The Prevalence And Risk Factors For Occupational Low Back Pain In Manual Therapists

BY

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"I, Nicole Pereira, declare that this dissertation is representative of my own work, both in conception and execution."

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DEDICATION

This is dedicated to my parents, Andy and Marthmary for all their hard work and sacrifice over the years. Thank you for always being there for me, for your patience, un-wavering support, encouragement and love. You gave me the security I needed to achieve this and I hope one day I'll be able to repay you for all you have done for me. I realize now more than ever that the most important and valuable gift in life is the love of your family…

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ABSTRACT

Manual therapists are susceptible to occupational low back pain. The aim of this study was to determine the prevalence and risk factors for occupational low back pain in manual therapists and to determine and compare the prevalence and risk factors for occupational low back pain among various types of manual therapists in South Africa.

This study was conducted as a cross-sectional survey and a self-administered questionnaire, developed from the literature and validated prior to the study, was mailed to 1500 randomly selected manual therapists, including: physiotherapists, occupational therapists, biokineticists, chiropractors, reflexologists, aromatherapists and massage therapists. A total of 233 completed questionnaires were returned, giving a response rate of 15.53%.

Results revealed that the point prevalence of low back pain in manual therapists was very high at 41%, the one-year prevalence was 59% and the career prevalence was 74%. The point prevalence of low back pain was highest in aromatherapists and biokineticists, while both the one-year and career prevalence of low back pain was highest in occupational therapists and massage therapists. The risk factors for low back pain in manual therapists were: BMI; previous abdominal surgery; previous trauma to the low back, hips, knees or ankles; a physically stressful job; not having an assistant and work in a hospital or other setting. In keeping with the literature, various work-related factors were implicated in the development and / or exacerbation of low back pain in certain manual therapists more than others and low back pain history in the different manual therapists was also in accordance with the literature.

To conclude, low back pain is prevalent among South African manual therapists and the development and implementation of preventative programs to reduce rates of occupational low back pain in manual therapists is mandatory.

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DEFINITIONS

AROMATHERAPY is a natural and holistic therapy that uses essential oils to treat mind, body and spirit. The effect on the mind is uplifting promoting calm, tranquillity, relaxation and sedation and on the body, is stimulating and assists the various bodily systems to function at optimal levels (Aromatherapy Society of South Africa, 2007). Essential oils follow three main pathways to gain entry into the body, they are: ingestion, olfaction and absorption through the skin (Price and Price, 1995). Massage is the most useful form of aromatherapy but the effects depend on the technical skill and knowledge of the masseur or masseuse. If applied properly an aromatherapy massage may stimulate all organs of the body, including the skin, muscles, nerves and glands. Body massage as applied by an aromatherapist can vary from soft, light and / or rhythmical stroking to bring about relaxation of muscles and nerves to heavy pounding and kneading to break up fatty areas (Price, 1999).

BIOKINETICISTS are specialised exercise therapists that function in professional alliance to health and medicine. A biokineticist is responsible for improving a person's physical status and quality of life through individualized assessment and exercise prescription (of both preventative or rehabilitative exercise) in the dual context of clinical pathology (acute or chronic) and performance enhancement. Biokineticists' scope of practice includes: assessment of morphological status, musculoskeletal status through isometric, isotonic and isokinetic testing, proprioception, range of motion, mechanics of motion and postural alignment, cardio-respiratory status, metabolic status, rehabilitation of pre-surgical orthopaedic and cardiac impairments, rehabilitation of non-acute, non-surgical and post-surgical orthopaedic, cardiac and cerebro-vascular impairments and specific applications in patients with chronic disorders (Biokinetics Association of South Africa, 2007).

BODY MASS INDEX (BMI) is calculated by taking an individual's weight in kilograms and dividing it by his / her height in metres squared. Overweight is indicated by a BMI >/= 25 and obesity is indicated by a BMI > 30 (Bickley and Szilagyi, 2003).

DISABILITY may imply the presence of illness, reduced capacity for activity and actual reduction in activity, or handicap. From a limited disease perspective, physical impairment causes disability but to understand disability, the entire clinical picture needs to be considered in detail (Waddell, 1999).

DISORDER is a physical condition in which there is a disturbance of normal functioning and physical health (The American Heritage Dictionary of the English language, 2003 and Word Net 3.0, 2008). Low back pain may thus be considered a disorder. [*See low back pain*].

DYSFUNCTION refers to difficult or abnormal functioning [Medicine Net Inc., 2008(a)] therefore; musculoskeletal dysfunction would refer to any difficult function or abnormal function of the musculoskeletal system.

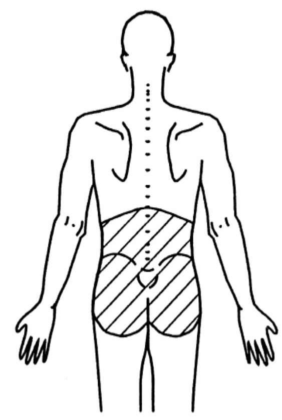
INCIDENCE is the percentage of a known population who develop new symptoms within a given time (Waddell, 1999).

INJURY is harm or hurt. The term “injury” may be applied in medicine to damage inflicted upon oneself as in a hamstring injury or by an external agent as in a cold injury. The injury may be accidental or deliberate, as with a needlestick injury. The term “injury” may be synonymous (depending on the context) with a wound or with trauma (Shiel, 2008). [*See low back pain*].

LIFETIME PREVALENCE is the percentage of people who can remember pain at some time in their life, whether or not they have it now (Waddell, 1999).

LOW BACK INJURY according to McGill (ACSM, 2001), most often occurs after a series of excessive loads gradually and progressively reduce tolerance to tissue failure. McGill proposes that relatively few low back injuries occur from a single event and that the injury process is also not always associated with loads of high magnitude (ACSM, 2001). About 80% of back injuries are short in duration, with pain and reduced function being experienced in the short-term. Occasionally the pain and suffering is long-term and sometimes even lifelong, leading to disability, loss of income, loss of independence and ultimately a diminished quality of life (Premier Inc., 2008). [*See low back pain*].

LOW BACK PAIN is defined in the Nordic Back Pain Questionnaire as any ache, pain or discomfort in the shaded area whether or not it extends from there to one or both legs (sciatica) (Kuorinka *et al.,* 1987). The shaded area is outlined on a body diagram and represents the area between the 12th rib and gluteal folds (Nyland and Grimmer, 2003). For the purposes of this study it was assumed that low back injuries or low back disorders would result in some form of low back pain. Low back pain, low back injury and low back disorders were thus considered synonymous. [*See disorder, injury, low back injury, pain, occupational low back pain and unspecified back pain*].



MANUAL HANDLING is defined as any activity requiring the use of force exerted by a person to lift, push, pull, carry or otherwise move, hold or restrain an animate or inanimate object (Cromie, Robertson and Best, 2001).

MANUAL TECHNIQUES in the context of the professions under investigation would include activities such as joint mobilization, soft tissue mobilization and manual resistive exercise (Bork *et al.,* 1996), as well as manipulation and massage (West and Gardner, 2001).

MANUAL THERAPIST is a term that is used broadly in this research study to encompass a number of health care professionals including physiotherapists, occupational therapists, biokineticists, chiropractors, reflexologists, aromatherapists and massage therapists. Although the scope of practice of the various manual therapy professions is fundamentally different, there are similarities. They all deal with patients who have impairments, functional limitations, disabilities or changes in physical function and health status.

Manual therapists use a hands-on approach in management of their patients with physical activities and interventions; they perform manual techniques in practice on a day-to-day basis and spend the majority of their time in direct patient contact (Sabonis-Chafee, 1989; Price and Price, 1995; A Guide to Physical Therapist Practice, 2001; Mackereth and Tiram, 2002; Cassar, 2004 and Biokinetics Association of South Africa, 2007).

MASSAGE THERAPY is described as the manipulation of soft tissues by a trained massage therapist for therapeutic purposes. The therapeutic value of massage extends beyond relaxation and includes additional therapeutic effects such as easing muscle tightness, increasing circulation and improving lymphatic drainage and peristalsis of the colon. Bodywork is a general term used to describe a number of soft tissue manipulative techniques that a massage therapist may use in addition to the traditional massage. Bodywork techniques include: the neuromuscular technique - where irregularities are palpated and stroking movements are then used to reduce nodules, tightness and sensitivity; ischemic compression on trigger points; frictions for fibrous adhesions; soft tissue manipulation to shift and modify the soft tissues so that they are stretched longitudinally or transversely, compressed, or lifted off the underlying structures; passive stretching; joint mobilization; muscle energy techniques to reduce muscle tension and stretch shortened muscles and post-isometric relaxation (Cassar, 2004).

MUSCULOSKELETAL DISORDERS are conditions in which a part of the musculoskeletal system becomes injured over time. The disorder occurs when the body part is called on to work harder, stretch further, impact more directly or otherwise function at a greater level than it is prepared for. The term musculoskeletal disorder is used to classify a large group of conditions that result from traumatizing the body in either a minute or major way over a period of time. It is the build up of trauma that causes the disorder, often focused on a joint but can also affect the muscle and bone as well as other areas, which may become strained and injured (Adams, 2006).

OCCUPATIONAL INJURY is defined by the United States Department of Labour (1992) as an injury that results from a work-related event or from a single instantaneous exposure in the work environment leading to death, lost work time, medical treatment other than first aid, loss of consciousness, work restriction or transfer to another job (Holder *et al.,* 1999 and Rupert and Ebete, 2004). Occupational injury may be referred to as work-related injury in this study. *[See work-related].*

OCCUPATIONAL LOW BACK PAIN is any ache, pain or discomfort in the low back region that the respondent feels was caused by their work as a manual therapist. Occupational low back pain may also be referred to as work-related low back pain in this study. *[See low back pain and work-related].*

OCCUPATIONAL RISK FACTORS for low back pain would be the occupational factors that are associated with an increased risk of developing low back pain e.g. heavy physical work, static or awkward work postures and whole body vibration. It is important to remember however, that low back pain is multifactorial in origin and may be associated with both occupational and non-work related, individual or psychosocial factors (Bernard *et al.,* 1997). Occupational risk factors may also be referred to as work-related risk factors in this study. *[See work-related].*

OCCUPATIONAL THERAPY is defined by the American Occupational Therapy Association (AOTA), as the use of purposeful activity with individuals who are limited by physical injury or illness, psychosocial dysfunction, developmental or learning disabilities, poverty, cultural differences and the aging process in order to maximize independence, prevent disability and maintain health. The practice of occupational therapy encompasses evaluation, treatment and consultation, with specific services including: teaching daily living skills; developing perceptual-motor skills and sensory integrative functioning; developing play skills and pre-vocational and leisure capacities; designing, fabricating or applying selected orthotic and prosthetic devices or selective adaptive equipment; using specifically designed crafts and exercises to enhance functional performance; administering and interpreting tests such as range of motion, and adapting environments for the handicapped. These services are provided individually, in groups or through social systems (Sabonis-Chafee, 1989).

ONE-YEAR PREVALENCE is the percentage of people who have pain at some time during that period (Waddell, 1999).

PAIN as defined by the International Association for the Study of Pain is, "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (McCulloch and Transfeldt, 1997). [*See low back pain*].

PHYSIOTHERAPISTS play a major role in provision of primary health care in terms of examination, evaluation, diagnosis, prognosis, intervention and outcomes. Procedural interventions used by physiotherapists in practice include the following: therapeutic exercise; functional training in self-care and home management (including activities of daily living); manual therapy techniques including mobilization, manipulation, manual traction, massage and passive range of motion; prescription, application and as appropriate fabrication of devices and equipment (assistive, adaptive, orthotic, protective, supportive and prosthetic); airway clearance techniques; electrotherapeutic modalities and physical agents and mechanical modalities such as cryotherapy, hydrotherapy, infrared, laser and ultrasound (A Guide to Physical Therapist Practice, 2001).

POINT PREVALENCE is the percentage of people who have pain now, on the day of the interview (Waddell, 1999).

POSTURE refers to the "overall positioning of the body", with standing and sitting being the two basic forms of posture in the workplace (Pope *et al.,* 1991). Posture is influenced by the task, workstation, working tools' design and the anthropometric characteristics of the workers and may be defined in various ways considering the biomechanical alignment, the spatial arrangement of body parts, the relative position between segments and the body attitude assumed to perform tasks (Vieira and Kumar, 2004).

PREVALENCE is the proportion of people in a known population who have a symptom or symptoms over a particular period of time (Waddell, 1999).

REFLEXOLOGY is a powerful form of health care and is useful in terms of achieving health and well-being by relieving symptoms of illness and disease. It is a means of maintaining homeostasis, aiding relaxation and enhancing the body's natural self-healing capacity. Reflexologists use a sophisticated system of touch, usually on the feet, but sometimes also on the ears, hands, face, tongue or back in which the area being massaged is thought to correspond to a map of the whole body. In this way, working on specific areas of the feet can influence other areas of the body, while a full treatment is in effect a full body massage (Mackereth and Tiram, 2002). Reflexology can be applied in various settings and it has been demonstrated to be particularly useful in the elderly, in pregnant women, children and in people with disabilities or special needs (Gould, 2005).

REPETITIVE STRAIN INJURIES OR REPETITIVE MOTION DISORDERS develop over periods of weeks, months or years and include a variety of symptoms (e.g. low back pain) related to the soft tissues of the musculoskeletal system that develop due to repeated exertions and movements of the body (Szabo and King, 2000).

RISK FACTORS are characteristics statistically associated with, although not necessarily causally related to, an increased risk of morbidity or mortality (Stedman's Medical Dictionary, 2006).

SPONDYLOLISTHESIS is the slipping forward of one vertebral body in relation to another vertebral body (Bradford, 1995). The aetiology of the majority of cases is unknown but there is a useful classification system that identifies 5 types: Type 1 – Dysplastic, Type 2 – Isthmic, Type 3 –

Degenerative, Type 4 – Traumatic and Type 5 – Pathologic (Wiltse, Newman and Macnab, 1976).

UNSPECIFIED BACK PAIN is pain that is felt in the low or upper back [Medicine Net Inc., 2008(b)]. Thus, although it may include low back pain it is not limited to low back pain only. [*See low back pain*].

WORK-RELATED was considered to be synonymous with "occupational" and these terms are used interchangeably in this study. *[See occupational injury, occupational low back pain and occupational risk factors].*

CHAPTER ONE

INTRODUCTION

1.1 THE PROBLEM AND ITS SETTING

Low back pain has an estimated prevalence of 80% (Manga, Angus and Swan, 1993) and is associated with exceedingly high societal costs (Waddell, 1999 and Simpson, Cholewicki and Grauer, 2006). Mechanical disorders are the cause in about 90% of cases with the remaining 10% of cases being due to a manifestation of systemic illness (Diamond and Borenstein, 2006). Anatomically the pain may originate from low back structures such as the facet joint capsules, ligaments, fascia, intervertebral discs, vertebrae, dura, nerve root sleeves and muscles (Waddell, 1999).

Low back pain is considered to be mechanical when symptoms arise from the musculoskeletal system and vary with physical activity (Waddell, 1999). When looking at factors which play a role in the pathogenesis of mechanical low back pain there are three major categories to consider; 1) emotional factors, 2) changes in muscle and 3) changes in facet joints and intervertebral discs (Kirkaldy-Willis, Burton and Cassidy, 1992). According to the concept of ‘functional pathology’ as described by Adams (2004), mechanical low back pain may develop because of postural habits generating painful stress concentrations within innervated tissues, even though the stresses are not high enough to cause physical disruption. Mechanical low back pain may therefore occur when structurally normal tissues become painful as a result of dysfunction arising in response to abnormal function. Musculoskeletal dysfunction may also be caused by direct trauma, by a single “over-exertion” or by repetitive or sustained loading (Waddell, 1999), with the two main mechanisms of injury in the lumbar spine being rotational and compressive forces in flexion (Kirkaldy-Willis *et al.,* 1992).

Based on the above pathogenesis criteria, it has been found that work activities and conditions may contribute to musculoskeletal disorders and in particular, the physical demands of health care occupations have been associated with high injury rates (Rupert and Ebete, 2004). Internationally, literature has, in accordance with this, revealed that occupational low back pain is prevalent among manual therapists such as physiotherapists (Holder *et al.,* 1999; Cromie, Robertson and Best, 2000; Rugelj, 2003 and Glover *et al.,* 2005) and chiropractors (Mior and Diakow, 1987 and Rupert and Ebete, 2004) and health care professionals such as nurses (Chiou, Wong and Lee, 1994; Smedley *et al.,* 1995; Yip, 2001 and Smith *et al.,* 2006).

Epidemiological studies have identified many individual, psychological and occupational risk factors for low back pain (Manek and MacGregor, 2005).

The individual risk factors which have been found to correlate with low back pain include: age (Bork *et al*., 1996); gender (Glover *et al.,* 2005); race (Docrat, 1999 and Vlok, 2005); anthropometric data such as weight, height (Van der Meulen, 1997) and body build (Vieira, Kumar and Narayan, 2005) and structural anomalies such as scoliosis and leg length inequalities (Tim, 1996 and Kovacs *et al*., 2003).

There also seem to be a high incidence of psychosocial problems reported by patients with low back pain [e.g. drug and alcohol abuse (Smith *et al.*, 2006), divorces and family problems (Pope *et al*., 1991)]. Psychosocial factors linked to low back pain in previous studies, have included: lack of exercise (Tim, 1996; Sjolie, 2004 and Vieira *et al.,* 2005), smoking (Vlok, 2005 and Vieira *et al.,* 2005), marital status, alcohol consumption (Smith *et al*., 2006), low job satisfaction (Pope *et al.,* 1991 and Van den Heuvel *et al*., 2004), stress and depression (Vlok, 2005) and excess weight (Vieira *et al.,* 2005). Whether these psychosocial factors are the cause or the result of the low back pain is difficult to ascertain (Pope *et al*., 1991) but psychosocial factors have been shown to play an important role in the transition from acute to chronic pain (Manek and MacGregor, 2005).

The occupational or work-related risk factors that have been associated with low back pain in manual therapists include: manual handling and performing manual therapy techniques (Bork *et al*., 1996 and Fyfe, 2006), lifting or transferring patients (West and Gardner, 2001), performing the same task repeatedly (Cromie, Robertson and Best, 2000), bending or twisting the back in an awkward way, working in the same position for prolonged periods (Glover *et al*., 2005), sitting for long periods of time (Fyfe, 2006), pushing and pulling (Pope *et al*., 1991), reaching and working away from the body (Tim, 1996) and responding to an unanticipated movement or sudden fall by a patient (Holder *et al*., 1999). In addition, lack of relaxation due to repetitive movements and sustained muscle contractions has been linked to the development of chronic low back pain in about 10% of cases (Ginanneschi *et al*., 2006). Other work-related factors that can increase the risk of low back pain are related to work history, work schedule (West and Gardner, 2001; Vlok, 2005 and Fyfe, 2006) and work / clinical setting [e.g. work in a hospital setting (Bork *et al.,* 1996) and neurological rehabilitation clinical setting (Glover *et al.,* 2005)]. A lack of staff (Cromie *et al*., 2001), incorrect table (plinth) height (Tim, 1996) and continuing to work when physically fatigued (Rupert and Ebete, 2004) may also play a role.

The development of occupational low back pain in manual therapists is of particular significance because it does not only have an impact on work efficiency but may also have an effect outside the work environment, at leisure and in activities of daily living (Docrat, 1999; Holder *et al*., 1999; Cromie *et al*., 2000 and West and Gardner, 2001). Hence it could be concluded that in addition to compromising patient care, the development of occupational low back pain in manual therapists will also jeopardize the therapist's quality of life, health and future prospects (Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005).

Therefore the aim of this study was to determine the prevalence and identify the risk factors for occupational low back pain in manual therapists in South Africa.

1.2 AIMS OF THE STUDY

The aim of this study was to determine the prevalence of occupational low back pain in manual therapists and to identify specific risk factors for occupational low back pain in manual therapists. The research also aimed to establish the prevalence and risk factors for occupational low back pain that existed in each group of manual therapists and to compare the different prevalence and risk factor profiles amongst the various manual therapists.

The first objective was to develop and pilot an appropriate questionnaire for manual therapists.

The second objective was the data collection and documentation with respect to:

- Patient demographics
- Risk factors
  - Individual risk factors
  - Psychosocial risk factors
  - Occupational or work-related risk factors
- Working history
  - Work schedule and work experience
  - Work activities / tasks
  - Ergonomic factors
  - Work / clinical setting
- Low back pain history

The third objective was to interpret the data to assess the strength of the relationships of the various factors documented in objective two, and between the different groups of manual therapists.

1.3 RATIONALE AND BENEFITS

Low back pain has been studied extensively in occupational settings (Tong *et al.,* 2003) and the health services sector in particular has been identified as a high-risk work sector for low back pain (Cunningham, Flynn and Blake, 2006). Increasing evidence has also suggested that manual therapists such as physiotherapists (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Rugelj, 2003 and Glover *et al.,* 2005) and chiropractors (Mior and Diakow, 1987; Tim, 1996 and Rupert and Ebete, 2004) and health care professionals such as nurses (Chiou *et al.,* 1994; Smedley *et al.,* 1995; Yip, 2001; Trinkoff *et al.,* 2003 and Smith *et al.,* 2004)) are susceptible to work-related musculoskeletal disorders. In manual therapists, occupational injuries such as low back pain may be attributed to; the frequent employment of techniques in practice that require force and postures that are disadvantageous to their spinal health (e.g. bending, twisting, reaching, pulling, pushing and lifting) (Mior and Diakow, 1987), high levels of patient contact and other variables in the health care environment (Holder *et al.,* 1999).

The approaches for dealing with low back pain in the general population have been mainly, to seek medical, chiropractic and physiotherapy treatment (Manga *et al.,* 1993). Therefore, the onset of occupational low back pain in manual therapists could have negative implications for the health care system in terms of severe occupational low back pain causing manual therapists to leave the profession or change specialty area (Cromie *et al.,* 2000 and West and Gardner, 2001). It will also have implications for the therapist's patients because if the manual therapist is suffering from low back pain personally it could adversely affect the efficiency of the service that he / she can provide to patients (Tim, 1996).

The importance of identifying the risk factors that make manual therapists susceptible to occupational low back pain therefore, lies predominantly in the need for prevention. Manual therapists such as physiotherapists often utilize manual handling activities and are subject to awkward postures in their daily practice (Ellis, 1993 and Hignett, 1995) and yet, no profession specific guidelines have been developed to assist them (Cromie *et al*., 2001). Without identification of the specific risk factors affecting manual therapists it will be very difficult to develop preventative programs and strategies to overcome these risks safely. Identifying these risks may also effectively prepare students for the hazards and risks they will face when entering practice (Nyland and Grimmer, 2003 and Rupert and Ebete, 2004).

Finally, this research is necessary so that longitudinal studies may be conducted in the future to help establish epidemiological patterns of low back pain during the various years of manual therapy study and after manual therapy students begin full-time employment.

1.4 LIMITATIONS

The research tool utilized in this study was a self-administered questionnaire and as a result relied solely on self-reporting. The researcher was not able to control whether or not respondents were being open and honest and also whether or not the individual’s responses were indeed based on their reality (e.g. respondents who are self diagnosed as opposed to those who have been diagnosed by another health care professional). As a result of the need for self-reporting there was a likelihood of over- or under-estimation of low back pain by the manual therapists. It was assumed that the manual therapists used their knowledge and experience to give informed and accurate responses with regards to work risk factors and low back pain.

Limitations of the cross-sectional research design are that it cannot distinguish between predictors of disease occurrence and disease progression. Also, information gathered retrospectively may not always be accurate (Morris, 2006).

This study was limited to investigating only low back pain and factors related thereto. It focused predominantly on the influences of occupational or work-related factors on low back pain, although other possible risk factors such as individual or psychosocial factors were briefly investigated to ensure as far as possible that the reported low back pain was truly of occupational origin.

1.5 CONCLUSION

A brief outline of the literature regarding low back pain has been presented along with the aims and objectives, the benefits and limitations of this study. The literature review in Chapter Two focuses predominantly on the prevalence and risk factors for low back pain, especially in an occupational setting. Chapter Three details the methodology for this research project and explains the exact procedure that was followed at every step in the research process. Study design, sample selection, questionnaire development and the intervention and confidentiality aspects of the questionnaire distribution are highlighted. The statistical methodology that was used in interpreting results from the data collected is also addressed. Chapter Four is a statistical presentation of the results supported by tabulations and charts; it is followed by Chapter Five which is a discussion of the results and Chapter Six, the conclusion of the study with recommendations for future research on the subject. The References and Appendices are included at the end of this dissertation, for completeness.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

According to Manga *et al.* (1993), low back pain is an “ubiquitous and economically costly problem”, afflicting nearly everyone at some point in life (Morris, 2006). In the general population there is a lifetime prevalence of unspecified low back pain of between 59 to 80%, a one-year prevalence of between 15 to 40% and a point prevalence of between 4 to 33% (Waddell, 1999). Low back pain affects almost half of all working adults in a given year (Morris, 2006), and activities that have been implicated in the development of occupational low back pain including: heavy physical work, lifting and forceful movements, bending and twisting (awkward postures) and static work postures (Bernard *et al.,* 1997), form part of manual therapists daily routine (Mior and Diakow, 1987). In the above context, musculoskeletal disorders are the most notorious causes of severe long-term pain and physical disability in the workplace (Glover *et al.,* 2005).

2.2 PREVALENCE OF OCCUPATIONAL LOW BACK PAIN

2.2.1 PREVALENCE OF OCCUPATIONAL LOW BACK PAIN IN MANUAL THERAPISTS

Physiotherapists experience work-related musculoskeletal disorders of sufficient severity that one in six make career changes as a consequence (Cromie *et al.,* 2000). Thus, work-related musculoskeletal disorders have a significant impact on physiotherapists and musculoskeletal complaints have been measured in up to 57.5% of physiotherapists (Campo, 2008).

A high prevalence of low back pain has been recorded in physiotherapists by several researchers, including; Bork *et al.* (1996) who noted that the low back had the highest reported one-year prevalence (45%) for work-related injury among physiotherapists and Holder *et al.* (1999) who indicated a prevalence of low back pain among physiotherapists and physiotherapist assistants of 62% and 56% respectively.

Cromie *et al.* (2000) concluded that a lifetime prevalence of work-related musculoskeletal disorders of 92% existed among Australian physiotherapists with 48% stating that their most serious work-related problem concerned their low back. Although limited by a small sample size, a study conducted by West and Gardner (2001) also established that the low back was the most common site of injury in Australian physiotherapists, with a reported career prevalence of 35%. Rugelj (2003) on the other hand reported a lifetime prevalence of severe low back pain of as high as 73.7% in physiotherapists in Slovenia. Also, among members of the Chartered Society of Physiotherapy (CSP) in the United Kingdom, the low back was the area identified by 44% of injured respondents as their most significant injury and the reported career prevalence of work-related low back pain was 48% (Glover *et al.,* 2005).

