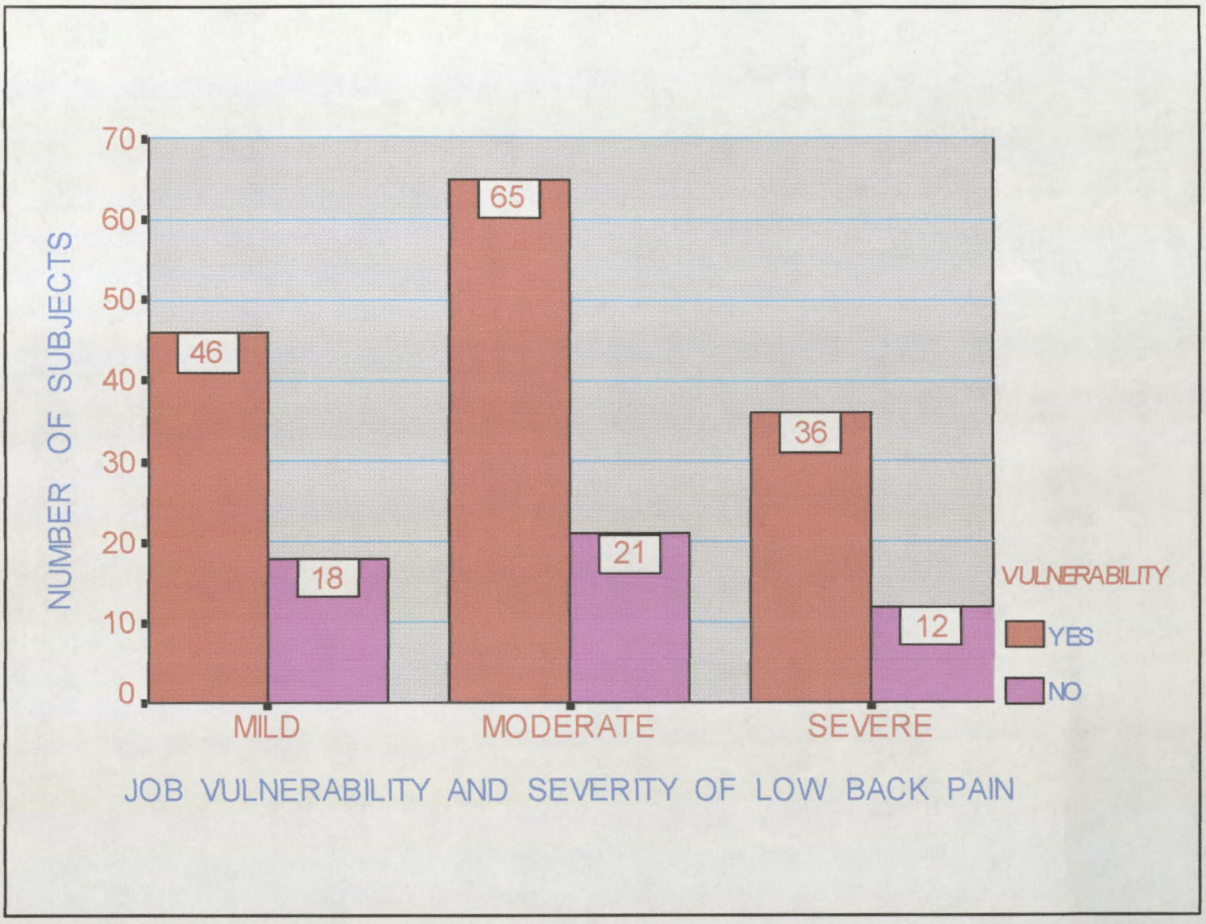

Figure 23. Job vulnerability for acquiring low back pain and its severity among the Indians

Figure 23 depicts that, overall more people felt that they were vulnerable to getting low back pain due to their jobs (i.e. all three categories had a majority 'yes' response). Forty six people (23%) felt that they had mild low back pain, 65 people (32.5%) moderate pain and 18 people (9%) had severe pain.

4.4.5.B. Job Vulnerability and Severity of Low Back Pain in the Coloured Sample Population

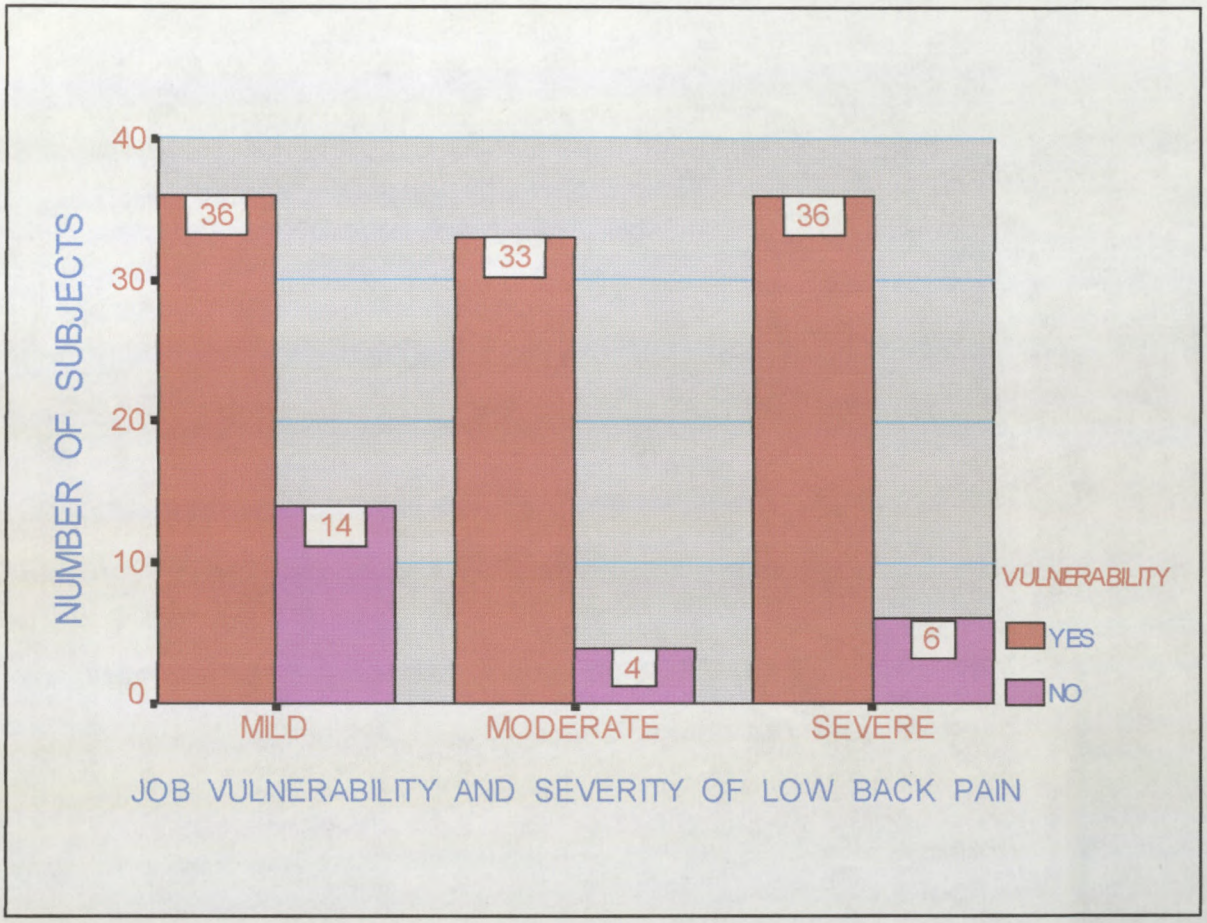

Figure 24. Job vulnerability for acquiring low back pain and its severity among Coloureds

Figure 24 also depicts that, overall more people felt that they were vulnerable to getting low back pain due to their jobs (i.e. all three categories had a majority yes response). Proportionately the percentages were generally higher in the Coloureds for each category. Thirty six people (28%) felt that they suffered from mild pain and an equal number felt that their pain was severe. Thirty three people felt (26%) that their pain was moderate in severity.

4.4.6.A. The Total Amount of Time Spent on Exercise Per Week and Low Back Pain Severity in the Indian Sample Population

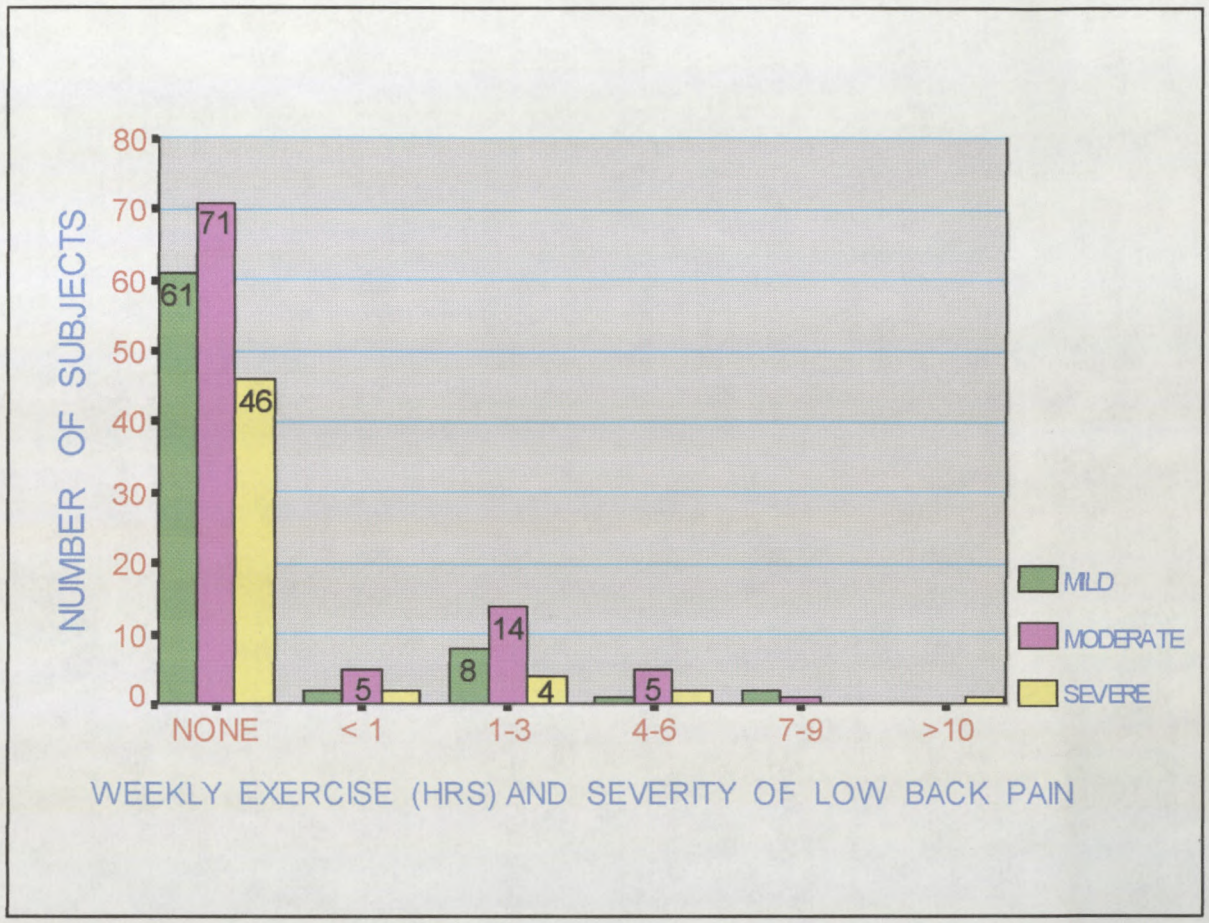

Figure 25. Exercise and severity of low back pain among the Indians

Figure 25 depicts that the majority of subjects in the Indian prevalence group did not do exercise 79% (n=178). Of this group 71 subjects (32%) said that their pain was moderate in nature, followed by 61 (27%) whose pain was mild and the 46 (20%) people who felt that they had severe pain. There were 3 individuals (1%) who did more than 10 hours of exercise per week and felt that they had severe low back pain.

4.4.6.B. The Total Amount of Time Spent on Exercise Per Week and Low Back Pain Severity in the Coloured Sample Population

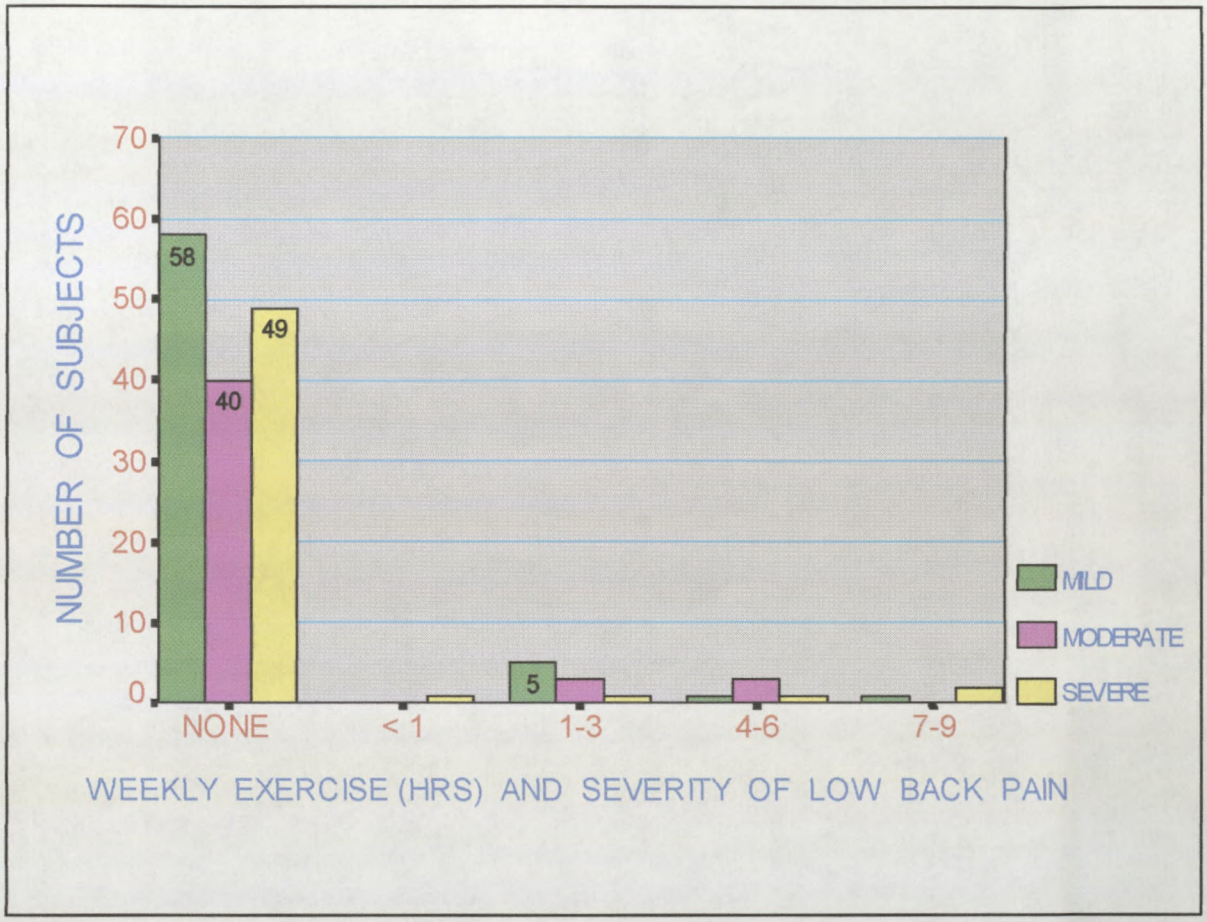

Figure 26. Exercise and severity of low back pain among the Coloureds

Figure 26 depicts that from among the Coloured prevalence sample 147 (90%) subjects did no exercise. Of this group 58 (36%) people said that their pain was mild, followed by 49 (30%) who said that their pain was severe. The remainder of this non-exercise group (n=40, 25%) felt that their pain was moderate. There were 14 people (9%) who said that they exercised for between 7-9 hours per week and that their pain was severe.

4.4.7.A. Accessibility of Health Services and Low Back Pain Severity in the Indian Sample Population

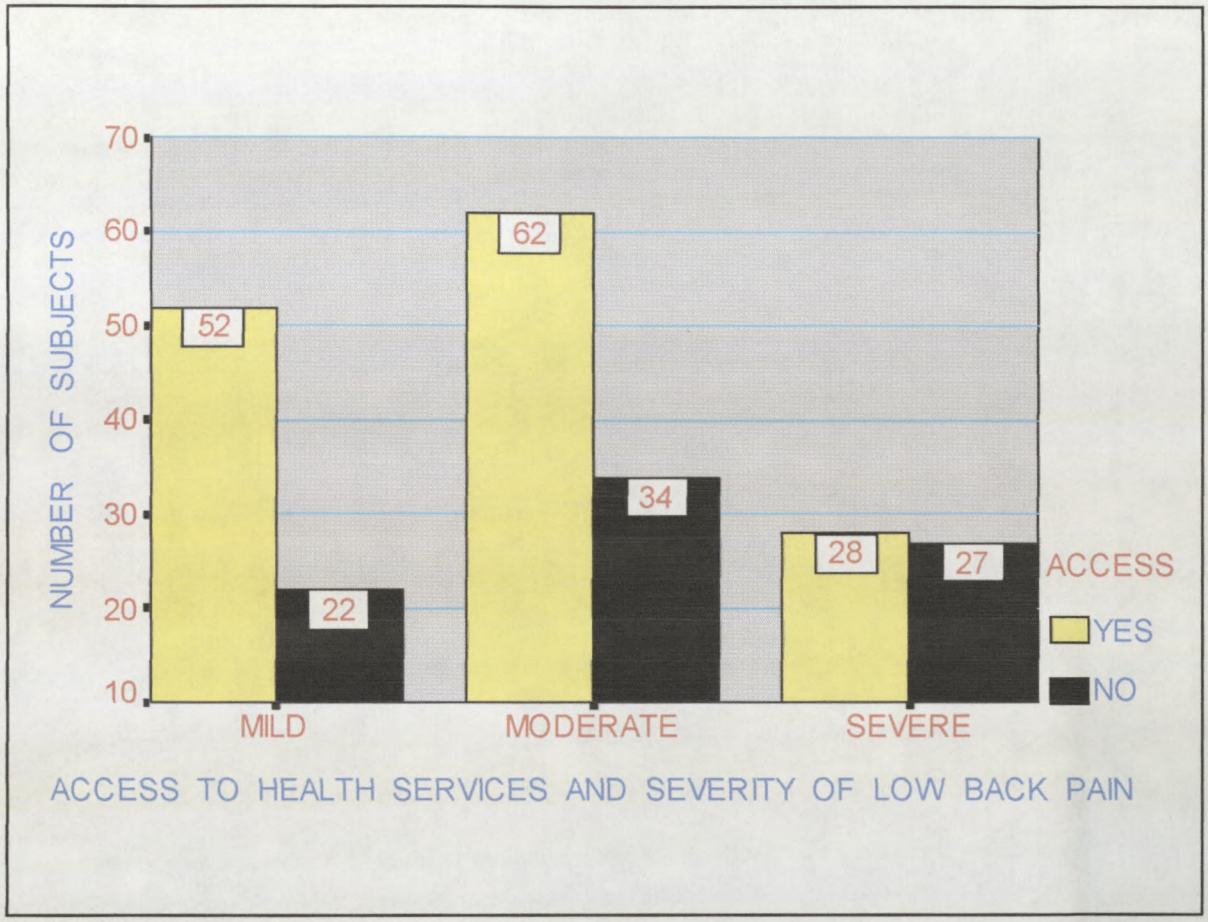

Figure 27. Access to health services and severity of low back pain among Indians

Figure 27 depicts that in the Indian prevalence sample 142 people (63%) said that they had sufficient access to health services while 83 (37%) said that they did not. It can be seen that most people who had access to health services suffered from moderate low back pain. Of those who did not have sufficient access, the majority suffered from moderate pain. The severe category had more people that had access to health services than those that did not.