Low back pain is also prevalent in chiropractors according to Mior and Diakow (1987), Tim (1996) and Rupert and Ebete (2004). In an epidemiological study conducted by Mior and Diakow (1987) on Canadian chiropractors, the overall prevalence of unspecified back pain was 87%, with low back pain claimed by 74% of the respondents. In South African chiropractors the figures were slightly lower with the overall prevalence of unspecified back pain reported to be 55.9% and low back pain prevalence was 65.1% (Tim, 1996). Similarly, Rupert and Ebete (2004) showed that during their career, chiropractors reported rates of up to 57% of work-related musculoskeletal injury, distributed as follows: low back (50%), hand (50%), wrist (52%), shoulder (35%), neck (22%) and upper back (21%).

Massage practitioners are also at high risk for work-related musculoskeletal disorders (Jang *et al.,* 2006). According to Jang *et al.* (2006), 71.4% of Taiwanese massage practitioners had indicated at least one work-related musculsokeletal disorder in the previous one-year period of their study. It was however, the fingers and thumbs, which were the most frequently affected areas with a one-year prevalence of 50.3% compared to the 19.3% prevalence reported for upper and / or low back pain.

Finally, following reports that a high prevalence of low back pain existed in young physiotherapists in Australia (Cromie *et al.,* 2000 and West and Gardner, 2001), a study was initiated by Nyland and Grimmer (2003) to determine whether low back pain was a problem amongst Australian undergraduate physiotherapy students. The study outcomes showed a 69% lifetime prevalence, a 63% one-year prevalence and a 44% one-month prevalence for low back pain in this student population. Similarly, research has shown that a significant number of South African chiropractic students also experience low back pain (Smith, 2004 and Fyfe, 2006). Smith (2004) conducted an epidemiological study of low back pain at a South African tertiary institution and determined that students registered in the health faculty had the highest proportion of low back pain when compared to other faculties. This was accounted for; by the fact that a large percentage of the students polled in the health faculty were chiropractic students (37%). In support, Fyfe (2006) concluded that up to 92.5% of South African chiropractic students suffered from low back pain at some time in their life in general and of these, 47.3% were experiencing low back pain at the time of the study. Lastly, in a recent study of low back pain conducted by Leggat, Smith and Clark (2008) among occupational therapy students in Australia, the one-year prevalence of low back pain was 64.6%, while the prevalence of low back pain persisting longer than two days ranged from 34.1% to 62.5% and the prevalence of low back pain ranged from 45.5% to 77.1%.

A limitation of the studies conducted by Cromie *et al.* (2000), West and Gardner (2001), Rupert and Ebete (2004), Glover *et al.* (2005) and Jang *et al.* (2006) was that they relied on self-reported data, which has been linked to bias in research (Adams *et al.,* 1999; Foley, Manuel and Vitolins, 2005 and Van de Mortel, 2008). Respondents were expected to retrospectively recall incidents of musculoskeletal injury, increasing the likelihood of them either over-estimating or understating their injury or symptoms. In addition, the random sample of CSP members used by Glover *et al.* (2005) was not stratified to reflect the wider population and although a large sample was used to counter the risk of sample bias, the approach was not ideal for ensuring representative results. A difference in definitions of low back pain was also a limitation when comparing low back pain prevalence rates between studies as it is likely that the studies which did not stipulate pain severity or symptom duration would yield higher low back pain prevalence rates compared to the studies which did consider these factors (West and Gardner, 2001 and Glover *et al.,* 2005). Research conducted by West and Gardner (2001) and Glover *et al.* (2005) for example, both specified that respondents had to have been experiencing low back pain for a period of no less than three days. Generalizability of the results in the studies conducted by Tim (1996) and Leggat *et al.* (2008) were also limited.

Notwithstanding the above limitations, literature seems to indicate that occupational low back pain is prevalent among manual therapists and work-related musculoskeletal disorders are indeed a problem in this population group (Mior and Diakow, 1987; Bork *et al.*, 1996; Tim, 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Nyland and Grimmer, 2003; Rugelj, 2003; Rupert and Ebete, 2004; Smith, 2004; Glover *et al.,* 2005; Fyfe, 2006; Jang *et al.,* 2006; Campo, 2008 and Leggat *et al.,* 2008).

2.2.2 PREVALENCE OF OCCUPATIONAL LOW BACK PAIN IN VARIOUS HEALTH CARE PROVIDERS

According to Kumar, Moro and Narayan (2004), workers in the healthcare sector are plagued by their development of musculoskeletal injuries. Bejia *et al.* (2005) determined that among hospital staff, the lifetime prevalence of low back pain was 57.7% and one-year prevalence was 51.1%. Among Irish health service workers which included: administrative, medical, general support, nursing staff and allied professionals; the lifetime, one-year and point low back pain prevalence rates were 46%, 30% and 15.5% respectively. On comparison of the occupational groups, no significant difference in low back pain prevalence was identified (Cunningham *et al.,* 2006).

Several studies on nurses have investigated their prevalence of occupational low back pain, including research by: Chiou *et al.* (1994) who established that Chinese nurses had a 77.9% lifetime prevalence of low back pain and Smedley *et al.* (1995) who pointed out that low back pain was highly prevalent among nurses and identified a lifetime prevalence of 60% and one-year prevalence of 45% for low back pain. In addition, in Hong Kong nurses, Yip (2001) recorded a 40.6% one-year prevalence of low back pain and Trinkoff *et al.* (2003) concluded that nursing is physically demanding and nurses have higher rates of musculoskeletal disorders and in particular low back pain than most other occupational groups in health care.

Similarly, Smith *et al.* (2004) reported an overall prevalence of musculoskeletal disorders in Chinese nurses of 70% with low back pain reported 56.7% of the time, and in a more recent survey conducted by Smith *et al.* (2006) among Japanese nurses, the one-year prevalence of musculoskeletal disorders at any body site was 85.5%, with the low back being the individual body site indicated in 71.3% of cases. In South Africa, the reported prevalence of current work-related low back pain was 59.7% among hospital nurses, which compared with rates found internationally (Nelson, Fragala and Menzel, 2003) according to Dasappa (2007).

In terms of occupational low back pain in nursing students, Smith *et al.* (2003) noted that only 13.5% of Japanese nursing students reported low back pain, which was considerably lower than in Australian nursing students amongst whom a high lifetime (79%), one-year (71%) and seven-day (31%) prevalence of low back pain was identified (Mitchell *et al.,* 2008). No significant difference was noted in the prevalence of low back pain and year of study among nurses but low back pain prevalence was found to be higher among working nurses compared to nursing students (Smith *et al.,* 2003 and Mitchell *et al.,* 2008).

Low back pain has also been identified among female caregivers of children with physical disabilities. These caregivers perform activities such as lifting and transferring children from a bed to a wheelchair on a daily basis. Findings showed that in a physical medicine and rehabilitation clinic, the prevalence of low back pain in the caregivers was 71.1% as opposed to the 43.5% low back pain prevalence in the caregivers in an endocrine clinic who were not required to lift, transfer and carry patients as regularly. The prevalence of low back pain in the caregivers (80.3%) when the child required physical assistance was significantly higher than the prevalence of low back pain in the caregivers (40.5%) when the child did not require physical assistance (Tong *et al.,* 2003).

According to Kumar *et al.* (2004), x-ray technologists also have significant and diverse musculoskeletal problems with 83% of respondents having reported some form of backache and 66% indicating low back pain in particular.

South African emergency medical services personnel have a high prevalence (76%) of low back pain, 86% believed that their current low back pain was caused by their occupation and 91% believed that their previous low back pain had an occupational origin as well (Vlok, 2005). According to Tam and Yeung (2006), 34.2% of non-emergency ambulance workers who performed regular patient transfers reported having low back pain that required medical treatment in the past year.

Musculoskeletal problems also occur frequently in the dental profession which is often perceived as rather stressful and according to Gijbels *et al.* (2006) who conducted a study among Belgium dentists, low back pain was recorded in more than half (54%) of the dentists in the study.

Perioperative personnel perform physically strenuous work and spend their time during surgical procedures in static work positions, doing heavy lifting, pushing, pulling and maintaining poor postures. Among these perioperative assistants or personnel, the total three-month prevalence of unspecified back pain was 46% and the total one-year prevalence of unspecified back pain was 58% (Meijsen and Knibbe, 2007).

When comparing prevalence rates, caution needs to be exercised as limitations of these studies included the utilization of a cross-sectional study design (Tam and Yeung, 2006 and Mitchell *et al.,* 2008), small sample size

(Smith *et al.,* 2003; Cunningham *et al.,* 2006 and Tam and Yeung, 2006) and the possibility that responders were unrepresentative (Smedley *et al.,* 1995). In the study conducted by Meijsen and Knibbe (2007), selection effects could not be ruled out completely as the study sample was not selected randomly and it was recommended that generalization of their results be made with caution. Furthermore, a difference in the definitions of low back pain was a limitation when comparing low back pain prevalence rates between studies (Smedley *et al.,* 1995; Yip, 2001; Smith *et al.,* 2003 and Mitchell *et al.,* 2008) as Smedley *et al.* (1995) and Yip (2001) for example, both specified that low back pain had to be of at least one-day duration. A further stipulation made by Smedley *et al.* (1995) was that pain occurring in association with pregnancy, menstruation or febrile illness be excluded. Differences in methodology as well as age and gender groups may also have contributed to the range of low back pain prevalence rates reported in the literature (Chiou *et al.,* 1994; Smedley *et al.,* 1995 and Bejia *et al.,* 2005).

Nevertheless, it is evident from the literature that occupational low back pain is prevalent among health care providers (Chiou, 1994; Smedley *et al.,* 1995; Yip, 2001; Smith *et al.,* 2003; Tong *et al.,* 2003; Trinkoff *et al.,* 2003; Kumar *et al.,* 2004; Smith *et al.,* 2004; Bejia *et al.,* 2005; Vlok, 2005; Cunningham *et al.,* 2006; Gijbels *et al.,* 2006; Smith *et al.,* 2006; Tam and Yeung, 2006; Dasappa, 2007; Meijsen and Knibbe, 2007 and Mitchell *et al.,* 2008).

In summary, a comparison table of the various studies of occupational low back pain discussed in this chapter follows with specific reference to the prevalence of work-related musculoskeletal disorders and / or occupational low back pain. Details of the limitations of these studies have also been bulleted where applicable.

Table 2.1: Comparison table of literature reviewed

Year	Population	Researcher/s	Country	Prevalence of work-related musculoskeletal disorders and / or occupational low back pain	Limitations
1987	Chiropractors	Mior and Diakow	Canada	• Overall prevalence of unspecified back pain was 87% • Low back pain prevalence was 74%	No limitations were identified.
1994	Nurses	Chiou, Wong and Lee	China	• Lifetime prevalence of low back pain was 77.9%	No limitations were identified.
1995	Nurses	Smedley, Egger, Cooper and Coggon	UK	• Lifetime prevalence of low back pain was 60% • 1-year prevalence of low back pain was 45%	• Cross-sectional design – causality could not be established • Recall bias • Responders may have been unrepresentative, as it was the nurses suffering from low back pain that were most inclined to participate and were thus also statistically more likely to exaggerate associations with occupational activity
1996	Physiotherapists	Bork, Cook, Rosecrance, Engelhardt, Thomason, Wauford and Worley	USA	• 1-year prevalence of work-related injury to the low back was 45%	• Sampling bias • Recall bias • Generalization of the results was limited
1996	Chiropractors	Tim	South Africa	• Overall prevalence of unspecified back pain was 55.9% • Low back pain prevalence was 65.1%	• Generalization of the results was limited • Relied on the subjective evaluation of respondents
1999	Physiotherapists	Holder, Clark, DiBlasio, Hughes, Scherpf, Harding and Shepard	USA	• Prevalence of low back pain was 62% in physical therapists and 56% in physical therapist assistants	No limitations were identified.
2000	Physiotherapists	Cromie, Robertson and Best	Australia	• Lifetime prevalence of work-related musculoskeletal disorders of 92% • Prevalence of low back pain was 48%	• Cross-sectional design – causality could not be established • Relied on self-reported data • Possible over- or under-estimation and reporting of symptoms

Year	Population	Researcher/s	Country	Prevalence of work-related musculoskeletal disorders and / or occupational low back pain	Limitations
2001	Physiotherapists	West and Gardner	Australia	• Career prevalence of low back pain was 35%	• Small sample size • Recall bias
2001	Nurses	Yip	Hong Kong	• 1-year prevalence of low back pain was 40.6%	• Cross-sectional design – causality could not be established • Recall bias • Responders may have been unrepresentative
2003	Physiotherapists	Rugelj	Slovenia	• Lifetime prevalence of severe low back pain was 73.7%	No limitations were identified.
2003	Physiotherapy students	Nyland and Grimmer	Australia	• Lifetime prevalence of low back pain was 69% • 1-year prevalence of low back pain was 63% • 1-month prevalence of low back pain was 44%	• Cross-sectional design – causality could not be established • Possible response bias
2003	Female nursing students	Smith, Sato, Miyajima, Mizutani and Yamagata	Japan	• Low back pain prevalence was 13.5%	• Small sample size
2003	Caregivers of children with physical disabilities	Tong, Haig, Nelson, Yamakawa, Kandala and Shin	USA	• Low back pain prevalence of caregivers in the physical medicine and rehabilitation clinic was 71.1% • Prevalence of low back pain was 80.3% in caregivers of children who required physical assistance	• Cross-sectional design – causality could not be established • Responders may have been unrepresentative • Several other potential predictive factors e.g. support from partners were not evaluated
2004	Chiropractors	Rupert and Ebete	USA	• Rates of up to 57% for work-related musculoskeletal injury distributed to the low back in 50% of cases	• Relied on self-reported data • Possible over- or under-estimation and reporting of symptoms • Recall bias • Response bias
2004	Nurses	Smith, Wei, Kang and Wang	China	• Overall prevalence of musculoskeletal disorders of 70% • Prevalence of low back pain was 56.7%	No limitations were identified.
2004	X-ray technologists	Kumar, Moro and Narayan	Canada	• Low back pain prevalence was 66% • Prevalence of unspecified back pain was 83%	• Small sample size

Year	Population	Researcher/s	Country	Prevalence of work-related musculoskeletal disorders and / or occupational low back pain	Limitations
2005	Physiotherapists	Glover, McGregor, Sullivan and Hague	UK	• 44% identified injury to the low back as their most significant work-related injury • Career prevalence of low back pain was 48%	• Relied on self-reported data • Possible over- or under-estimation and reporting of symptoms • Relied on the subjective evaluation of respondents • Sample was random but not stratified to reflect the wider population under study
2005	Hospital staff	Bejia, Younes, Jamila, Khalfallah, Ben Salem Touzi, Akrout and Bergaoui	Tunisia	• Lifetime prevalence of low back pain was 57.7% • 1-year prevalence of low back pain was 51.1% • Chronic low back pain prevalence was 12.8%	No limitations were identified.
2005	Emergency medical services personnel	Vlok	South Africa	• Prevalence of low back pain was 76% • 86% of respondents believed their current low back pain was due to their occupation • 91% believed that their previous low back pain had an occupational origin	• Small sample size • Cross-sectional design – causality could not be established.
2006	Chiropractic students	Fyfe	South Africa	• Lifetime prevalence of low back pain of 92.5% • Prevalence of current low back pain of 47.3%	• Relied on self-reported data • Possible over- or under-estimation and reporting of symptoms • Relied on the subjective evaluation of respondents
2006	Massage practitioners	Jang, Chi, Tsauo and Wang	Taiwan	• 1-year prevalence was 71.4% for at least one work-related musculoskeletal disorder • 1-year prevalence of low back pain was 19.3%	• Cross-sectional design – causality could not be established • Relied on self-reported data • Possible over- or under-estimation and reporting of symptoms • Risk of possible false positive reporting
2006	Hospital employees	Cunningham, Flynn and Blake	Ireland	• Lifetime prevalence of low back pain was 46% • 1-year prevalence of low back pain was 30% • Point prevalence of low back pain was 15.5%	• Although the overall response rate was good at 62%, the numbers in some of the sub-groups of the sample was small (e.g. doctors)
2006	Nurses	Smith, Mihashi, Adachi, Koga and Ishitake	Japan	• 1-year prevalence of musculoskeletal disorders at any body site was 85.5% • Low back was indicated as individual body site of concern in 71.3% of cases	• Relied on self-reported data • Possible over- or under-estimation and reporting of symptoms

Year	**Population**	**Researcher/s**	**Country**	**Prevalence of work-related musculoskeletal disorders and / or occupational low back pain**	**Limitations**
2006	Non-emergency ambulance workers	Tam and Yeung	Hong Kong	• 34.2% reported low back pain that had required medical treatment in the past year	• Cross-sectional design – causality could not be established • Small sample size • Results may not have been representative of true prevalence rates as the study was confined to current workers only and thus did not take into account workers with disease who may have left the workforce
2006	Dentists	Gijbels, Jacobs, Princen, Nackaerts and Debruyne	Belgium	• Low back pain prevalence was 54%	• Possible sample bias and response bias as retired dentists were not included
2007	Nurses	Dasappa	South Africa	• Prevalence of current work-related low back pain was 59.7%	• Poor response. Only 3 of the 6 hospitals selected agreed to participate thus the number of possible participants was greatly limited • Questionnaire could be refined in future studies taking into account other factors e.g. psychological factors
2007	Perioperative personnel	Meijsen and Knibbe	Netherlands	• Total 3-month prevalence of low back pain was 46% • Total 1-year prevalence of low back pain was 58%	• Sample was not selected randomly and selection effects could not be ruled out completely • Generalization of the results was limited as the professional situation of perioperative nurses may vary in different countries
2008	Physiotherapists	Campo	USA	• Prevalence of musculoskeletal complaints was 57.5%	• As many subjects had a significant change in their work status over the follow-up year there was instability of the exposure data from baseline • Generalizability of results was limited as the sample only included members of the American Physical Therapy Association • Confounding was a consideration
2008	Occupational therapy students	Leggat, Smith and Clark	Australia	• Prevalence of low back pain ranged from 45.5%-77.1% • Prevalence of low back pain with symptoms persisting longer than two days was 34.1%-62.5% • 1-year prevalence of low back pain was 64.6%	• Generalizability of results was limited

Year	**Population**	**Researcher/s**	**Country**	**Prevalence of work-related musculoskeletal disorders and / or occupational low back pain**	**Limitations**
2008	Australian nursing students and qualified nurses	Mitchell, O' Sullivan, Burnett, Straker and Rudd	Australia	• In the nursing students: - Lifetime prevalence of low back pain was 79%, 1-year prevalence was 71% and 7-day prevalence was 31% • In working nurses: - Lifetime prevalence of low back pain was 96%, 1-year prevalence was 90% and 7-day prevalence was 39%	• Cross-sectional design – causality could not be established • Possible over- or under-estimation and reporting of symptoms • Response rates were good but a potential for response bias remained as only nursing students who attended lectures participated

2.3 RISK FACTORS FOR LOW BACK PAIN

Risk factors have been divided into three categories for discussion, they are: individual, psychosocial and occupational or work-related risk factors.

2.3.1 INDIVIDUAL RISK FACTORS

Individual factors such as age (Manga *et al.,* 1993; Bork *et al.,* 1996; Cromie *et al.,* 2000 and Rugelj, 2003), gender (Waddell, 1999; Bejia *et al.,* 2005 and Glover *et al.,* 2005) and BMI (Bejia *et al.,* 2005 and Vieira *et al.,* 2005), are known to be important predictive variables for low back pain. It is therefore necessary to consider individual risk factors in the evaluation of low back pain in manual therapists, to determine whether individual or occupational risk factors are indeed the cause of their low back pain.

2.3.1.1 AGE

Several authors have commented on the link between age and low back pain in the general population including, Manga *et al.* (1993) reported that low back pain is most common between the ages of 25 and 55 years; Papageorgious *et al.* (1995) determined that the prevalence of low back pain increased with age until 45 years and then decreased until the age of 60 years where it increased once again and Waddell (1999) who concluded, that although the first onset of unspecified low back pain is spread fairly evenly in terms of age from teens to early forties it is uncommon to develop ordinary unspecified low back pain for the first time after the mid-fifties.

Bork *et al.* (1996) showed that among physiotherapists the prevalence of occupational low back pain ranged between 42 to 52% from 25 to 50 years of age. After the age of 50 years however, the prevalence of occupational low back pain declined to 34%. This is in accordance with the trend observed in the general population (Waddell, 1999). Possible explanations provided by Bork *et al.* (1996) for this phenomenon was that the lower prevalence of work-related musculoskeletal disorders in older therapists might be related to a survivor bias as older therapists tend to develop coping strategies to deal with the physical demands of their work over the years and thus remain relatively injury free. Alternatively, older therapists may have moved out of patient care as they gained experience into administrative positions that are less physically demanding and therapists with low back pain may also have left the profession by this stage, resulting in an artificial decrease in reported low back pain.

Several studies (Holder *et al.,* 1999; Cromie *et al.* 2000; West and Gardner, 2001 and Glover *et al.,* 2005) have also shown a younger age for onset of work-related musculoskeletal injury. Holder *et al.* (1999) determined that the highest injury prevalence was seen in physiotherapists aged between 21 to 30 years and Cromie *et al.* (2000) similarly recorded the highest prevalence of low back pain in the youngest age group of physiotherapists (20 to 29 years). West and Gardner (2001) concluded that 28.5 years was the approximate age that physiotherapists would experience a major occupational injury and Glover *et al.* (2005) established that 59% of physiotherapists experienced their most serious work-related musculoskeletal injury at 30 years or younger compared to 42% who were aged over 30 years.

On the other hand, Rugelj (2003) determined that older physiotherapists experienced a higher rate of low back pain and Bejia *et al.* (2005) also noted that there was an association between advanced age and low back pain in nurses. This was attributed to a resistance reduction to dynamic work due to spine degenerative processes (Bejia *et al.,* 2005) and may also be linked to obesity resulting from the sedentary lifestyle that many individuals adopt with increasing age (United States Government, 1993 and The Pepper Institute on Aging and Public Policy, 2006).

No significant correlation between age and low back pain has been documented in local studies on chiropractors (Tim, 1996 and Fyfe, 2006).

2.3.1.2 GENDER

In terms of gender, most of the large population surveys have shown a slightly higher prevalence of unspecified low back pain in women (Waddell, 1999). According to Pope *et al.* (1991) however, low back pain is as common in males as it is in females, until the work situation is taken into account. Then this pattern changes and women in physically demanding jobs have been shown to have a greater prevalence of low back pain than males.

In chiropractors, gender was related to a varied presentation of back pain [i.e. thoracic back pain seemed to be more common in female chiropractors whereas low back pain was more common in male chiropractors] (Mior and Diakow, 1987). Among physiotherapists however, it was the females who had a greater prevalence of low back pain (Bork e*t al.,* 1996 and Glover, 2005) and the female gender was also identified as a risk factor for low back pain in nurses (Bejia *et al.,* 2005). Researchers have suggested that females who are generally smaller in stature are at a physical disadvantage when it comes to manual activities such as lifting or transferring large patients; in addition manual manipulative techniques may strain their backs and shoulders (Mior and Diakow, 1987; Bork e*t al.,* 1996 and Glover, 2005).

2.3.1.3 ETHNICITY

In emergency medical services personnel a link was found between ethnicity and low back pain (Vlok, 2005). According to Vlok (2005), low back pain prevalence was highest in the Indian (92.3%) and Coloured participants (91.7%), followed by White participants (69.4%) and was lowest in the Black participants (53.9%). No other studies were found that have reported an association between low back pain and ethnicity.

2.3.1.4 ANTHROPOMETRY

In female nurses unspecified low back pain was only weakly associated with increased height (Smedley *et al.,* 1995) and Waddell (1999), in agreement, pointed out that anthropometric data such as height as well as weight and body build are not strongly related to unspecified low back pain.

According to Bickley and Szilagyi (2003), the BMI (body mass index) takes into account an individual's weight related to their height and gives a more accurate measure of body fat than just looking at their weight alone. A BMI > 25 indicates overweight and a BMI > 30 indicates obesity (Bickley and Szilagyi, 2003). The causal link between obesity and low back pain could be explained by the fact that additional weight would put strain on load-bearing spinal elements, resulting in altered biomechanics leading to excessive wear and early degeneration, but according to Wai *et al.* (2008), evidence to support this hypothesis is lacking.

In the general population, factors such as body weight and BMI did not increase the risk of low back pain (Waddell, 1999 and Kovacs *et al.,* 2003) and no association was identified between these factors in chiropractors either (Tim, 1996). However, according to Bejia *et al.* (2005), nurses with a high BMI had an increased risk of low back pain and Vieira *et al.* (2005) also concluded that nurses who were overweight were 1.38 times more likely to have had low back pain during their working life.

2.3.1.5 STRUCTURAL ANOMALIES

The incidence of pain as the presenting or initial complaint in adult scoliosis has varied from 40% to 90% with low back pain tending to be more common than thoracic pain, as well as more severe and is often related to increased levels of activity. The pain may develop secondary to muscle fatigue, degenerative osteoarthritis of the facet joints, radiculopathy or a combination of these factors (Bradford, 1995). Scoliosis centers see many adults presenting with a range of problems related to their scoliosis, and although pain is the most common, other problems to consider include: progressive deformity, decreased pulmonary function, loss of self-image and neurological deficits (Winter, 1995).

According to Knutson (2005), leg length inequality can be divided into two groups: anatomic and functional, of which anatomic inequality was found to be near universal with a recorded prevalence of 90%. Evidence suggests that for most people, leg length inequality only becomes clinically significant when the magnitude of the inequality reaches 2cm (Knutson, 2005). Leg length inequality may affect gait, running mechanics, standing posture and postural sway. Level of activity also seems to play a role and individuals who are on their feet all day or who are involved in sport seem to be more sensitive to the leg length inequality. In addition, low back pain is considered to be the most equivocal pathological condition associated with leg length inequality. However, according to Gurney (2002), the exact role leg length inequality plays both as a biomechanical impediment and predisposing factor for associated musculoskeletal disorders is controversial.

Tim (1996) determined that all of the chiropractors that reported having scoliosis suffered from unspecified back pain and 93.8% of the chiropractors that reported having leg length inequalities suffered from unspecified back pain. Kovacs *et al.* (2003) also established that among school children and their parents, a diagnosis of scoliosis or difference in leg length was significantly associated with low back pain.

Spondylolisthesis may also be associated with pain that occurs most commonly according to Bradford (1995), in the low back. This low back pain is often due to the instability present at the affected segment and may be related to high activity levels or participation in sports. In terms of the clinical presentation of spondylolisthesis, patients may present with two types of pain patterns: a mild aching low back pain with occasional radiation into the buttocks and thighs, or localized back pain with a significant radicular component extending to the posterior thighs and rarely down to the foot or calf (Bradford, 1995).

2.3.1.6 PREGNANCY, NATURAL BIRTH AND NUMBER OF CHILDREN

During and after pregnancy women may experience pain around the pelvic area and / or low back (Bastiaanssen *et al.,* 2005). According to Bullock, Jull and Bullock, (1987) as many as 82% of women experience unspecified low back pain at some stage during their pregnancy. Low back pain has often been described as an inevitable sequelae of pregnancy and 77% of women with moderate to severe pregnancy-related pelvic pain and sacroiliac joint dysfunction will suffer with persisting complaints postpartum (Borggren, 2007). Performing physically strenuous work increases the risk of low back pain and sacroiliac dysfunction in pregnant women (Bastiaanssen *et al.,* 2005 and Borggren, 2007) and according to Bork *et al.* (1996) physiotherapists who continued to work while pregnant often implicated the stress that pregnancy superimposed on their work in the exacerbation of their low back pain.

According to Van der Meulen (1997) the prevalence of low back pain was lowest (34.4%) in nulliparous women, was higher (59.3%) in women with a history of one to four live births and was highest (77.8%) in those who had had five or more live births. This was supported by Waddell (1999) who concluded that multiple pregnancies increased the risk for a higher prevalence of unspecified low back pain in the future.

However, because low back pain only occurred after birth for some women, Polden and Mantle (1990) proposed that the type of delivery might also play an important role in the development of low back pain. The extreme ligamentous stretching and laxity of joints that is required for the passage of the foetus through the pelvis during a natural delivery, as opposed to a caesarian section, could be instrumental in causing low back pain. In addition, epidural analgesia, which is an effective way of relieving labour pain, is the alternative of choice for many women despite inconclusive claims that it may be associated with an increased risk of transient or chronic unspecified low back pain (Howell and Chalmers, 1992; Vincent and Chestnut, 1998; Leighton and Halpern, 2002 and Louizos *et al.,* 2004).

Polden and Mantle (1990) also stated that low back pain could be experienced by 49% to 65% of women at some stage in their postnatal recovery period and that some could suffer from low back pain for up to a year after birth. The work involved in caring for infants and toddlers such as daily lifting and carrying, changing nappies and breastfeeding as well the effects of sleep deprivation, tiredness, fatigue and mood changes (e.g. postnatal depression) may cause recurrence or exacerbation of existing low back pain (Polden and Mantle, 1990 and Conway, 1995) and may explain the progression of low back pain in the postnatal period and in mothers with young children (Bejia *et al.,* 2005).

In addition, according to Smith *et al.* (2006) parenthood was a musculoskeletal disorder risk factor among nurses and was possibly related to increased recreational activities undertaken with children. This supported the findings of Smith *et al.* (2004), who determined that having children was strongly associated with low back pain in nurses; and was supported by Dasappa (2007) who indicated that having one to two children compared to having no children increased the risk of low back pain by 3.8 times in South African nurses.

2.3.1.7 <u>PREVIOUS SURGERY</u>

In patients who have been subjected to general epidural anaesthesia, the incidence of post-surgical low back pain can be as great as 20% with the risk of unspecified back pain increasing with an increasing duration of surgery and anaesthesia (40 minutes or longer) (Jorgenscn and Confait, 1997). In addition, many patients have reported post-operative unspecified low back pain with or without leg pain after spinal surgery (Brox *et al.,* 2006) and cognitivie-behavioural factors such as fear avoidance or pain-related fear of movement or re-injury may also lead to continued disability and pain after lumbar disc surgery (den Boer *et al.,* 2006).

Ericksen *et al.* (2006) documented in a systematic literature review and discussion that low back pain was associated with surgery involving an abdominal incision to access the bladder and urethra, hysterectomy, abortion, dilatation and curettage and childbirth. Ericksen *et al.* (2006) also stated that it is the potential injury and deconditioning of the abdominal or pelvic floor muscles that may occur during gynaecologic surgery, that leads to altered muscle function and core muscle dysfunction that may predispose women to the development of low back pain later in life. “Surgical menopause” and previous ovarian surgery in particular were associated with an increased risk of moderate low back pain according to this study.

Kirkaldy-Willis *et al.* (1992) and Travell, Simons and Simons (1997) propose that there is a link between hip pain and low back pain and that although low back pain may cause hip pain, hip pain may in converse, also cause low back pain. The latter was supported, in terms of previous lower limb surgery and low back pain, by Ben-Galim *et al.* (2006) who concluded that total hip replacement surgery may improve spinal function and alleviate low back pain. The mechanism for this is thought to be the severe osteoarthtirits present in the hip, which results in a wobbling gait and abnormal spinal alignment that is then corrected by the surgery.

2.3.1.8 PREVIOUS TRAUMA

The ankles, knees, hips and low back are all connected through the lower limb kinematic chain (Seymour, 2002). Any acute or repetitive trauma occurring at these sites would result in an injury which may lead to compensatory, altered or faulty biomechanics that would have far reaching effects on the musculoskeletal system (e.g. on muscles, tendons and ligaments) and may have a domino effect of abnormal stresses and strains on many joints of the body. Low back pain is thus often associated with some prior / pre-existing or subsequent ramification in the form of mechanical dysfunction lower down in the musculoskeletal system (Stoxen, 2008).

These findings are in contrast to Smedley *et al.* (1995) who proposed that severe trauma was not associated with low back pain in nurses.

2.3.1.9 <u>PREVIOUS INJURY</u>

Having a history of previous injury increases the risk of subsequent injury or re-injury (Schneider, Bigelow and Amoroso, 2000; Arnason *et al.,* 2004 and Steffen *et al.,* 2008). Some of the general risk factors for injuries include: increasing age, muscle imbalances, decreased range of motion, joint laxity, inadequate rehabilitation (Steffen *et al.,* 2008), continued exposure to the risks that resulted in the initial injury (Schneider *et al.,* 2000), structural changes, scar tissue formation and persistent mechanical instability (Arnason *et al.,* 2004). It is important to note that these studies were conducted among army airborne soldiers (Schneider, Bigelow and Amoroso, 2000) and soccer players (Arnason *et al.,* 2004 and Steffen *et al.,* 2008) and it is only the general principles relating to previous injury and risk factors for injury that emerged from these studies that was considered relevant for manual therapists.

Work-related injuries to the low back and / or lower limb, which may be linked to low back pain due to the effects of lower limb kinematic chain (Seymour, 2002 and Stoxen, 2008), have been investigated in many studies among manual therapists (e.g. physiotherapists) and various health care professionals (e.g. nurses). These studies consistently show that although work-related injury to the low back was prevalent, work-related injury of the lower limb and in particular of the hip and / or knee is not common (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Rugelj, 2003; Smith *et al.,* 2003; Glover *et al,* 2005; Jang *et al.,* 2006 and Meijsen and Knibbe, 2007).

2.3.2 PSYCHOSOCIAL RISK FACTORS

Psychosocial risk factors play an important role in the etiology and perpetuation of work-related musculoskeletal disorders (Campo, 2008).

2.3.2.1 EXERCISE

Wai *et al.* (2008) pointed out in their study that the relationship between low back pain and physical inactivity is complex, as there is evidence suggesting either too much or too little activity may be associated with low back pain. Van der Meulen (1997) showed that in a general Black population, the prevalence of low back pain was 16.9% lower among subjects who exercised regularly as opposed to those who did not exercise. Similarly, Sjolie (2004) proposed that exercise and low back pain have an inverse association. On the other hand however, Kovacs *et al.* (2003) showed that the practice of sports two or more times per week was moderately associated with the development of low back pain but Pope *et al.* (1991) in contrast, found no link between these factors. The inconsistency of these findings showed that the results are not conclusive because studies researched different sports and exercises by different ethnic groups at different intensities.

In health care professionals; relatively less unspecified back pain was reported in chiropractors who exercised for 60 minutes or more per session (Tim, 1996) and 30 cumulative minutes or more of moderately intense physical activity on most days of the week was indicated to help prevent low back pain in nurses (Yip, 2003). Bejia *et al.* (2005) concluded that exercise was a protecting factor against low back pain in hospital staff and nurses who smoked and did not exercise were two times more likely to have had low back pain during their working life compared to those who did not smoke and exercised (Vieira *et al.,* 2005). According to Vlok (2005), exercise was also linked to a decreased prevalence of low back pain in emergency medical services personnel exercise.

The positive effect of exercise on low back pain as indicated above, concurs with the understanding that core stabilization exercise is an important and useful tool in the management of low back pain (Kirkaldy-Willis *et al.,* 1992 and Travell *et al.,* 1997) resulting from neuromuscular imbalance of the erector spinae muscles (Renkawitz, Boluki and Grifka, 2006) and asymmetry and atrophy of the multifidus muscle (Hides *et al*., 2006). In addition, yoga has been shown to be effective in the treatment of chronic low back pain (Sherman *et al.,* 2005) and resistance exercise which increases lumbar extension strength, also reduces pain and improves daily functioning in chronic low back pain sufferers (Winett and Carpinelli, 2001).

Literature has also revealed that while some physical activities may protect against low back pain (Kirkaldy-Willis *et al.,* 1992; Travell *et al.,* 1997; Winett and Carpinelli, 2001 and Sherman *et al.,* 2005), other activities can lead to it (e.g. golf and tennis) (Renkawitz *et al.,* 2006 and McHardy, Pollard and Luo, 2007) and the risk of low back pain is modified depending on the type of activity, its intensity as well as the level of competition (e.g. professional athletes who take part in sport that puts strain on their back) (Bejia *et al.,* 2005; Morris, 2006 and Renkawitz *et al.,* 2006).

2.3.2.2 SMOKING

Smoking is associated with an increased prevalence of low back pain (Kirkaldy-Willis *et al.,* 1992 and Leboeuf-Yde, Yashin and Lauritzen, 1996) and an increased risk of low back pain among both current and ex-smokers (Fogelholm and Alho, 2001). The following theories may explain this relationship:

- Smoking is frequently accompanied by a chronic cough and is thus a risk factor for development of prolapsed intervertebral discs in the lumbar spine (Kirkaldy-Willis *et al.,* 1992).

- Smoking has been positively linked to diminished mineral content of bone, reduces vertebral body blood flow and impairs fibrinolytic activity (Kirkaldy-Willis *et al.,* 1992).

- Smoking causes increased serum proteolytic activity that accelerates disc degeneration and may attack other connective tissue structures of the spine as well, weakening spinal ligaments and resulting in spinal instability (Fogelholm and Alho, 2001).

No significant association between smoking and increased risk of low back pain has been established in the general population (Van der Meulen, 1997; Docrat, 1999 and Kovacs *et al.,* 2003). In emergency medical services personnel survey, however, the prevalence of low back pain was reportedly higher (96%) among those who smoked compared to those who did not smoke (70%) (Vlok, 2005).

Based on the overall literature, smoking cessation should be promoted as a means of ameliorating chronic low back pain by decreasing exposure to the potentially harmful effects of smoking on the lumbar spine (Wai *et al.,* 2008).

2.3.2.3 ALCOHOL CONSUMPTION

Excessive alcohol consumption is a lifestyle factor that is generally known to contribute to disease (e.g. cardiovascular and liver disease), and although it may be linked to social and psychological problems which could lead to the development of chronic low back pain, a systematic literature review conducted to determine the relationship between alcohol consumption and low back pain, showed no positive association between the two (Leboeuf-Yde, 2000). This supported Tim (1996) who found that alcohol consumption was not associated with having more unspecified back pain in chiropractors. However, according to Smith *et al.* (2006), psychosocial factors including alcohol consumption was significantly associated with the development of musculoskeletal disorders in nurses.

2.3.2.4 MARITAL STATUS

In chiropractors the number of divorces and / or marriages and family problems was not linked to increased unspecified back pain (Tim, 1996). However among hospital staff, low back pain and chronic low back pain were more frequent in married and divorced individuals as opposed to those who were neither married nor divorced (e.g. single individuals). This was attributed by Bejia *et al.* (2005) to increased family dimensions, especially the number of young children, that may occur after marriage.

2.3.2.5 STRESS AND DEPRESSION

According to Bogduk (2006), psychological and social factors such as depression, anxiety and distress may be considered risk factors (increasing the likelihood that an individual will experience low back pain in the future) or prognostic factors (increasing the likelihood that an individual's low back pain will progress to chronic pain and disability), for low back pain.

On the one hand, research has shown that depression is a strong and independent predictor for the onset of an episode of intense and / or disabling low back pain (Carroll, Cassidy and Cote, 2004). But on the other hand however, low back pain is seldom if ever considered to be purely psychogenic in origin (Kirkaldy-Willis *et al.,* 1992). Mostly low back pain starts with a physical problem in the back and any psychological changes that follow occur secondary to the pain. The pain is considered to be subjective with an emotional dimension and when present, anxiety, stress and depression have been found to increase the pain experienced (Kirkaldy-Willis *et al.,* 1992; Waddell, 1999; Middleton and Pollard, 2005 and Diamond and Borenstein, 2006).

Associations between psychological or social factors and low back pain have thus been identified before the fact, (i.e. in subjects who have yet to develop low back pain), and after the fact, (i.e. in patients who have developed low back pain) (Bogduk, 2006).

According to Smith (2004) in a general population of students, those who were suffering from depression were 1.949 times more likely to have low back pain although definitive causality could not be established. Non-musculoskeletal occupational injuries have been documented in physiotherapists as well, with depression and anxiety among the complaints of stress-related illnesses that they felt were caused by their work (West and Gardner, 2001) and in a study on emergency medical services personnel, 25% of participants suffered from depression and those suffering from depressive states also showed a directly proportional increase in low back pain (Vlok, 2005).

Based on the literature presented, it would appear that the exact link between stress, depression and low back pain is unclear yet there is an indication that one may exist (Kirkaldy-Willis *et al.,* 1992; Waddell, 1999; West and Gardner, 2001; Carroll *et al.,* 2004; Smith, 2004; Middleton and Pollard, 2005; Vlok, 2005; Bogduk, 2006 and Diamond and Borenstein, 2006).

2.3.2.6 JOB SATISFACTION AND WORK STRESS

Low job satisfaction may be one of the best predictors for occurrence of occupational low back pain (Van Poppel *et al.,* 1998) and for a poor prognosis of low back pain (Van den Heuvel *et al.,* 2004). According to Davis and Heaney (2000) biomechanical demands have a greater effect on low back pain under poor psychosocial work conditions and it would appear that employees' reactions to psychosocial work characteristics (e.g. job dissatisfaction and job stress) are more consistently related to low back pain than are the psychosocial work characteristics themselves (e.g. work overload). Work-related psychosocial risks also become increasingly important when low back pain is chronic (i.e. in the development and recovery of long-term low back pain) (Gheldof *et al.,* 2007).

Poor rating by a supervisor, emotionally stressful or anxiety-provoking work, high psychological job demands and poor work-place social environment have also been linked to low back pain (Morris, 2006). According to Vlok (2005), 70% of emergency medical services personnel reported that emotional stress was the likely cause of their occupational stress and participants who rated their job as very stressful had higher levels of low back pain (92%) when compared to those who reported little or no stress (62%). In addition, monotony at work, having little control over the job and a low job satisfaction tends to increase the risk of low back pain (Pope *et al.,* 1991 and Waddell, 1999). This was supported by Smedley *et al.* (1995) who linked low mood, stress and job dissatisfaction to low back pain in nurses and Yip (2001) who concluded that nurses who stated they “hardly ever” enjoyed their job were twice as likely to have low back pain compared to those who “almost always” enjoyed their job.

Morris (2006) also determined in a systematic literature review that physical stress as well as high perceived job demands and perceptions of intensified workload were linked to low back pain in the workplace. This was supported by Tam and Yeung (2006), who established that a higher rate of perceived effort at work was associated with low back pain in non-emergency ambulance workers and Trinkoff *et al.* (2003) who showed that as the perceived level of demand increased so did the odds of reported musculoskeletal disorders in nurses. It is suggested however that these results be interpreted with some caution because, according to Tam and Yeung (2006) perceived effort is assessed by self-reports which means there is potential for bias as workers with negative affectivity (e.g. those with low job satisfaction) may perceive their work load more negatively.

2.3.3 OCCUPATIONAL / WORK-RELATED RISK FACTORS

According to the outcome of studies conducted by Mior and Diakow (1987) and Rugelj (2003) it would appear that manual therapists believe their low back pain may be caused or aggravated by their work.

2.3.3.1 WORK ACTIVITIES / TASKS

Heavy manual labour, physically demanding or stressful work, repetitious work and work that requires staying in one position for long periods of time has been associated with the development of low back pain (Morris, 2006). Vieira and Kumar (2004) also stated that physical exertion in the work place could precipitate musculoskeletal injuries and that poor posture, extreme range of motion; force, repetitive movements and time all play a role.

This is because any awkward, constrained, asymmetric, repeated or prolonged postures can overload tissues and exceed their thresholds of tolerable stress resulting in injury, while the maintenance of static postures for prolonged periods of time compresses blood vessels within the muscles resulting in microlesions due to decreased tissue oxygenation and nutrition (Vieira and Kumar, 2004). Therefore, incorrect working postures which lead to imbalance and fatigue or over-exertion cause mostly muscle, tendon and ligament injuries that may result in discomfort and low back pain (Vieira and Kumar, 2004).

According to Pope *et al.* (1991), performing work in a predominantly sitting posture for long periods of time without adequate lumbar support, may increase the risk of low back pain. This was supported by Bejia *et al.* (2005) who noted in their literature review that several studies linked low back pain in administrative hospital staff to their predominantly seated position and sedentary nature of their activities. In addition, awkward posture was associated with the presence of low back pain and / or sciatica, so, sitting for more than half of a workday or the combination of sitting with an awkward posture leads to the greatest increase in low back pain (Lis *et al.,* 2007).

When lifting or transferring patients, high compression forces are produced in the lumbar spinal discs that could potentially cause injury (Pope *et al.,* 1991) and the risk of injury to the low back, especially in the form of disc prolapse, also increases when flexion and rotation of the spine are combined (i.e. during bending and / or twisting) (Bogduk, 1999 and Waddell, 1999).

This was highlighted by Holder *et al.* (1999) who found that physiotherapists' susceptibility to occupational musculoskeletal injury increased with labour intensive tasks (e.g. lifting / transferring dependent patients) and Smith *et al.* (2006) who similarly showed that regular manual handling of patients by nurses was associated with a 2.59 times higher risk of low back pain.

Therefore, to reduce the risk of developing musculoskeletal disorders researchers have suggested that the following be determined prior to carrying out patient handling tasks (e.g. lifting): the patients' readiness, mobility and weight; the availability of mechanical devices and aids to assist with the lifting; the unit / work environment and the therapist or nurse's own capability (Yip, 2001 and Campo, 2008).

Therefore, what follows are the findings of several key research studies that focused on the job risk factors associated with the development of work-related musculoskeletal disorders in manual therapists:

> Based on previous research outcomes, the work activities / tasks that physiotherapists most often felt had contributed in some way to the development of their work-related musculoskeletal injuries included: lifting or transferring patients, performing manual therapy and orthopedic techniques (Bork *et al.,* 1996; Holder *et al.,* 1999 and Cromie *et al.,* 2000), catching patients during falls or responding to an unanticipated or sudden movement by a patient (Bork *et al.,* 1996 and Holder *et al.,* 1999), performing the same task repeatedly (Cromie *et al.,* 2000 and Glover *et al.,* 2005), lifting heavy equipment and assisting patients during gait activities (Bork *et al.,* 1996).
>
> In addition, the work activities / tasks associated with an increased risk of low back pain (Cromie *et al.,* 2000 and Glover *et al.,* 2005) that were identified as risk factors of particular concern for physiotherapists who had acquired work-related injuries to the low back were postural risk factors such as, working in the same position for long periods of time, bending or twisting of the back (Cromie *et al.,* 2000 and Glover *et al.,* 2005) and working in awkward positions (Cromie *et al.,* 2000).
>
> West and Gardner (2001) also asked physiotherapists, who had low back pain as a result of work-related injuries, to consider 17 job risk factors and indicate how much of a problem (if any) each item was for their low back pain. Six factors chosen by 50% or more of the injured physiotherapists included: working in the same position for long periods, working in static postures with flexion and / or rotation of the spine, continuing to work while hurt, performing manual therapy techniques, treating an excessive number of patients in one day and performing the same task over and over. Other problematic factors identified were lifting or transferring dependent patients (35%) and carrying, lifting or moving equipment (25%).

Similarly, Campo (2008) identified patient transfers, patient repositioning, bent or twisted postures and job strain as the risk factors most frequently associated with the development of work-related low back pain in physiotherapists.

In comparison, factors related to the administering of manual procedures (e.g. adjustments, massage and motion palpation) have been implicated in the development of unspecified back pain and other occupational injuries in chiropractors (Mior and Diakow, 1987; Tim, 1996 and Rupert and Ebete, 2004). Tim (1996) determined that frequent lifting of patients into the correct position for an adjustment; static work postures, especially standing and working all day in a slightly flexed position; bending and twisting and stretching and reaching were all significantly associated with unspecified back pain in chiropractors. In addition, performing these activities in a standing position seemed to cause more back pain according to the practitioner, than if he / she was sitting (Tim, 1996).

Furthermore, physiotherapy students have poor working postures (Jackson and Liles, 1994) and research has revealed that sitting and looking down for long periods of time increased the prevalence of low back pain in both physiotherapy (Nyland and Grimmer, 2003) and chiropractic students (Fyfe, 2006).

According to the literature, the job risk factors identified as problematic in manual therapists are also of concern in various health care professionals who utilize manual handling tasks and physical activities, such as nurses (Smedley *et al.,* 1995; Yip, 2001; White and Kirby, 2003; Eriksen, Bruusgaard and Knardahl, 2004; Vieira *et al.,* 2005; Smith *et al.,* 2006), paramedics (Vlok, 2005), firefighters (Lavender *et al.,* 2000) and x-ray technologists (Kumar *et al.,* 2004).

SUMMARY

To summarize, the five job risk factors which appear to be of most significance among manual therapists are (in no particular order): repetitious activities (Glover *et al.,* 2005), performing manual therapy techniques (Bork *et al.,* 1996 and Holder *et al.,* 1999), static postures (Tim, 1996 and Glover *et al.,* 2005), bending and twisting (Tim, 1996; Glover *et al.,* 2005 and Campo, 2008) and lifting and transferring patients (Bork *et al.,* 1996; Tim, 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Campo, 2008).

2.3.3.2. WORK SCHEDULE, HISTORY AND SETTING

2.3.3.2.1 NUMBER OF YEARS IN PRACTICE / EXPERIENCE

Among physiotherapists, the majority of first episodes of musculoskeletal injury occur within the first five years of practice, among the younger therapists (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005) and students (Nyland and Grimmer, 2003). Inexperience and a reluctance to seek assistance with physically demanding tasks may account for the increased prevalence of symptoms seen in younger physiotherapists (Cromie *et al.,* 2000). Also, Tam and Yeung (2006) established that younger non-emergency ambulance workers were more susceptible to low back pain and attributed the findings to the fact that subjects who had longer working experience, learned to adapt to their environment and tended to self manage problems even when low back pain occurred.

Thus, it is the newly qualified graduates, who often enter into the workplace with existing low back pain (Nyland and Grimmer, 2003), that are in most need of intervention services aimed at reducing injury rates as they do not appear to be putting their training or other principles they teach their patients into practice when it comes to how they approach their work (Glover *et al.,* 2005). This highlights the importance of implementing preventative low back pain strategies even prior to the commencement of full time employment (Mitchell *et al.,* 2008).

2.3.3.2.2 PATIENT CONTACT TIME

Treating an excessive number of patients in one day has been positively linked to an increased risk for occupational injury among physiotherapists (Bork *et al.,* 1996 and West and Gardner, 2001) and chiropractors, who reported that this was an added factor that led to over-exertion and contributed to development of their occupational unspecified back pain (Tim, 1996).

The link between number of hours worked per week and occupational low back pain is unclear and overall the literature is contradictory. On average a physiotherapist may spend up to 28.5 hours in direct patient care, varying slightly by work setting (Bork *et al.,* 1996). Holder *et al.* (1999) determined that the highest injury prevalence in physiotherapists occurred in those who worked between 41 to 50 hours per week but concluded that the majority of physiotherapists would not limit their patient contact time as a result of injury. Decreasing patient contact hours was however found to be a preventative step used often by physiotherapists in response to occupational injury according to West and Gardner (2001) and Glover *et al.* (2005).

In contradiction to the above, Mior and Diakow (1987) noted that 87% of chiropractors who worked more than 35 hours per week; 86% of those who worked between 20 to 35 hours per week and 95% of those who worked less than 20 hours per week experienced unspecified back pain. Thus, working more hours per week appeared to protect chiropractors against the development of unspecified back pain to some degree. However in contrast to the findings of Mior and Diakow (1987), in chiropractic students, practicing chiropractic techniques for more than 21 hours per week was associated with a 22 times higher risk for low back pain (Fyfe, 2006).

Lastly, Jang *et al.* (2006) noted that the number of hours spent in direct patient contact also had an impact on the prevalence of work-related musculoskeletal disorders in massage practitioners. They suggested that hours in direct patient contact should be limited by reducing scheduling of clients, allowing time for breaks, recognizing the point at which fatigue starts to affect work and modifying techniques to reduce stress.

2.3.3.2.3 WORK SCHEDULE

According to Lavender *et al.* (2000) a lack of strength and endurance are key factors leading to a number of musculoskeletal injuries and disabilities. Job rotation, rest breaks and variety in the physical demands of work are therefore important to avoid overloading and fatigue which is believed to precede injury (Cromie *et al.,* 2001). Eriksen *et al.* (2004) concluded that working night shifts was associated with the development of low back pain in nurses' aides and Kumar *et al.* (2004) concluded that one of the possible contributing factors to the high morbidity profile among x-ray technologists was the pace of work in this profession. According to Kumar *et al.* (2004) work activities often assumed a frantic pace that could not always be controlled, respondents reported that they were occasionally unable to take scheduled breaks and several indicated that the time provided to complete tasks was realistic only sometimes.

2.3.3.2.4 WORKING NEAR TO OR AT YOUR PHYSICAL LIMIT / OVER-EXERTION

Biomechanically any direct trauma, single over-exertion or frequent sustained or repetitive loading may trigger a musculoskeletal injury (Pope *et al.,* 1991). With this in mind, "working near to or at your physical limits" was implicated by 44% of physiotherapists in the development of their occupational injury (Glover *et al.,* 2005), while the bulk of work-related injuries in x-ray technologists were also due to over-exertion resulting in sprains and strains (Kumar *et al.,* 2004).

2.3.3.2.5 LACK OF STAFF AND ASSISTANCE WITH PATIENT HANDLING

As with most manual therapists, physiotherapists cannot choose their patients shape or size, but they can be selective about their techniques and the number of staff utilized for safe treatment handling (Hignett, 1995). Patient handling with assistance is less risky than handling by only one person, but presumes an adequate availability of staff (Cromie *et al.,* 2001) and research has shown that obtaining assistance when handling heavy patients was a preventive measure chosen by 66% of physiotherapists after acquiring a work-related musculoskeletal injury (Glover *et al.,* 2005).

2.3.3.2.6 USE OF HEIGHT ADJUSTABLE SURFACES

The design of the physical environment in the workplace (i.e. the equipment, furniture, space and lighting) is important in prevention of work-related injuries (Cromie *et al.,* 2001). Although one of the central concepts of ergonomics is to “fit the job to the person”, manual therapists work with human beings and it is impossible to select either the patient or the therapist to obtain an ideal anthropometric match for safe treatment handling (Hignett, 1995).