4.4.7.B. Accessibility of Health Services and Low Back Pain Severity in the Coloured Sample Population

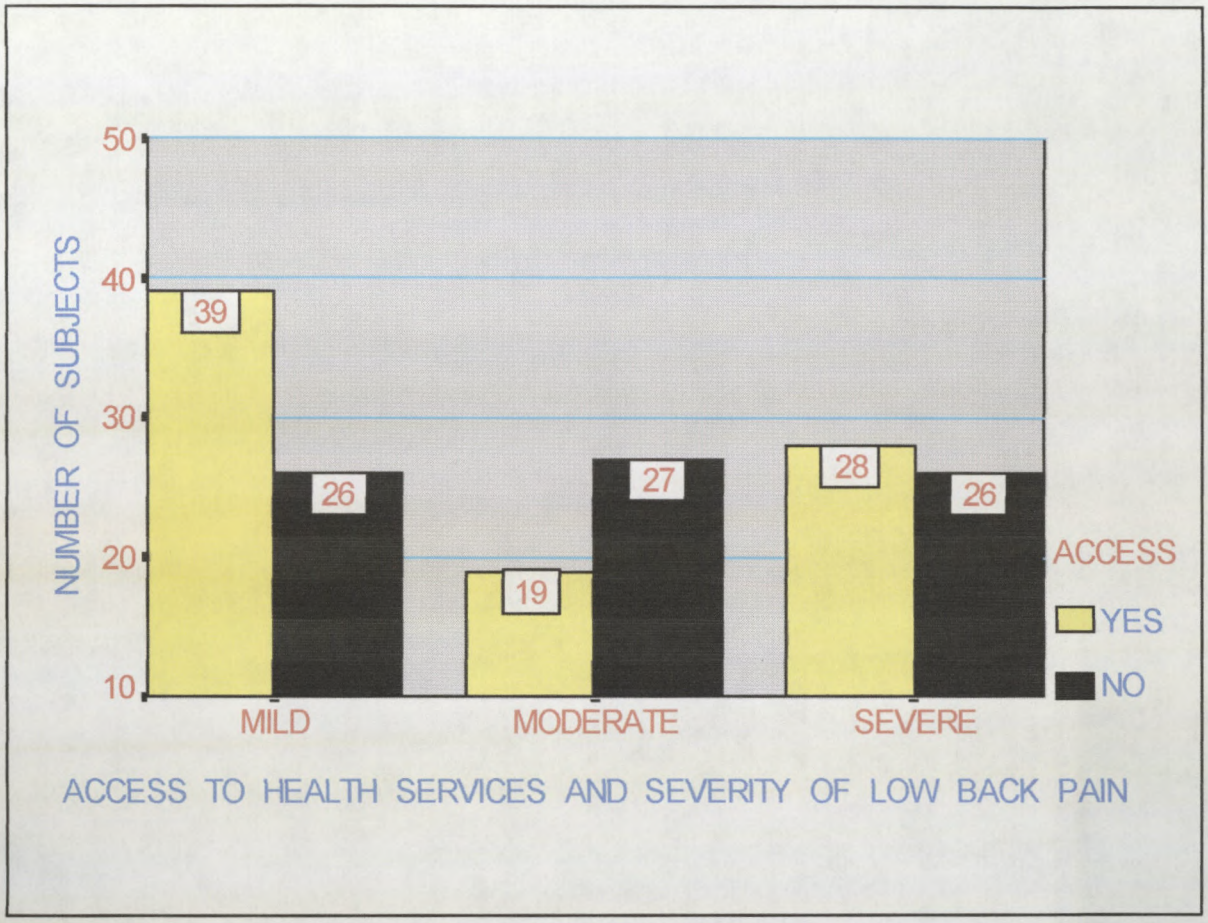

Figure 28. Access to health services and severity of low back pain among the Coloureds

Figure 28 depicts that from among the Coloureds it was found that 86 people (53%) of the prevalence sample had sufficient access to health services while 77 people (47%) did not. The spread of mild, moderate and severe low back pain among Coloureds who did not have sufficient access to health services was generally the same.

4.4.8.A. Lifting Heavy Objects At Work and Severity of Low Back Pain in the Indian Sample Population

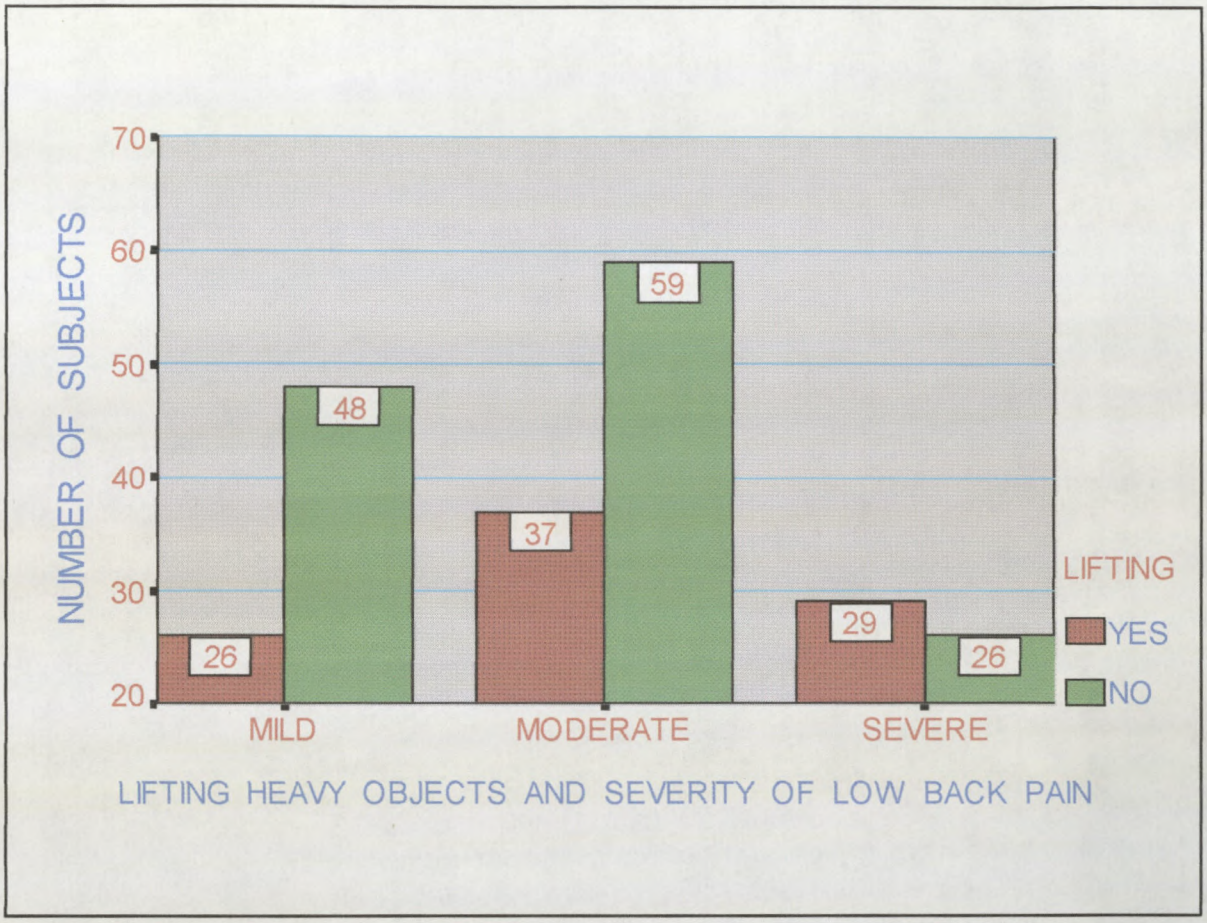

Figure 29. Lifting heavy loads and severity of low back pain among the Indians

Figure 29 depicts that in the mild and moderate categories of low back pain severity, the majority of people did no lifting at work (n=48, 21% and n=59, 26%. respectively). However, in the severe category, the majority (n=29, 13%) was made up of people who lifted heavy objects while at work. This finding was significant.

4.4.8.B. Lifting Heavy Objects At Work and Severity of Low Back Pain in the Coloured Sample Population

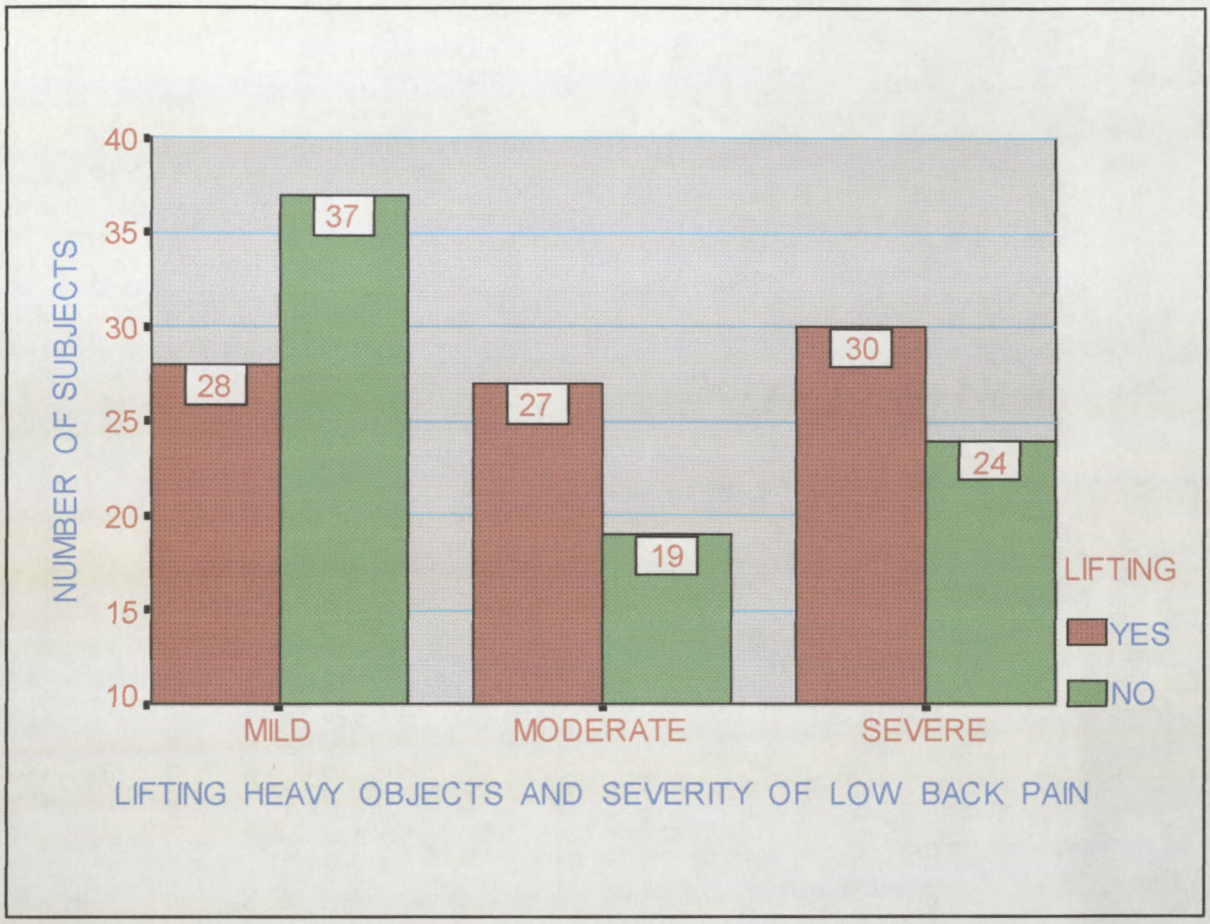

Figure 30. Lifting heavy loads and severity of low back pain among the Coloureds

Figure 30 depicts that among the Coloured prevalence sample there was not much difference in the number of people that lifted heavy objects and had moderate or severe low back pain (the majority in these two categories). However, in the mild category, it is evident that most people that did no lifting had mild pain (n=37, 16%).

4.4.9.A. Driving for Long Periods and Severity of Low Back Pain in the Indian Sample Population

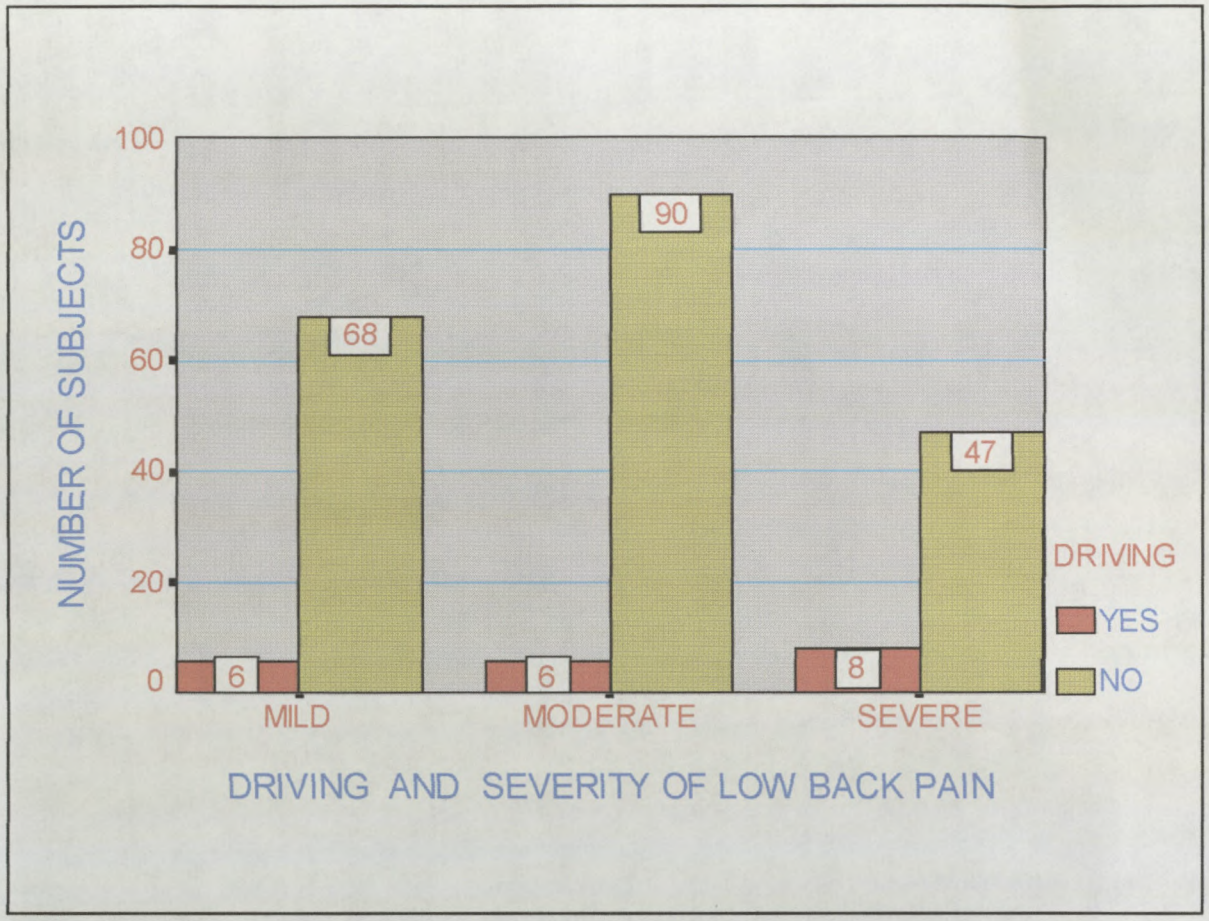

Figure 31. Driving for long periods and severity of low back pain among Indians

Figure 31 depicts that the number of people that drove for long periods and had severe low back pain was higher (n=8 4%) than those in the mild and moderate groups (n=6, 2.6% in both groups). The number of people that drove for long periods but did not have severe low back pain was lower in the severe category compared to the other two categories. This was opposite to the group that did driving for long periods. This finding was significant. However, it must be stated that the majority of all cases in all categories was made up of people that did no driving.

4.4.9.B. Driving for Long Periods and Severity of Low Back Pain in the Coloured Sample Population

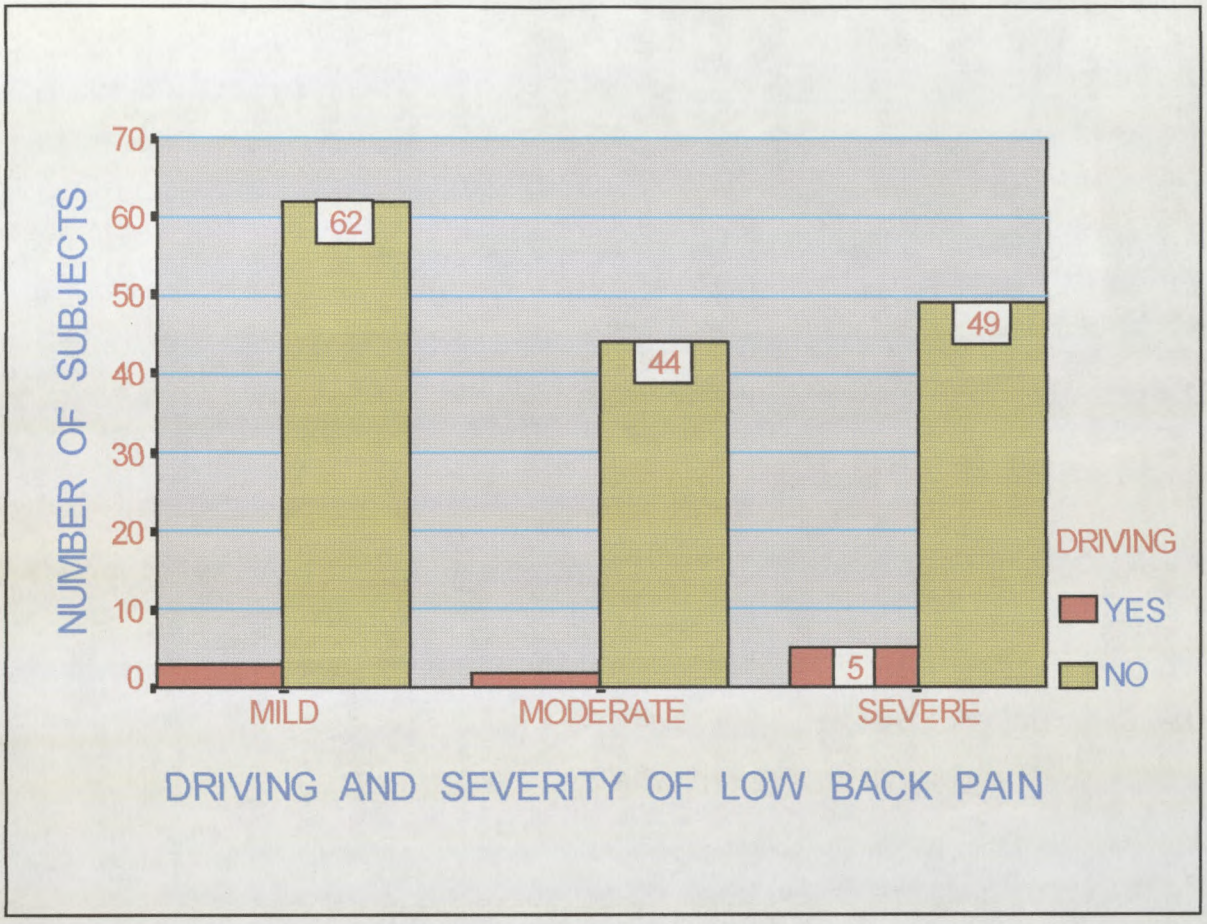

Figure 32. Driving for long periods and severity of low back pain among the Coloureds

Figure 32 depicts that the number of people that drove for long periods and had severe low back pain was higher (n=5, 3%), than those in the mild and moderate groups (n=2, 1% and n=1, 0.6% respectively). This finding was also significant for Coloureds. However, it must again be stated that the majority of all cases in all categories was made up of people that did no driving.

4.10.A. Level of Education and Severity of Low Back Pain in the Indian Sample Population

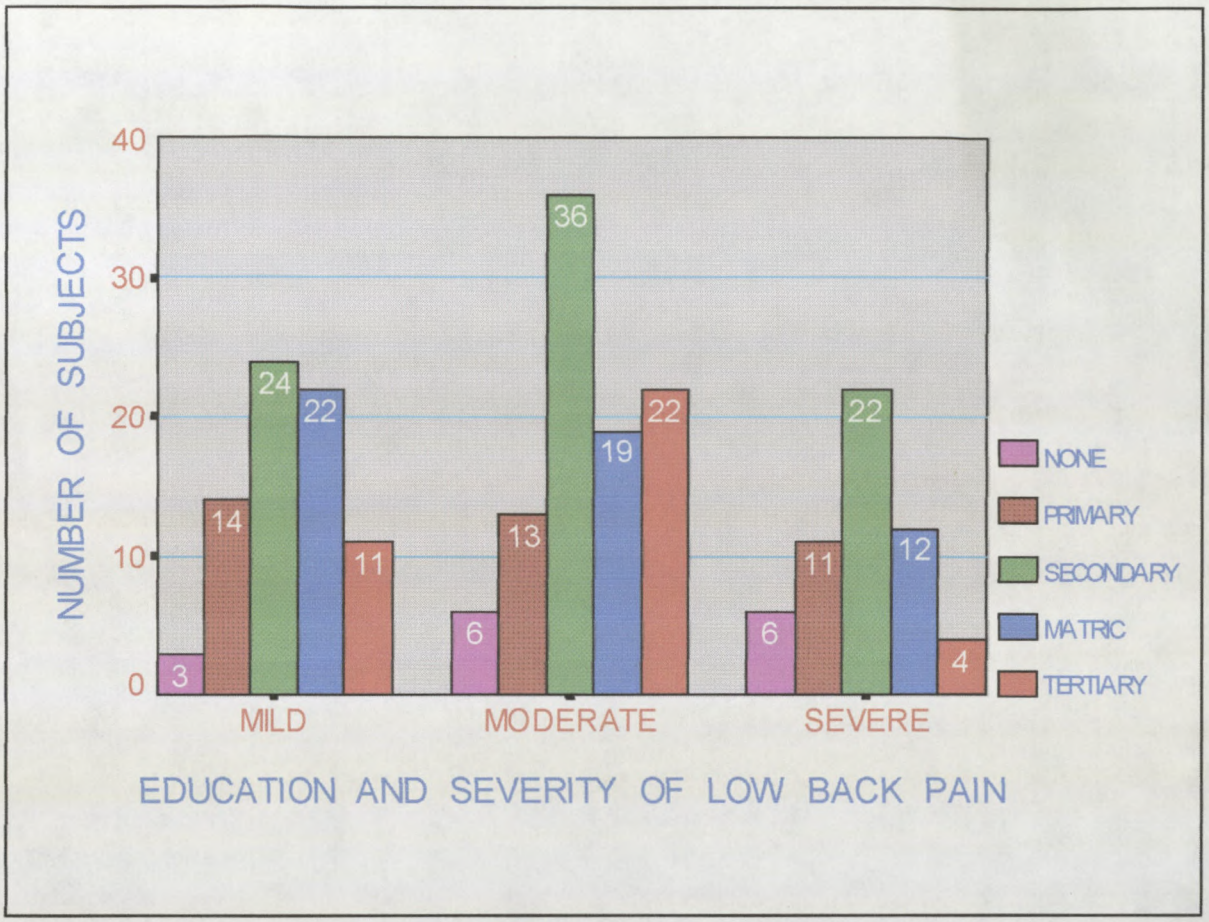

Figure 33. Level of education and severity of low back pain among the Indians

Figure 33 depicts that in the severe group there were fewer people educated at a tertiary institution (n=4) and matriculants (n=12) while people that had primary (n=11), secondary (n=22) or no education (n=6) were as common in this group as in the mild and moderate groups (n=14 and 13 n=24 and 36, n=3 and 6 respectively). This means that people who had a tertiary education or had at least matriculated appeared to be less likely to get severe low back pain.

4.4.10.B. Level of Education and Severity of Low Back Pain in the Coloured Sample Population

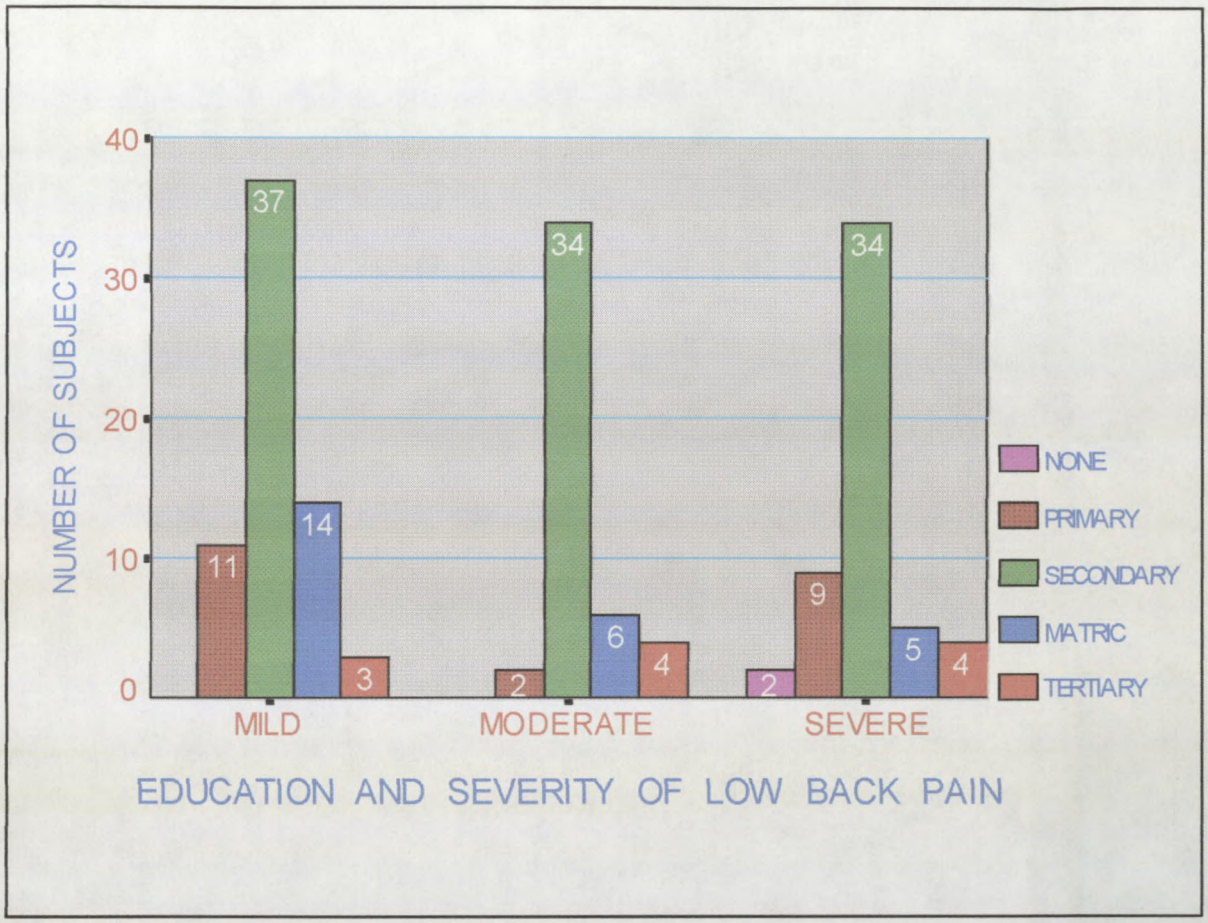

Figure 34. Level of education and severity of low back pain among the Coloureds

Figure 34 depicts that in the severe group there were fewer people with matric (n=5) or tertiary education (n=4) while people that had primary (n=9), secondary (n=34) or no education (n=2) were as common in this group as in the mild and moderate groups (n=11 and 2, n=37 and 34 respectively). People with incomplete secondary education were common in all categories and made up the majority in all categories as well. These findings were significant in both Indians and Coloureds.

4.5. Disability Due to Low Back Pain

4.5.1.A. Daily Activities Affected Due to Low Back Pain in the Indian Sample Population

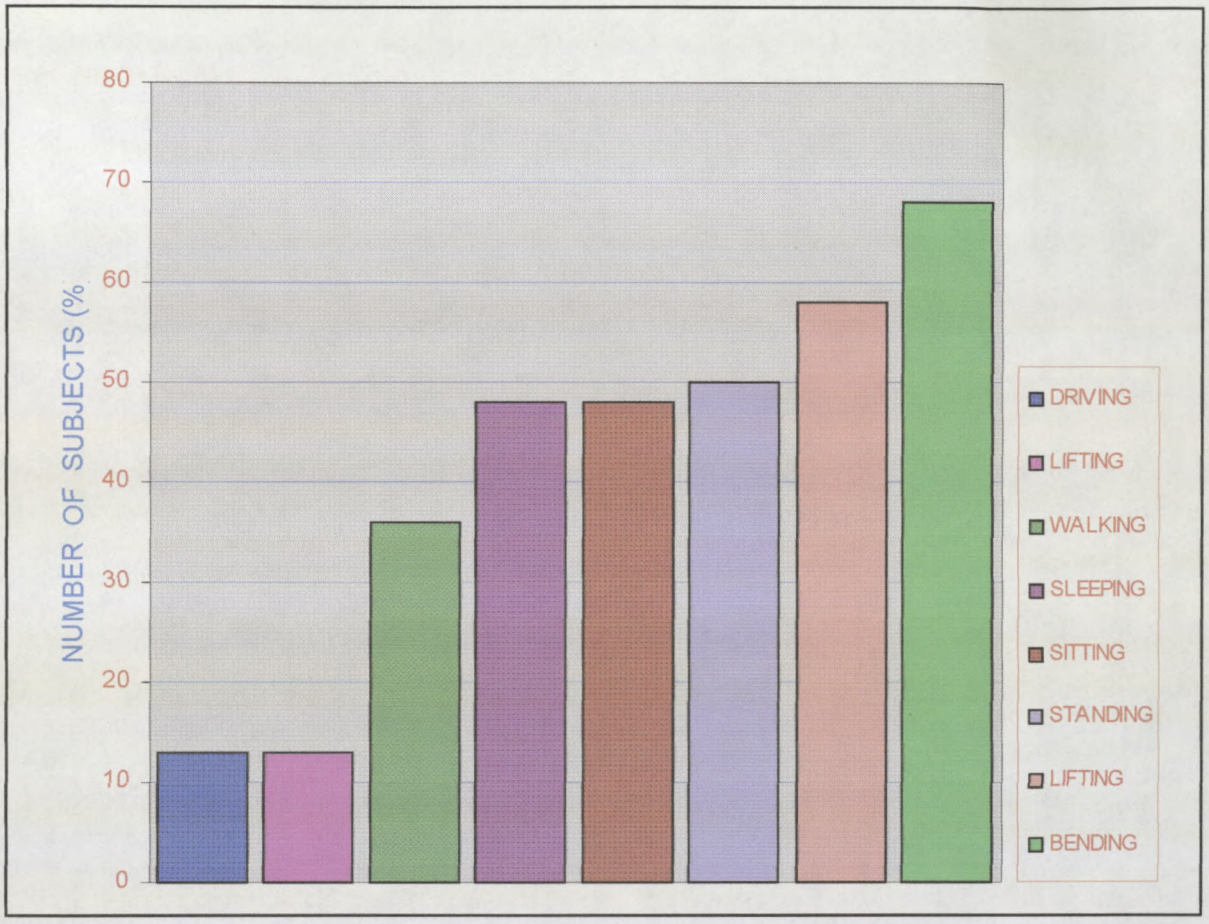

Figure 35. Daily activities affected due to low back pain among Indians

Figure 35 depicts that more than 60% (n=135) of the prevalence group had difficulty bending. This was followed closely by lifting, standing, sitting and then sleeping in descending order.

4.5.1.B. Daily Activities Affected Due to Low Back Pain in the Coloured Population

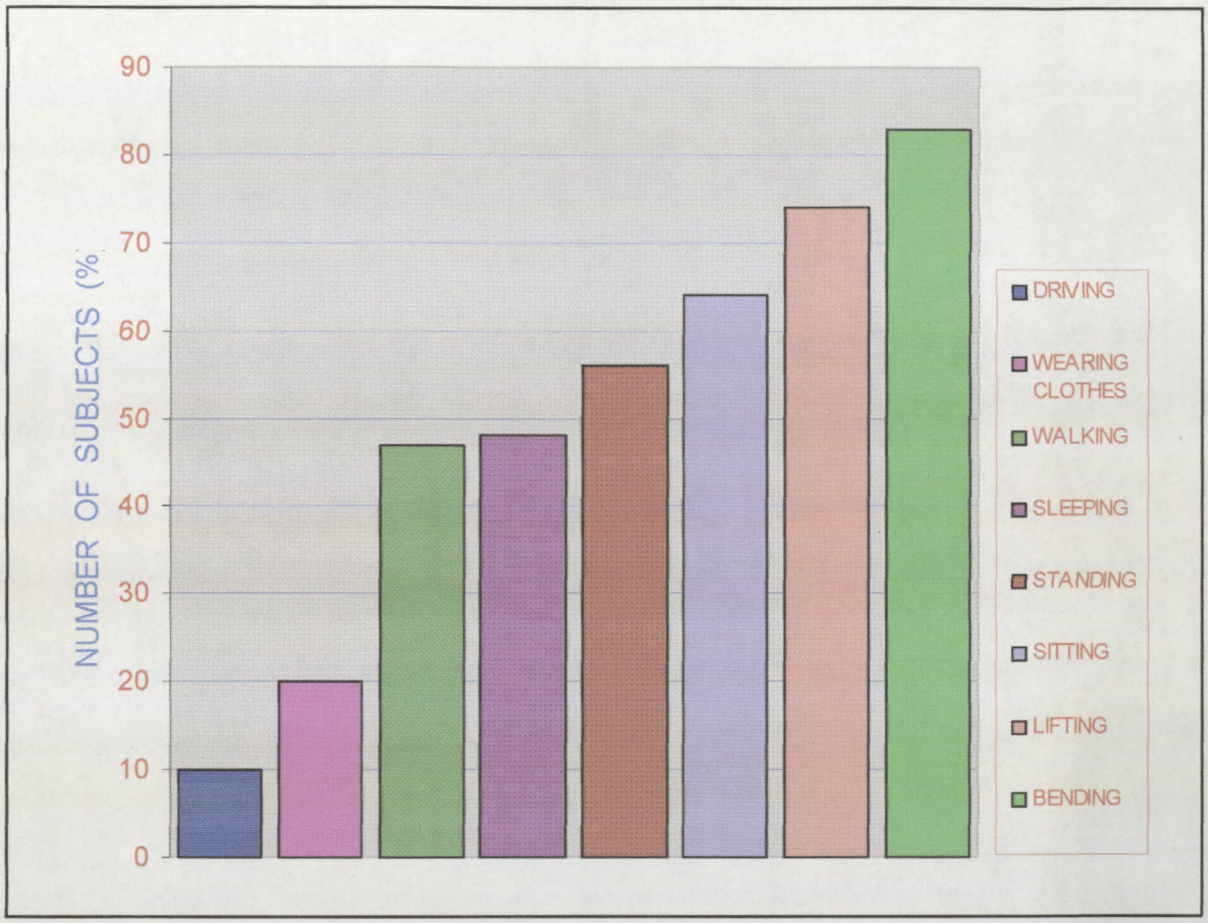

Figure 36. Daily activities affected by low back pain among the Coloureds

Figure 36 depicts that more than 80% (n=130) of the prevalence group had difficulty bending. This was followed closely by lifting, sitting, standing and then sleeping in descending order. This was different from the Indians in that more people felt difficulty sitting than standing.