Prolonged or repetitive bending is a recognized factor in the development of occupational low back pain and provides a rationale for use of height adjustable work surfaces. While most therapists would be aware of the benefits of an adjustable treatment plinth in their rooms, it is not a requirement and is not always used, particularly when a number of therapists are sharing the same facilities (Cromie *et al.,* 2001). Postural analysis has revealed that to compensate for a working table that is too high or too low, practitioners have to bend or twist their back, elevate their shoulders and / or bend their elbows or wrists, resulting in awkward postures that cause work-related musculoskeletal disorders (Jang *et al.,* 2006).

Studies indicate that, adjusting the height of the plinth / bed was the preventive measure adopted most frequently by injured physiotherapists (86%) (Glover *et al.,* 2005) and in massage practitioners, inappropriate working table height increased the odds of low back pain up to 3.6 times (Jang *et al.,* 2006). Among chiropractors, the literature was contradictory. Mior and Diakow, (1987) concluded that incorrect table height was a contributing factor to the production of occupational unspecified back pain in chiropractors but Tim (1996) showed that over 90% of chiropractors did not attribute their unspecified back pain to their chair or table heights, which were considered to be complementary.

2.3.3.2.7 WORK / CLINICAL SETTING

Chiou *et al.* (1994) determined that hospital nurses working in the ICU and neurological wards were at greatest risk of developing low back pain. The workload of nurses in these units is heavier because the patients are usually very ill or comatose and require more help from the nurses for daily activities and transfers. Similarly, Bork *et al.* (1996) concluded that hospital-based physiotherapists have a greater prevalence of low back pain compared to non-hospital based physiotherapists, a fact which was also attributed to the level of physical dependence of hospital patients who are likely to have acute and more extensive injuries.

According to Holder *et al.* (1999) the increased risk of low back pain associated with treating dependent patients occurs because therapists are likely to perform patient transfers and lifts, activities commonly found to be a mechanism of low back pain, more frequently when treating dependent patients. Further evidence to support this was provided by Rugelj (2003), who indicated that the number of incidents of low back pain was higher in physiotherapists who often and exclusively worked with dependent patients.

Several studies in the literature that evaluated every body region in their investigations of work-related musculoskeletal disorders in physiotherapists found a clear association between the type of physical therapy work and work-related musculsokeletal disorders.

Bork *et al.* (1996), Holder *et al.* (1999) and Glover *et al.* (2005) concluded that work in the general musculoskeletal outpatient setting was associated more with the development of work-related injuries of the wrists or hands than the low back in physiotherapists. The increased prevalence of wrist or hand injuries in the general musculoskeletal outpatient setting was attributed to the likelihood that manual therapy techniques would be performed more frequently in a general musculoskeletal outpatient setting when compared to other settings (e.g. neurological rehabilitation) and according to Bork *et al.* (1996) performing manual therapy regularly was associated with a 3.5 times greater risk of sustaining a wrist or hand work-related injury. Jang *et al.*

(2006) also considered manual therapy to be a major source of work-related musculoskeletal injuries in the upper extremities in massage practitioners and Campo (2008) agreed that therapists who do more soft tissue work and joint mobilization tend to have more wrist and hand complaints.

Bork *et al.* (1996) also established that physiotherapists treating children (<12yrs of age) were 3.5 times more likely to have had knee complaints than those who treated adults and Cromie *et al.* (2000) agreed that a higher prevalence of knee symptoms exists in paediatric physiotherapists, possibly due to the large amount of time spent by these therapists in kneeling and crouching.

In addition, Holder *et al.* (1999) determined that physiotherapists practicing in rehabilitation environments generally reported more low back pain (75%) than those who practiced in outpatient settings (64%) and Glover *et al.* (2005) noted that physiotherapists who reported significant injuries to their low back believed that it was while working in a neurological rehabilitation setting (18%), with general musculoskeletal outpatients (17%), with the elderly (14%) and in an orthopedic setting (11%) that their low back pain first occurred. In research conducted by Campo (2008), the proportion of work-related musculoskeletal disorders in physiotherapists varied across settings but was highest in the school system (31.3%), private outpatient setting (22.3%), home care (21%) and acute care (17.3%) settings.

2.3.3.2.8 INADEQUATE TRAINING IN INJURY PREVENTION

Physiotherapists have a good knowledge of the biomechanics, principles and application of patient handling skills but in a busy clinical setting this knowledge is compromised according to Ellis (1993), who therefore suggested that the content and setting of training be assessed and improved in order to minimize occupational low back pain in physiotherapists. Despite this, most injured physiotherapists do not view inadequate training in injury prevention as a contributory factor to their injury (Bork *et al.,* 1996; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005). However, well-trained health care workers such as manual therapists, with specialist knowledge of injury prevention continue to be injured during the course of their work, suggesting a gap between knowledge of “safe” practice and its application in the workplace (Glover *et al.,* 2005).

SUMMARY

Based on the literature, work factors that are linked to the development of occupational injury in manual therapists therefore include: number of years in practice and inexperience - with most injuries occurring for the first time within five years (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005); treating an excessive number of patients per day (Bork *et al.,* 1996 and Tim, 1996) or working for an excessive number of hours per week (West and Gardner, 2001 and Glover *et al.,* 2005), work schedule (e.g. pace of work); over-exertion, lack of staff and assistance with patient handling (Cromie *et al.,* 2001; Kumar *et al.,* 2004 and Glover *et al.,* 2005); use of incorrect table height (Mior and Diakow, 1987; Cromie *et al.,* 2001; Jang *et al.,* 2006) and the type of work / clinical setting with the greatest risk occurring in neurological rehabilitation and hospital settings (Bork *et al.,* 1996; Holder *et al.,* 1999; Glover *et al.,* 2005 and Campo, 2008).

2.4 LOW BACK PAIN HISTORY

2.4.1 ABSENTEEISM DUE TO LOW BACK PAIN

In general, injuries occurring to the low back at work result in more work-loss days than injuries occurring away from work, and low back pain is the second most frequent cause of worker absenteeism in the United States (Morris, 2006).

Nevertheless, physiotherapists do not often miss work or take time off as a result of work-related musculoskeletal injury (Bork *et al.,* 1996; Cromie *et al.,* 2000; West and Gardner, 2001 and Campo, 2008). Sick leave or absenteeism may be in the lower ranges among physiotherapists because they often continue to work with discomfort when they are injured or hurt (Bork *et al.,* 1996; Cromie *et al.,* 2000 and West and Gardner, 2001), behaviour that Cromie, Robertson and Best (2002) attributed, in part, to cultural factors.

Also, the literature may not be reflective because few therapists choose to seek formal evaluation from a physician for work-related musculoskeletal disorders. Evidence suggests that manual therapists who have the knowledge and skill needed, often prefer to treat themselves or seek informal treatment from colleagues, thus rendering a visit to a physician that requires absence from work unnecessary (Bork et al., 1996 and Campo, 2008).

2.4.2 SEVERITY / INTENSITY

Literature has indicated that in chiropractors and chiropractic students, mild and moderate intensities of low back pain are more common than severe pain (Tim, 1996 and Fyfe, 2006). The intensity, as described here in chiropractors, is an important characteristic of low back pain to document as it determines the impact of the problem on the patient, family, health care system and society. In addition, the treatment, outcome and prognosis are all dependent on severity (Waddell, 1999). No literature relating to the severity / intensity of low back pain in other manual therapists was found.

2.4.3 DURATION AND FREQUENCY OF LOW BACK PAIN EPISODES

The best-known predictor of a further episode of low back pain is a history of previous episodes (Waddell, 1999) and lifetime recurrence rates of up to 85% have been reported (Rives and Douglass, 2004). Most patients with low back pain will improve within one week and the majority will be pain free within eight weeks but patients who continue to feel pain after 12 weeks may develop chronic low back pain with recurring episodes over a long period of time (Diamond and Borenstein, 2006).

An interesting finding made by Weiner *et al.* (2004) in a general population of older adults with low back pain was that there was an inverse relationship between pain duration and physical disability. According to Weiner *et al.* (2004), this clearly contradicted the commonly held belief that chronicity automatically implies disability. One possible explanation was that the greater duration of pain allowed more time for development of effective coping skills and resulted in the pain having less impact on physical dysfunction.

According to Kumar *et al.* (2004) the majority of occupational low back pain experienced by x-ray technologists was acute, as most cases resolved within one to two weeks and the number of reported episodes ranged from one to four. Research has revealed that in physiotherapists there are high rates of recurrence (88%) of occupational injuries (West and Gardner, 2001) and symptoms are also frequently exacerbated by clinical practice (Holder *et al.,* 1999). In chiropractic students previous low back pain tended to be more frequent than current low back pain (Fyfe, 2006) and in chiropractors, although the majority reported infrequent or occasional unspecified back pain, constant unspecified back pain was also reported by 20% (Mior and Diakow, 1987) and 6.3% (Tim, 1996) of the chiropractors respectively.

2.4.4 TYPE OF LOW BACK INJURY / DIAGNOSIS

Low back pain is usually benign and self-limiting but it should be kept in mind that low back pain may also be due to underlying systemic disease (e.g. cancer or infection) (Jarvik and Deyo, 2002; Rives and Douglass, 2004 and Diamond and Borenstein, 2006). Most cases of uncomplicated low back pain are caused by muscle sprains and strains, ligamentous injuries, spinal degenerative disease, disc herniation and nerve root compression or irritation (Jarvik and Deyo, 2002). According to Holder *et al.* (1999), the type of injury reported by manual therapists varies depending on the individual and on the activity being performed at the time of injury; but muscle strain, ligament sprain and vertebral disc involvement were the most common type of injuries reported among physiotherapists.

2.4.5 IMPACT ON ACTIVITIES OF DAILY LIVNG / DISABILITY

Low back pain may impact on an individual’s life, general health and well-being as well as activities of daily living and work. The effect that it may have on lifestyle varies, but mainly involves restriction of normal activities in the home, garden, sleep and restriction of mobility and sport (Waddell, 1999). In a general population of Blacks, Indians and Coloureds, the daily activities that were adversely affected by low back pain included: bending, lifting, standing, sitting, walking, dressing and driving (Van der Meulen, 1997 and Docrat, 1999). According to Cromie *et al.* (2000), 41.5% of physiotherapists suffering from low back pain were also reportedly prevented from performing their normal activities of daily living and leisure activities and 12.5% were prevented from working as a consequence while 30 to 40% of nurses with low back pain reported associated limitations of daily activities including housework, sleeping and walking (Yip, 2001).

2.5 IMPACT OF OCCUPATIONAL LOW BACK PAIN

Occupational low back pain has an impact at three levels.

Firstly, it is a burden on the economy and health care system (Manga *et al.,* 1993 and Morris, 2006).

Secondly, the manual therapist is affected directly. When returning to work after suffering from an episode of occupational low back pain, there is always a risk of decreased work capacity, of having the pain exacerbated and of having the condition worsen (Pransky *et al.,* 2002). Research shows that responses to the development of occupational injuries in physiotherapists include: modifying physiotherapy practice techniques, taking sick leave or work loss, decreasing patient contact hours, changing the type of patient that is predominantly treated, altering duties and work habits and increased use of other personnel (Holder *et al.,* 1999; West and Gardner, 2001 and Glover *et al.,* 2005). Changing work setting, leaving the profession or retiring are some of the more drastic responses that have been reported (Cromie *et al.,* 2000 and Campo, 2008). Thus we can conclude that in addition to affecting the individual's quality of life, occupational low back pain will also impact on the therapist's ability to work efficiently, jeopardizing the success of his / her practice and financial income (Cromie *et al.,* 2000).

Lastly, it is the patients and public who are indirectly affected, as manual therapists suffering from occupational low back pain may be unable to provide efficient service to them when they are in need of treatment (Tim, 1996).

2.6 CONCLUSION

Physiotherapy (Bork *et al.,* 1996; West and Gardner, 2001 and Glover *et al.,* 2005) and chiropractic (Mior and Diakow*,* 1987; Tim, 1996 and Fyfe, 2006) are professions that carry a high risk for development of low back pain and it is the labour intensive tasks and physical activities that these manual therapists perform on a daily basis that is believed to contribute to this (Rupert and Ebete, 2004). The knowledge and skill that manual therapists possess cannot always prevent them from acquiring occupational injuries and their cultural and ethical values are also thought to result in behaviours during practice that add to their risk of injury instead of minimizing it (Cromie *et al.,* 2001).

Although several studies have investigated the prevalence and risk factors of occupational low back pain in physiotherapists (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Glover *et al.,* 2005; Campo, 2008) and chiropractors (Mior and Diakow, 1987; Tim, 1996; Rupert and Ebete, 2004 and Fyfe, 2006), to date, none have focused on aromatherapists, biokineticists and reflexologists and literature available on massage therapists (Jang *et al.,* 2006) and occupational therapists (Leggat *et al.,* 2008) was limited. No studies have compared the prevalence and risk among various manual therapy professions either, possibly due to lack of consistency in research designs and methods.

Thus this research aimed to determine the prevalence and risk factors for occupational low back pain in manual therapists and to compare the prevalence and risk factors for occupational low back pain among various manual therapy professions.

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CHAPTER THREE

MATERIALS AND METHODS

3.1 INTRODUCTION

This chapter is concerned with explaining and describing the research methodology, data collection and statistical analysis process utilized in this study.

3.2 STUDY DESIGN

This research was conducted as a cross-sectional survey (Morris, 2006), which was quantitative in nature and made use of a structured questionnaire to collect data.

Based on the above study design this research was approved by the Faculty of Health Sciences Research and Ethics Committee (Appendix K), which details that this research complies with the Declaration of Helsinki, 1975.

3.3 ALLOCATION OF PARTICIPANTS

3.3.1 SAMPLING AND SELECTION PROCEDURE

The study sample was selected from the population of registered manual therapists across South Africa. Probability proportional to size (PPS) sampling using a stratified random sampling technique was used to ensure an optimal sample size for statistical purposes.

PPS is a sampling technique for use with surveys or mini-surveys in which the probability of selecting a sampling unit is proportional to the size of its population. It gives a probability (i.e. random, representative) sample. It is most useful when the sampling units vary considerably in size because it assures that those in larger sites have the same probability of getting into the sample as those in smaller sites (McGinn, 2004).

PPS sampling was used in this study, based on the fact that it allowed for a representative sample per population (e.g. the sample of physiotherapists) that was reflective of the entire population (e.g. the entire population of physiotherapists). Thus a proportion of a profession was utilized to generate a representative mean for that profession as a whole. Without this representative mean the researcher would not have been able to statistically compare the professions (Esterhuizen, 2007), as was required in the outcomes that were set for this research.

3.3.2 SAMPLE SIZE

In telephonic communication with the Health Professions Council of South Africa (Booi, 2007) and the Allied Health Professions Council of South Africa (Maple, 2007) and on the basis of purchased registers from the relevant councils (Booi, 2007 and Maple, 2007), it was determined that the number of practitioners registered with respect to manual therapy as on the 31/01/2007 were as follows:

1. With the Health Professions Council of South Africa:
   - Physiotherapists – 4951
   - Biokineticists – 721
   - Occupational Therapists – 2966
2. With the Allied Health Professions Council of South Africa:
   - Reflexologists – 1122
   - Aromatherapists – 639
   - Massage Therapists – 228

On further communication with the Allied Health Professions Council of South Africa (Pillay, 2007) it was determined that a total of 450 chiropractors were registered with the Allied Health Professions Council of South Africa as on the 30/05/2007.

The total population of manual therapists was thus determined at 11 077. Proportionally physiotherapists made up 44.70% of the manual therapist group, occupational therapists made up 26.78%, biokineticists made up 6.51%, chiropractors made up 4.06%, reflexologists made up 10.13%, aromatherapists made up 5.77% and massage therapists only made up 2.06%. (All figures were rounded off to two decimal places).

The sample (n=1500) chosen for this study through PPS sampling represented 13.54% of the total population of 11 077 manual therapists. The following numbers of professionals were included to make up the total sample of 1500 manual therapists:

Physiotherapists	– 670
Occupational Therapists	– 402
Biokineticists	– 98
Chiropractors	– 61
Reflexologists	– 152
Aromatherapists	– 86
Massage Therapists	– 31

Ideally all 1500 questionnaires should have been returned but because postal questionnaire surveys have the lowest response rate of 30-40% (Esterhuizen, 2007), a realistic expectation for this study was set at a minimum response rate of 20% or 300 questionnaires, which was still considered statistically viable and would allow for comparison of risk factors. In order to ensure a 30-40% response rate, reminders, either telephonically or via email (as available contact details allowed), were conducted at six weeks and again at 12 weeks.
In order to make comparisons and to avoid bias, an equal minimum response rate of 20% was required for each group or profession (Esterhuizen, 2007). The minimum number of questionnaires required for each group to meet the minimum response rate of 20% therefore, was as follows:

Physiotherapists	– 134
Occupational Therapists	– 80.4
Biokineticists	– 19.6

Chiropractors	– 12.2
Reflexologists	– 30.4
Aromatherapists	– 17.2
Massage Therapists	– 6.2

3.3.3 INCLUSION AND EXCLUSION CRITERIA

3.3.3.1 INCLUSION CRITERIA:

1. Physiotherapists, biokineticists and occupational therapists had to have been registered with the Health Professions Council of South Africa (HPCSA) in order to be eligible for participation in the study.
2. Chiropractors, reflexologists, aromatherapists and massage therapists had to have been registered with the Allied Health Professions Council of South Africa (AHPCSA) in order to be eligible for participation in the study.
3. Participants were required to read a Letter of Information and sign an Informed Consent Form.
4. All questionnaires that were returned with informed consent were accepted.

3.3.3.2 EXCLUSION CRITERIA:

1. Only questionnaires that were returned without informed consent were excluded. These questionnaires were shredded immediately.
2. Focus group participants and subjects participating in the pilot study were excluded from participating in the main study to prevent bias, as set out in Morgan (1998(a)), Morgan (1998(b)) and Morgan (1998(c)).

3.4 STUDY MATERIALS

The data collection tool was a self-administered questionnaire.

3.4.1 QUESTIONNAIRE DEVELOPMENT AND BACKGROUND

The questionnaire was designed in such a way that it would address all possible risk factors contributing to the development of low back pain as documented in the outcomes of previous studies (Bork *et al.,* 1996; Tim, 1996; Holder *et al*., 1999; West and Gardner, 2001; Glover *et al.,* 2005; Vlok, 2005 and Fyfe, 2006).

The questionnaire focused on various categories of risk factors including individual, psychosocial and occupational risk factors. Questions regarding individual factors such as age (Bork *et al*., 1996), gender (Glover *et al.,* 2005), ethnicity (Vlok, 2005), height, weight (Smedley *et al.,* 1995; Waddell, 1999 and Bejia *et al.,* 2005), body build (Vieira *et al.*, 2005), structural anomalies (Tim, 1996 and Kovacs *et al*., 2003), previous surgery (Brox *et al.,* 2006 and Ericksen *et al.,* 2006), previous trauma (Stoxen, 2008) and previous injury (Schneider *et al.,* 2000 and Steffen *et al.,* 2008) as well as questions regarding pregnancy and children (Polden and Mantle, 1990; Bastiaanssen *et al.,* 2005; Borggren, 2007 and Dasappa, 2007) were developed.

A questionnaire pertaining to occupational low back pain was difficult to establish accurately because it was difficult to distinguish or separate the individual's risk factors from the work-related risk factors (Bejia *et al*., 2005) thus, the reason for including questions regarding individual factors was that it was necessary to exclude as far as possible the effects of these factors, to ensure that the reported low back pain was indeed of occupational origin.

The psychosocial risk factors that were addressed included: exercise (Tim, 1996; Sjolie, 2004 and Fyfe, 2006), smoking (Kirkaldy-Willis *et al.,* 1992 and Vlok, 2005), marital status (Bejia *et al.,* 2005), alcohol consumption (Smith *et al*., 2006), stress and depression (Carroll *et al.,* 2004 and Smith, 2004) and job satisfaction and work stress (Van den Heuvel *et al*., 2004 and Morris, 2006).

To gather information on possible occupational risk factors, questions aimed at work activities / tasks (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000 and West and Gardner, 2001), work schedule and history (West and Gardner, 2001; Kumar *et al.,* 2004 and Glover *et al.,* 2005) and work environment (Cromie *et al.,* 2001) were compiled. Questions that would appropriately determine low back pain prevalence, intensity (Tim, 1996 and Fyfe, 2006), frequency, recurrence, duration (Waddell, 1999; West and Gardner 2001 and Diamond and Borenstein, 2006), onset, diagnosis (Jarvik and Deyo, 2002), disability (Cromie *et al.,* 2000) and absenteeism (West and Gardner, 2001) related to low back pain were also included to cover low back pain history.

Although the initial development of the questionnaire was based primarily on the literature (Bork *et al.,* 1996; Tim, 1996; Holder *et al*., 1999; West and Gardner, 2001; Glover *et al.,* 2005; Vlok, 2005 and Fyfe, 2006), further development was necessary to ensure that the questionnaire was valid and reliable.

3.4.1.1 FACE VALIDITY

According to Bernard (2000) as cited in Peek (2005), validity refers to the accuracy and trustworthiness of instruments, data and findings in research, thereby ensuring that future research utilizing the particular tool is accurate.

There are various components of validity including face validity, content validity, construct validity and criterion validity.

1) *Face validity* according to Bernard (2000) as cited in Peek (2005), is determined by an agreement between researchers and those with a vested interest in a questionnaire, that on “the face of it” the tool seems valid.
2) An instrument has c*ontent validity* when the content of the questionnaire is considered effective and appropriate enough to be able to assess a particular concept (Bernard, 2000).

3) *Construct validity* measures the degree of closeness between the construct being measured and the actual observation made with the instrument. How accurately it answers questions in a scale that reflect theoretical predictions of a particular construct (Bernard, 2000).
4) *Criterion or concurrent validity* is measured when a particular tool produces similar results when compared to another tool already known to be trustworthy (Bernard, 2000). Predictive validity falls under this category as well. If a tool can predict a future situation accurately it has predictive validity (Mouton, 1996).

Focus group and pilot testing conducted prior to the study ensured that face validity as well as construct and content validity of the questionnaire were achieved.

Focus group and Pilot testing

A focus group is a qualitative research technique that collects data and insights through group interaction based on topics supplied by the researcher who plays the role of moderator. Focus groups should ideally consist of between seven to ten participants recruited on the basis of common characteristics (Greenbaum, 2000).

The focus group in this study consisted of eight participants, including; one physiotherapist, one biokineticist, one occupational therapist, one person who represented reflexology, aromatherapy and massage therapy; one chiropractic student, one chiropractor, the researcher and the research supervisor who is also a chiropractor. Before commencing, the participants in the focus group were supplied with a Letter of Information (Appendix C) and had to give informed consent (Appendix B). All participants also had to sign a Code of Conduct (Appendix E) and Confidentiality Statement (Appendix D) to ensure that all information discussed during the focus group meeting as well as any information pertaining to the identity of the participants in the research process would be kept private and confidential. It also indicated that participants agreed to give due respect to every suggestion and comment made by any other member of the focus group and that these would be debated with reference to the outcomes of the research. The Code of Conduct (Appendix E) and Confidentiality Statement (Appendix D) forms also emphasized that the information gathered through the focus group by the researcher would be made public in terms of a mini-dissertation and journal publication but that the researcher would ensure that any participants in the focus group and research would remain anonymous.

The initial questionnaire or Pre-focus group questionnaire (Appendix A) was then given to the participants who were asked to review and discuss the questions and to give recommendations as to how the questionnaire could be modified in order to accurately record the relevant information within this study, based on the aims of this research and in the South African context (Peek, 2005). In addition, the focus group aimed to identify the following in the questionnaire: ambiguity, inconsistencies with practice, questions that were deemed to be in excess or those that were omitted and questions / areas that were not covered which needed to be further developed (Bourque and Fielder, 1995; Fowler, 1995 and Morgan, 1998(a)).

Suggestions for changes to the questionnaire were analyzed and discussed before being implemented (Vlok, 2005). Revisions made to the questionnaire based on the changes proposed by the focus group are believed to establish face and content validity (Holder *et al*., 1999).

With reference to the focus group transcript and according to notes made during the focus group meeting what follows is a detailed description of the changes made to the Pre-focus group research questionnaire (Appendix A).

3.4.1.2 <u>CHANGES MADE FROM THE PRE-FOCUS GROUP (Appendix A) TO THE POST-FOCUS GROUP RESEARCH QUESTIONNAIRE (Appendix F)</u>

<u>SECTION 1:</u>

- Omission:
  - “Individual Factors” was removed from the section heading.

Question 1:

- Wording:
  - Changed to, “Please tick the appropriate box to indicate your ***registered*** profession.”
- Table formatting:
  - Chiropractors were included as an option in the sample.
  - Options were arranged in alphabetical order.

Question 2: No changes.

Question 3: No changes.

Question 4:

- Wording:
  - Changed to, ***“Please indicate your ethnicity by ticking the appropriate box”.***
- Presentation:
  - The line / space provided for the answer was replaced with a table.
- Table formatting:
  - Options were arranged in alphabetical order.

Question 5:

- Omission:
  - “Anthropometry and BMI” was removed.

Question 5a:

- Numbering > changed to Question 6a.

Question 5b:

- Numbering > changed to Question 6b.

Question 5c:

- Numbering > changed to Question 6c.

Question 6:

- Numbering > changed to Question 6d.
- Omission:
  - “Postural/structural anomalies” was removed, as was the table presentation of the question.
- Wording:
  - Changed to, ***“Do you have any known musculoskeletal/structural anomalies? E.g. scoliosis, leg length inequality.”***
- Presentation:
  - The table was removed and replaced with the question: “Do you have any known musculoskeletal/structural anomalies? E.g. scoliosis, leg length inequality”, that could be answered by ticking either YES or NO options provided in a small table.

<u>QUESTIONS ADDED TO SECTION 1:</u>

Question 6e:

- Question:
  - If YES, to Question 6d) above: Please specify what the musculoskeletal anomaly is?
- Presentation:
  - A long line / space was provided for the respondents to write their answer.

Question 7:

- Question:
    - What is your primary function/activity during the day? Please tick the appropriate box to indicate how many hours in a working day you spend on each of the following activities.
- Presentation:
    - The question was presented in a table format, with five columns and six options for varying degrees of time, ranging from <1hr, between 1-3hrs, between 3-5hrs, between 5-8hrs and >8hrs.

Question 8a:

- Question:
    - Have you had any previous surgery?
- Presentation:
    - Answer options, YES or NO were presented in a small table.

Question 8b:

- Question:
    - Please specify the type of surgery and the year in which it took place.
- Presentation:
    - The question was presented in a table format, with two columns:
        - The heading of the first column was "Type of surgery e.g. Pelvic or abdominal".
        - The heading of the second column was, "Year in which it took place e.g. 2005."
    - There was one line provided for an answer in the table.

Question 9a:

- Question:
    - Have you had any previous trauma to your lower back, hips, knees or ankles that resulted in an injury requiring medical intervention?