4.5.2.A. Level of Disability Due to Low Back Pain in the Indian Sample Population

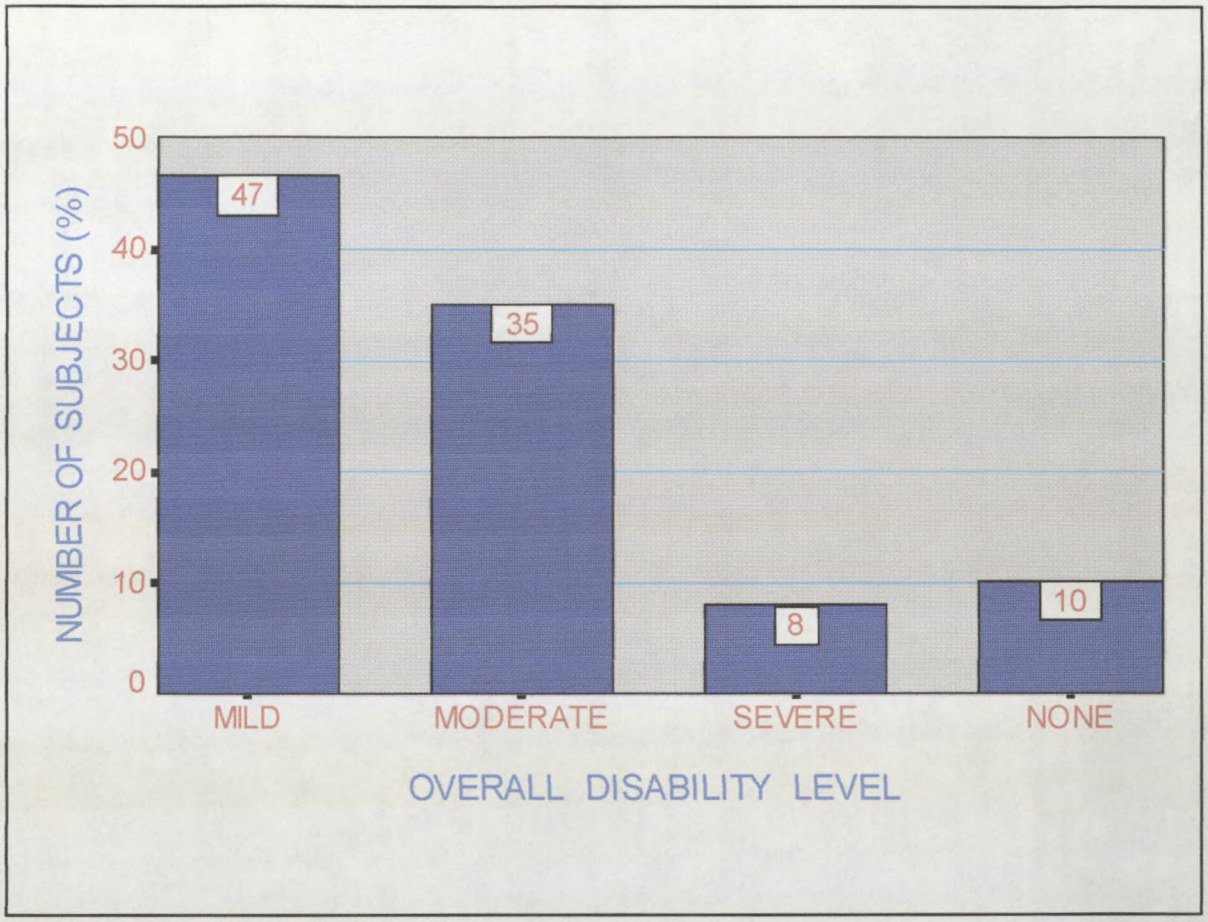

Figure 37. Disability level due to low back pain among the Indians

Figure 37 depicts that 47% (n=106) felt that the difficulty they experienced due to low back pain was mild while 35% (n=79) felt that it was moderate. Only 8% (n=18) felt that they were severely disabled and 10% (n=23) had absolutely no difficulty at all. The response to this question was very subjective and no objective tool was used to measure the individuals' actual objective difficulty.

4.5.2.B. Level of Disability Due to Low Back Pain in the Coloured Sample Population

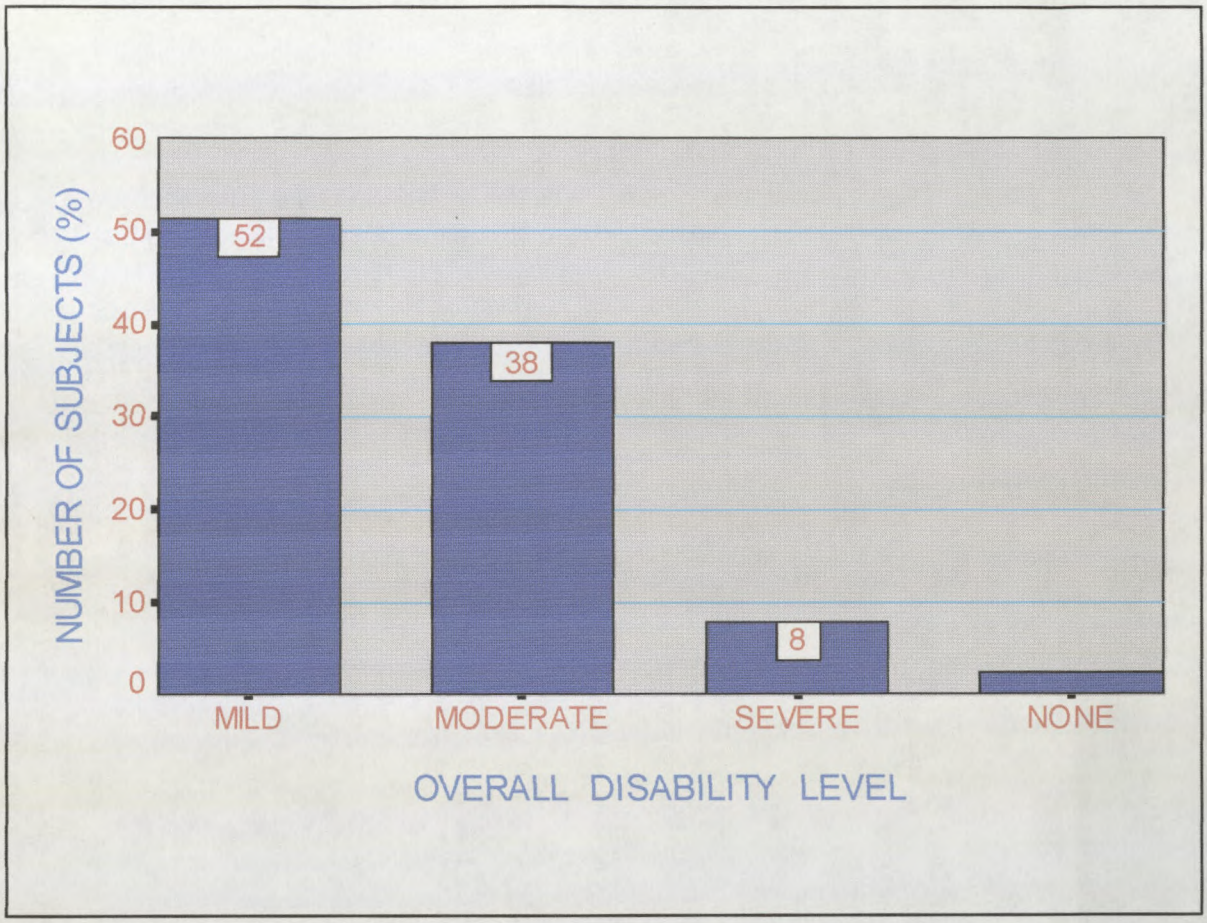

Figure 38. Disability level due to low back pain among the Coloureds

Figure 38 depicts that 52% (n=85) felt that the difficulty they experienced due to low back pain was mild while 38% (n=62) felt that it was moderate. Only 8% (n=18) felt that they were severely disabled and 2% (n=3) had absolutely no difficulty at all. The response to this question was very subjective and no objective tool was used to measure the individuals' actual objective difficulty. Hence the findings of a comparison between the 2 groups may lack credibility.

4.6. Results of Special Statistical Analysis on the Factors Related to the Severity of Low Back Pain

4.6.1. Results of the Pearson Chi-square Statistic

Screening of variables was done using the Pearson Chi-square statistic to identify those actors that were significantly associated with the severity of low back pain (Y). This procedure revealed that there were 10 factors that strongly affected the severity of low back pain. The results are displayed in the following table.

Table 3. Factors that were found to be significantly associated with the severity of low back pain where α=0.05 and P$\leq$0.05

Factors	P-Value for Indians	P-Value for Coloureds
1. Age	0.10366 (P > α)	0.00026 (P < α)
2. Gender	0.02214 (P < α)	0.09129 (P > α)
3. Number of children	0.00063 (P < α)	0.00329 (P < α)
4. Number of pregnancies	0.00001 (P < α)	0.03238 (P < α)
5. Level of education	0.01543 (P < α)	0.04612 (P < α)
6. Lifting heavy objects	0.00849 (P < α)	0.09241 (P > α)
7.Driving for long periods	0.02008 (P < α)	0.01810 (P < α)
8. *Job vulnerability	0.00881 (P < α)	0.00007 (P < α)
9. Weekly exercise time	0.17351 (P > α)	0.04028 (P < α)
10. *Access to H. services	0.02223 (P < α)	0.23173 (P > α)

* These factors depended on the individuals' perception, i.e. as to whether their job made them vulnerable to getting low back pain and if they felt that they had sufficient access to health services.

Where the decision rule for the Pearson Chi-square statistic (section 3.2.1. of Chapter 3) was applied, it was concluded that all factors **except** Age (1) and the Amount of time spent doing exercise per week (9) were strongly associated with the severity of low back pain among Indians at the α=0.05 level of significance. Among Coloureds the only factors **not** strongly associated with the severity of low back pain were, Gender (2), Lifting of heavy objects (6) at work and Accessibility of Health services (11). All of the other factors were significantly associated with the severity of low back pain at the α=0.05 level of significance.

4.6.2. Results of the Two-sampled Unpaired T-test

Table 4. Results of Two-Sampled Unpaired t-test for equality of variances

Factors	Levene's	Equal Variance	Unequal Variance
1. Age	0.184	0.506 "(-0.039, 0.079)	0.506 **(-0.039, 0.079)
2. Gender	0.048	0.308 (-0.094, 0.030)	0.308 (-0.094, 0.030)
3. Number of children	0.001	0.083 (-0.115, 0.007)	0.083 (-0.115, 0.007)
4. Number of preg.	0.000	0.016 (-0.105, -0.011)	0.016 (-0.105, -0.011)
5. Level of education	0.000	0.000 (-0.221, -0.103)	0.000 (-0.221, -0.103)
6. Lifting heavy objects	0.000	0.008 (-0.143, -0.021)	0.008 (-0.143, -0.021)
7. Driving for long	0.000	0.016 (-0.006, 0.620)	0.016 (-0.006, 0.620)
8. *Job vulnerability	0.000	0.019 (0.12, 0.136)	0.019 (0.12, 0.136)
9. Weekly exercise time	0.073	0.371 (-0.070, 0.026)	0.371 (-0.070, 0.026)
10. *Access to H.	0.001	0.079 (-0.006, 0.114)	0.079 (-0.006, 0.114)

*These factors depended on the individual's perception, i.e. as to whether their job made them vulnerable to getting low back pain and if they felt that they had sufficient access to health services.
**Numbers in brackets indicates a 95% Confidence Interval.

Where the decision rule for the Two-Sampled Unpaired t-test was applied, it was concluded that the 2 race groups were **not** significantly different with regards to the distribution of Age (1), at the α=0.05 level of significance. All the other factors between the 2 groups **were** different with regards to their distribution at the α=0.05 level of significance. A 95% Confidence Interval is given in brackets for each factor on the table.

4.6.3. Results of Logistic Regression Analysis

Table 5. Results of the Optimum Logistic Regression Model

Variable	$\hat{\beta}$	Standard Error	Exp($\hat{\beta}$) (Odds ratios)
Number of children (X_7)	-0.2472	0.1257	0.7810
Number of pregnancies (X_8)	-0.2980	0.1340	0.7423
Level of education (X_9)	-0.2748	0.1319	0.7597
Driving for long periods($X_{15.4}$)	-0.6313	0.1818	0.5319
*Job vulnerability (X_{16})	-0.4207	0.1093	0.6566
Constant	-1.5616	0.2022	

*This factor depended on the individuals' perception, i.e. as to whether their job made them vulnerable to getting low back pain or not.

The Optimum Logistic Regression Model (tabulated above) gives the following odds ratios for developing severe low back pain which applied to both the Indian and Coloured race groups. The odds or the likelihood of having severe low back pain are increased if Exp (B) is greater than 1. The odds are decreased if Exp (B) is less than 1. The odds remain unchanged if Exp (B) is equal 1. With this brief explanation the following five interpretations are given for the results shown above in **table 5**.

1. When X_7 varies from a low level to a high level (i.e. the number of children increased) the odds of having severe low back pain are equal to 0.7810 or 78.10% with P=0.0493.

X_7= Number of children - Where: 1=3 or more children

0=no children.

2. When X_8 varies from a low level to a high level (i.e. the number of pregnancies increased) the odds of having severe low back pain are equal to 0.7423 or 74.23% with P=0.0262.

X_8= Number of pregnancies - Where: 1=4 or more pregnancies

0=nulliparous.

3. When X_9 varies from a low level to a high level (i.e. the level of education decreased) the odds of having severe low back pain are equal to 0.7597 or 75.97% with P=0.0372.

X_9= Level of education - Where: 1=High school education or lower

0=matriculant or tertiary education.

4. When $X_{15.4}$ varies from a low level to a high level (i.e. the longer the time driving) the odds of developing severe low back pain are equal to 0.5319 or 53.19% with P=0.0005.

$X_{15.4}$= Driving for long periods - Where 1=Yes

0=No

5. When X_{16} varies from a low level to a high level (i.e. the individual felt that their job made them vulnerable to getting low back pain) the odds of developing severe low back pain are equal to 0.6566 or 65.66% with P=0.0001.

X_{16}= The subject's perception of job vulnerability for acquiring low back pain:

Where 1=Yes

0=No

The overall Percentage of Correct Classification of the estimated Logistic Regression Model was 82.9%. This indicates that the estimated Logistic Regression Model performed relatively well. All standard errors were small. In addition, the estimated small P-values (all were below the α=0.05 level of significance) also indicates that X_7, X_8, X_9, $X_{15.4}$ and X_{16} were important variables that explained the variability in the dependent variable 'Y' (severity of low back pain).

The equation for the estimated logistic regression model is given by (see 3.3.3. Chapter 3):

$$\Pr(Y=1) = \frac{1}{1+(e)^{-z}}$$

Where $Z = -1.5616 - 0.2472(X_7) - 0.2980(X_8) - 0.2748(X_9) - 0.6313(X_{15.4})$

$-0.4207(X_{16}) = \underline{-3.4336}$

and $\Pr(Y=1)$ is the probability of having severe low back pain

Using the above equation one can estimate other probabilities for any given value of X_7, X_8, X_9, $X_{15.4}$ and X_{16} of any interviewee in either of the race groups studied.

4.7. Additional Factors Related to Low Back Pain

4.7.1. Age of Onset of Low Back Pain

Among the Indian subjects, most people reported that their low back pain episodes started between the ages of 21-30 (43%, n=168) followed by 16-20 (18%, n=70). Few people experienced their onset of low back pain before or at adolescence and after middle age. In the Coloured community most of the subjects also reported that their low back pain started between 21-30 (31%, n=119). This was followed very closely by the 16-20 age category where 30% (n=114) of people had their first experience of low back pain.

4.7.2. Work Absence Due to Low Back Pain

Most people who stayed away from work from among the Indian subjects were absent for a week or less (14%, n=31). However, 78% (n=175) did not have to stay away from work due to low back pain. Among the Coloureds there were 20% (n=33) of people who stayed away from work for a week or less. This was 6% higher than the Indian subjects. Sixty six percent (n=108) did not have to stay away from work. Four percent (n=7) and 5% (n=8) stayed away for between 2-3 weeks and more than 4 weeks respectively.

4.7.3. Level of Care-seeking Among Subjects with Low Back Pain

In the Indian sample there were 23% (n=51) subjects that were receiving treatment for low back pain at the time of the study while among the Coloureds this figure was 26% (n=42).

4.7.4. Job Change Or Loss Due to Low Back Pain

The following table depicts how the Indian and Coloured sample populations compared with respect to the number of subjects that had either changed or lost their jobs due to low back pain.

Table 6. Job loss and Job change due to low back pain

Race group.	Job change.	Job loss.
INDIANS	3.5%(n=8)	1.7% (n=4)
COLOUREDS	9.8% (n=16)	5.5% (n=9)

Among Indians 3.5% (n=8) of the sample had to change their jobs whereas 9.8% (n=16) of the Coloureds, triple that of the Indians, required a job change. There were 5.5% (n=9) and 1.7% (n=4) Coloured and Indian subjects respectively who lost their jobs due to low back pain.

4.7.5. Bed Rest Due to Low Back Pain

The vast majority of people from among the Indians that suffered from low back pain were never bed-ridden (88%, n=198). However, 12% (n=27) of subjects were bed-ridden due to low back pain. Of the 12%, most were bed-ridden for less than a week, 3% (n=7) for between 1-2 weeks, 1% (n=2) for between 2-3 weeks and 2% (n=4) for more than 4 weeks. In the Coloureds also, most people were not bed-ridden (83%, n=135). There were 17% of subjects (n=28)) who said that they were bed-ridden. Of the 17% that were, 9% (n=10) were for between 0-1 week, 3% (n=3) for between 1-2 weeks, 2% (n=3) for between 2-3 weeks, 1% (n=2) for between 3-4 weeks and 2% (n=3) for more than 4 weeks. Generally there 5% were more Coloureds that were bed-ridden for low back pain compared to Indians.

4.7.6. Source of Past and Present Treatment for Low Back Pain

Table 7. Source of past and present treatment for low back pain

Source of treatment.	Indians.	Coloureds.
1. General Practitioner	47.6% (n=108)	47.5% (n=84)
2. Chiropractor	4.4% (n=10)	1.7% (n=3)
3. Acupuncturist	0% (n=0)	0% (n=0)
4. Pharmacist	1.3% (n=3)	0% (n=0)
5. Traditional Healer	0.44% (n=1)	1.1% (n=2)
6. State Hospital	17.6% (n=40)	36.1% (n=64)
7. Physiotherapist	14.1% (n=32)	6.8% (n=12)
8. Reflexologist	0.88% (n=2)	0% (n=0)
9. Orthopaedic surgeon	7.9% (n=18)	5.6% (n=10)
10. Homeopath	0% (n=0)	0% (n=0)
11. Neurologist	0.44% (n=1)	0% (n=0)
12. Neurosurgeon	0.44% (n=1)	0.56% (n=1)
13. Other	4.8% (n=11)	0.56% (n=1)

The above table represents the source of treatment for low back pain either in the past or presently, (i.e. Incidence and Prevalence samples). It shows that the greatest source of treatment among both communities was the General Practitioner (47.6% for Indians and 47.5% for Coloureds). Both sample populations relied equally on their General Practitioner. Among the Coloureds many people sought treatment from a State Hospital (36.1%). Only half this number from the Indians used a State Hospital (17.6%). Fourteen percent of Indians and only 7% of Coloureds sought help from a Physiotherapist. Eight percent of Indians and 6% of Coloureds were treated by an Orthopaedic Surgeon. Overall the Coloureds relied more on their General Practitioner and State Hospital while Indians were also dependent on their General Practitioners but were also treated by other allopathic sources.

4.7.7. Number of Respondents Taking Medication for Low Back Pain

Table 8. Number of subjects taking medication for low back pain

Race group.	Subjects on medication.
Indians	28.9% (n=69)
Coloureds	25.8% (n=42)

Almost 29% (n=69) of Indians and 25.8% (n=42) of Coloureds were on medication.