- Presentation:
  - ➢ Answer options, YES or NO were presented in a small table.

NOTE IS ADDED: If your answer to 9a) above is NO, please skip to Question 10a).

Question 9b:

- Question:
  - ➢ On the following table, please indicate:

1) The location/s of any previous injury
2) Whether you would classify the trauma that resulted in your injury, as Acute Trauma or Repetitive Microtrauma

(**Repetitive Microtrauma: Caused by activities that induce repetitive stress over time, resulting in injury)*

3) Approximately how long ago the injury occurred.

- Presentation:
  - ➢ Answer options were presented in table format:
    - There were five columns: the first column was “LOCATION OF PREVIOUS INJURY”, the second column was for a “Tick”, the third column was for “Acute Trauma”, the fourth column was for “Repetitive Microtrauma” and the fifth column was for “Approximately how long ago did the injury occur.”
    - In the second line of the table, examples of how to answer the table were provided however; crosses were used instead of ticks.
    - The four options provided, included: Low Back, Hips, Knees and Ankles.

Question 9c:

- Question:
  - ➢ Please specify the location of your most severe previous injury.

- Presentation:
  - Four answer options were provided in a table format, they were: Lower back, Hips, Knees and Ankles.

SECTION 2:

- Omission:
  - "Psychosocial Factors" was removed from the section heading.

Question 7:

- Omission:
  - "Exercise and Physical Fitness" was removed.

Question 7a:

- Numbering > changed to Question 10a.

NOTE WAS ADDED: If your answer to 10a) above is NO, please skip to Question 11).

Question 7b:

- Numbering > changed to Question 10b.
- Omission:
  - "If YES to 7a) above:" was removed.
- Wording:
  - Changed to, "***Approximately***, how many times do you exercise per week?"
- Formatting and omission:
  - The word "Times" was removed from the end of the line / space provided for the answer.

Question 7c:

- Numbering > changed to Question 10c.

Question 7d:

- Numbering > changed to Question 10d.
- Omission:
  - Option 14 “None”, was removed from the table.
- Table formatting:
  - Option 15 “Other”, became a double space and had no line to separate the block.
- Grammar:
  - Option 15 “Other”, was followed by a semi-colon instead of a comma and “Please specify” began with the upper case.

Question 8:

- Numbering > changed to Question 11a.
- Wording:
  - Changed to, “Do you smoke ***cigarettes/pipe/cigars***?”

NOTE WAS ADDED: If your answer to 11a) above is NO, please skip to Question 11d).

Question 8a:

- Numbering > changed to Question 11b.
- Omission:
  - “If YES, to 8) above:” was removed.
- Wording:
  - Changed to, “***Approximately how often*** do you smoke per day?”

Question 8b:

- Numbering > changed to Question 11c.

Question 8c:

- Numbering > changed to Question 11d.

NOTE WAS ADDED: If your answer to 11d) above is NO, please skip to Question 12).

Question 8d:

- Numbering > changed to Question 11e.
- Omission:
  - “If YES, to 8c) above:” was removed.
- Wording:
  - Changed to, “***Approximately how often*** did you smoke per day?”

Question 8e:

- Numbering > changed to Question 11f.

Question 8f:

- Numbering > changed to Question 11g.

Question 9:

- Numbering > changed to Question 12a.

NOTE WAS ADDED: If your answer to 12a) above is NO, please skip to Question 13).

Question 10 and 11:

- Numbering > changed to Question 5 in Section 1. Question 10 and 11 were combined in Question 5.
- Wording:
  - Changed to, “***Please tick the appropriate box to indicate your marital status.***”
- Presentation:
  - The question was presented in a table format.
- Table formatting:
  - Four options were provided: single, married, divorced, widowed.

- Two columns were provided: the first column was to tick the boxes where appropriate and the second column was to indicate the number of times (i.e. that the respondent had been married).

Question 12:

- Numbering > changed to Question 15.
- Table formatting and omission:
    - Option 3 “Neither satisfied or dis-satisfied”, was removed.

Question 13:

- Numbering > changed to Question 16a.
- Wording:
    - Changed to, “***Are you on any medication?”***
- Format for answer:
    - Changed from YES / NO to just Y / N.

Question 13a:

- Numbering > changed to Question 16b.
- Omission:
    - “If YES, to 13) above:” was removed.
- Wording:
    - Changed to, “***Please indicate what you are taking the medication for***:”
- Format for answer:
    - The option of YES / NO was replaced with a long line / space for respondents to write their answer.

Question 14:

- Numbering > changed to Question 17.
- Table format:
    - The table was changed to include 2 columns:
        - The first columns was, PSYCHOLOGICAL STRESS and the second column was for, PHYSICAL STRESS e.g. due

to manual activities and physical workload or demands of your occupation.

- Space was provided for respondents to rate their occupational stress (both psychological and physical stress) by ticking the appropriate corresponding box with the options of: very stressful, stressful, little stress and no stress.

QUESTIONS ADDED TO SECTION 2:

Question 12b:

- Question:
    - “Approximately how many units of alcohol do you drink per day? [Note: 1 unit of alcohol = 1 glass of wine (125ml), 1 beer (340ml) or 1 tot of spirits (25ml)]”
- Table format:
    - A table was provided with five options for units of alcohol and an adjacent column to tick the appropriate answer. The five options were: 1, 2-3, 4-5, 6-7, 8+.

NOTE WAS ADDED: Question 13 is not applicable to MALE RESPONDENTS. Please skip to Question 14a.

Question 13a:

- Question:
    - “How many times have you been pregnant?”
- Format for answer:
    - A line / space was provided for respondents to write their answer.

Question 13b:

- Question:
    - “Please indicate:

1) The type and number of deliveries you have had and,
2) Whether those deliveries were in a hospital setting or non-hospital setting?”

- Table format:
    - A table was presented with four columns:
        - The first column indicated the TYPE OF DELIVERY with two options, either Natural Birth (Non-caesarian section) or Caesarian Section.
        - The second column was for IN HOSPITAL deliveries.
        - The third column was for NON-HOSPITAL deliveries.
        - The fourth column was for respondents to indicate the NUMBER of each respective type of delivery.
        - There was an N/A placed under NON-HOSPITAL/Caesarian Section as Caesarian Sections cannot be done outside of a hospital / clinical setting.

Question 13c:

- Question:
    - “Did you have an epidural injection with any of your deliveries?”
- Format for the answer was, Y / N.

Question 14a:

- Question:
    - “How many children do you have?”
- Format for answer:
    - A line / space was provided for respondents to write their answer.

Question 14b:

- Question:
    - “Into what age groups do your children fall? Tick all appropriate.”
- Format for answer:
    - A table was presented with the following options: N/A, Infant, Toddler, Child, Teenager and Adult.

SECTION 3:

- Numbering > the entire Section 3 was changed to Section 4.
- Omission:
    - “Occupational Factors” was removed from the section heading.

Question 15 and 32:

- Numbering > these questions were combined and changed to Question 29.
- Wording:
    - Changed to, **“*What work (Practice) activity:***
    - **a)** ***Were you doing when you experienced low back pain for the first time.*” (Re-wording of Question 15)**
    - **b)** ***Causes exacerbation of your low back pain or causes your low back pain to recur.”* (Re-wording of Question 32)**
- Table formatting:
    - The table options remained the same as in Question 15 except for the following additions:
        - “Reaching and working away from the body” was added as option number 13 on the combined table.
        - “N/A” was added as option number 14.
    - Two columns were included in the table, they were headed as follows:
        - Activity you were doing when you experienced LBP for the first time.
        - Activities which cause your LBP to recur or be exacerbated.

Question 16:

- Numbering > changed to Question 30.
- Wording:
    - Changed to, "In the following table are 18 potential job risk factors for ***low back pain***. On a scale of 0-5; 0 being no problem and 5 being a major problem, please indicate to what extent ***you believe*** each risk factor may be implicated in the development of your low back pain."

Question 17:

- Omission:
    - "Work schedule and work history" was removed.

Question 17a:

- Numbering > changed to Question 31a.

Question 17b:

- Numbering > changed to Question 31b.
- Wording:
    - Changed to, "***Approximately*** how many patients do you see per day?"

Question 17c:

- Numbering > changed to Question 31c.

Question 17d:

- Numbering > changed to Question 31e.

Question 17e:

- Numbering > changed to Question 31d.

Question 18:

- Omission:
  - "Work environment and ergonomics" was removed.

Question 18a:

- Numbering > changed to Question 32a.

Question 18b:

- Numbering > changed to Question 32b.

Question 18c:

- Numbering > changed to Question 32c.

Question 19:

- Numbering > changed to Question 33a.
- Wording:
  - An example was added to the question, "***e.g. neurological rehabilitation, hospital setting, private practice, paediatrics***."
- Grammar:
  - The question mark was removed at the end of the question.
- Omission:
  - The entire table was removed from the question.
- Format for answer:
  - A long line / space was provided for the respondents to write their answer.

<u>QUESTIONS ADDED TO SECTION 3:</u>

A NOTE WAS ADDED after Question 28: If you answered NO, to BOTH Questions 27) and 28) Please skip to Question 31.

Question 33b:

- Question:
  - “Please indicate in what work/clinical setting your low back pain is exacerbated or caused to recur?”
- Format for answer:
  - A long line / space was provided for the respondents to write their answer.

Question 34:

- Question:
  - “At what stage of your life did you first experience a major episode of low back pain?”
- Format for answer:
  - Options were presented in a table format and included:
    - Before becoming a student
    - As a student and
    - Once you started working as a manual therapist

<u>SECTION 4:</u>

- Numbering > the entire Section 4 was changed to Section 3.
- Omission:
  - “Low Back Pain (LBP) History” was removed from the section heading.

DEFINITION: No changes.

Question 20:

- Numbering > changed to Question 18.
- Grammar:
  - LBP changed to “low back pain”.
- Format for answer:
  - The options, YES / NO were placed into a small table.

A NOTE WAS ADDED (all in bold): If you have NEVER experienced LBP, please skip this Section and proceed to Section 4.

Question 21, 22, 23 and 24:

- Numbering > changed to Question 19.
- Wording:
    - Changed to, "***Have you experienced low back pain in any of the following time periods: Tick the boxes where appropriate."***
- Table format:
    - Wording of two of the options on the table changed:
        - In the past month > changed to "In the ***past 4 weeks."***
        - In the past 12 months > was changed to "In the ***past 1 year***"
    - Participants were required to tick either the YES or NO column, for each of the following four options:
        - In the past 4 weeks.
        - In the past 1 year
        - Ever in your career as a manual therapist.
        - Before working as a manual therapist.

Question 25:

- Numbering > changed to Question 20.

Question 26:

- Numbering > changed to Question 21.
- Wording:
    - Changed to, "What best describes the intensity of ***your worst episode of low back pain in the past year?"***
- Table formatting and omission:
    - Option 1, "No pain at the moment" was removed and replaced with the option of "N/A".

Question 27:

- Numbering > changed to Question 22.
- Grammar:
  - LBP was changed to “low back pain”.
- Table formatting:
  - Omission:
    - Option 1 “Never”, was removed.
  - Wording:
    - Option 1 changed to “***Irregular or Seldom***”
  - Wording:
    - Option 2 changed to Infrequent (1-2 days/***month***)

Question 28:

- Numbering > changed to Question 23.
- Wording:
  - Changed to, “What is the ***approximate*** duration of each episode of your ***low back pain***?”

Question 29:

- Numbering > changed to question 24.
- Wording:
  - Changed to, “***Approximately*** how many ***acute exacerbations*** of your ***low back pain*** have you suffered from in the last year?”

Question 30:

- Numbering > changed to Question 27.
- Grammar:
  - LBP changed to “low back pain”

Question 31:

- Numbering > changed to Question 28.
- Grammar:
  - LBP changed to “low back pain”

Question 32:

- Numbering > combined with Question 15 and changed to Question 29.

Question 33:

- Numbering > changed to Question 9d.
- Omission:
  - ➢ The entire table was removed.
- Wording:
  - ➢ Changed to, ***"If you've indicated a previous lower back injury.*** What was the diagnosis?"
- Format for answer:
  - ➢ The answer options were presented in a small table:
    - Two options were provided including, N/A and "Please specify the diagnosis: (if applicable)".
    - A block was provided next to each option to tick or write the answer where appropriate.

Question 34:

- Numbering > changed to Question 26.
- Grammar:
  - ➢ LBP changed to "low back pain"

Question 35:

- Numbering > it remained Question 35 but was moved to the end of the section on Occupational factors instead of being in the Low back pain history Section.
- Grammar:
  - ➢ LBP changed to "low back pain"
- Table formatting:
  - ➢ Omission:
    - Option 1 "As a student", was removed and N/A was then added as Option 1.

- Wording:
  - Option 6 “20+ years”, was changed to “***21+***years”
- Format for answer:
  - Options were presented in a table format and included the following: N/A, 0-5 years, 6-10 years, 11-15 years, 16-20 years and 21+ years.

QUESTIONS ADDED TO SECTION 4:

Question 25a:

- Question:
  - “Are you currently suffering from any medical conditions/disorders which may be causing your lower back pain or contributing to your low back pain?”
- Format for answer:
  - The options of YES or NO were provided in a small table.

Question 25b:

- Question:
  - “If yes to 25a) above: Please specify the medical condition:”
- Format for answer:
  - A long line / space was provided for the respondents to write their answer.

NOTE AT THE END OF THE QUESTIONNAIRE: No changes.

SUGGESTIONS MADE BY THE FOCUS GROUP THAT WERE NOT INCLUDED IN THE QUESTIONNAIRE:

There were only three suggestions made by members of the focus group that were not implemented in the questionnaire because no unanimous decision was reached regarding their inclusion. These suggestions were as follows:

- To ask dietary / nutrition related questions.
- To ask questions related to genetic inheritance / disorders.
- To include "administrative / office work" as one of the potential job risk factors presented in Question 16 (which changed to Question 30).

After achieving the outcomes of the focus group in terms of content validity, face validity was further achieved through the use of a pilot procedure whereby the Post-focus group questionnaire (Appendix F) was piloted on sample subjects, who consequently were not allowed to participate in the main study (Vlok, 2005).

The purpose of pilot testing of the questionnaire was to determine readability, questionnaire construction and comprehensibility and to identify remaining ambiguity and errors of grammar / language (Fink and Kosecoff, 1985 and Hicks, 2004), which would be indicated by participants on the Pilot-test Evaluation Form (Appendix G). The Post-pilot questionnaire (Appendix H) was then finalized and was used in the main study.

A detailed description of the changes made to the Post-focus group research questionnaire based on the findings / outcomes of the pilot study as well as suggestions made by the Departmental Research Committee and the Faculty of Health Sciences Research and Ethics Committee [not dissimilar to a Delphi process often utilized in questionnaire development (Adler and Ziglio, 1996 and Linstone and Turoff, 2002)], was as follows:

3.4.1.3 CHANGES MADE FROM THE POST-FOCUS GROUP (Appendix F) TO THE MAIN RESEARCH QUESTIONNAIRE (Appendix H)

SECTION 1:

Question 1: No changes.

Question 2: No changes.

Question 3: No changes.

Question 4: No changes.

Question 5: No changes.

Question 6a: No changes.

Question 6b: No changes.

Question 6c: No changes.

Question 6d: No changes.

Question 6e: No changes.

Question 7:

- Omission
  - ➢ "What is your primary function/activity during the day?" was removed from the question.
- Wording:
  - ➢ Changed to, "***Please tick the appropriate boxes to indicate how many hours in a working day you spend on each of the following activities***."

- Formatting of table:
    - A column was added for 0hrs/NAD.
    - Option Number 7), “Other: Please specify.” Was added.
    - Options were correctly numbered 1-7.

Question 8a:

- Wording:
    - Changed to, “***Please tick the appropriate block/s to indicate any previous surgery***.”
- Format for answer:
    - A table was presented with:
        - Two options, YES or NO and,
        - Four columns, including: Pelvic Surgery, Abdominal Surgery, Lower Back Surgery and Lower Limb Surgery.

A NOTE WAS ADDED (in bold): If you answered NO to ALL the options in Question 8a), please skip to Question 9a).

Question 8b:

- Formatting of table:
    - The format of the headings of the two columns was altered. Headings were placed in the blocks above with examples typed below the headings.
    - The examples provided in the first column underneath the heading, “Type of surgery” was changed to, **“*e.g. Hysterectomy or Lower Back Surgery*”.**
    - Three more blocks were provided as extra space for answers, in the case of participants who have had more than one type of surgery.

Question 9a:

- Wording:
  - Changed to, " Have you had any previous trauma to your ***low*** back, hips, knees or ankles that resulted in an injury ***for which you sought a second opinion from a colleague or other health care professional?***"
- Omission:
  - "If your answer to 9a) above is NO, please skip to Question 10a)." was removed.

Question 9b:

- Grammar:
  - The erroneous additional full stop at the end of Question 9b, Number 1) was removed.
- Format of question:
  - The definition of "Repetitive Microtrauma" in brackets was moved. It now started directly after Question 9b, number 2) and was no longer underneath it.
  - The font of this definition was also changed to Arial.
  - No space / line was left between the question and the table.
- Formatting of table:
  - The first column was made bigger and the heading, "LOCATION OF PREVIOUS INJURY" was thus no longer over two lines.
  - The width of the other four columns was decreased.
  - The examples provided in the second line of the table were put into normal font, not bold and the crosses were changed to ticks.
  - The additional option of, "N/A (i.e. you have NO history of previous injury to your lower back, hips, knees or ankles)" was inserted.

Question 9c: No changes.

Question 9d:

- Formatting of table:
  - There was a small block provided for participants who wished to tick the “N/A” option. No block was formed in the second line of the table where participants were required to write their answer out in full in the space provided, where applicable.
  - Grammar:
    - The semi-colon was removed after the word “diagnosis” and the brackets around “if applicable” were removed. One bracket was left uncorrected however.

<u>SECTION 2:</u>

- Format:
  - No space / line was left between the heading, “Section 2” and Question 10a.

Question 10a: No changes.

THE NOTE:

- Wording:
  - Changed to, “If your answer to 10a) above is NO, please skip to Question 11a).”
- Format:
  - The note was placed in bold and italics.

Question 10b: No changes.

Question 10c: No changes.

Question 10d:

- Format of table:
  - The table was changed to include 16 options.

- ➢ The following options of sports / activities were added: ***Yoga, Pilates and Tae-bo.***
- ➢ Omissions:
  - Soft ball was removed from the options.
- ➢ The numbering of the options changed: 1) Jogging, 2) Swimming, 3) Soccer, 4) Tennis, 5) Golf, 6) Squash, 7) Aerobics, 8) Yoga, 9) Rugby, 10) Cycling, 11) Walking, 12) Pilates, 13) Weightlifting, 14) Cricket, 15) Tae-bo, 16) OTHER.
- ➢ The table changed from having four columns to having ten columns. The options were provided in five of the columns and the other five columns provided the blocks needed to tick the appropriate options.
- ➢ Option 16:
  - Omission > "Please specify:" was removed, as was the line / space provided.
  - "Other" was put into upper case > "OTHER:"

Question 11a: No changes.

THE NOTE:

- Format:
  - ➢ The note was placed in bold and italics.
  - ➢ No space / line was left between the note and Question 11b.

Question 11b:

- Wording:
  - ➢ Changed to, "Approximately ***how many*** do you smoke per day?"

Question 11c:

- Format:
  - ➢ No space / line was left between Question 11c and Question 11d.

Question 11d: No changes.

THE NOTE:

- Format:
  - ➢ The note was placed in bold and italics.

Question 11e:

- Wording:
  - ➢ Changed to, "Approximately ***how many*** did you smoke per day?"

Question 11f: No changes.

Question 11g: No changes.

Question 12a: No changes.

THE NOTE:

- Format:
  - ➢ The note was placed in bold and italics.
  - ➢ No space / line was left between the note and Question 12b.

Question 12b:

- Formatting of table:
  - ➢ "***Socially/Irregularly (e.g. only on weekends)"*** was added as the last option on the table.
  - ➢ The width of the first column was adjusted so that it was much wider and could fit the option that had been added.

THE NOTE:

- Format:
  - ➢ The note was placed in bold and italics.

- Grammar:
  - ➢ The words "MALE RESPONDENTS", was taken out of the upper case and was left as "***male respondents***" in bold and italics.

Question 13a:

- Numbering > changed to Question 13b.

Question 13b:

- Numbering > changed to Question 13c.

Question 13c:

- Numbering > changed to Question 13d.
- Format for answer:
  - ➢ Changed from Y / N to ***YES / NO.***

Question 14a: No changes.

Question 14b:

- Wording
  - ➢ Changed to, "***Please indicate into what age group/s your children fall and how many children you have in a specific age group? (e.g. 1 toddler or 3 teenagers)"***
- Formatting of table:
  - ➢ The six options provided were divided into two columns (with three on each side) as opposed to one column, in order to save space.

Question 15: No changes.

Question 16a:

- Format for answer:
  - ➢ Changed from Y / N to ***YES / NO***.

Question 16b: No changes.

Question 17:

- Formatting of table:
  - ➢ The headings, "PSYCHOLOGICAL STRESS" and "PHYSICAL STRESS" were centered.

<u>QUESTIONS ADDED TO SECTION 2:</u>

Question 13a:

- Question:
  - ➢ "Have you ever been pregnant?"
- Format for answer:
  - ➢ The option of YES or NO was provided simply as, "YES / NO".

A NOTE WAS ADDED:

- "If your answer to 13a) above is NO, please skip to Question 14a)."
- Format:
  - ➢ The note was placed in bold and italics.
  - ➢ No line / space was left between this note and Question 13b.

<u>SECTION 3:</u>

- Format:
  - ➢ No line / space was left between the heading "Section 3" and the Low back pain definition.

DEFINITION:

- Wording:
  - ➢ Changed to, "***LOW BACK PAIN*** DEFINITION:"
- Format:
  - ➢ The entire definition was placed in bold.
  - ➢ The definition was placed underneath the words "LOW BACK PAIN DEFINITION".

Question 18:

- Numbering > changed to Question 18a.

THE NOTE:

- Grammar:
  - LBP was changed to “***low back pain***”.
- Format:
  - The note was placed in italics.

Question 19: No changes.

Question 20: No changes.

Question 21: No changes.

Question 22:

- No changes.

Question 23:

- Numbering > changed to Question 24.
- Wording:
  - Changed to, “What is the approximate duration of each ***acute exacerbation/episode*** of your low back pain?”

Question 24:

- Numbering > changed to Question 23.
- Wording:
  - Changed to, “Approximately how many ***acute exacerbations/episodes*** of low back pain have you suffered from in the last year?”

Question 25a: No changes.

Question 25b: No changes.

Question 26: No changes.

QUESTIONS ADDED TO SECTION 3:

Question 18b:

- Question:
  - “If yes to 18a) above: Is your low back pain associated with any leg pain?” *(*Pain extending/radiating from your lower back down one or both legs.).*
- Format for answer:
  - A small table was provided with the options of YES or NO and blocks for the appropriate option to be ticked.

SECTION 4:

- Format:
  - No line / space was left between the heading “Section 4” and Question 27.

Question 27: No changes.

Question 28: No changes.

THE NOTE:

- Format:
  - The note was placed in bold and italics
  - No line / space was left between Question 28 and the note.

Question 29:

- Grammar:
  - The word “Practice” was changed to “practice” and the option of the plural of activity was provided as follows, “What work ***(practice)*** activity***/ies***:”

- Wording:
    - Question 29a changed to, “Were you doing when you experienced low back pain for the first time ***in practice***.”
- Formatting of table:
    - The two columns were labeled “A.” and “B.” These were also centered.
    - Option 14 “N/A”, was moved and became option 1.
    - The numbering of options 1-15 was corrected. The number 13, which was repeated twice erroneously, was corrected such that option 13, “Reaching and working away from the body” was now option 14 and “Other. Please specify”, became option15.

Question 30: No changes.

Question 31a: No changes.

Question 31b: No changes.

Question 31c: No changes.

Question 31d: No changes.

Question 31e: No changes.

Question 32a: No changes.

Question 32b: No changes.

Question 32c: No changes.

Question 33a and 33b:

- Numbering > these two questions were combined and changed to Question 33b.

- Wording:
    - ➢ Changed to, **“*Please tick the appropriate boxes to indicate:***

1)How you would describe the majority of work you were doing when you experienced low back pain for the first time in practice.

***2)How you would describe the work that you feel causes your low back pain to recur or be exacerbated*.”**

- Format for the answer was in table presentation:
    - ➢ The table provided the following options of work / clinical settings:
        - 1. HOSPITAL and NON-HOSPITAL: Elderly care, General Muskuloskeletal Outpatient Setting, Neurological Rehabilitation, Paediatrics and Learning Difficulties and Physical Impairments
        - 2. HOSPITAL: Cardiothoracic/Respiratory Care, ICU Care, Oncology, Orthopedics
        - 3. OTHER: Please specify.
    - ➢ The table had two columns labeled number 1 and 2.
        - Column number 1 was headed, “1. Majority of work you were doing when you experienced low back pain for the first time in practice.”
        - Column number 2 was headed, “2. Work that you feel causes your low back pain to recur or be exacerbated.”

Question 34:

- Grammar:
    - ➢ “At what stage ***of*** your life did you first experience a major episode of low back pain?”

Question 35:

- Wording:
    - ➢ Changed to, **“For how many years *had* you been working as a manual therapist when you experienced *your first* major episode of low back pain? E.g. If you experienced low back pain**

for the first time within 3 years of commencing work/practice as a manual therapist – tick 0-5 years."

- The words, "had" and "your first" were printed in bold.

NOTE AT THE END OF THE QUESTIONNAIRE: No changes.

<u>QUESTIONS ADDED TO SECTION 4:</u>

Question 33a:

- Question:
  - "***Please indicate your work/clinical setting:"***
- Format for the answer:
  - A table was presented with:
    - Three options including: Hopsital, Non-Hospital or Private practice and Other: Please specify.
    - Blocks were provided next to each option for "ticks" where appropriate.

<u>OVERALL PRESENTATION OF THE MAIN RESEARCH QUESTIONNAIRE (Appendix H):</u>

- The questionnaire that was posted to sample subjects was presented in a small booklet form.
- The following was centered, placed in bold and underlined on the front page of the questionnaire booklet.

<u>DURBAN UNIVERSITY OF TECHNOLOGY</u>

<u>DEPARTMENT OF CHIROPRACTIC</u>

<u>RESEARCH QUESTIONNAIRE</u>

- All six pages of the questionnaire were minimized so that two pages would fit on one page i.e. reduced to half in landscape format.