4.7.8. Source of Medication

Table 9. Source of medication

Source of medication	Indians	Coloureds
1. General Practitioner	45% (n=31)	33.3% (n=14)
2. Pharmacist	1.4% (n=1)	0% (n=0)
3. State Hospital	31.9% (n=22)	42.9% (n=18)
4. Orthopaedic surgeon	10.1% (n=7)	2.3% (n=1)
5. Neurosurgeon	1.4% (n=1)	0% (n=0)
6. Self-medication	10.1% (n=7)	21.4% (n=9)

Most subjects in the Indian community received their medication from a General Practitioner followed by a State Hospital and then other types of allopathic professionals, while most people among the Coloureds received their treatment from a State Hospital followed by a General Practitioner, and then other types of allopathic professionals. There were 10.1% (n=7) of Indian respondents and 21.4% (n=9) of Coloured respondents that were self-medicating.

4.7.9. Effectiveness of Medication

Table 10. Effectiveness of medication

Race group	Effective	Not Effective
Indians	75.4% (n=52)	24.6% (n=17)
Coloureds	85.7% (n=36)	14.3% (n=6)

The majority of people on medication for low back pain found that it was effective.

4.7.10. Cost of Medication Per Month

Table 11. Cost of medication per month

Cost of medication.	Indians.	Coloureds.
R 1 - R 30	49.2% (n=34)	47.6% (n=20)
R 31 - R 60	18.8% (n=13)	26.1% (n=11)
R 61 - R 80	5.7% (n=4)	14.3% (n=6)
R 81 - R 100	4.3% (n=3)	2.4% (n=1)
> R100	21.7% (n=15)	9.5% (n=4)

The majority of people in both samples paid between R1 - R30 for their medication. Almost 22% (n=15) of Indians paid more than R100 whereas less than 10% (n=4) of Coloureds paid the same amount.

4.7.11. Cost of Treatment Per Month (Excluding Medication)

Table 12. Cost of treatment per month (excluding medication)

Cost of treatment.	Indians.	Coloureds.
R 1 - R 30	39.6% (n=19)	53.1% (n=17)
R 31 - R 60	18.6% (n=9)	15.6% (n=5)
R 61 - R 80	6.2% (n=3)	12.5% (n=4)
R 81 - R 100	2.1% (n=1)	3.1% (n=1)
R 101 - R 200	4.2% (n=2)	6.2% (n=2)
> R200	29.2% (n=14)	9.4% (n=3)

The majority of people in both samples paid between R1 - R30 for treatment every month. However 29.2% (n=14) of Indians paid more than R200 per month while less than 10% (n=3) of Coloureds paid the same amount.

4.7.12. Comparison of the Severity of Low Back Pain Between Race Groups.

Table 13. A Comparison of severity of low back pain between race groups.

Intensity	Indians	Coloureds	*Blacks
Mild	33%	40%	31.8%.
Moderate	43%	28%	44.8%
Severe	24%	32%	23.4%

*results in this column are obtained from Van der Meulen (1997)

The results of the Indians and the Blacks appear to be similar. However, many more Coloured people felt that their pain was mild, fewer felt that they were suffering from moderate pain and a lot more described their pain as severe, compared to the Indians and Blacks.

CHAPTER FIVE

Discussion of Results

5.2. Incidence, Prevalence and Factors Related to Low Back Pain Severity Care Seeking and Disability

5.2.1. Lifetime Incidence of Low Back Pain

This study found that the lifetime incidence of low back pain was 78.2% in Indians and 76.6% in Coloureds (**Figures 5** and **6** respectively). This represented a small difference of 1.6%, with Indians showing a higher incidence. These statistics were in keeping with the findings of Frymoyer et al. (1983) who reported that between 60% and 80% of people suffered from low back pain at some point in their lives. It was also within the range of what Casidy and Wedge (1988:4) reported (60% to 80%). Heliovaara et al. (1989) also reported that 75% of people interviewed in the "Mini-Finland Health Survey" suffered from at least one episode of low back pain in their lives. Their definition for low back pain was similar to the one used in this study. However, the rates were found to be higher than those reported by Svensson and Andersson (1982) (61%) and Svensson et al. (1990) (60%).

Van der Meulen (1997) conducted a similar study of low back pain in a formal Black South African township. He found that the total lifetime incidence among Black South

Africans was 57.6%. This was substantially lower than the rates found in both the race groups in this study (approx. 20% difference).

However, Van der Meulen (1997) reported that the low rate found in his study could have been due the problem of recall. This problem was also mentioned by Svensson and Andersson (1982), who argued that low recall could substantially reduce the actual figure. However, the problem cannot be fully explained as one of recall only. There may be racial, cultural, and genetic factors which could be involved. More detailed studies are required to specifically address this problem.

5.2.2. The Prevalence of Low Back Pain

The prevalence of low back pain in this study was found to be 45% among Indians and 32.6% among Coloureds (**Figures 7** and **8** respectively). There was a 12.4% difference between the two race groups with the Indians having the higher prevalence. The reasons for this could be cultural, racial or genetic and more detailed investigation is required to assess the influence of these factors. The prevalence of low back pain in this study was defined as "low back pain within a month of the interview" with the subject. These prevalence rates were much lower than those found by Van der Meulen (1997) in the Black community of South Africa. He reported a prevalence of 53.1%. However, the definitions used for prevalence in his study and this one were different and this could account for the

discrepancy. Van der Meulen (1997) defined the "prevalence group" in his study as "subjects that had low back pain at the time of the study or ongoing low back pain on an occasional basis.".

The prevalence rates reported for the 2 groups in this study were much higher than those found in the "Mini-Finland Health Survey" conducted by Heliovaara et al. (1989) who reported a prevalence of 20%. The definition of prevalence was exactly the same in this study as in the Heliovaara et al. (1989) study. The prevalence of low back pain among the Coloureds was slightly higher than that reported by Svensson and Andersson (1982) who reported a prevalence of 31%. However, it was similar to a later study done by Svensson et al. (1990) who reported a 33% prevalence. Both the above studies were carried out on the general population of Gothenburg in Sweden at different times.

Many researchers such as Reisbord and Greenland (1985) and Carey et al. (1995) have reported that the incidence and prevalence rates of low back pain might easily be affected by educational status, socio-economics and employment status. These factors could explain some of the discrepancies between this study and others done overseas in much more developed countries. In the past a different educational system existed for each race group in South Africa. These educational systems were of different academic standards, hence each race group acquired a different level of education - whether at primary secondary, or tertiary levels.

5.2.3. Age and Low Back Pain Prevalence

The results of this study indicated that the highest prevalence of low back pain in the Indian population was reported by the 31-35 age group ((**Figures 9**), whilst in the Coloured group the highest prevalence of low back pain was reported by the 41-45 age group (**Figures 10**).

Possible reasons for the above observation could be that younger people may be employed in jobs that require more physical strain (lifting, bending, twisting) while older people may be employed in jobs that require less physical strain (clerical work, sedentary work).

The study conducted by Heliovaara et al. (1989) in Finland found that the prevalence rate was highest in the 55-64 year age group. This means that in South Africa the majority of people from among the Indians and Coloureds are suffering from low back pain at younger ages. The pattern found in this study was in concurrence with the findings of Rowe (1969) and Roncarati and McMullen (1988) who reported that the prevalence of low back pain was highest in age groups under 50 and especially highest in the 30-49 age category.

5.2.4. Gender and Low Back Pain Prevalence

Sixty four percent of people in both the Indian and Coloured prevalence groups were female and 36% were male. These rates were exactly the same for the 2 race groups (**Figures 11** and **12** respectively).

These results were similar to those found by Van der Meulen (1997) who reported that more females were suffering from low back pain (56.4%) than males in the prevalence group.

Similar results were reported by Nagi et al. (1973), Reisbord and Greenland (1985) and Toroptsova et al. (1995). They reported that the prevalence of low back pain was generally higher in females.

Possible reasons for the higher rate of low back pain among females could be due to the fact that females are normally required to perform domestic tasks such as washing of clothing, house keeping, cooking (standing for long periods) and other domestic chores. A significant number of Coloured women were employed, and hence they would be exposed to the risk factors associated with employment. The combination of having to do formal employment activities and household chores could also be associated with a higher prevalence of low back pain. In addition the number of pregnancies might also be associated with the higher level of low back pain as reported by Ostgaard et al. (1991a) and Orvieto et al. (1994a).

5.2.5. The Perceived Severity of Low Back Pain.

In the present study 33% of people described their pain as mild, 43% as moderate and 24% as severe. These figures represent the Indian community (**Figure 13**). Among the Coloureds it was found that 40% described their pain as mild, 28% as moderate and 32% as severe

(**Figure 14**). Van der Meulen (1997) found that in Black people, 31.8% reported that their pain was mild, 44.8% moderate and 23.4% as severe.

The findings among Indians from this study and Blacks from Van Der Meulen (1998) were similar to each other (**Table 13**). A very substantial difference in the pattern occurred among the Coloureds. More people described their pain as mild and more as severe compared to the other two race groups. Fewer described their pain as moderate among the Coloureds. Frymoyer et al. (1980) found results similar to those of the Indians from this study and the Blacks from the Van der Meulen (1997) study. He reported that 30% of people in that study described their pain as mild, 46% as moderate and 24% as severe.

Deyo and Tsui-Wu (1987) found that 21.2% of subjects in their study done in America felt that they had mild pain, 43.4% moderate pain and 35.4% severe pain. In this American study more people suffered from moderate pain followed by the number that suffered from severe pain. A similar number of Indians in this study and Blacks from the Van der Meulen (1997) study suffered from moderate pain (43% and 44.8% respectively) and the number of people suffering from severe pain in the Deyo and Tsui-Wu (1987) study was comparable to that of the Coloureds in this study (32%).

Many of the studies done on the various aspects of the epidemiology of low back pain concentrated on analysing factors related to the prevalence of low back pain (factors associated with predisposing an individual to developing low back pain.) Some of these studies included details of severity (as described above), but only as an isolated variable and not in relation to other factors as done in this study. The Frymoyer et al. (1983) study was

the only one found to associate different levels of severity with other variables as is normally done with prevalence. However, it was done on a sample of 1 221 males. Hence comparisons for the female gender could not be drawn from that study.

The severity of low back pain could possibly reflect the disability that an individual experiences. People that suffer from severe low back pain are probably not able to carry out certain daily activities that those with mild low back pain are still functional with. The actual severity may prevent them from carrying out certain daily activities.

5.3. Factors Found to Be Significantly (α=0.05) Associated with the Severity of Low Back Pain

5.3.1. Age and Severity of Low Back Pain

This study revealed that most people who suffered from severe low back pain were in the 41-45 age group in Coloureds (**Figure 16**). This finding was significant ($p < 0.05$). Among Indians the highest number of subjects that suffered from severe low back pain were in the 31-35 age category (**Figure 15**). Figures 1 and 2 show that the samples of both the race groups consisted more of younger individuals than of individuals from the older age groups. The age distribution was generally similar for both the race groups. Age was found to be significantly related to the severity of low back pain among the Coloureds (P=0.00026) but not among the Indians (P=0.10366) (**Table 3**).

It is possible that individuals in higher age categories suffered from low back pain for a much longer period and that it was therefore reported as being of a more severe nature by this group. Hence the higher number of older people suffering from severe low back pain. Older individuals may also have a lower pain threshold, and such respondents were thus probably more likely to report severe low back pain than younger subjects.

Frymoyer et al. (1983) found that in their study the mean age of people with moderate pain was 32.6 years and for those with severe pain it was 33.2 years. The results for the same variable from the Coloured population was a decade higher than the Frymoyer et al.(1983) study but that of the Indian sample concurred with the Frymoyer et al.(1983) study

As stated earlier, the Frymoyer et al. (1983) study was the only one found to associate low back pain severity with other factors. The age range in the Frymoyer et al. (1983) study was 18-55 for men. Thus the results were not directly comparable to this study. Van der Meulen (1997) also concentrated on the analysis of factors associated with the prevalence of low back pain rather than severity and hence a comparison was not possible.

5.3.2. Gender and Severity of Low Back Pain

Gender was significantly associated with the severity of low back pain among the Indians (P=0.02214) but not among the Coloureds (P=0.09129) (**Table 3**).

Females made up the majority in all categories of severity among the Indians. However, the number of females that described their pain as severe was double that of males (32 females and 17 males) (Figure 17). Among the Coloureds, females made up the majority in all categories of severity also. The severe category also had double the number of females compared to males (**Figure 18**). However, this finding was not significant among the Coloureds.

The Frymoyer et al. (1983) study as described earlier was conducted on men only. Hence no comparison with this study was possible. Neither Van der Meulen (1997) nor any of the other studies reviewed considered the association between low back pain severity and gender, and hence no further comparisons were possible.

It is possible that males find it socially unacceptable to describe their pain as severe and hence fewer males reported having low back pain of a severe nature. Females are probably more prone to the adverse effects of pregnancy on the biomechanics of the lower back and hence to the development of more severe low back pain.

5.3.3. Number of Children and Severity of Low Back Pain

The number of children (males and female parents) was significantly associated with the severity of low back pain among both the Indians (P=0.00063) and Coloureds (P=0.00329) (**Table 3**).

By means of logistic regression analysis it was found that when the number of children increased, the odds of having severe low back pain are equal to 0.7810 or 78.10% with P=0.0493 (**Table 5**). Thus the more children that an individual had the higher their odds were of having severe low back pain.

Among both race groups, it was found that individuals that had more than 3 children tended to report their pain as severe compared to those with fewer than 3. This finding was significant among both Indian and Coloureds (**Figure 19** and **Figure 20**).

Individuals with more than 3 children are probably (the observed statistical result does not however imply causality) more likely to have developed low back pain due to carrying the children (more children to carry). In addition, since the majority of respondents in the prevalence sample in both race groups were females, it is likely that the number of pregnancies together with the maternal tasks of care giving had an effect on the severity of low back pain. In addition to this, a viable explanation for how males could be affected by this factor cannot be given.

5.3.4. Number of Pregnancies and Severity of Low Back Pain

The number of pregnancies was also found to be significantly associated with the severity of low back pain among Indian (P=0.00001) and Coloured (P=0.03238) females (**Table 3**).

By means of logistic regression analysis it was found that when the number of pregnancies increased, the odds of having severe low back pain are equal to 0.7423 or 74.23% with

P=0.0262 (**Table 5**). Thus it seemed that the more pregnancies a female had the higher her chances were of developing severe low back pain.

Among both the race groups, females who had more than 4 pregnancies tended to report their pain as severe compared to those with fewer pregnancies (**Figure 21** and **Figure 22**).

The studies done by Orvieto et al. (1994a) and Ostgaard et al. (1991a), as described earlier, only considered factors associated with an increased prevalence of low back pain during pregnancy and whether pregnancy itself was associated with low back pain. The number of pregnancies in relation to the level of severity was not considered as a factor.

It is argued that females who had more than 4 pregnancies were more likely to have been affected to a greater degree by the adverse effects of the biomechanics of the lower back during pregnancy. The maternal tasks of care giving following delivery could also be related to a higher number of females that were pregnant more than 4 times reporting their pain as severe.

5.3.5. Job Vulnerability and Severity of Low Back Pain

This factor was dependent on the individual's perception of whether they were vulnerable to acquiring low back pain due to their occupational activities. It was found to be significantly related to the severity of low back pain among Indians (P=0.00881) and Coloureds (P=0.00007) (**Table 3**).

By means of logistic regression analysis it was found that when an individual felt that their job made them vulnerable to getting low back pain, the odds of developing severe low back pain are equal to 0.6566 or 65.66% with P=0.0001 (**Table 5**). Thus if an individual feels that they are vulnerable to developing low back pain due to the kind of job that they do, then the chances of them developing severe low back pain are increased.

In both the Indian and Coloured sample population it was found that, overall, more people felt that they were vulnerable to getting low back pain due to their jobs (**Figure 23** and **24**).

Masset and Malchaire (1994) found in their study of workers in 2 major steel industries in Belgium, that no association existed between low back pain and the opinion of the workers regarding their workloads. However, the opinion of the workers regarding their workloads was not related to severity level, but was related to the prevalence of low back pain reporting. Bigos et al. (1986) concluded that psychologic risk factors were more predictive (for subjects at risk for developing low back pain) than any other risk factor. However, job vulnerability for acquiring low back pain in relation to the severity of low back pain was not assessed by Bigos et al. (1986) or by Van der Meulen (1997).

It is possible that individuals who are under the impression that their jobs make them vulnerable to acquiring low back pain are probably more aware of the physical nature of their jobs. Hence they would be biased towards describing a level of severity proportional to the level of vulnerability that they assume or think that they are under.

5.3.6. Total Amount of Time Spent on Exercise Per Week and Low Back Pain Severity

The amount of time spent doing exercise per week was found to be significantly related to the severity of low back pain among Coloureds (P=0.04028) but not among Indians (P=0.17351) (**Table 3**).

The majority of subjects in the Indian prevalence group did not do exercise 79% (n=178). From this group of individuals that did no exercise, 27% of subjects described their pain as mild, 32% as moderate and 20% as severe. One percent did more than 10 hours of exercise per week and felt that they had severe low back pain (**Figure 25**). These findings were not significant, though.

From among the Coloured prevalence sample, 90% (n=147) of subjects did no exercise. From this "no exercise" group 36% people said that their pain was mild, 25% moderate and 30% said that their pain was severe. Nine percent of subjects exercised for between 7-9 hours per week and described their pain as severe (**Figure 26**).

It appears from the results of this study that those people who did no exercise at all suffered more from low back pain than those that did exercise. This is applicable to both the race groups. However, among the Coloureds those that exercised for long periods (7 hours to 9 hours per week) also suffered more from severe low back pain.

Gyntelberg (1974), Frymoyer et al. (1983) and Van der Meulen (1997) assessed exercise in terms of prevalence of low back pain and not according to severity level of low back pain and therefore no comparisons can be drawn with the present study.

People who do not exercise are probably not physically fit. Their musculoskeletal systems could therefore be more vulnerable to injuries sustained from lifting, bending and other everyday activities. It is likely that they also are not educated in the correct manner of lifting and of doing heavy work (stretching, warm up, cool down). Individuals doing lots of exercise could also be prone to sprain, strain and overuse injuries and hence backache of a severe nature over a period of repeated injury.

5.3.7. Accessibility of Health Services and Severity of Low Back Pain

One of the questions of this study asked whether the respondents felt that they had sufficient access to health services. It was found that accessibility of health services was related to the severity of low back pain in Indians (P=0.02223) but not among the Coloureds (P=0.23173) (**Table 3**).

Among the Indians it was evident that in all the categories of severity (mild, moderate and severe), subjects with access to health services made up the majority (**Figure 27**). However, one would have expected that people with severe low back pain might not have had sufficient access to health services and hence they have severe low back pain due to a lack

of treatment. The results of this study as it concerns the Indian population group revealed that the general spread of mild, moderate and severe low back pain among Coloureds who did not have sufficient access to health services was generally the same (**Figure 28**). However, this factor was not significant among the Coloureds.