3.5 <u>DATA COLLECTION AND ANALYSIS</u>

The data was collected from the sample of South African manual therapists by means of a questionnaire (Appendix H), which was developed from the literature (Pope *et al.,* 1991; Kirkaldy-Willis *et al.,* 1992; Bork *et al.,* 1996; Tim, 1996; Van der Meulen, 1997; Bailes, 1998; Docrat, 1999, Holder *et al.,* 1999, Waddell, 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Jarvik and Deyo, 2002; Kovacs *et al.,* 2003; Carroll *et al.,* 2004; Sjolie, 2004; Smith, 2004; Van den Heuvel *et al.,* 2004; Bejia *et al.,* 2005; Glover *et al.,* 2005; Vieira *et al.,* 2005; Vlok, 2005; Brox *et al.,* 2006; Diamond and Borenstein, 2006; Ericksen *et al.,* 2006; Fyfe, 2006; Morris, 2006; Smith *et al.,* 2006; Schneider *et al.,* 2008; Steffen *et al.,* 2008 and Stoxen, 2008;) and validated prior to the study through a focus group (Bourque and Fielder, 1995; Fowler, 1995; Mouton, 1996; Morgan, 1998(a); Holder *et al.,* 1999; Greenbaum, 2000; Bernard, 2000; Peek, 2005 and Vlok, 2005), pilot testing (Fink and Kosecoff, 1985; Bernard, 2000; Hicks, 2004 and Vlok, 2005) and Delphi refinement (Adler and Ziglio, 1996 and Linstone and Turoff, 2002).

The research questionnaire (Appendix H) was initially mailed to prospective participants together with a Letter of Information (Appendix I) and Informed Consent Form (Appendix J). The Letter of Information (Appendix I) requested the manual therapists participation and informed consent (Appendix J) and explained the purpose of the study as well as the procedure to be followed by participants. The benefits of conducting the research, confidentiality and remuneration were also addressed. Lastly, contact details for the researcher and research supervisor were provided should any of the manual therapists have had any queries or questions regarding the study.

Those subjects who agreed to participate in the study were instructed to complete and sign the Informed Consent Form (Appendix J) and then to complete the research questionnaire (Appendix H) with respect to the following:

- Section 1 – Demographics and individual risk factors
- Section 2 – Psychosocial risk factors
- Section 3 – Low back pain history; which included a definition of low back pain, since it is a condition that is very hard to characterize and defining low back pain in the questionnaire (Appendix H) was a means of minimizing this.
- Section 4 – Occupational / Work-related risk factors

The various sections of the research questionnaire were not titled. This was purposely done to make sure that respondents would answer individual questions as they stood and not be led by the title of the section, although the various sections did address separate or specific topics as indicated above.

A business reply envelope was provided for return of the completed questionnaire and Informed Consent Form, there was therefore no personal cost involved in participating in the study.

The period set aside for return of the questionnaires was six weeks from the date of initial mailing, based on the assumption that it would take on average one week for the questionnaires to be delivered to the participants and one week for them to be returned via post, it allowed enough time for as many participants to reply as possible. In order to ensure optimal response from the manual therapists the intervention frequency was twice and participants were contacted again three weeks after the initial mailing either telephonically or via email, as allowed by contact details, to remind them and to encourage their participation. The questionnaire and related information was emailed to participants at their request if they wished to reply but had lost or misplaced the questionnaires and information originally sent to them in the post.

Ethically, anonymity and confidentiality were maintained throughout the research process in terms of the research questionnaire as all returned questionnaires and Informed Consent Forms were received by a neutral third party who separated the questionnaire and the Informed Consent Form. No names were filled in on the questionnaire and no questionnaire was associated with its Informed Consent Form, thus the questionnaires remained anonymous and confidentiality was ensured. Furthermore, no participant names were revealed in the analysis or reporting of the results. Participants were therefore encouraged to be honest and to answer all questions to the best of their knowledge.

In terms of recording, reporting and dissemination of the data all information was coded thus ensuring confidentiality of participants. The data or questionnaires would also, only be stored by the research administrator for a period of five years after which the questionnaires would be shredded.

The participants were informed that the completed research manuscript would be made available at the Durban University of Technology library and results of the study as seen in the research abstract would be sent to those participants who requested it.

The data collected from each questionnaire was used for data capturing purposes and was analyzed using the SPSS version 13.0 package for analysis (SPSS Inc., Chicago, Illinois). Results and statistics were then finally determined.

3.6 STATISTICAL METHODS

3.6.1 STATISTICAL METHODOLOGY

Descriptive statistics were achieved using frequency tabulations and charts for categorical variables, and summary statistics such as mean, standard deviation and range for quantitative variables. Risk factors for low back pain were examined using Pearson’s chi square tests / Fisher’s exact tests, and Students t-tests where appropriate. For quantitative variables, which were non-normally distributed, non-parametric Mann-Whitney or Kruskal-Wallis tests were used. Multivariate logistic regression analysis was used to assess the independent effects of various risk factors on current low back pain whilst controlling for confounders. The prevalence of low back pain between the various types of manual therapists was compared using Pearson’s chi square test. A p value of <0.05 was considered as statistically significant (Esterhuizen, 2007).

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

This chapter presents and explains the results of the study with particular emphasis on the statistically significant and relevant findings. The tables depicting non-significant results can be found in the Appendices (Appendix L: Table 7.1 to 7.81), together with a summary of the results for each profession (Appendices M to T) and a summarized comparison of the responses to each question between professions (Appendix U).

4.2 AIMS AND OBJECTIVES

The aim of this study was to determine the prevalence and risk factors for occupational low back pain in manual therapists and to determine and compare the prevalence and risk factors for occupational low back pain among various manual therapy professions.

In order to elucidate the information necessary to achieve the aims of the study as indicated above, the following objectives were identified and utilized by the statistician (Esterhuizen, 2008).

4.2.1 OBJECTIVE ONE

Was to determine the point prevalence, one-year prevalence and career prevalence of low back pain in manual therapists.

4.2.2 OBJECTIVE TWO

Was to determine and compare the point prevalence, one-year prevalence and career prevalence of low back pain among the various types of manual therapists.

4.2.3 OBJECTIVE THREE

Was to identify the risk factors associated with current low back pain in manual therapists.

4.2.4 OJBECTIVE FOUR

Was to compare the responses to all questions between the various types of manual therapists.

4.2.5 OBJECTIVE FIVE

Was to compare the responses on the experiences of low back pain among the various types of manual therapists who had at least one episode of low back pain in the last year.

4.3 DATA SOURCES

4.3.1 PRIMARY DATA SOURCES

The primary source of data was the self-administered research questionnaire, which was used to collect information from the manual therapists' directly.

4.3.2 SECONDARY DATA SOURCES

The secondary sources of data included: books, research dissertations, journal publications and articles, internet websites and directories, electronic and telephonic communication with the manual therapists in the study sample as well as the Health Professions Council of South Africa (Booi, 2007) and the Allied Health Professions Council of South Africa (Maple, 2007 and Pillay, 2007) and personal communication with my research supervisor (Dr. C. Korporaal; (TN), CCFC (TN), CSSP (USA), ICSSD (FICS), 2008) and statistician (Esterhuizen, 2008). All of the above-mentioned data sources can be found in the References of this study.

4.4 ABBREVIATIONS

LBP	Low back pain
Physio	Physiotherapist
OT	Occupational therapist
Bio	Biokineticist
Chiro	Chiropractor
Reflex	Reflexologist
Aroma	Aromatherapist
Masst	Massage therapist
Fig.	Figure
N or n	Sample
SD	Standard deviation
BMI	Body mass index
m	Metres
%	Percentage
C.I.	Confidence interval
OR	Odds ratio
p, p value or P	Probability value or significance level
S.E. or Std. Error	Standard error
Wald	Wald statistic (similar to a chi square statistic)
Df	Degrees of freedom
Sig.	Significance
Asymp. Sig. (2-sided)	Asymptotic significance 2 sided (same as the p value)
F	F statistic from the F distribution which ANOVA uses

4.5 RESULTS

4.5.1 RESPONSE RATE

Two hundred and thirty-three respondents participated in the survey by returning completed questionnaires. The response rate for manual therapists in terms of recorded responses or completed questionnaires was therefore 15.53% *(233/1500x100)*. The total response rate for the study overall (including non-responses and unusable responses) was 24.27% *(364/1500x100).*

Despite having met the recommended 20% minimum for total response rate, the response rate in terms of returned completed questionnaires of 15.53% was poor. A small sample size (n=233) was a limitation in this study that should therefore be kept in mind.

The study sample (n=1500) included: physiotherapists, occupational therapists, biokineticists, chiropractors, reflexologists, aromatherapists and massage therapists. The total response rate for each profession, taking into account completed questionnaires as well as non-responses and unusable responses is depicted in Table 4.1. The greatest response came from the chiropractors (42.62%) and the poorest was from aromatherapists (20.93%).

Table 4.1: Total response rate for each profession

	Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	Total
Sample	31	86	98	61	402	670	152	1500
Completed questionnaires	8	9	18	21	59	101	17	233
Non-responses	2	9	7	5	41	44	21	129
Unusable responses	0	0	1	0	1	0	0	2
Total response	10	18	26	26	101	145	38	364
Response rate	32.26%	20.93%	26.53%	42.62%	25.12%	21.64%	25%	24.27%

Non-Responses

The non-responses in this study were for various reasons but were similar among all of the manual therapy professions. The non-responses were recorded on the basis of postal (either the original envelope or the business reply envelope returned with a note attached), telephonic and electronic communication with a third party or with the subjects themselves.

The possible reasons identified for the recorded non-responses included:

1) A change of address or an address that no longer existed in which case the original posted envelope was returned marked, “Return to sender”.
2) Many subjects indicated either through telephonic or electronic communication that they had in fact never received any documents in the post regarding the research study (a limitation noted for the study was that the delivery of the original document could not be guaranteed due to the unreliability of the postal service).
3) Being on maternity or annual leave.
4) Several manual therapists had immigrated or were currently traveling overseas.

5) Those receiving medical treatment due to illness could not respond.
6) Many subjects voluntarily chose not to participate. The reasons for this included the following:
    a. They did not wish to participate.
    b. They were too busy and thus time constraints prevented them from participating.
    c. They were no longer involved in clinical practice or did not practice manual therapy at all.
    d. They had retired.
    e. They felt their input would be irrelevant because they spent very little time performing manual therapy work for example, where:
        i. The manual therapist had changed his / her scope of practice and work e.g. to administration / lecturing.
        ii. They practiced only part time.
        iii. They were more involved in aspects of their profession that did not involve manual therapy (e.g. occupational therapists who instead facilitated psychological and cognitive group therapy).

Unusable Responses

The two unusable responses had been returned via email, but there were no attachments to the one email although the respondent had indicated the completed questionnaire was attached and in the second email the returned questionnaire was in a format that could not be opened or read.

In both cases the respondents were contacted again to inform them that their response could not be used because of the missing attachments or incorrect format, and a request was issued for them to re-send the documents. They however chose not to respond again thereafter.

4.5.2 DEMOGRAPHICS OF THE STUDY

It is necessary to note before the results of this study are presented, that although 233 manual therapists participated in this study by returning completed questionnaires, this number (n=233) was not consistent throughout the analysis of the questionnaire as it was not a requirement that the returned questionnaires be completed in full to be considered. Therefore, the sample may be lower than (n=233) in some cases as a result of missing data on the returned questionnaires.

4.5.2.1 TYPES OF MANUAL THERAPISTS

The percentage of recorded responses for the different types of manual therapists in the study is shown in Table 4.2. The majority were physiotherapists (43.3%) and the minority were massage therapists (3.4%).

Table 4.2: Types of manual therapists in the sample

	Frequency	Percent
Massage therapist	8	3.4
Aromatherapist	9	3.9
Biokineticist	18	7.7
Chiropractor	21	9.0
OT	59	25.3
Physiotherapist	101	43.3
Reflexologist	17	7.3
Total	233	100.0

4.5.2.2 AGE

The mean age of participants in this study was 37.6yrs (SD 11.7yrs) with a range from 23 to 71yrs. A summary of the statistics for age, weight, height and BMI of the participants is depicted in Table 4.3.

Table 4.3: Summary of statistics for age, weight, height and BMI

		Age	Weight	Height (m)	BMI
N	Valid	218	231	217	217
	Missing	15	2	16	16
Mean		37.61	68.60	1.6840	24.1932
Std. Deviation		11.705	14.327	.09606	4.48866
Minimum		23	42	1.20	17.06
Maximum		71	125	1.94	41.91

4.5.2.3 GENDER

The vast majority of participants were female (84.5%).

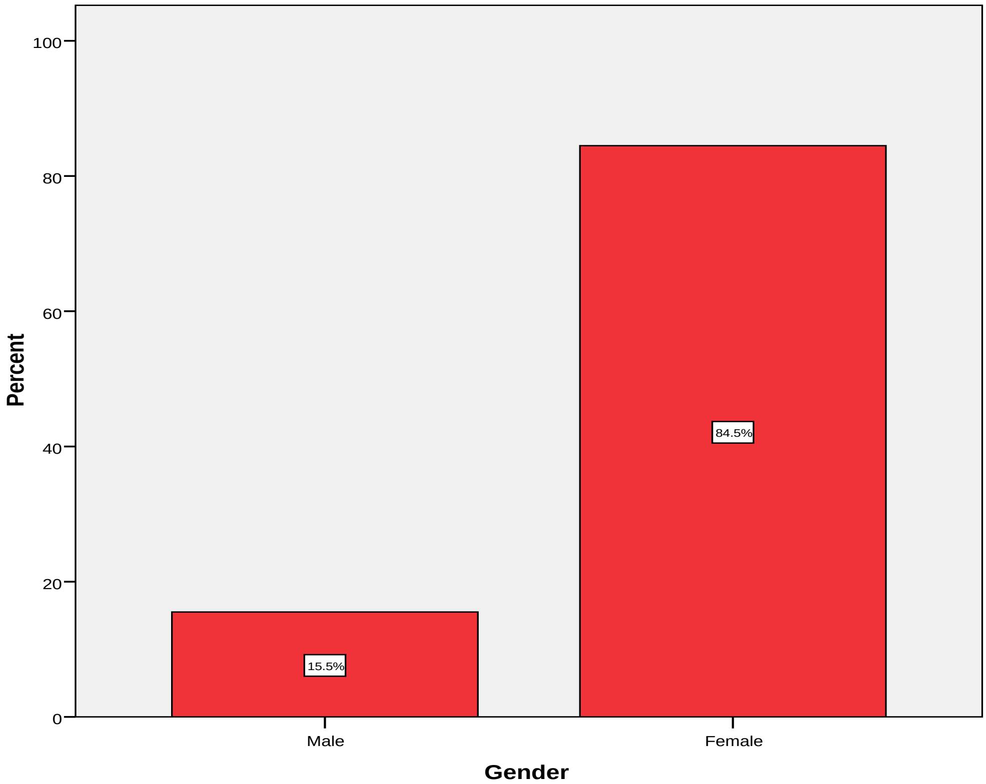


Figure 4.1: Gender of participants (n=232)

4.5.2.4 ETHNICITY

The majority of respondents were white (88.4%) (Table 4.4).

Table 4.4: Ethnic group of participants

	Frequency	Percent
Asian	5	2.2
Black	6	2.6
Coloured	7	3.0
Indian	9	3.9
White	205	88.4
Total	232	100.0

4.5.2.5 ANTHROPOMETRY: WEIGHT, HEIGHT AND BMI

Mean BMI was 24.3 with a range from 17 to 42 (Refer back to Table 4.3 for a summary of the statistics for age, weight, height and BMI of the participants).

4.5.2.6 MARITAL STATUS

Almost 61.9% of the sample were married, while 27.3% were single, 8.2% were divorced and 2.6% were widowed.

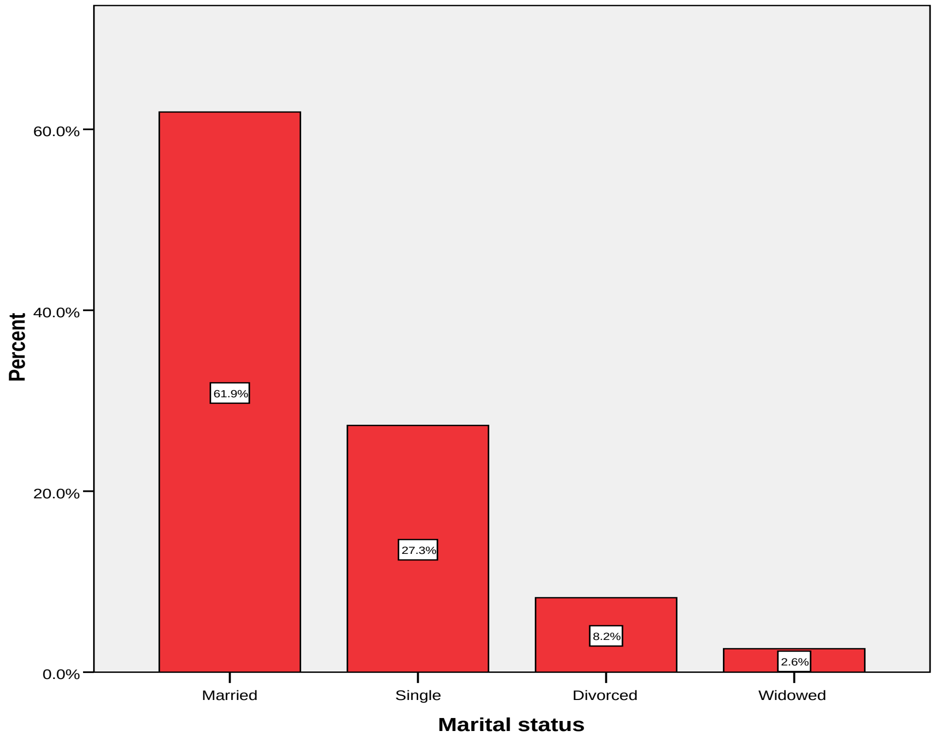


Figure 4.2: Marital status of participants (n=231)

4.5.3 OBJECTIVE ONE: To determine the prevalence of low back pain in manual therapists

In manual therapists the point prevalence of low back pain was very high at 41%, the one-year prevalence was higher at 59% and the career prevalence was highest at 74%.

Table 4.5: Point and period prevalence of low back pain

	Frequency	Percent	95% CI
Low back pain at present	95	41.1%	34.8 – 47.8%
Low back pain in last 4 weeks*	99	47.8%	40.9 - 54.8%
Low back pain in past 1-year*	121	58.5%	51.4 – 65.2%
Low back pain ever in career as a manual therapist*	153	73.9%	67.3 – 79.6%
Low back pain before working as manual therapist*	47	22.7%	17.3 – 29.1%

* total sample size =207 (26 missing responses)

4.5.4 OBJECTIVE TWO: To determine and compare the prevalence of low back pain among the various types of manual therapists

Point prevalence of low back pain

There was no association between profession and point prevalence of low back pain (p=0.775), although the trend demonstrated that aromatherapists had the highest point prevalence (56%) followed by biokineticists (50%). The lowest point prevalence was found in massage therapists (25%).

Table 4.6: Point prevalence of low back pain by profession

			Low back pain at present		Total
			yes	no	
Profession	Massage therapist	Count	2	6	8
		% within Profession	25.0%	75.0%	100.0%
	Aromatherapist	Count	5	4	9
		% within Profession	55.6%	44.4%	100.0%
	Biokineticist	Count	9	9	18
		% within Profession	50.0%	50.0%	100.0%
	Chiropractor	Count	10	11	21
		% within Profession	47.6%	52.4%	100.0%
	OT	Count	25	34	59
		% within Profession	42.4%	57.6%	100.0%
	Physiotherapist	Count	39	62	101
		% within Profession	38.6%	61.4%	100.0%
	Reflexologist	Count	5	10	15
		% within Profession	33.3%	66.7%	100.0%
Total		Count	95	136	231
		% within Profession	41.1%	58.9%	100.0%

Pearson's chi square =3.26, p=0.775

One-year prevalence of low back pain

There was a borderline non-significant association between profession and one-year prevalence of low back pain (p=0.069). The one-year prevalence was highest in massage therapists (80%) followed by occupational therapists (70%), and was lowest in aromatherapists (12.5%).

Table 4.7: One-year prevalence of low back pain by profession

			Low back pain in past 1 year		Total
			yes	no	
Profession	**Massage therapist**	**Count**	4	1	5
		% within Profession	80.0%	20.0%	100.0%
	Aromatherapist	**Count**	1	7	8
		% within Profession	12.5%	87.5%	100.0%
	Biokineticist	**Count**	10	6	16
		% within Profession	62.5%	37.5%	100.0%
	Chiropractor	**Count**	11	10	21
		% within Profession	52.4%	47.6%	100.0%
	OT	**Count**	37	16	53
		% within Profession	69.8%	30.2%	100.0%
	Physiotherapist	**Count**	51	39	90
		% within Profession	56.7%	43.3%	100.0%
	Reflexologist	**Count**	7	7	14
		% within Profession	50.0%	50.0%	100.0%
Total		**Count**	121	86	207
		% within Profession	58.5%	41.5%	100.0%

Pearson's chi square =11.7, p=0.069

Career prevalence of low back pain

There was a borderline significant association between career prevalence of low back pain and profession (p=0.049). The career prevalence was highest in occupational therapists (83%) followed by massage therapists (80%), and was lowest in aromatherapists (37.5%).

Table 4.8: Career prevalence of low back pain by profession

			Low back pain ever in career as manual therapist		Total
			yes	no	
Profession	Massage therapist	Count	4	1	5
		% within Profession	80.0%	20.0%	100.0%
	Aromatherapist	Count	3	5	8
		% within Profession	37.5%	62.5%	100.0%
	Biokineticist	Count	11	5	16
		% within Profession	68.8%	31.3%	100.0%
	Chiropractor	Count	15	6	21
		% within Profession	71.4%	28.6%	100.0%
	OT	Count	44	9	53
		% within Profession	83.0%	17.0%	100.0%
	Physiotherapist	Count	69	21	90
		% within Profession	76.7%	23.3%	100.0%
	Reflexologist	Count	7	7	14
		% within Profession	50.0%	50.0%	100.0%
Total		Count	153	54	207
		% within Profession	73.9%	26.1%	100.0%

Pearson's chi square =12.67, p=0.049

4.5.5 OBJECTIVE THREE: To identify the risk factors associated with current low back pain in manual therapists

Variables that were significantly associated with current low back pain in bivariate analysis (using Pearson's chi-square tests or Independent t-tests) were: build; BMI; performing physical activity; previous abdominal surgery; previous trauma to the low back, hips, knees or ankles; previous low back injury; physical stress levels; not having an assistant; a non-adjustable work surface and not working in private practice.

These variables were entered into a logistic regression model as independent variables for the outcome of current low back pain. A backward selection technique based on likelihood ratios was used. After five elimination steps, the variables which emerged as significant independent predictors of low back pain in manual therapists were: BMI; previous abdominal surgery; previous trauma to the low back, hips, knees or ankles; a physically stressful job; not having an assistant and working in a hospital or other setting (Table 4.9). It must be stressed however, that due to the cross-sectional study design of this study it is not possible to state that these factors pre-existed before the low back pain started. Thus it is not possible to establish whether these factors are causally related to low back pain, or merely co-existing factors, or even due to reverse causality (i.e. occurred as a result of the low back pain).

4.5.5.1 SIGNIFICANT INDEPENDENT PREDICTORS OF LOW BACK PAIN IN MANUAL THERAPISTS

4.5.5.1.1 BMI

BMI was significantly and independently associated with current low back pain in manual therapists. As BMI increased by one unit, the risk of low back pain increased by 1.16 times (OR 1.157, p=0.001) (Table 4.9).

4.5.5.1.2 PREVIOUS ABDOMINAL SURGERY

Previous abdominal surgery increased the risk of low back pain by 2.5 times (OR 2.458, p=0.025) (Table 4.9).

4.5.5.1.3 PREVIOUS TRAUMA

Having experienced trauma to the low back, hips, knees or ankles increased the risk of low back pain by 3.7 times (p<0.001) (Table 4.9).

4.5.5.1.4 PHYSICAL WORK STRESS

The factor with the highest association to low back pain was a very physically stressful occupation (OR 7.5, p=0.001). A physically stressful job increased the risk of low back pain by 3.1 times compared to an occupation without physical stress or with little stress (p=0.004) (Table 4.9).

4.5.5.1.5 NO ASSISTANT

Not having an assistant was associated with an increased risk of low back pain, which was not statistically significant (OR 2.2, p=0.074) (Table 4.9).

4.5.5.1.6 HOSPITAL OR OTHER SETTINGS

The manual therapists who were not in private practice (i.e. worked in a hospital or other setting) were at a 4.1 times higher risk of low back pain compared to those who were in private practice (p=0.001) (Table 4.9).

Table 4.9: Binary logistic regression analysis of factors associated with current low back pain in manual therapists

		B	S.E.	Wald	df	Sig.	OR	95.0% C.I. for OR	
								Lower	Upper
Step 5(a)	BMI	.146	.043	11.369	1	.001	1.157	1.063	1.260
	Previous abdominal surgery (baseline= no)			5.681	2	.058			
	yes	.899	.402	5.002	1	.025	2.458	1.118	5.408
	missing	1.465	1.324	1.224	1	.269	4.329	.323	58.036
	Trauma to low back, hips, knees or ankles (baseline = no)			13.716	2	.001			
	yes	1.303	.352	13.700	1	.000	3.679	1.846	7.332
	missing	.519	1.299	.160	1	.689	1.681	.132	21.442
	Occupational physical stress (baseline = none or little)			16.772	3	.001			
	Stressful	1.137	.394	8.320	1	.004	3.118	1.440	6.754
	Very stressful	2.008	.599	11.230	1	.001	7.451	2.302	24.121
	missing	-1.352	1.199	1.272	1	.259	.259	.025	2.713
	Do you have an assistant (baseline = yes)			3.190	2	.203			
	no	.807	.452	3.190	1	.074	2.241	.924	5.431
	Work setting in private practice (baseline = yes)			10.370	2	.006			
	no	1.408	.437	10.370	1	.001	4.086	1.735	9.623
	Constant	-6.554	1.268	26.721	1	.000	.001		

a Variable(s) entered on step 1: build, BMI, physical activity, abdominal surgery, trauma, low back injury, physical stress, assistant, adjustable, non hospital

4.5.6 OBJECTIVE FOUR: To compare the responses to all questions between the various types of manual therapists

The factors that were significantly different between the professions will now be presented under the following headings: individual factors, psychosocial factors and occupational / work-related factors.

4.5.6.1 INDIVIDUAL FACTORS

4.5.6.1.1 GENDER

There was a higher percentage (71%) of male chiropractors in the study than in the other professions (p<0.001).

Table 4.10: Gender by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Gender	Male	Count	2	0	7	15	1	11	0	36
		% within Profession	25.0%	.0%	38.9%	71.4%	1.7%	11.0%	.0%	15.5%
	Female	Count	6	9	11	6	58	89	17	196
		% within Profession	75.0%	100.0%	61.1%	28.6%	98.3%	89.0%	100.0%	84.5%
Total		Count	8	9	18	21	59	100	17	232
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	73.056(a)	6	.000
Likelihood Ratio	62.629	6	.000
Linear-by-Linear Association	19.652	1	.000
N of Valid Cases	232		

a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.24.

4.5.6.1.2 MARITAL STATUS

Aromatherapists, physiotherapists and occupational therapists were more likely to be married (p=0.001).