One would have assumed that many more individuals that had no access to health services would tend to report their low back pain as severe compared to those who had access. However the results showed the opposite in the Indian group (ie. the majority of subjects with severe low back pain did have sufficient access to health services). A possible explanation for this could be that those with severe low back pain were probably forced to seek some sort of medical help either from a private source or from the state. Hence they would be more likely, and would find it more easier, to seek help from the same source whenever needed and therefore would have adequate access to medical help. From the literature reviewed, no studies considered such a factor as this, perhaps because it was not relevant in well developed first world countries.

5.3.8. Lifting Heavy Loads At Work and Severity of Low Back Pain

The lifting of heavy objects was found to be significantly related to the severity of low back pain among Indians (P=0.00849) but not among Coloureds (P=0.09241) (**Table 3**).

Among the Indians it was found that in the mild and moderate categories of low back pain severity, the majority of people did no lifting of heavy objects at work, but in the severe

category the majority (n=29, 13%) was made up of people who lifted heavy objects while at work (**Figure 29**). This finding was significant.

Among the Coloured prevalence sample there was not much of a difference in the number of people that lifted heavy objects and had moderate or severe low back pain (the majority in these two categories). However in the mild category most people did no lifting at all (**Figure 29**).

The findings of this study were similar to those of Frymoyer et al. (1983) in that there were more people in the severe category who did heavy lifting as part of their occupations. Frymoyer et al. (1983) reported that in analysing the subjects' occupation in their study, they found that repetitive weight-lifting was a most important prognostic factor. One hundred and sixty three (44.4%) people without low back pain did lifting as part of their jobs. However, 269 (47.7%) of those suffering from moderate pain and 155 (53.8%) of patients with severe low back pain did work that required repetitive lifting of 20 kilograms or more. The present study did not attempt to measure objectively the weight of objects lifted by respondents. The answer was based on the respondent's judgement as to whether they lifted heavy objects or not.

Damkot et al. (1984) reported that their results showed significant differences for the usual method of lifting, and previous instruction in lifting habits. They found that individuals with severe low back pain tended to use their legs to lift heavy loads more than subjects with moderate or no low back pain. This could have been due to the subjects with severe low back pain receiving instructions on lifting methods after they sought treatment for severe low

back pain. The present study did not consider the methods of lifting in relation to low back pain severity as in the Damkot et al. (1984) study.

One would expect people lifting heavy objects to develop more severe low back pain than those that do no lifting. This is probably in concurrence with the biomechanics of the low back pain, in that the discs would most likely be under repeated stresses in individuals lifting heavy objects at work, thus predisposing them to severe discogenic pain especially in subjects with preexisting degenerative disc disease. However, it is also possible that in some subjects, an existing low back problem of whatever nature could become aggravated by repeated lifting and hence there could also be other sources of pain.

5.3.9. Driving for Long Periods and Severity of Low Back Pain

The length of time that an individual spent driving was found to be significantly related to the severity of low back pain in both the Indians (P=0.02008) and Coloured (P=0.01810) groups (**Table 3**).

By means of logistic regression analysis it was found that the longer the time an individual spent driving, the higher were their chances of developing low back pain of a more severe nature. When driving for long periods ($X_{15.4}$) varied from a low level to a high level (i.e. the longer the time spent driving) the odds of developing severe low back pain are equal to 0.5319 or 53.19% with P=0.0005 (**Table 5**).

According to Frymoyer et al. (1983) the automobile driver had the highest rate of low back pain in both categories (moderate and severe) followed by the light truck driver, the motor cyclist, heavy truck driver, tractor driver, heavy equipment operator and lastly bus driver in descending order of magnitude. The present study did not separate drivers into different categories according to the type of vehicle driven. However, as a whole the findings were in agreement with the results of Frymoyer et al. (1983).

Van der Meulen (1997) did not assess this factor in his study of Black South Africans in Chesterville. A possible reason for him not assessing driving as a risk factor could be that very few Blacks living in townships actually own motor vehicles, and most of the residents rely on public transport. However, being a passenger could also expose one to the same level of vehicular vibration as the driver is exposed to. Hence, passengers who commute long distances could also be affected in the same manner as drivers are. A comparison with Van der Meulen's (1997) study was therefore not possible.

Driving probably exposes the individual to vehicular vibration and the longer an individual spends driving the longer is the time spent sitting. This prolonged seated posture coupled with the vehicular vibration could place a lot of stress on the sacroiliac joints, thus predisposing one to developing severe low back pain. The same could also apply for passengers who commute long distances.

5.3.10. Educational Status and Severity of Low Back Pain

The level of an individual's education was found to be significantly related to the severity of low back pain in Indians (P=0.01543) and Coloureds (P=0.04612) (**Table 3**).

It was found, by means of logistic regression analysis, that when the level of education (X_9) varied from a low level to a high level (i.e. a decrease in the level of education) the odds of having severe low back pain are equal to 0.7597 or 75.97% (P=0.0372) (**Table 5**). Thus people that had a lower educational status (lower than matric and tertiary education) had a higher chance of developing severe low back pain.

Among both race groups, individuals that matriculated or were educated at a tertiary institution tended to report severe low back pain less frequently. In both the race groups subjects with incomplete secondary education formed the majority in all categories of severity.

Nagi et al. (1973), Reisbord and Greenland (1985) and Deyo and Tsui-Wu (1987) assessed educational status in relation to low back pain prevalence. They all found that the prevalence generally decreased with increasing educational status. However, educational status was not assessed it terms of the severity of low back pain as was done in this study. Hence a direct comparison was not possible

Individuals with a higher level of education are probably able to offer a more objective description of their low back pain severity. It is also possible that people with a lower level of education would hold more menial types of jobs than those that are well educated. The more physical nature of the job could thus predispose them to developing low back pain of a more severe nature.

5.4. Disability Associated with Low Back Pain

5.4.1. Daily Activities Most Affected Due to Low Back Pain

In this study the daily activities that were adversely affected due to low back pain were the same in both race groups. In descending order of difficulty they were: bending, lifting, sitting, standing, walking, dressing and driving (**Figures 35** and **36** respectively). This pattern could be in keeping with the pathomechanics that occurs with mechanical low back pain and how it might affect different movements and activities in that these activities could place a lot of strain on the spinal structures, bending being the most strenuous followed by lifting, standing, sitting, walking, dressing and driving. This pattern was reported in exactly the same fashion by Van der Meulen (1997) in his study on the Black community in Chesterville. In the study done by Svensson and Andersson (1983) it was also reported that low back pain sufferers frequently suffer from difficulty doing the activities mentioned above.

5.4.2. Subjective Level of Disability of Individuals with Low Back Pain

The results for the two groups of this study were similar (**Figure 37** and **38**). Nevertheless, the response to this question was very subjective and no objective scale was used to measure the individual's actual objective difficulty. Hence comparing the two groups presented difficulties.

Heliovaara et al. (1989) found from their study in Finland that subjects reported that the functional ability to perform daily activities by those individuals with low back pain was at least slightly limited in 50%, at least markedly limited in 20% and severely limited in 5%.

The findings of this study (**Figure 37** and **38**) were similar to those of the Heliovaara et al. (1989) study. Carey et al. (1995) did a study in North Carolina, USA on back pain in which they interviewed 4 437 people telephonically. Thirty four percent considered themselves to be permanently disabled and 53% assessed their overall health as fair or poor. These findings were much higher than what was found in the present study.

Sanderson et al. (1995) found that unemployment and compensation both influenced the patients' perception of disability. However, employment status was the most important determining factor. This could have played a role in affecting the different rates reported. The unemployment level among the Indians was 9% and 15% among Coloureds. However, there appeared to be no difference in the manner in which disability was reported between the two race groups even though there existed a difference in the unemployment rates. This apparent discrepancy between the two studies could be due to different insurance and

disability claim systems in different countries. The ease with which an individual will be compensated for disability due to low back pain, will most probably be related to a higher level of disability being reported.

5.5. Additional Factors Associated with Low Back Pain

5.5.1. Age of Onset of Low Back Pain

As indicated in **section 4.7.1**, this study found in both the Indian and Coloured groups that most subjects reported that their low back pain episodes started between the ages of 21-30 This was followed very closely by the 16-20 age category where 30% (n=114) of people had their first experience of low back pain.

These results were similar to those of Van der Meulen (1997) who reported that most of the Black subjects in his study started suffering from low back pain at an age of between 20 and 39. There were also 21.7% of people who first suffered from low back pain between 1-19 years of age in Van der Meulen's (1997) study. This was similar to the results in the Coloured community reported here where a high proportion of people first suffered from low back pain at a younger age.

The age of onset of low back pain could depend on when the individual begins working. Most people probably begin working after age 18, when they have completed schooling.

Hence after 2 or 3 years of work, a possible back problem could develop and it is therefore reported in the 20-30 age group. Among the Blacks in Van der Meulen's (1997) study, the high number of subjects reporting low back pain in the 1-19 age group could mean that subjects in the Black community of Chesterville become employed at a much younger age.

5.5.2. Work Absence Due to Low Back Pain

The results in **section 4.7.2.** indicated that 78% of Indians did not have to stay away from work due to low back pain while 22% of subjects stayed absent. Of the 22%, 14% were absent for a week or less. Among the Coloured sample, 29% of subjects stayed away from work due to low back pain. Of the 29%, 20% (6% higher than the Indian sample) were absent from work for a week or less.

It is possible that the Coloureds could be occupying jobs that have better medical insurance payment systems for low back pain sufferers than the jobs of the Indian subjects, hence the higher rate of absence form work due to low back pain.

Van der Meulen (1997) found that 82% of Black people did not stay away from work due to low back pain. This was not significantly higher than among the Indians (78%) (**section 4.7.2.**). However, the same figure for Coloureds was 66% (**section 4.7.2.**). This means that 18% of the Black subjects in Van der Meulen's (1997) study stayed away from work and 22% of the Indian and 44% of the Coloured subjects in this study were absent from work

due to low back pain. Thus the Coloured group displayed a higher rate of work-absence compared to the Indian group and the Blacks from Van der Meulen's (1997) study.

According to the WHO Report of a Scientific Group on Rheumatic Disorders (1991) there is a growing trend for people to take more time off work because of back problems. According to Carey et al. (1995) back pain is the second most common reason for time taken off from work. Low back pain with or without sciatica has reached epidemic proportions in most industrialized countries. This same trend, however is not seen in developing countries. This might explain some of the discrepancies seen in the present study in that Coloureds may be employed in different types of jobs as compared to the Indians. The difference in the types of employment could have resulted from different levels of education and different opportunities that existed for these two race groups in South Africa before its democratization.

Frymoyer et al. (1983) found that of the patients with severe or moderate low back pain, 181 had an average loss of 30.3 days of work due to low back pain. Sixty nine (12.2%) of the patients with mild pain and 107 (37.1%) of the patients with severe pain had lost days of work during the preceding year. These figures were much higher than those found by this study.

5.5.3. Level of Care Seeking for Low Back Pain

As indicated in **section 4.7.3.** the percentage of subjects receiving treatments for low back pain in both the Indian group (23%) and the Coloured group (26%) did not differ significantly from that reported by Van de Meulen (1997) in the Black community (25.5%).

The level of care-seeking among the Indians and Coloureds of Africa is not as high as what Carey and Evans et al. (1995) or Deyo and Tsui-Wu (1987) found in their studies on low back pain in the USA Carey and Evans et al. (1995) reported that 73% of those affected by back pain saw a health care provider. Deyo and Tsui-Wu (1987) found that of the subjects in their study who had lower back pain for at least two weeks, 84.6% visited a health professional. The Deyo and Tsui-Wu (1987) study also found that there was no general difference in the utilization of these services between different race groups or educational groups, with the exception of the poorly educated subjects (elementary grades or lower) who were more likely to be hospitalized than college-educated individuals (40.8% as opposed to 27.1%, P=.001 respectively).

According to Reisbord and Greenland (1985) the decision to seek medical care for low back pain is dependent on: (A) the predisposition of the individual to use medical service; which is based on demographic and social characteristics as well as attitudes about medical care and efficacy of treatment, (B) the ability to obtain medical services and © the perception of severity of illness. This may be significant in the South African context in that the majority of people, due to past constraints, will most certainly fall into the first two categories if not all three. This means that the results could be a reflection of whether subjects from the race groups studied in Africa (Indians, Coloureds and Blacks) have sufficient access to health services or not. Access to health services in Africa is probably dependant on where the subject resides (ie. urban or rural) as well as on their cultural background (ie. their views, perceptions and experiences with western allopathic medicine).

Although this study and that of Van der Meulen's (1997) were conducted in urban settings, the level of development of the infrastructure in the South African health system in these areas could probably not be comparable to that in the USA In addition the health-educational status of the average South African citizen might also not compare to that of Americans. The results obtained from the Indians and Coloureds were most definitely affected by the factors mentioned by Reisbord and Greenland (1985).

5.5.4. Job Change Or Loss Due to Low Back Pain

The results reported in **section 4.7.4.** indicated that three times as many Coloureds required a job change due to low back pain as compared to Indians (9.8% of Coloureds versus 3.5% of Indians). In addition, 5% of Coloured subjects reported that they lost their jobs due to low back pain while the same figure for Indians was 1.7%.

It is possible that more Coloured subjects lost their jobs due to low back pain because of the higher rate of work absence observed among them as discussed in **section 5.5.2.**

Van der Meulen (1997) found that in the Black community of Chesterville only 2.5% of respondents had ever lost or changed their jobs due to low back pain. This was a combined figure and not reported separately as in this study. If the figure was separated individually into the number of subjects that lost their jobs and the number of subjects that changed their jobs, the figures for each category might be lower than those reported in this study. The difference in the figures between Van der Meulen's (1997) study this study could be due

to different types of jobs held by members in the different race groups. Individuals employed in menial jobs are more likely to be dismissed from their jobs if they are unable to work due to low back pain compared to individuals doing a job of a clerical or managerial nature. Medical insurance benefits also play a role in the absence from work as reported by Sandersson et al. (1995). The medical insurance schemes could be abused by claiming unnecessarily, or they could psychologically predispose subjects to prolong episodes of low back pain in order to gain insurance benefits. This will increase the rate of absence from work.

Masset and Malchaire (1994) reported in a Belgian study that 1.7% workers changed their jobs at least once due to low back pain. This was much lower (almost more than half) than the findings among the Indians and Coloureds (3.5% and 9.8% respectively). However if the figures are considered as a proportion of the total sample (500) then the percentage for job loss among Indians concurs with the Masset and Malchaire (1994) study and that of the Coloureds is significantly reduced to half that of the Masset and Malchaire (1994) study.

5.5.5. Bed Rest Due to Low Back Pain.

This study revealed that 88% of low back pain patients in the Indian community were never bed-ridden due to low back pain. Of the 12% who required bed-rest, 3% stayed in bed for a week or less and the remainder for different lengths of time more then one week. There were 5% more Coloured low back pain patients who required bed-rest (17% in total) as

compared to the Indian sample. Of these, 9%-the majority, were in bed for a week or less and the remainder for different lengths of time more than one week (**section 4.7.5.**).

This apparent discrepancy between races could be due to different communities having different perceptions of illness behaviour (i.e. Bed-rest or not). People of the different race groups may care for ill members of the family in different ways. For example, an individual living with a large family in a small house, may find it difficult to stay in bed, or may feel obliged not to inconvenience others who may have to care for them. On the other hand, an affluent individual may be able to take full bed rest and have a care-giver in attendance.

Van der Meulen (1997) reported that among the prevalence group in the Black community studied, 28.2% were bed-ridden (ie. required complete bed-rest) and 71.8% never needed bed-rest for low back pain. This figure was considerably higher than that found among the Indians and Coloureds (12% and 17% respectively) as described in **section 4.7.5.** Roncarati and McMullen (1988) also reported a relatively high frequency of bed-rest among low back pain suffers. However, the percentage of individuals that were bed-ridden among the Indians and Coloureds was not as high as that found among the Blacks by Van der Meulen (1997).

5.5.6. Source of Past and Present Treatment for Low Back Pain

The results of this study as reported in **section 4.7.6.** and **Table 7** revealed that most people from both communities sought treatment from a General Practitioner (47.6% for Indians and 47.5% for Coloureds). Double the percentage of Coloureds also sought treatment form a

State Hospital as compared to Indians (36.1% and 17.6% respectively). Indians seemed to visit Physiotherapists more than Coloureds (14% and 7% respectively). Almost an equal percentage of Indians and Coloureds visited Orthopaedic specialists. This could be as a result of accessibility of the different professionals who are involved in the treatment of low back pain and affordability also. These were the main sources of treatment for both communities. Other disciplines were rarely utilized as sources of treatment.

Sydenham is much closer to a large State Hospital than Isipingo Beach. Thus, the Coloured group could have easier access to the State Hospital than Indians, which could be a reason for the higher percentage of Coloureds using the State Hospital (second only to their General Practitioner) as compared to Indians. Isipingo Beach has a few privately practising Physiotherapists and this could explain the high use of Physiotherapy among Indians. There are no Chiropractors situated in either of the suburbs or even nearby that patients could visit.

Carey and Evans et al. (1995) found in their study on low back pain in North Carolina, USA that 73% of those affected by back pain saw a health care provider. Of those who sought care, 91% saw a medical doctor, 29% saw a physical therapist and 25% saw a Chiropractor. The use of technology was extensive: 37% received computer tomography scan, 25% received a magnetic resonance imaging scan and 10.4% underwent surgery. This could reflect the heavy use of technology in other parts of the world where back pain is prevalent.

Van der Meulen (1997) found that in the Black community of Chesterville, 25.5% of people that were receiving some sort of treatment for low back pain purchased medication from the pharmacist or shops and 13.6% of people reported receiving treatment for low back pain

from State Hospitals. This figure was comparable, although 4% lower, to the 17.6% of people that used the State Hospital for treatment from among the Indians in this study. However the Coloured sample had almost triple (36.1%) the number of people using State Hospitals. The Indians and Blacks had rates of State Hospital use that were in keeping with the findings of Nagi et al. (1973) who reported that 18.8% of people suffering from low back pain had been to a hospital for treatment. The use of high technology at such institutions (State Hospitals) could also be as prevalent in South African State Hospitals as Carey and Evans et al. (1995) have explained. State Hospitals are government subsidised institutions and thus the price that the patient pays at these state aided hospitals is a fraction of what privately owned hospitals charge. The high use of expensive technology in the investigation, diagnosis and treatment of low back pain could be costing the government an enormous amount of money annually.

Deyo and Tsui-Wu (1987) found that of the 1 516 individuals who had lower back pain and visited a health professional, 58.6% visited a General Practitioner, 36.9% visited a Orthopaedist, 30.8% visited a Chiropractor, 13.8% an Osteopath and 7.6% and 2.5% visited Internists and Rheumatologists respectively. These rates were much higher than what was found in this study.

The level of care seeking found in the present study may not be as high as reported by the Deyo and Tsui-Wu (1987) and Carey and Evans et al. (1995), but with regard to racial differences, it can be concluded that the majority in both races depend equally on their General Practitioners but a larger percentage of Coloureds as compared to Indians also depend on the State Hospital for treatment. This can be due to the problems of perceptions

and accessibility as explained by Reisbord and Greenland (1985) in that different race groups might have access to different disciplines for treatment and may perceive each discipline accordingly. Access includes financial and physical (transport, location). Thus if a hospital or clinic is expensive or located far away, residents may not use it.