Table 4.11: Marital status by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Marital status	Single	Count	1	1	8	10	19	23	1	63
		% within Profession	12.5%	11.1%	44.4%	47.6%	32.2%	23.0%	6.3%	27.3%
	Married	Count	4	7	10	11	37	65	9	143
		% within Profession	50.0%	77.8%	55.6%	52.4%	62.7%	65.0%	56.3%	61.9%
	Divorced	Count	2	1	0	0	2	11	3	19
		% within Profession	25.0%	11.1%	.0%	.0%	3.4%	11.0%	18.8%	8.2%
	Widowed	Count	1	0	0	0	1	1	3	6
		% within Profession	12.5%	.0%	.0%	.0%	1.7%	1.0%	18.8%	2.6%
Total		Count	8	9	18	21	59	100	16	231
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	43.952(a)	18	.001
Likelihood Ratio	37.441	18	.005
Linear-by-Linear Association	2.631	1	.105
N of Valid Cases	231		
A 18 cells (64.3%) have expected count less than 5. The minimum expected count is .21.			

4.5.6.1.3 AGE, WEIGHT AND HEIGHT

Age (p<0.001), weight (p=0.002) and height (p<0.001) are indicated in Table 4.12 and 4.13. For results of the Post Hoc Tests, see Appendix Table 7.43.

Table 4.12: Age, weight, height and BMI by profession

Report					
Profession		**Age**	**Weight**	**Height (m)**	**BMI**
Massage therapist	**Mean**	46.00	70.38	1.7188	23.6534
	N	7	8	8	8
	Std. Deviation	5.416	14.956	.07661	3.78182
Aromatherapist	**Mean**	50.57	71.56	1.6929	25.6511
	N	7	9	7	7
	Std. Deviation	7.277	15.930	.05529	6.17067
Biokineticist	**Mean**	28.78	74.28	1.7400	24.6006
	N	18	18	17	17
	Std. Deviation	4.124	17.749	.09253	4.32912
Chiropractor	**Mean**	32.86	78.62	1.7471	25.7879
	N	21	21	21	21
	Std. Deviation	10.056	13.581	.11516	4.13769
OT	**Mean**	34.15	64.66	1.6329	24.2166
	N	55	59	56	56
	Std. Deviation	9.352	13.982	.09974	5.08036
Physiotherapist	**Mean**	38.39	68.21	1.6965	23.6180
	N	95	99	93	93
	Std. Deviation	11.594	12.715	.08039	4.07061
Reflexologist	**Mean**	52.60	63.71	1.6233	24.5847
	N	15	17	15	15
	Std. Deviation	11.746	14.269	.04337	4.85963
Total	**Mean**	37.61	68.60	1.6840	24.1932
	N	218	231	217	217
	Std. Deviation	11.705	14.327	.09606	4.48866

Table 4.13: ANOVA tests for age, weight, height and BMI

ANOVA						
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Age	**Between Groups**	7635.651	6	1272.608	12.153	.000
	Within Groups	22094.423	211	104.713		
	Total	29730.073	217			
Weight	**Between Groups**	4129.989	6	688.332	3.579	.002
	Within Groups	43080.416	224	192.323		
	Total	47210.405	230			
Height (m)	**Between Groups**	.363	6	.061	7.804	.000
	Within Groups	1.630	210	.008		
	Total	1.993	216			
BMI	**Between Groups**	106.528	6	17.755	.878	.512
	Within Groups	4245.454	210	20.216		
	Total	4351.983	216			

4.5.6.1.4 HIP INJURY

Hip injury (p=0.003) was highest in aromatherapists and massage therapists.

Table 4.14: Hip injury by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Hip injury	no	Count	4	5	16	20	49	84	10	188
		% within Profession	80.0%	62.5%	94.1%	95.2%	98.0%	95.5%	100.0%	94.5%
	yes	Count	1	3	1	1	1	4	0	11
		% within Profession	20.0%	37.5%	5.9%	4.8%	2.0%	4.5%	.0%	5.5%
Total		Count	5	8	17	21	50	88	10	199
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.632(a)	6	.003
Likelihood Ratio	11.496	6	.074
Linear-by-Linear Association	7.689	1	.006
N of Valid Cases	199		
A 8 cells (57.1%) have expected count less than 5. The minimum expected count is .28.			

4.5.6.1.5 KNEE INJURY

Knee injury (p=0.001) was highest in aromatherapists.

Table 4.15: Knee injury by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Knee injury	no	Count	3	3	9	13	38	77	9	152
		% within Profession	60.0%	37.5%	52.9%	61.9%	76.0%	87.5%	90.0%	76.4%
	yes	Count	2	5	8	8	12	11	1	47
		% within Profession	40.0%	62.5%	47.1%	38.1%	24.0%	12.5%	10.0%	23.6%
Total		Count	5	8	17	21	50	88	10	199
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.128(a)	6	.001
Likelihood Ratio	20.907	6	.002
Linear-by-Linear Association	20.070	1	.000
N of Valid Cases	199		
a 6 cells (42.9%) have expected count less than 5. The minimum expected count is 1.18.			

4.5.6.2 PSYCHOSOCIAL FACTORS

4.5.6.2.1 EXERCISE FREQUENCY AND EXERCISE DURATION

Exercise number of times per week (p=0.009) and time per session (p=0.001) were found to be factors that were significantly different between the professions. Table 4.16 is a combination table depicting the statistics for exercise, smoking, alcohol and pregnancy. For the results of the Kruskal-Wallis Test, see Appendix Table 7.65.

Table 4.16: Exercise, Smoking, Alcohol and Pregnancy

Report Median								
Profession	Times per week	Time per session	How many smoked	Years smoked	Years smoked before quitting	Years quit	Units alcohol per day	Many times pregnant
Masst	3.50	60.00	2.50	3.00	10.00	9.00	6.00	2.00
Aroma	3.00	45.00	10.00	41.00			3.50	3.00
Bio	4.00	60.00	10.00	10.00	3.50	6.00	6.00	2.00
Chiro	4.00	60.00	.50	20.00			6.00	
OT	3.00	45.00	3.50	4.50	4.50	2.50	6.00	2.00
Physio	3.00	45.00	8.00	25.00	8.00	7.00	6.00	2.00
Reflex	5.00	45.00	15.00	40.00	15.00	20.00	6.00	2.50
Total	3.00	45.00	10.00	12.00	6.00	6.50	6.00	2.00

Table 4.17: Summary of test statistics for exercise time

Test Statistics(a,b)									
	Times per week	Time per session	How many smoked	Years smoked	How many smoked (quit)	Years smoked before quitting	Years quit	Units alcohol perday	Many times pregnant
Chi-Square	15.437	21.106	6.745	7.871	5.366	2.450	6.852	3.934	6.510
df	5	5	5	5	3	3	3	5	4
Asymp. Sig.	.009	.001	.240	.163	.147	.484	.077	.559	.164
a Kruskal Wallis Test									
b Grouping Variable: Profession									

4.5.6.2.2 TYPES OF EXERCISE

4.5.6.2.2.1 JOGGING

Jogging (p=0.022) was highest in biokineticists.

Table 4.18: Jogging by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Jogging	yes	Count	2	1	12	8	15	37	3	78
		% within Profession	28.6%	11.1%	66.7%	42.1%	28.8%	43.0%	18.8%	37.7%
	no	Count	5	8	6	11	37	49	13	129
		% within Profession	71.4%	88.9%	33.3%	57.9%	71.2%	57.0%	81.3%	62.3%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.767(a)	6	.022
Likelihood Ratio	15.370	6	.018
Linear-by-Linear Association	.222	1	.638
N of Valid Cases	207		
a 3 cells (21.4%) have expected count less than 5. The minimum expected count is 2.64.			

4.5.6.2.2.2 GOLF

Golf (p<0.001) was highest in chiropractors, possibly because the majority of the chiropractic group was male (See Table 4.10).

Table 4.19: Golf by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Golf	yes	Count	0	0	2	7	1	5	0	15
		% within Profession	.0%	.0%	11.1%	36.8%	1.9%	5.8%	.0%	7.2%
	no	Count	7	9	16	12	51	81	16	192
		% within Profession	100.0%	100.0%	88.9%	63.2%	98.1%	94.2%	100.0%	92.8%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.115(a)	6	.000
Likelihood Ratio	22.024	6	.001
Linear-by-Linear Association	2.927	1	.087
N of Valid Cases	207		
a 6 cells (42.9%) have expected count less than 5. The minimum expected count is .51.			

4.5.6.2.2.3 YOGA

Yoga (p<0.001) was highest in reflexologists.

Table 4.20: Yoga by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Yoga	**yes**	**Count**	1	3	0	0	4	8	7	23
		% within Profession	14.3%	33.3%	.0%	.0%	7.7%	9.3%	43.8%	11.1%
	no	**Count**	6	6	18	19	48	78	9	184
		% within Profession	85.7%	66.7%	100.0%	100.0%	92.3%	90.7%	56.3%	88.9%
Total		**Count**	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.355(a)	6	.000
Likelihood Ratio	23.854	6	.001
Linear-by-Linear Association	1.445	1	.229
N of Valid Cases	207		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is .78.			

4.5.6.2.2.4 WALKING

Walking (p=0.003) was lowest in biokineticists and chiropractors.

Table 4.21: Walking by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Walking	yes	Count	5	7	2	6	24	43	11	98
		% within Profession	71.4%	77.8%	11.1%	31.6%	46.2%	50.0%	68.8%	47.3%
	no	Count	2	2	16	13	28	43	5	109
		% within Profession	28.6%	22.2%	88.9%	68.4%	53.8%	50.0%	31.3%	52.7%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.560(a)	6	.003
Likelihood Ratio	21.335	6	.002
Linear-by-Linear Association	1.341	1	.247
N of Valid Cases	207		
a 4 cells (28.6%) have expected count less than 5. The minimum expected count is 3.31.			

4.5.6.2.2.5 PILATES

Pilates (p=0.028) was lowest in chiropractors.

Table 4.22: Pilates by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Pilates	yes	Count	3	4	6	0	7	17	3	40
		% within Profession	42.9%	44.4%	33.3%	.0%	13.5%	19.8%	18.8%	19.3%
	no	Count	4	5	12	19	45	69	13	167
		% within Profession	57.1%	55.6%	66.7%	100.0%	86.5%	80.2%	81.3%	80.7%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.107(a)	6	.028
Likelihood Ratio	16.344	6	.012
Linear-by-Linear Association	2.742	1	.098
N of Valid Cases	207		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.35.			

4.5.6.2.2.6 WEIGHT TRAINING

Weight training (p=0.002) was highest in biokineticists and chiropractors.

Table 4.23: Weight training by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Weights	yes	Count	0	1	7	7	4	9	2	30
		% within Profession	.0%	11.1%	38.9%	36.8%	7.7%	10.5%	12.5%	14.5%
	no	Count	7	8	11	12	48	77	14	177
		% within Profession	100.0%	88.9%	61.1%	63.2%	92.3%	89.5%	87.5%	85.5%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.690(a)	6	.002
Likelihood Ratio	18.061	6	.006
Linear-by-Linear Association	4.370	1	.037
N of Valid Cases	207		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.01.			

4.5.6.2.3 PREGNANCY

Pregnancy between professions [in women only] (p<0.001), was lowest in chiropractors and biokineticists.

Table 4.24: Ever been pregnant by profession

Ever been pregnant * Profession Crosstabulation										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Ever been pregnant	yes	Count	5	8	3	0	27	59	14	116
		% within Profession	83.3%	88.9%	27.3%	.0%	47.4%	66.3%	82.4%	59.5%
	no	Count	1	1	8	6	30	30	3	79
		% within Profession	16.7%	11.1%	72.7%	100.0%	52.6%	33.7%	17.6%	40.5%
Total		Count	6	9	11	6	57	89	17	195
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.063(a)	6	.000
Likelihood Ratio	30.227	6	.000
Linear-by-Linear Association	1.384	1	.239
N of Valid Cases	195		
a 6 cells (42.9%) have expected count less than 5. The minimum expected count is 2.43.			

4.5.6.2.4 NATURAL BIRTH

In terms of the type of delivery [in women only], ever having given natural birth was lowest in chiropractors and biokineticists and was highest in aromatherapists and reflexologists (p<0.001).

Table 4.25: Natural birth by profession

Natural birth * Profession Crosstabulation											
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Natural birth	no	Count	4	2	17	21	44	68	6	162
		% within Profession	50.0%	22.2%	94.4%	100.0%	74.6%	67.3%	35.3%	69.5%
	yes	Count	4	7	1	0	15	33	11	71
		% within Profession	50.0%	77.8%	5.6%	.0%	25.4%	32.7%	64.7%	30.5%
Total		Count	8	9	18	21	59	101	17	233
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.769(a)	6	.000
Likelihood Ratio	41.548	6	.000
Linear-by-Linear Association	1.456	1	.228
N of Valid Cases	233		
a 2 cells (14.3%) have expected count less than 5. The minimum expected count is 2.44.			

4.5.6.2.5 NUMBER OF CHILDREN

Number of children (p<0.001) was lowest in biokineticists and chiropractors. For results of the Kruskal-Wallis test, see Appendix Table 7.69.

Table 4.26: Number of children by profession

Report Median						
Profession	**How many children do you have**	**Number of infants**	**Number of toddlers**	**Number of children**	**Number of teenagers**	**Number of adult children**
Masst	2.00			2.00	1.00	2.00
Aroma	2.00		1.00	2.00	1.50	2.00
Bio	.00	1.00	1.00	1.00		
Chiro	.00	1.00	1.00	2.00	3.00	2.00
OT	1.00	1.00	1.00	1.50	1.00	2.00
Physio	1.00	1.00	1.00	2.00	2.00	2.00
Reflex	2.00			2.00	2.00	2.00
Total	1.00	1.00	1.00	2.00	2.00	2.00

Table 4.27: Summary of test statistics for number of children

Test Statistics(a,b)						
	How many children do you have	**Number of infants**	**Number of toddlers**	**Number of children**	**Number of teenagers**	**Number of adult children**
Chi-Square	30.997	.857	.846	3.027	7.165	2.343
Df	5	3	4	5	4	4
Asymp. Sig.	.000	.836	.932	.696	.127	.673
a Kruskal Wallis Test						
b Grouping Variable: Profession						

4.5.6.2.6 PSYCHOLOGICAL WORK STRESS

Psychological work stress ($p<0.001$) was lowest in massage therapists, biokineticists and chiropractors.

Table 4.28: Psychological work stress by profession

Crosstab										
			Profession							**Total**
			Masst	**Aroma**	**Bio**	**Chiro**	**OT**	**Physio**	**Reflex**	
Psychological stress	**Very stressful**	**Count**	0	2	2	1	5	4	0	14
		% within Profession	.0%	25.0%	11.1%	4.8%	8.8%	4.2%	.0%	6.3%
	Stressful	**Count**	0	3	5	9	39	40	3	99
		% within Profession	.0%	37.5%	27.8%	42.9%	68.4%	41.7%	18.8%	44.4%
	Little stress	**Count**	4	3	11	11	11	45	8	93
		% within Profession	57.1%	37.5%	61.1%	52.4%	19.3%	46.9%	50.0%	41.7%
	No stress	**Count**	3	0	0	0	2	7	5	17
		% within Profession	42.9%	.0%	.0%	.0%	3.5%	7.3%	31.3%	7.6%
Total		**Count**	7	8	18	21	57	96	16	223
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	60.523(a)	18	.000
Likelihood Ratio	56.997	18	.000
Linear-by-Linear Association	.160	1	.689
N of Valid Cases	223		
a 16 cells (57.1%) have expected count less than 5. The minimum expected count is .44.			

4.5.6.2.7 PHYSICAL WORK STRESS

Physical work stress (p=0.047) was lowest in massage therapists, biokineticists and reflexologists. Appendix Table 7.73 shows the results for physical work stress, where "No stress" and "Little stress" have been combined. For the report on median responses and results of the Kruskal-Wallis test, see Appendix Table 7.74 and 7.75 respectively.

Table 4.29: Physical work stress by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Physical stress	Very stressful	Count	1	1	2	4	4	17	0	29
		% within Profession	12.5%	14.3%	13.3%	20.0%	7.1%	17.9%	.0%	13.6%
	Stressful	Count	3	4	5	9	31	51	2	105
		% within Profession	37.5%	57.1%	33.3%	45.0%	55.4%	53.7%	16.7%	49.3%
	Little stress	Count	4	2	8	6	18	24	7	69
		% within Profession	50.0%	28.6%	53.3%	30.0%	32.1%	25.3%	58.3%	32.4%
	No stress	Count	0	0	0	1	3	3	3	10
		% within Profession	.0%	.0%	.0%	5.0%	5.4%	3.2%	25.0%	4.7%
Total		Count	8	7	15	20	56	95	12	213
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.116(a)	18	.047
Likelihood Ratio	27.207	18	.075
Linear-by-Linear Association	.034	1	.854
N of Valid Cases	213		
a 18 cells (64.3%) have expected count less than 5. The minimum expected count is .33.			

Table 4.30: Summary of test statistics for psychological and physical work stress

Test Statistics(a,b)			
	Psychological stress	Physical stress	Physical stress
Chi-Square	26.762	17.461	15.693
df	5	5	5
Asymp. Sig.	.000	.004	.008
a Kruskal Wallis Test			
b Grouping Variable: Profession			

4.5.6.3 OCCUPATIONAL / WORK-RELATED FACTORS

4.5.6.3.1 NUMBER OF HOURS SPENT ON SPECIFIC ACTIVITIES IN AN EIGHT HOUR WORKING DAY

The amount of time spent doing administrative work at a desk ($p<0.001$), in interaction with patients ($p<0.001$), performing manual therapy techniques ($p<0.001$) and performing manual / physical activities ($p=0.002$) was significantly different between professions. For results of the Kruskal-Wallis test, see Appendix Table 7.42.

Table 4.31: Report on the amount of time spent on various activities in a working day

Profession	Administrative work at a desk	Interaction with patients	Applying modalities	Performing manual therapies	Performing physical activity	Lecturing	Other
Massage therapist	2.00	2.00	3.00	4.50	1.00	1.00	4.00
Aromatherapist	4.00	3.00	3.00	5.00	2.00	3.00	
Biokineticist	2.50	4.50	3.00	2.00	3.00	2.00	6.00
Chiropractor	3.00	4.00	2.00	3.00	2.00	2.00	6.00
OT	3.00	4.00	3.00	2.00	3.00	2.00	4.00
Physiotherapist	2.00	3.00	3.00	4.00	2.00	2.00	3.00
Reflexologist	3.00	3.00	3.00	4.00	2.00	2.00	3.00
Total	3.00	3.00	3.00	3.00	2.00	2.00	3.50

Table 4.32: Summary of test statistics for the amount of time spent on various activities in a working day

Test Statistics(a,b)							
	Administrative work at a desk	Interaction with patients	Applying modalities	Performing manual therapies	Performing physical activity	Lecturing	Other
Chi-Square	24.879	28.590	8.917	57.296	19.451	7.310	8.524
Df	5	5	5	5	5	5	4
Asymp. Sig.	.000	.000	.112	.000	.002	.199	.074
a Kruskal Wallis Test							
b Grouping Variable: Profession							

4.5.6.3.2 NUMBER OF YEARS PRACTICING

Number of years practicing ($p<0.001$) was highest in physiotherapists and aromatherapists (See Table 4.33 and 4.34).

4.5.6.3.3 NUMBER OF PATIENTS SEEN PER DAY

Number of patients seen per day ($p<0.001$) was highest in chiropractors, occupational therapists and physiotherapists (See Table 4.33 and 4.34).

4.5.6.3.4 NUMBER OF HOURS WORKED PER WEEK

Number of hours worked per week ($p=0.003$) was highest in biokineticists.

The results of the Kruskal-Wallis test on number of years practicing, patients seen per day and hours worked per week can be found in Appendix Table 7.76.

Table 4.33: Report on number of years practicing, patients seen per day and hours worked per week

Report Median			
Profession	**Years practicing**	**Patients seen per day**	**Hours per week**
Massage therapist	10.50	4.50	27.75
Aromatherapist	11.00	5.00	40.00
Biokineticist	5.00	6.00	45.00
Chiropractor	3.75	9.00	40.00
OT	7.50	8.00	40.00
Physiotherapist	13.00	9.00	40.00
Reflexologist	10.00	3.00	20.00
Total	9.00	8.00	40.00

Table 4.34: Summary of test statistics for number of years practicing, patients seen per day and hours worked per week

Test Statistics(a,b)			
	Years practicing	**Patients seen per day**	**Hours per week**
Chi-Square	34.254	35.880	17.994
df	5	5	5
Asymp. Sig.	.000	.000	.003
a Kruskal Wallis Test			
b Grouping Variable: Profession			

4.5.6.3.5 WORKING IN A HOSPITAL

Working in a hospital ($p<0.001$) was highest in occupational therapists and physiotherapists.

Table 4.35: Work in a hospital by profession

Crosstab										
			Profession							**Total**
			Masst	**Aroma**	**Bio**	**Chiro**	**OT**	**Physio**	**Reflex**	
Work in a hospital	**yes**	**Count**	0	0	1	1	25	39	0	66
		% within Profession	.0%	.0%	5.6%	4.8%	43.9%	39.4%	.0%	28.9%
	no	**Count**	8	9	17	20	32	60	16	162
		% within Profession	100.0%	100.0%	94.4%	95.2%	56.1%	60.6%	100.0%	71.1%
Total		**Count**	8	9	18	21	57	99	16	228
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.621(a)	6	.000
Likelihood Ratio	47.690	6	.000
Linear-by-Linear Association	13.659	1	.000
N of Valid Cases	228		

4.5.6.3.6 WORKING IN A NON-HOSPITAL OR PRIVATE PRACTICE

Working in a non-hospital or private practice (p=0.004) was lowest in occupational therapists and physiotherapists.

Table 4.36: Non hospital / private practice by profession

Crosstab											
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Non hospital / private practice	**yes**	**Count**	7	9	15	21	36	77	15	180
		% within Profession	87.5%	100.0%	83.3%	100.0%	63.2%	77.8%	93.8%	78.9%
	no	**Count**	1	0	3	0	21	22	1	48
		% within Profession	12.5%	.0%	16.7%	.0%	36.8%	22.2%	6.3%	21.1%
Total		**Count**	8	9	18	21	57	99	16	228
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.301(a)	6	.004
Likelihood Ratio	25.046	6	.000
Linear-by-Linear Association	2.789	1	.095
N of Valid Cases	228		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.68.			

4.5.6.3.7 ASSISTANCE WITH MANUAL HANDLING

The use of assistance with manual handling activities was highest in occupational therapists and physiotherapists (p=0.002).

Table 4.37: Assistance with manual handling by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Assistance with manual handling	yes	Count	0	2	3	0	21	32	1	59
		% within Profession	.0%	25.0%	16.7%	.0%	38.2%	33.0%	6.3%	26.5%
	no	Count	8	6	15	21	29	62	15	156
		% within Profession	100.0%	75.0%	83.3%	100.0%	52.7%	63.9%	93.8%	70.0%
	sometimes	Count	0	0	0	0	5	3	0	8
		% within Profession	.0%	.0%	.0%	.0%	9.1%	3.1%	.0%	3.6%
Total		Count	8	8	18	21	55	97	16	223
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.845(a)	12	.002
Likelihood Ratio	40.054	12	.000
Linear-by-Linear Association	2.894	1	.089
N of Valid Cases	223		

a 11 cells (52.4%) have expected count less than 5. The minimum expected count is .29.

SUMMARY

The individual factors that were significantly different between the professions were: gender (p<0.001), marital status (p=0.001), age (p<0.001), weight (p=0.002), height (p<0.001), hip injury (p=0.003) and knee injury (p=0.001).

The psychosocial factors that were significantly different between the professions were: exercise frequency (p=0.009) and time spent exercising (p=0.001), type of exercise including jogging (p=0.022), golf (p<0.001), yoga (p<0.001), walking (p=0.003), pilates (p=0.028) and weight training (p=0.002), ever having been pregnant (p<0.001), number of children (p<0.001) and psychological (p<0.001) and physical work stress (p=0.047).

The occupational factors that were significantly different between the professions were: number of years practicing (p<0.001), number of patients seen per day (p<0.001), number of hours worked per week (p=0.003), use of assistance with manual handling activities (p=0.002), working in a hospital setting (p<0.001) and working in a non-hospital or private practice (p=0.004).

4.5.7 OBJECTIVE FIVE: To compare the responses on the experiences of low back pain among the various types of manual therapists who had low back pain in the last year

For this objective all those who reported “yes” to at least one or more of the following questions were selected for inclusion into the analysis: Question 18a (current low back pain) and Question 19a (low back pain in the last 4 weeks) or 19b (low back pain in the last year). One hundred and sixty eight records were selected for analysis.

Statistically significant associations were noted between the type of profession and the following variables:

4.5.7.1 PAIN-RELATED FACTORS

4.5.7.1.1 NUMBER OF ACUTE EPISODES

Aromatherapists had a median of 12 acute episodes of low back pain last year (p=0.031) whilst the other professions had less recorded episodes of acute low back pain.

Table 4.38: Days absent, number of acute episodes and duration of acute epsiodes

	Profession							
	Masst	**Aroma**	**Bio**	**Chiro**	**OT**	**Physio**	**Reflex**	**Total**
	Median	Median	Median	Median	Median	Median	Median	Median
Days absent from work	.00	.00	.00	.00	.00	.00	.00	.00
Acute episodes last year	1.00	12.00	2.50	1.00	2.00	1.00	1.00	2.00
Duration of acute episodes (days)	1.00	1.75	2.00	2.00	2.00	2.00	1.25	2.00

	Days absent from work	Acute episodes last year	Duration of acute episodes
Chi-Square	6.085	12.280	6.285
df	5	5	5
Asymp. Sig.	.298	.031	.279

a Kruskal Wallis Test
b Grouping Variable: Profession

4.5.7.2 PAIN-RELATED / WORK-RELATED FACTORS

4.5.7.2.1 LOW BACK PAIN EXACERBATED BY CLINICAL PRACTICE

Occupational therapists and physiotherapists were more likely to say that the symptoms of their low back pain were exacerbated by clinical practice (p<0.001) than the other professions.

Table 4.39: Low back pain exacerbated by clinical practice

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Exacerbated by clinical practice	yes	Count	2	2	9	13	39	58	2	125
		% within Profession	50.0%	40.0%	69.2%	76.5%	90.7%	82.9%	20.0%	77.2%
	no	Count	2	3	4	4	4	12	8	37
		% within Profession	50.0%	60.0%	30.8%	23.5%	9.3%	17.1%	80.0%	22.8%
Total		Count	4	5	13	17	43	70	10	162
		% within Profession	100.0%	100.0%	100.0 %	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	30.361(a)	P<0.001

4.5.7.2.2 STAGE OF LIFE AT WHICH THE FIRST MAJOR EPISODE OF LOW BACK PAIN WAS EXPERIENCED

In terms of the stage of life at which manual therapists' first experienced low back pain (p<0.001): aromatherapists, reflexologists and massage therapists were most likely to develop low back pain before becoming a student, while chiropractors and biokineticists were likely to develop low back pain whilst a student and physiotherapists and occupational therapists tended to develop low back pain for the first time only once working as a manual therapist.