When it came to Chiropractors as sources of low back pain treatment, 4.4% of Indians and only 1.7% of Coloureds sought treatment from them. These figures were much lower than those reported by Carey and Evans et al. (1995) (25%) and Deyo and Tsui-Wu (1987) (30.8%). The reasons for this wide variation compared to international studies are probably in line with Reisbord and Greenland (1985) explanation as reported a few's paragraphs above regarding the factors affecting the decision to seek medical care. The establishment of the Chiropractic profession in the Indian and Coloured communities in South Africa is still underdeveloped. Hence access to these types of professionals is highly limited in these areas.

5.5.7. Medication for Low Back Pain, its Source and Effectiveness

As stated in **section 4.7.7.** and **Table 8** about a third of the Indian subjects and a quarter of the Coloured subjects were on medication for their low back pain. Deyo and Tsui-Wu (1987) reported that with regard to medication for low back pain, aspirin was used by 58.2% of subjects. However their study only enquired about aspirin use. Thus a proper comparison cannot be made.

As reported in **section 4.7.6.** and **Table 7**, a smaller percentage of Indians sought treatment from a State Hospital compared to the Coloureds, hence the sources of medication were distributed respectively (**section 4.7.8.** and **Table 9**). Although the General Practitioner was used as a source of treatment by the majority of subjects in both groups, the majority of Coloureds received their medication from the State Hospital.

According to Van der Meulen (1997) most Black people in his study received their treatment/medication from the community clinic (36.4%) and the rest (25.2%) received their medication from chemists or shops. Only 13.6% depended on State Hospitals for medication/treatment. Just under 8% received medicine/treatment from medical doctors. It was not possible to compare these results because the Van der Meulen (1997) study combined the source of treatment and medication as one while this study attempted to separately ascertain the source of medication for low back pain.

From among the Coloureds 85.5% of people said that their medication was effective compared to 75.4% of Indians (**section 4.7.9.** and **Table 10**). These figures were not very different between the two groups in that they formed the majority of cases. According to Deyo and Tsui-Wu (1987) the success rate ranged from 70% to 85%. The results found were therefore in concurrence with this finding.

5.5.8. Cost of Medication and Treatment for Low Back Pain

As stated in **section 4.7.10.** and **Table 11** The majority of subjects in both communities paid between R1 - R30 for their medication per month (49.2% of Indians and 47.2% of Coloureds). Van der Meulen (1997) found that among the Blacks 52.4% paid less than R25 a month This was not very different form the results of this study. However, the Van der Meulen (1997) study did not separate the cost of the medication from that of treatment (consultations and other modalities used besides medication) hence a direct comparison was not possible. It was also not possible to compare these findings with other international studies due to different currency values.

5.5. The Degree to Which the Results Were Representative of the Populations of Study

The data were collected using the Systematic Random Sampling method as outlined in Chapter three. This method was used until 500 subjects had been interviewed per community (i.e. 1 000 in total). Therefore the data collected had a good random spread of subject profiles in each community. The Overall Percentage of Correct Classification of the estimated Logistic Regression model was 89.2%. This indicates that the Logistic Regression model also fitted the data adequately. The vast majority of people were compliant and a negligible number of residents in either community declined to be interviewed. It can therefore be assumed that the data collected from the two populations (Indians and Coloureds) were adequately representative of the two communities under investigation.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

The results of this study showed that a large proportion of individuals in the Indian and Coloured communities had, at some time in their lives, experienced low back pain. The lifetime incidence of low back pain in Indians was 78.2% and in Coloureds it was 76.6%. This depicts that more than three quarters of the adult population in these communities had at some point in their lives experienced low back pain. Frymoyer et al. (1983) and Casidy and Wedge (1984:4) reported similar rates for the lifetime incidence of low back pain (between 60% and 80%) in their studies conducted in the North American region. Heliovaara et al. (1989) also reported a 75% prevalence rate in their study conducted in Finland, Europe.

In a study conducted in South Africa in the Black community, the first of its kind, by Van der Meulen (1997) it was found that the lifetime incidence of low back pain was 57.6%. This was much lower than the results of this study. More studies of a larger and more compatible scale need to be done in similar communities (i.e. Blacks, Coloured and Indians) in South Africa in order to facilitate much more accurate comparisons of the various factors associated with the epidemiology of low back pain. Mulimba (1990) reported in the East

African Medical Journal in an article entitled "The problems of low back pain in Africa" that not much is known about the epidemiology of low back pain on the African continent because most of the emphasis is on the infective disorders of the spine. The present study and the one conducted by Van der Meulen (1997) address this discrepancy directly.

The prevalence of low back pain was found to be 45% in Indians and 32.6% in Coloureds, a difference of 12.4%. This depicts that just under half of the people in the Indian and almost a third of the Coloured communities studied were suffering from low back pain at the time of interview. The difference in prevalence rates could be due to genetic and racial factors. More studies are required to address this. The racial difference in low back pain prevalence was also reported by Deyo and Tsui-Wu (1987) in America where Whites had the highest prevalence (14.2%) followed by Blacks (11.4%) and then other race groups (9.3%).

Van der Meulen (1997) found that the prevalence rate was 53.1% in Blacks in South Africa. However, one of the limiting factors in comparing various studies accurately is that of different definitions used. The difference in prevalence rates could also stem from the fact that the race groups could be involved in dissimilar occupational activities. This is relevant in the South African context from a historical perspective. Reisbord and Greenland (1985) suggested that factors such as employment status, educational status, and other socioeconomical factors could have an effect on the incidence and prevalence rates of low back pain.

It was evident from the results reported by various studies in other continents that low back pain is a global problem of great concern. Future studies should concentrate on comparisons of the epidemiology of low back pain between different countries and regions not only in the Southern African region but on the entire African continent just as it is done in Europe and America. Thus more public awareness and education programmes are required to inform people of the effects of low back pain and how it can be avoided.

The majority of people in both the Indian and Coloured communities reported that their low back pain started in the 21-30 age category (43% and 31% respectively). Among the Coloureds however, there were 30% who reported the onset of low back pain in the 16-20 age category. It can be concluded that many more people from the Coloured community started suffering from low back pain at a younger age. Van der Meulen found that most subjects in his study (45%) had their first experience of low back pain in the 20-39 age category. Individuals should be educated about the causes and prevention of low back pain at a younger age (e.g. at school or when starting employment). This will enable the younger generation to become more aware of the problem and its effects in later life. It could be a source of intervention for lowering the rate of low back pain.

Generally, most of the subjects in the Indian community suffered from moderate low back pain (43%) while the majority of Coloured subjects suffered from mild pain (40%). However, a higher proportion of Coloureds suffered from severe low back pain than Indians (32% as opposed to 24%). The Coloured sample had the highest proportion of subjects that were suffering from severe low back pain even when compared to the Black community in the Van der Meulen (1997) study (23.4% of Blacks suffered from severe low back pain). It can

be concluded that the Coloured community of South Africa have a larger proportion of people that suffer from severe low back pain than the Indians and Blacks. It should also be mentioned that these results and conclusions would have been more accurate if an objective scale had been used to measure intensity of low back pain in order to exclude the possible bias that could arise from different perceptions.

Age was found to be significantly ($p<0.05$) related to the severity of low back pain in the Coloureds but not among the Indians ($p>0.05$). It was found that as age increased so did the number of people suffering from severe low back pain in the Coloured sample. The peak was in the 41-45 age category. Thereafter the level of individuals with severe low back pain was more prominent than in the categories of age before 41. Thus it can be concluded that as age increases so does the risk of getting low back pain of a more severe nature.

Gender was found to be significantly ($p<0.05$) related to the severity of low back pain but only among Indians. There were more females in both race groups that had severe low back pain than males. It can be concluded that Indian females are more prone to getting low back pain of a more severe nature.

The number of children an individual (male or female) had appeared to be significantly ($p<0.05$) associated with the severity of low back pain in both Indians and Coloureds. Logistic regression analysis showed that as the number of children increased (especially beyond 3) the odds of getting severe low back pain were equal to 0.7810 or 78%. No plausible explanation for this relationship could be found.

The number of pregnancies that a female had was found to be significantly ($p<0.05$) related to the severity of low back pain in Indian and Coloured females. Logistic regression analysis revealed that as the number of pregnancies increased (especially beyond 4) the odds of having severe low back pain were equal to 0.7423 or 74.23%.

The severity of low back pain appeared to be significantly ($p<0.05$) influenced by the level of education that a subject in either of the race groups possessed. The results depicted that there were more people with a lower educational standard (none, primary and incomplete secondary schooling) that suffered from severe low back pain than those with a higher level of education (matric or tertiary education.). This was the case in both the race groups. Logistic regression analysis revealed that when the level of education decreased, then the odds of developing severe low back pain were equal to 0.7597 or 75.97%. The reason for this could be that people with a lower educational status hold jobs of a more manual and laborious nature which could in turn affect their musculoskeletal health.

This study did not quantify the weight of loads lifted while working. It was left to the individual's discretion to decide as to wether they felt that they were lifting heavy objects at work. It was, however, found that lifting heavy objects was significantly ($p<0.05$) associated with the severity of low back pain among the Indians but not among the Coloureds. The majority of people in the Indian community that reported severe low back pain said that they routinely lifted heavy objects as part of their occupations. Frymoyer et al. (1983) reported similar results. It is therefore essential for employers to make certain that the jobs offered (especially those involving lifting) are ergonomically designed to prevent musculoskeletal morbidity to the employee.

Driving for long periods was found to be significantly ($p<0.05$) associated with the severity of low back pain in both the Indians and Coloured groups. Logistic regression analysis also revealed that when the length of time spent driving increased, then the odds of having severe low back pain were equal to 0.5319 or 53.19%. There were more people in both race groups that drove for long periods and had severe low back pain than in the mild and moderate categories. Frymoyer et al. (1983) also reported similar results.

The individual's perception as to whether their jobs made them vulnerable to developing low back pain was also found to be significantly ($p<0.05$) related to the severity of low back pain. The severe category of low back pain intensity was made up mostly of people that answered yes to this question. Logistic regression analysis revealed that people who perceived their jobs as making them vulnerable to developing low back pain were more likely to develop severe low back pain by a factor of 0.6566 or 65.66%.

In the Coloured prevalence sample it was found that the majority of individuals that did no exercise reported having severe low back pain. The amount of time spent doing exercise was significantly ($p<0.05$) associated with the severity of low back pain only in the Coloured community. Many people that exercised for between 7-9 hours per week and had low back pain reported their pain as severe in nature. It seems that no exercise or exercise of between 7-9 hours could be a triggering factor in giving Coloured subjects severe low back pain. Van der Meulen (1997) found that Black people that did no exercise were more prone to developing low back pain than those that did exercise.

The individual's perception as to their access to health services (i.e. yes or no) was related to the severity of low back pain ($p<0.05$) among Indian subjects but not among Coloured subjects. Each category of low back pain intensity in the Indians had a majority of subjects that had access to health services including the severe category. The reason for this could be as explained earlier, that due to the low back pain they made an effort to gain access to some health facility to seek help.

The factors found to be significantly related to low back pain severity should be addressed accordingly. Subjects with and without low back pain should be educated with respect to driving for long periods, lifting heavy objects, gaining access to health services, number of children, number of pregnancies, educational status and the other factors related to severity of low back pain. Information about the above factors could help reduce the disability level and help prevent successive generations from developing severe low back pain.

The daily activities that people in both communities found difficult to do were (in descending order of difficulty) bending, lifting, sitting, standing, walking, wearing clothing and driving. Van der Meulen (1997) reported the same pattern of difficult activities in the Black community. The majority of people in the Indian community felt that their overall difficulty level due to low back pain was mild (47%) and 52% of Coloureds reported the same. Eight percent of people in both race groups reported severe disability. Nevertheless many subjects' lives are affected in some way or other because of low back pain since the activities mentioned are carried out daily. Occupational therapy for individuals with severe disabilities could help them doing daily activities with much more ease without causing more harm.

There were 22% of Indians who said that they had to stay away from work due to low back pain and 36% of Coloureds stayed absent from work. Among the Blacks in Van der Meulen's (1997) study 18% were absent from work due to low back pain. The Coloureds thus had the highest rate of work absence between the three race groups. However a large proportion of subjects in all three races had to stay away from work due to low back pain.

In the Coloured community many subjects' employment was affected in the form of loss of work or a job change due to low back pain even when compared to the Blacks in Van der Meulen's (1997) study. Thus from an employment point of view Coloureds seemed to be affected the most due to low back pain.

Employers and medical personnel need to be educated about when work absence or bed rest is indicated for low back pain. Insurance systems that are being abused should be tightened with respect to payouts for minor or non-organic (malingering) causes of low back pain.

In the Indian community 12% of people took bed-rest for a period for low back pain while in the Coloured community this figure was 17%. Among the Blacks Van der Meulen (1997) found that 28.2% were bed-ridden for low back pain. Roncarati and McMullen (1988) also reported a high frequency of individuals that took bed rest for low back pain. It can be concluded that a fair amount of people had to take bed rest for low back pain in all three race groups with the Blacks having the highest percentage followed by Coloureds and lastly Indians. The difference in percentages could be due to different perceptions among the three race groups of what needs to be done during illness and what level of care should be applied.

The rate of smoking was substantially higher in Coloureds than in the Indians. There were also many more female smokers in the Coloured sample than in the Indian sample. However, smoking was not found to be associated with the severity of low back pain in this study. Much controversy exists in the literature regarding smoking and low back pain. Many studies have reported that it is associated with an increased prevalence of low back pain while still many others found exactly the opposite. The study of Van der Meulen (1997) also found no significant association between smoking and an increased risk of getting low back pain. More studies specifically targeting this issue are required to clear up the apparent controversy that exists around the subject. Anti-smoking campaigns already in place at whatever level will most certainly help in ameliorating the problem of low back pain if a direct link can be established between smoking and low back pain.

In the Indian community there were 23% of people that were being treated for low back pain compared to 26% of the Coloured group. This indicates that about one fifth of the prevalence samples in both race groups was receiving some sort of treatment for low back pain. Van der Meulen (1997) found that 25.5% of Blacks were being treated for low back pain at the time of the study. This indicates that the level of care seeking in all three race groups was fairly high. The majority of subjects in both race groups sought treatment from their General Practitioner. However, among the Coloureds there was a large percentage of subjects that received treatment from a State Hospital (36.1% as opposed to 17.6% of Indians). Among the Indians the next greatest source of treatment (following the GP (47.6%) and State Hospital (17.6%)) was the Physiotherapist (14.1%) which was hardly used by Coloureds (6.8% only). A possible reason for these varied figures is that of accessibility of the services. The Coloureds seem to have more access to the State Hospital than Indians,

while the Indians have more access to a Physiotherapist. This makes sense in that a State Hospital was found fairly close to the area in which the Coloureds resided while it was almost double the distance from the Indian community. Nevertheless it can be concluded that the level of care-seeking among individuals with low back pain is relatively high in the race groups studied in this study and in that of Van der Meulen's (1997) study.

There were 29% of Indians and 25.8% of Coloureds that were taking medication for low back pain. Deyo and Tsui-Wu (1987) found that 58.2% of subjects in their study were using aspirin as medication. However, this question in the present study concentrated mainly on what the source of medication was. Among Indians the greatest source of medication was the General Practitioner while among the Coloureds it was the State Hospital. A high percentage of Coloureds (21.4%) were self-medicating while less than half the Indians (10.1%) were on self-medication. Van der Meulen combined the factors of treatment and medication and hence a direct comparison was not possible. However, it can still be concluded that a high proportion of people are taking some sort of medication for low back pain in all three race groups.

Eighty five percent of Coloureds and 75.4% of Indians found that the medication was successful. Just less than half of both communities paid between R1- R30 a month for their medication. A high proportion (22%) of Indians could afford paying more than R100 a month for medication while only 10% of Coloureds paid as much. This could be due to the fact that Coloureds relied more heavily on the State Hospital which charges a nominal fee per visit. It appears as though more Indians could afford paying a higher fee for medication every month than the Coloureds.

Access to health services and cost of treatment and medication could have an effect on the progress of low back pain in sufferers. Therefore clinics that deal specifically with low back pain will be of tremendous help to the two communities. The clinics could be mobile or permanent depending on the demand and should be situated such that access is available to all. These clinics should be equipped to deal specifically with all aspects of low back pain.

6.2. Recommendations.

There exists a need for more information regarding the epidemiology of low back pain in Indians and Coloureds in the various regions of South Africa. Comparisons between race groups in such studies will reveal valuable information about racial differences and low back pain prevalence and incidence. Van der Meulen (1997) also recommended that more studies be done among the Black community. It will be a valuable exercise to compare the epidemiology of low back pain in Black South Africans to that of Blacks in other regions of the African continent. Similarly the comparison of the epidemiology of low back pain of Indians in South Africa to that of Indian communities settled in other parts of the globe (e.g. England, Zambia, Canada, Barbados and Indian nationals of the Indopak continent) will reveal valuable information. The Coloured community of South Africa has a unique gene pool that is probably indigenous only to Southern Africa. This is a legacy of South Africa's colonial history. Studies should be conducted in the various areas with a high density of Coloured communities.

Future studies should be conducted with much larger sample sizes. This will lead to more powerful conclusions. It is also very important that all types of studies mentioned above be similar in design. The questionnaires of comparative studies should be compatible with each other with respect to the categories (possible choices or answers) in each variable of study. Definitions of factors such as incidence, prevalence, severity, costs, occupational classifications, time series of certain variables should be the same. This will facilitate valid, and more compatible comparisons.

Certain factors such as the weights of loads lifted while at work, should be quantified to create objectivity and should not be left to the individual's discretion. The intensity and disability level of low back pain should also be "measured" using a tested objective scale (such as the McGill pain questionnaire and the Oswestry pain and disability index) and future studies should remain consistent with these factors to facilitate later comparisons if necessary. Variables of study such as cost of medication and treatments should be in similar scales.

The high level of care seeking in both communities means that a lot of stress is probably being placed on already strained health services. There are also many people that are on medication which is being prescribed by their local GP or that they are taking by themselves. Low back pain of a mechanical nature needs physical therapy (such as the type used by the Chiropractic profession) as part of the intervention. Many studies (Carey et al. (1995), Hurwitz et al. (1994), Meade et al. (1995)) have proved the effectiveness of chiropractic in the management of mechanical low back pain. However, very few people from both communities make use of Chiropractic care. This might be due to a lack of education about Chiropractic in these communities and also because of a lack of access to the profession.

It is therefore recommended that firstly, the public in such areas be educated about the benefits of Chiropractic care by means of all the media available. This will be more effective and will reach a larger audience in the community. Secondly, some sort of access point should be created in the health systems already in place in the communities to allow the chiropractic profession to be accessible to all. Similar recommendations were made by

Van der Meulen (1997). In this way the profession can be promoted but more importantly,

it can be a means of creating specialized musculoskeletal care facilities in communities, which in turn can help alleviate the burden that low back pain puts on the already over-taxed health system.

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APPENDIX A
CODED QUESTIONNAIRE (6 pages)

An Epidemiological Investigation of Low Back Pain.

BACKGROUND INFORMATION

IDENTIFYING INFORMATION

Questionnaire Number _____
Date of Interview (___/___/___)

GENERAL INFORMATION

1. How old are you ? (years). 18-25 (_1_) 51-55 (_7_) 81-85 (_13_)
26-30 (_2_) 56-60 (_8_) 86-90 (_14_)
31-35 (_3_) 61-65 (_9_) >90 (_15_)
36-40 (_4_) 66-70 (_10_)
41-45 (_5_) 71-75 (_11_)
46-50 (_6_) 76-80 (_12_)

2. Gender Male (_1_) Female (_2_)

3. Height (centimeters)
0-100 (_1_)
101-125 (_2_)
126-150 (_3_)
151-175 (_4_)
176-200 (_5_)
>200 (_6_)

4. Weight (kilograms)
0-25 (_1_) 101-125 (_5_) >200 (_9_)
26-50 (_2_) 126-150 (_6_)
51-75 (_3_) 151-175 (_7_)
76-100 (_4_) 176-200 (_8_)

5. Race Indian (_1_) Coloured (_2_)

6. Marital Status
Married (_1_)
Single (_2_)
Divorce (_3_)
Separated (_4_)
Widowed (_5_)
Cohabiting (_6_)

7. Number of children N/A (_1_) 4 (_5_) 8 (_9_)
1 (_2_) 5 (_6_) 9 (_10_)
2 (_3_) 6 (_7_) 10 (_11_)
3 (_4_) 7 (_8_) >10 (_12_)

8. Number of pregnancies

N/A (_1_)	4 (_5_)	8 (_9_)
1 (_2_)	5 (_6_)	9 (_10_)
2 (_3_)	6 (_7_)	10 (_11_)
3 (_4_)	7 (_8_)	>10 (_12_)

9.Highest level of education

Primary school	(_1_)	Tertiary	(_5_)
High school	(_2_)	Other	(_6_)
Matriculated	(_3_)		
No Formal education	(_4_)		

10. Present occupational status

Self-employed	(_1_)	Employed (full-time)	(_5_)
Unemployed	(_2_)	Employed (part-time)	(_6_)
Retired	(_3_)	Student	(_7_)
Housewife	(_4_)		

11.If unemployed or retired, what occupation were you in for the longest period previously?

Liberal profession	(_1_)	Managerial	(_8_)
Businessman	(_2_)	Clerical	(_9_)
Artisan	(_3_)	Labourer	(_10_)
Farmer	(_4_)	Skilled worker	(_11_)
Unskilled worker	(_5_)	Student	(_12_)
Housewife	(_6_)	Educator	(_13_)
Salesman	(_7_)	N/A	(_14_)

12. What was the duration of the above occupation ?(years)

0-5	(_1_)	21-25	(_5_)
6-10	(_2_)	26-30	(_6_)
11-15	(_3_)	> 30	(_7_)
16-20	(_4_)	N/A	(_8_)

13. If employed what type of work do you do ?

Liberal profession	(_1_)	Managerial	(_8_)
Businessman	(_2_)	Clerical	(_9_)
Artisan	(_3_)	Labourer	(_10_)
Farmer	(_4_)	Skilled worker	(_11_)
Unskilled worker	(_5_)	Student	(_12_)
Housewife	(_6_)	Educator	(_13_)
Salesman	(_7_)	N/A	(_14_)

14. For how long have you been in this occupation ?(years)

0-5	(_1_)	21-25	(_5_)
6-10	(_2_)	26-30	(_6_)
11-15	(_3_)	> 30	(_7_)
16-20	(_4_)	N/A	(_8_)

15. Does your occupation involve any of the following

Lifting heavy objects	(_1_)	Driving for long periods	(_1_)
Standing for long periods	(_1_)	Causes your body to vibrate	(_1_)
Sitting for long periods	(_1_)	Lying on your back for long periods	(_1_)

16. Do you feel that your job makes you vulnerable in any way to get low back pain ?

Yes (_1_) No (_2_)

17. Total annual income of interviewee alone.

R1 - R5000	(_1_)	R45001 - R55000	(_6_)	> R95000	(_11_)
R5001 - R15000	(_2_)	R55001 - R65000	(_7_)	N/A	(_12_)
R15001 - R25000	(_3_)	R65001 - R75000	(_8_)		
R25001 - R35000	(_4_)	R75001 - R85000	(_9_)		
R35001 - R45000	(_5_)	R85001 - R95000	(_10_)		

18. Are you suffering from or have suffered in the past from any serious disease or illness ?

Muscular system	(_1_)	Reproductive system	(_1_)
Nervous system	(_1_)	Endocrine system	(_1_)
Lymphatic system	(_1_)	Cardiovascular system	(_1_)
Haemopoetic system	(_1_)	Excretory system	(_1_)
Skeletal system	(_1_)	Skin	(_1_)
Psychiatric illness	(_1_)	Respiratory system	(_1_)
		Gastrointestinal	(_1_)

19. Do you smoke ? Yes (_1_) No (_2_)

20. How much do you smoke everyday ?

1-5	(_1_)	20-30	(_5_)
6-10	(_2_)	31-40	(_6_)
11-15	(_3_)	>40	(_7_)
16-20	(_4_)	N/A	(_8_)

21. For how long have you been smoking (years) ?

1-5	(_1_)	16-20	(_4_)	N/A (_7_)
6-10	(_2_)	21-30	(_5_)	
11-15	(_3_)	>30	(_6_)	

22. If you presently don't smoke but was a former smoker then how much did you smoke in the past ?

1-5	(_1_)	20-30	(_5_)
6-10	(_2_)	31-40	(_6_)
11-15	(_3_)	>40	(_7_)
16-20	(_4_)	N/A	(_8_)

23. How long ago did you quit (years) ?

1-5	(_1_)	16-20	(_4_)	N/A (_7_)
6-10	(_2_)	21-30	(_5_)	
11-15	(_3_)	>30	(_6_)	

24. For how long did you smoke before you quit (years) ?

1-5	(_1_)	16-20	(_4_)	N/A (_7_)
6-10	(_2_)	21-30	(_5_)	
11-15	(_3_)	>30	(_6_)	

25. Do you presently have a cough ? Yes (_1_) No (_2_)

26. For how long have you had it ? 0-6 mnths (_1_) 7mnths - 1yr (_2_) >1yr - 2 yrs (_3_) >2 yrs -3yrs (_4_) >3yrs (_5_) N/A (_6_)

27. Do you do any exercise ? Yes (_1_) No (_2_)

28. What type of exercise do you do most of the time ?

Running	(_1_)	Swimming	(_1_)	Squash	(_1_)
Soccer	(_1_)	Cricket	(_1_)	Aerobics	(_1_)
Rugby	(_1_)	Tennis	(_1_)	Yoga	(_1_)
Fishing	(_1_)	Cycling	(_1_)	Gymnastics	(_1_)
Boxing	(_1_)	Martial arts	(_1_)	Walking	(_1_)
Badminton	(_1_)	Weight training	(_1_)	Other	(_1_)

29. Number of exercise sessions per week/ combined if more than one sport is played.
1 (_1_) 2 (_2_) 3 (_3_) 4 (_4_) 5 (_5_) 6 (_6_) 7 (_7_) >7 (_8_) N/A (_9_)

30. What is the total amount of time spent each week doing exercise (hours) ?
< 1 (_1_) 1-3 (_4_)
4-6 (_2_) 7-9 (_5_)
>10(_3_) N/A(_6_)

31. If you played sport in the past, what sport/s or form of exercise did you do then ?

Running	(_1_)	Swimming	(_1_)	Squash	(_1_)
Soccer	(_1_)	Cricket	(_1_)	Aerobics	(_1_)
Rugby	(_1_)	Tennis	(_1_)	Yoga	(_1_)
Fishing	(_1_)	Cycling	(_1_)	Gymnastics	(_1_)
Boxing	(_1_)	Martial arts	(_1_)	Walking	(_1_)
Badminton	(_1_)	Weight training	(_1_)	Other	(_1_)

32. For how long were you involved in the above sport/s in the past (years)?
0-1(_1_) >1 - 2 (_2_) >2 - 3 (_3_) >3-4 (_4_) > 4 - 5 (_5_) > 5 (_6_) N/A (_7_)

33. Do you have medical aid ? Yes (_1_) No (_2_)

34. Do you feel that you have sufficient access to health services ? Yes (_1_) No (_2_)

35. Have you ever experienced low back pain ? Yes (_1_) No (_2_)

36. What was your age when you first experienced low back pain (years)?

0-10 (_1_)	11-15 (_2_)	16-20 (_3_)
21-30 (_4_)	31-40 (_5_)	41-50 (_6_)
51-60 (_7_)	61-70 (_8_)	71-80 (_9_)
81-90 (_10_)	>90 (_11_)	N/A (_12_)

37. Do you presently have low back pain ? Yes (_1_) No (_2_)

38. How long have you had low back pain ?
0-1(_1_) >1 - 2 (_2_) >2 - 3 (_3_) >3-4 (_4_) > 4 - 5 (_5_) > 5 - 10 (_6_)
11- 15 (_7_) 16-20 (_8_) >20 (_9_) N/A (_10_)

39. How severe is the pain ? Mild (_1_) Moderate (_2_) Severe (_3_) N/A (_4_)

40. At what time of the day is the pain at its worst ?
Morning (_1_)Afternoon (_2_)Evening (_3_) Night (_4_) Activity related (_5_) N/A (_6_)

41. At what time of the day is the pain at its least ?
Morning (_1_) Afternoon (_2_) Evening (_3_) Night (_4_) N/A (_5_)

42. How often do you experience low back pain ?
Seldom (_1_) Frequently (_2_) Constantly (_3_) Intermittently (_4_) N/A (_5_)

43. How did your low back pain begin ?
Gradually without injury (_1_) Abruptly without injury (_3_) N/A (_5_)
Gradually after injury (_2_) Abruptly after injury (_4_)

44. Progression of low back pain ?
Getting worse (_1_) Getting better (_2_) Staying the same (_3_) N/A (_4_)

45. Do you experience any difficulty in doing any of the following things as a result of your low back pain ?
Dressing (_1_) Walking (_1_) Sitting (_1_) Standing (_1_) Bending(_1_)
Lifting (_1_) Driving (_1_) Sleeping (_1_)

46. How would you rate your overall disability as a result of your low back pain.
Mild (_1_) Moderate (_2_) Severe (_3_) N/A (_4_)

47. Have you ever had to stay away from work as a result of low back pain ?
Yes (_1_) No (_2_) N/A (_3_)

48. For how long ? 0 - 1 week (_1_) >1 - 2 weeks (_2_) >2 - 3 weeks (_3_)
>3 - 4 weeks (_4_) >4 weeks (_5_) N/A (_6_)

49. Have you ever been bed ridden because of low back pain?Yes (_1_) No (_2_) N/A(_3_)

50. For how long ? 0 - 1 week (_1_) >1 - 2 weeks (_2_) >2 - 3 weeks (_3_)
>3 - 4 weeks (_4_) >4 weeks (_5_) N/A (_6_)

51.Have you ever had to change your job due to low back pain?Yes(_1_)No(_2_) N/A(_3_)

52. Have you ever lost your job due to low back pain ? Yes (_1_) No (_2_) N/A (_3_)

53. Were you ever treated for low back pain ? Yes (_1_) No (_2_) N/A (_3_)

54. Are you presently being treated for low back pain ? Yes (_1_) No (_2_) N/A (_3_)

55. Where are/were you treated for low back pain ?

General practitioner	(_1_)	State Hospital	(_1_)	Neurologist	(_1_)
Chiropractor	(_1_)	Physiotherapist	(_1_)	Neurosurgeon	(_1_)
Acupuncturist	(_1_)	Reflexologist	(_1_)	Other	(_1_)
Pharmacist	(_1_)	Orthopaedic Specialist	(_1_)		
Traditional healer	(_1_)	Homeopath	(_1_)		

56. For how long have you been receiving treatment for low back pain now ?

< 1 month (_1_) 1 - 6 months (_2_) 7 - 12 months (_3_)
> 1 year (_4_) N/A (_5_)

57. For how long have you been treated for low back pain in the past ?

< 1 month (_1_) 1 - 6 months (_2_) 7 - 12 months (_3_)
> 1 year (_4_) N/A (_5_)

58. Which treatment helped or is helping you to get the most amount of relief ?

General practitioner	(_1_)	State Hospital	(_1_)	Neurologist	(_1_)
Chiropractor	(_1_)	Physiotherapist	(_1_)	Neurosurgeon	(_1_)
Acupuncturist	(_1_)	Reflexologist	(_1_)	Other	(_1_)
Pharmacist	(_1_)	Orthopaedic Specialist	(_1_)		
Traditional healer	(_1_)	Homeopath	(_1_)		

59. Are you presently on any medication for low back pain ? Yes (_1_) No (_2_) N/A(_3_)

60. Who prescribed the medicine ?

General practitioner	(_1_)	State Hospital	(_1_)	Neurologist	(_1_)
Chiropractor	(_1_)	Physiotherapist	(_1_)	Neurosurgeon	(_1_)
Acupuncturist	(_1_)	Reflexologist	(_1_)	Other	(_1_)
Pharmacist	(_1_)	Orthopaedic Specialist	(_1_)		
Traditional healer	(_1_)	Homeopath	(_1_)		

61. Does the medication you receive for your low back pain help ?
Yes (_1_) No (_2_) N/A(_3_)

62. How much do you pay for the medication every month ?

R1 - R30 (_1_) N/A (_6_)
R31 - R60 (_2_)
R61 - R80 (_3_)
R81 - R100 (_4_)
>R100 (_5_)

63. Excluding the medication how much does your treatment cost you per month ?

R1 - R30 (_1_) N/A (_7_)
R31 - R60 (_2_)
R61 - R80 (_3_)
R81 - R100 (_4_)
R101 - R200 (_5_)
> R200 (_6_)

APPENDIX B

RECODING OF THE IMPORTANT VARIABLES OF STUDY FOR COMPUTING THE PEARSON CHI-SQUARE STATISTIC-(TABLE-3) AND FOR LOGISTIC REGRESSION ANALYSIS-(TABLE-5)

X_{39} = Severity of low back pain was renamed **Y**, the dependant variable of study.

Y = Severity where 1= Severe

0= Otherwise

X_1 = Age where 1= 31 or above

0= Otherwise

X_2 = Gender where 1= Female

0= Male

X_7 = Number of children where 1= 3 or more

0= Otherwise

X_8 = Number of pregnancies where 1= 4 or more

0= Otherwise

X_9 = Level of education where 1= High School or less

0= Otherwise

APPENDIX B

$X_{15.1}$ = Lifting heavy objects where 1= Yes

0= Otherwise

$X_{15.4}$ = Driving for long periods where 1= Yes

0= Otherwise

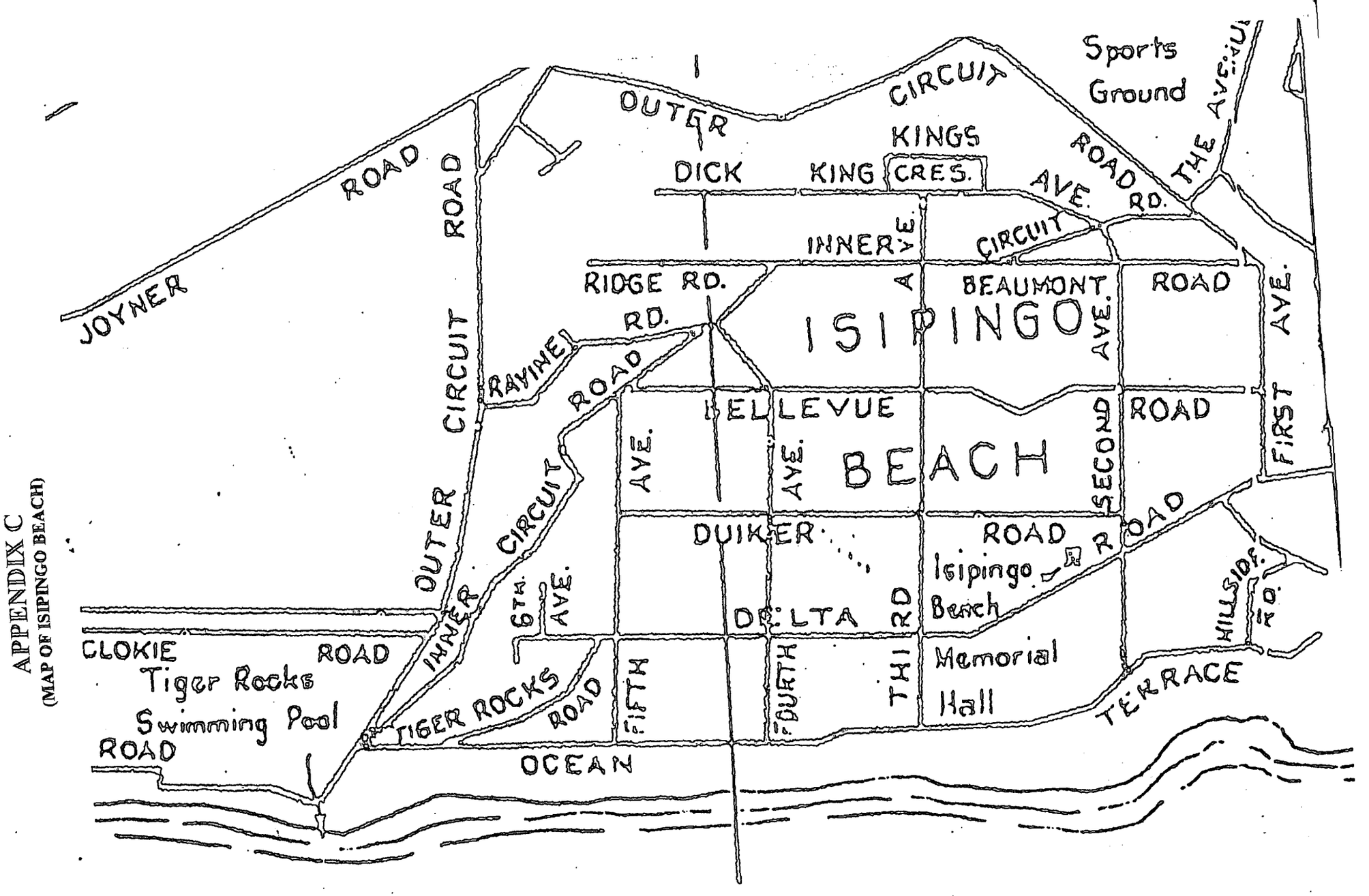
X_{16} = Job Vulnerability where 1= Yes

0= Otherwise

X_{34} = Access to health services where 1= Yes

0= Otherwise

APPENDIX C
(MAP OF ISIPINGO BEACH)



APPENDIX C

(MAP OF SYDENHAM)