Table 4.40: Stage of life at which low back pain was first experienced

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflexo	
Stage	Before becoming a student	Count	2	4	2	4	7	8	6	33
		% within Profession	66.7%	80.0%	15.4%	25.0%	16.3%	12.1%	75.0%	21.4%
	As a student	Count	1	1	6	8	13	13	1	43
		% within Profession	33.3%	20.0%	46.2%	50.0%	30.2%	19.7%	12.5%	27.9%
	Once started working	Count	0	0	5	4	23	45	1	78
		% within Profession	.0%	.0%	38.5%	25.0%	53.5%	68.2%	12.5%	50.6%
Total		Count	3	5	13	16	43	66	8	154
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %

Pearson Chi-Square	44.833(a)	P<0.001

4.5.7.2.3 NUMBER OF YEARS WORKING AS A MANUAL THERAPIST BEFORE EXPERIENCING LOW BACK PAIN FOR THE FIRST TIME (I.E. IN PRACTICE)

Physiotherapists and occupational therapists tended to be working for longer periods of time before their low back pain began (p=0.036).

Table 4.41: Number of years working as a manual therapists when low back pain was experienced for the first time

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Years working before experiencing major LBP	N/A	Count	2	1	1	1	2	1	1	9
		% within Profession	50.0%	20.0%	7.7%	5.9%	4.4%	1.4%	11.1%	5.5%
	0-5 years	Count	2	2	9	14	32	40	4	103
		% within Profession	50.0%	40.0%	69.2%	82.4%	71.1%	55.6%	44.4%	62.4%
	6-10 years	Count	0	2	3	2	7	15	1	30
		% within Profession	.0%	40.0%	23.1%	11.8%	15.6%	20.8%	11.1%	18.2%
	11-15 years	Count	0	0	0	0	4	7	3	14
		% within Profession	.0%	.0%	.0%	.0%	8.9%	9.7%	33.3%	8.5%
	16-20 years	Count	0	0	0	0	0	2	0	2
		% within Profession	.0%	.0%	.0%	.0%	.0%	2.8%	.0%	1.2%
	21+ years	Count	0	0	0	0	0	7	0	7
		% within Profession	.0%	.0%	.0%	.0%	.0%	9.7%	.0%	4.2%
Total		Count	4	5	13	17	45	72	9	165
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Test Statistics	
	Years working before experienced major LBP
Chi-Square	11.919
df	5
Asymp. Sig.	P=0.036
Kruskal Wallis Test	
Grouping Variable: Profession	

4.5.7.3 OCCUPATIONAL / WORK-RELATED FACTORS

4.5.7.3.1 WORK ACTIVITIES / TASKS

4.5.7.3.1.1 BENDING AND / OR TWISTING

Biokineticists were more likely to say their low back pain was first noticed when bending or twisting (Question 29.3A) (p=0.004).

Table 4.42: Low back pain due to bending or twisting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Bending or twisting (A)	yes	Count	0	0	6	6	12	9	3	36
		% within Profession	.0%	.0%	66.7%	46.2%	29.3%	14.1%	50.0%	26.1%
	no	Count	2	3	3	7	29	55	3	102
		% within Profession	100.0%	100.0%	33.3%	53.8%	70.7%	85.9%	50.0%	73.9%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	18.960(a)	P=0.004

4.5.7.3.1.2 INSTRUCTING PATIENTS

A biokineticist was the only respondent to indicate that his / her low back pain was first noticed when instructing a patient (Question 29.4A) (p=0.025).

Table 4.43: Low back pain due to instructing a patient

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Instructing patient (A)	yes	Count	0	0	1	0	0	0	0	1
		% within Profession	.0%	.0%	11.1%	.0%	.0%	.0%	.0%	.7%
	no	Count	2	3	8	13	41	64	6	137
		% within Profession	100.0%	100.0%	88.9%	100.0%	100.0%	100.0%	100.0%	99.3%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	14.438(a)	P=0.025

4.5.7.3.1.3 LIFTING

Occupational therapists were more likely to indicate that their low back pain was exacerbated during lifting (Question 29.5B)(p=0.015).

Table 4.44: Low back pain exacerbated by lifting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Lifting (B)	yes	Count	0	1	3	4	28	24	1	61
		% within Profession	.0%	33.3%	33.3%	30.8%	68.3%	37.5%	16.7%	44.2%
	no	Count	2	2	6	9	13	40	5	77
		% within Profession	100.0%	66.7%	66.7%	69.2%	31.7%	62.5%	83.3%	55.8%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	15.768(a)	P=0.015

Figure 4.3 is a summary of all the “yes” responses to Question 29A, indicating what work (practice) activity/ies were being performed by the manual therapist when low back pain was experienced for the first time in practice.

Figure 4.4 is a summary of all the “yes” responses to Question 29B, indicating what work (practice) activity/ies cause exacerbation or recurrence of the manual therapists’ low back pain.

Figure 4.3: Work activities / tasks being performed when low back pain was experienced for the first time in practice – by profession

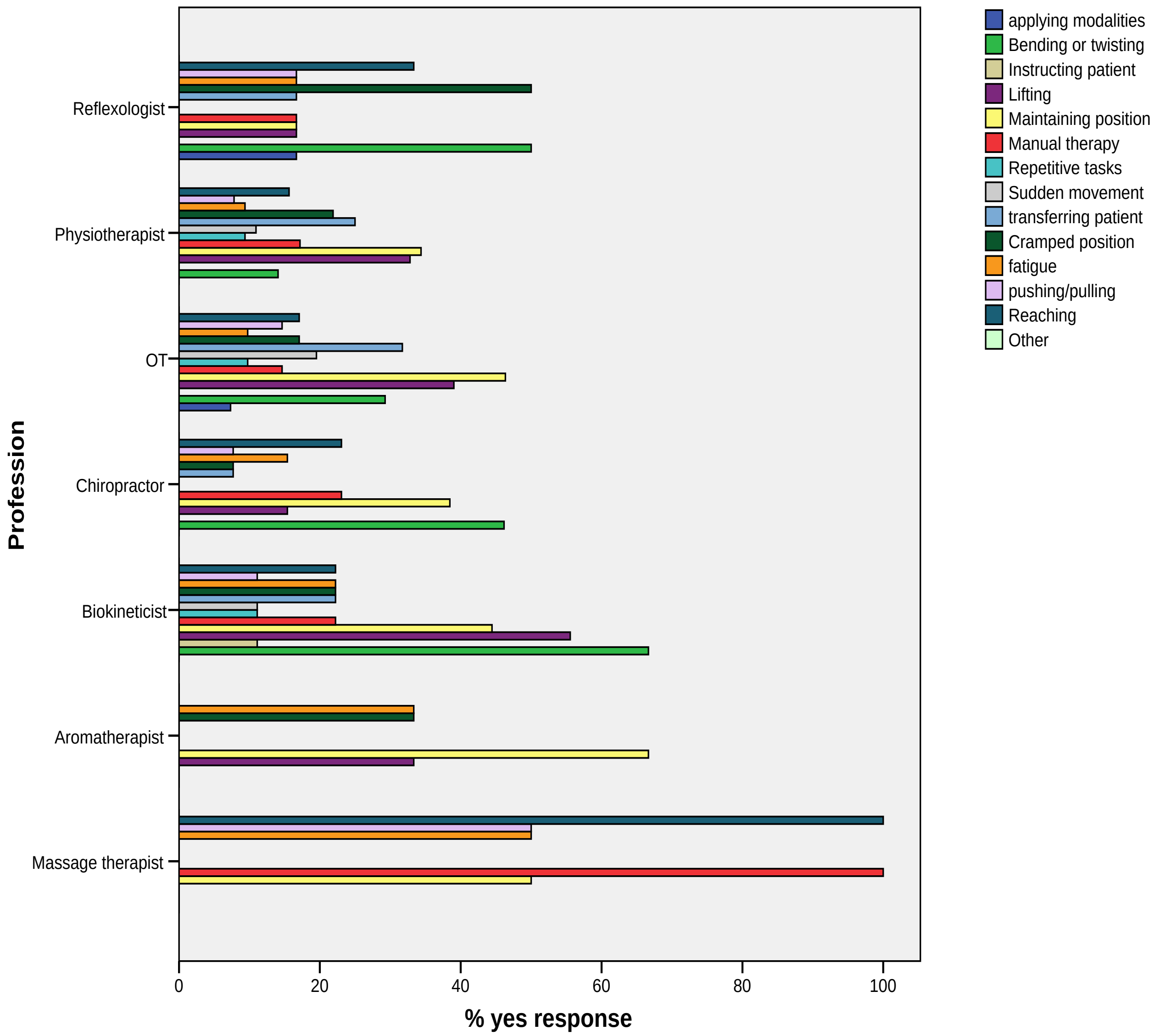
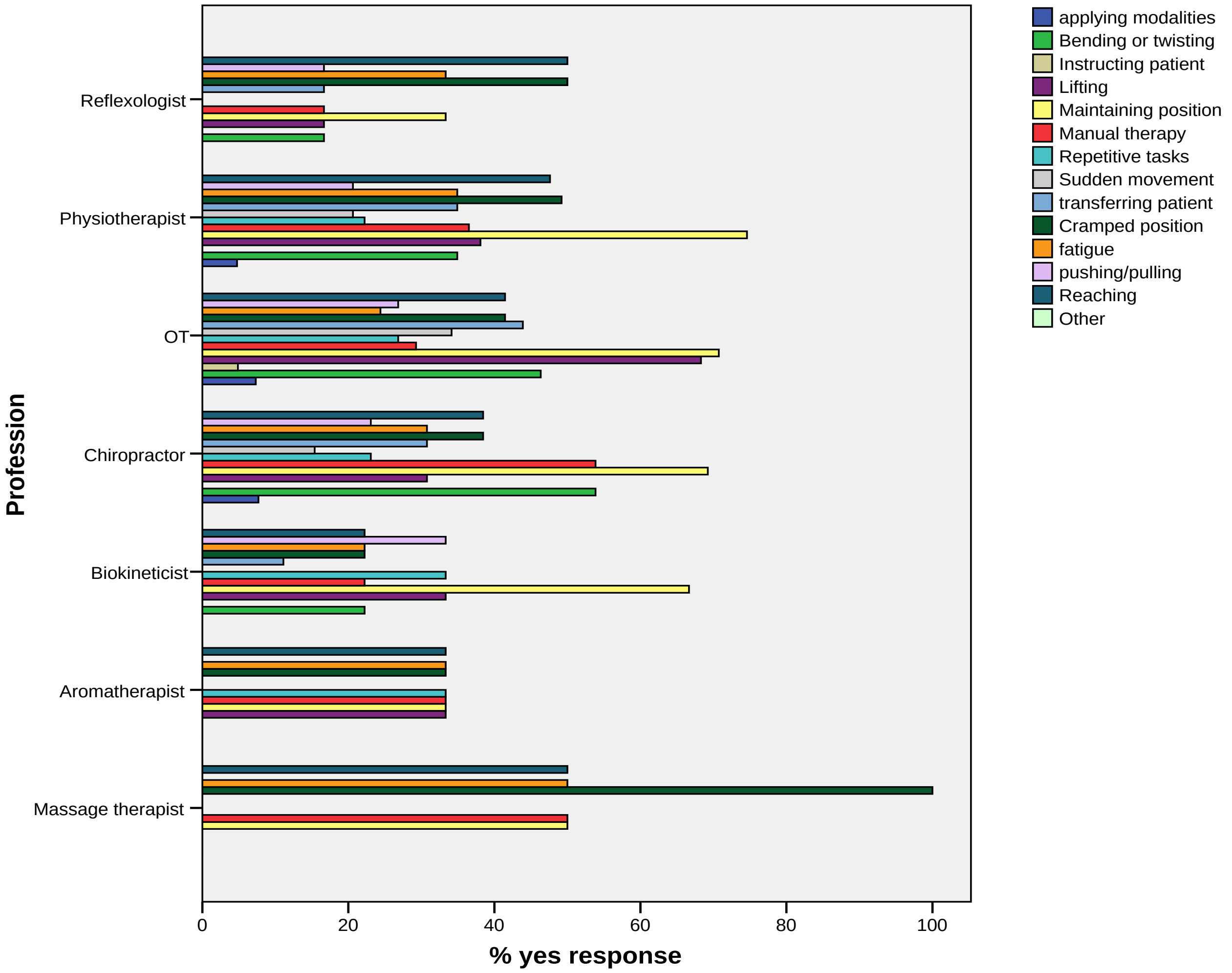


Figure 4.4: Work activities / tasks that cause exacerbation or recurrence of low back pain – by profession



4.5.7.3.1.4 WORK SCHEDULE

Work schedule as a job risk factor was rated significantly differently between the professions (p=0.002). Biokineticists and chiropractors rated it higher than the other professions.

Figure 4.5 summarizes the median responses of those manual therapists' with low back pain to the 18 potential job risk factors presented in Question 30. For this question respondents were asked to rate 18 potential job risk factors on a scale of 0-5.

Figure 4.5: Median response of manual therapists' with low back pain to 18 potential job risk factors

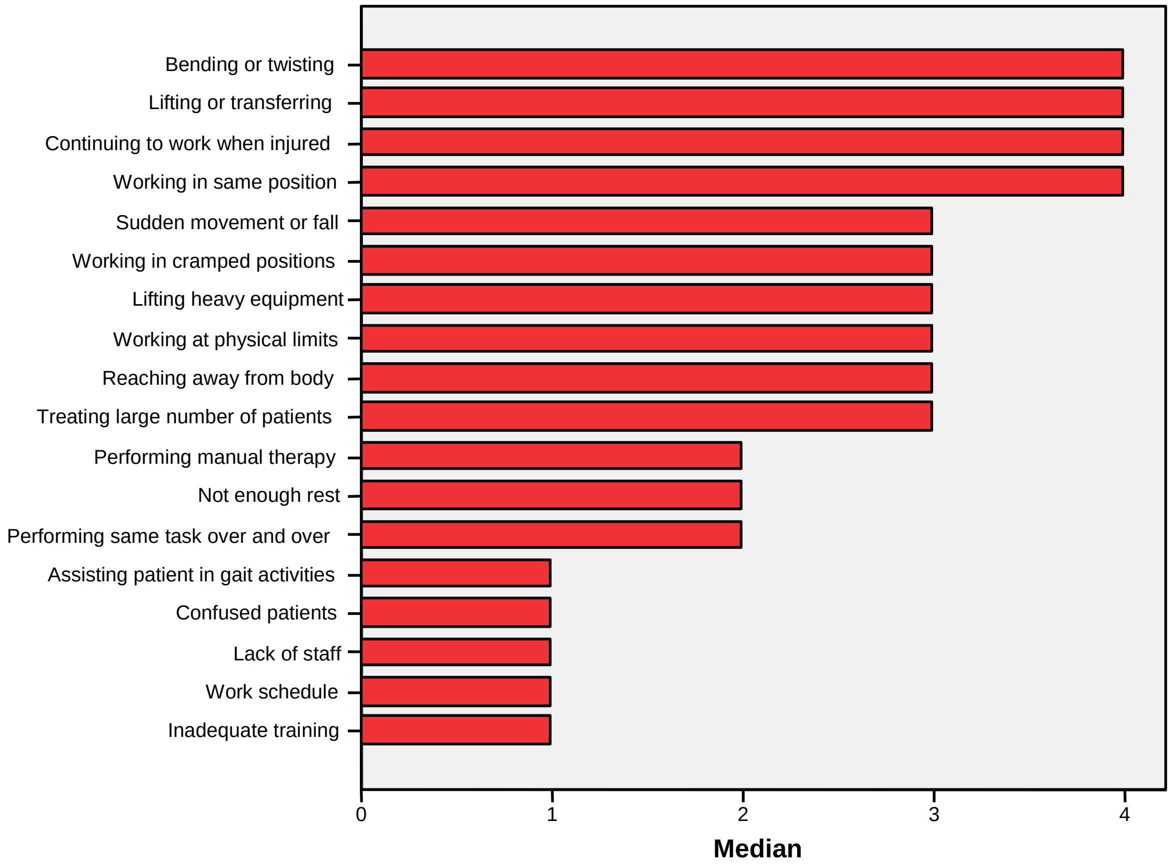


Table 4.45: Median response / rating of the 18 potential job risk factors by profession

	Profession								p value
	Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	Total	
Bending or twisting	3.00	3.00	4.00	4.00	4.00	4.00	3.00	4.00	0.818
Lifting or transferring	4.00	1.50	4.00	4.00	4.00	4.00	3.50	4.00	0.716
Continuing to work when injured	5.00	4.50	4.00	4.50	4.00	4.00	4.00	4.00	0.330
Working in same position	3.00	4.00	3.00	4.00	4.00	4.00	4.50	4.00	0.844
Sudden movement or fall	4.00	3.00	1.00	2.00	4.00	3.50	1.00	3.00	0.207
Working in cramped positions	4.00	4.00	3.00	3.00	3.00	3.00	4.00	3.00	0.710
Lifting heavy equipment	2.00	3.50	4.00	3.00	4.00	2.00	3.00	3.00	0.024
Working at physical limits	3.00	3.00	3.00	3.00	3.00	3.00	1.50	3.00	0.742
Reaching away from body	2.00	2.50	3.00	3.50	3.00	3.00	3.50	3.00	0.898
Treating large number of patients	4.00	4.00	4.00	4.50	3.00	3.00	2.50	3.00	0.091
Performing manual therapy	2.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	0.596
Not enough rest	3.00	3.00	3.00	2.50	3.00	2.00	2.50	2.00	0.197
Performing same task over and over	3.00	2.00	3.00	3.00	2.00	2.00	1.00	2.00	0.524
Assisting patient in gait activities	.00	2.00	3.00	1.00	1.00	1.00	.00	1.00	0.477
Confused patients	.00	1.00	2.00	1.00	1.00	1.00	.50	1.00	0.875
Lack of staff	.00	1.50	2.00	.50	2.00	1.00	.50	1.00	0.203
Work schedule	.00	1.00	3.00	3.00	1.00	.00	1.50	1.00	0.002
Inadequate training	.00	.50	1.00	1.00	1.00	.00	.00	1.00	0.200

4.5.7.3.2 WORK / CLINICAL SETTING

4.5.7.3.2.1 GENERAL MUSCULOSKELETAL OUTPATIENT SETTING

Chiropractors and biokineticists were most likely to indicate that they were working in a general musculoskeletal outpatient setting when experiencing low back pain for the first time ($p<0.001$) (Table 4.46).

Chiropractors were also more likely to indicate that working in a general musculoskeletal outpatient setting exacerbated their low back pain ($p<0.001$) (Table 4.47).

Table 4.46: Low back pain experienced for the first time in a general musculoskeletal outpatient setting (GMOS)

			Profession						Total	
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
GMOS (A)	yes	Count	1	0	7	14	9	23	0	54
		% within Profession	50.0%	.0%	63.6%	93.3%	21.4%	34.3%	.0%	38.6%
	no	Count	1	2	4	1	33	44	1	86
		% within Profession	50.0%	100.0%	36.4%	6.7%	78.6%	65.7%	100.0%	61.4%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	**29.614(a)**	**P<0.001**

Table 4.47: Low back pain exacerbated in a general musculoskeletal outpatient setting (GMOS)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
GMOS (B)	yes	Count	1	1	2	12	6	27	0	49
		% within Profession	50.0%	50.0%	18.2%	80.0%	14.3%	40.3%	.0%	35.0%
	no	Count	1	1	9	3	36	40	1	91
		% within Profession	50.0%	50.0%	81.8%	20.0%	85.7%	59.7%	100.0%	65.0%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	**24.402(a)**	**P<0.001**

4.5.7.3.2.2 NEUROLOGICAL REHABILITATION

Occupational therapists and physiotherapists were more likely to indicate that they were working in a neurological rehabilitation setting when experiencing low back pain for the first time (p<0.001) (Table 4.48) and that work in the neurological rehabilitation setting caused exacerbation of their low back pain (p=0.001) (Table 4.49).

Table 4.48: Low back pain experienced for the first time in a neurological rehabilitation clinical setting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Neurological rehab (A)	yes	Count	0	0	1	0	30	36	0	67
		% within Profession	.0%	.0%	9.1%	.0%	71.4%	53.7%	.0%	47.9%
	no	Count	2	2	10	15	12	31	1	73
		% within Profession	100.0%	100.0%	90.9%	100.0%	28.6%	46.3%	100.0%	52.1%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	**35.259(a)**	**P<0.001**

Table 4.49: Low back pain exacerbated in a neurological rehabilitation clinical setting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Neurological rehab (B)	yes	Count	0	0	4	0	25	38	0	67
		% within Profession	.0%	.0%	36.4%	.0%	59.5%	56.7%	.0%	47.9%
	no	Count	2	2	7	15	17	29	1	73
		% within Profession	100.0%	100.0%	63.6%	100.0%	40.5%	43.3%	100.0%	52.1%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	23.337(a)	P=0.001

4.5.7.3.2.3 PAEDIATRICS

Occupational therapists were more likely to indicate that they were working in a paediatric setting when experiencing low back pain for the first time in practice (p<0.001) (Table 4.50) and that the paediatric setting exacerbated their low back pain (p<0.001) (Table 4.51).

Table 4.50: Low back pain experienced for the first time in a paediatric setting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Paediatrics (A)	yes	Count	0	0	0	0	18	6	0	24
		% within Profession	.0%	.0%	.0%	.0%	42.9%	9.0%	.0%	17.1%
	no	Count	2	2	11	15	24	61	1	116
		% within Profession	100.0%	100.0%	100.0%	100.0%	57.1%	91.0%	100.0%	82.9%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	29.128(a)	P<0.001

Table 4.51: Low back pain exacerbated in a paediatric setting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Paediatrics (B)	yes	Count	0	0	0	0	21	9	0	30
		% within Profession	.0%	.0%	.0%	.0%	50.0%	13.4%	.0%	21.4%
	no	Count	2	2	11	15	21	58	1	110
		% within Profession	100.0%	100.0%	100.0%	100.0%	50.0%	86.6%	100.0%	78.6%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	31.362(a)	P<0.001

4.5.7.3.2.4 LEARNING DIFFICULTIES AND PHYSICAL IMPAIRMENTS

Biokineticists and occupational therapists were more likely to indicate that working in a learning difficulties and physical impairments clinical setting caused exacerbation of their low back pain (p=0.001).

Table 4.52: Low back pain exacerbated in learning difficulties and physical impairments clinical setting

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Learning difficulties and physical impairment (B)	yes	Count	0	0	4	0	15	5	0	24
		% within Profession	.0%	.0%	36.4%	.0%	35.7%	7.5%	.0%	17.1%
	no	Count	2	2	7	15	27	62	1	116
		% within Profession	100.0%	100.0%	63.6%	100.0%	64.3%	92.5%	100.0%	82.9%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0 %	100.0%	100.0%	100.0%	100.0%	100.0 %

Pearson Chi-Square	21.617(a)	P=0.001

SUMMARY

To summarize, the pain-related factors that were found to have significant associations with various manual therapy professions included: number of acute episodes last year (p=0.031), low back pain exacerbated by clinical practice (p<0.001), stage of life at which low back pain was experienced for the first time (p<0.001) and the number of years working as a manual therapist when low back pain was experienced for the first time (p=0.036).

The occupational risk factors that were found to be significantly associated with various manual therapy professions included the following work activities / tasks: bending or twisting (p=0.004), instructing patients (p=0.025), lifting (p=0.015) and work schedule (p=0.002) as well as the following work / clinical settings: general musculoskeletal outpatient setting, neurological rehabilitation, paediatrics and learning disabilities and physical impairments.

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 INTRODUCTION

What follows is a discussion of the results of this study, with particular emphasis on the significant findings as depicted in chapter four.

5.2 OBJECTIVE ONE: PREVALENCE OF LOW BACK PAIN IN MANUAL THERAPISTS

The point prevalence of low back pain in South African manual therapists was 41% and the one-year prevalence was 59% (Table 4.5). These rates are higher than the prevalence rates that have been recorded for unspecified low back pain in the general population, where the point prevalence ranged from 4 to 33% and the one-year prevalence ranged from 15 to 40% (Waddell, 1999). The career prevalence (74%) of low back pain identified in manual therapists (Table 4.5) was also at the higher end of the range of lifetime prevalence for unspecified low back pain in the general population, that was reported as between 59 to 80% (Waddell, 1999). Manual therapists perform activities that are associated with the development of low back pain on a daily basis (Bernard *et al.,* 1997; Vieira and Kumar, 2004 and Morris, 2006) and are therefore, due to the nature of their work, at a greater risk of developing low back pain compared to the general population.

In addition, the prevalence of low back pain identified in manual therapists in this study was similar to or higher than the trends observed in previous studies conducted among manual therapists and other health care professionals (Smedley *et al.,* 1995; Bork *et al.,* 1996; West and Gardner, 2001; Yip, 2001; Nyland and Grimmer, 2003; Bejia *et al.,* 2005; Glover *et al.,* 2005; Cunningham *et al.,* 2006; Fyfe, 2006; Jang *et al.,* 2006; and Tam and Yeung, 2006; Dasappa, 2007; Meijsen and Knibbe, 2007 and Leggat *et al.,* 2008).

The 59% one-year prevalence (Table 4.5) of low back pain in manual therapists was higher than the one-year prevalence of low back pain recorded in nurses by Smedley *et al.* (1995) (45%) and Yip (2001) (40.6%), and the 74% career prevalence (Table 4.5) of low back pain in manual therapists was also considerably higher than the 35% and 48% career prevalence recorded in physiotherapists by West and Gardner (2001) and Glover *et al.* (2005) respectively. The higher prevalence of low back pain identified in this study compared to others (Smedley, *et al.,* 1995; West and Gardner, 2001; Yip, 2001 and Glover *et al.,* 2005) may have been due to differences in the definitions of low back pain, as opposed to Smedley *et al.* (1995), West and Gardner (2001), Yip (2001) and Glover *et al.* (2005), the “duration of symptoms” was not included as a criterion in the definition of low back pain in this study.

5.3 OBJECTIVE TWO: PREVALENCE AND COMPARISON OF LOW BACK PAIN AMONG VARIOUS TYPES OF MANUAL THERAPISTS

Point prevalence of low back pain

According to our results there was no association between profession and point prevalence of low back pain, although the trend demonstrated that aromatherapists (56%) and biokineticists (50%) had the highest point prevalence of low back pain (Table 4.6).

Aromatherapists were one of the “oldest” groups in this study with an average age of 50.57 years (Table. 4.12). The high point prevalence of low back pain identified in aromatherapists may therefore be attributed to increasing age (Manga *et al.,* 1993; Bork *et al.,* 1996; Waddell, 1999 and Glover *et al.,* 2005) and associated age-related changes (Bejia *et al.,* 2005), which have been linked to low back pain in the literature.

Biokineticists on the other hand, although representing the “youngest” group in this study (Table 4.12), worked the most number of hours (45 hours) per week (Table 4.33 and 4.34) and considered their work schedule to be a problematic job risk factor for low back pain (Table 4.45). It is thus possible that a heavy work schedule and frantic work pace, which are factors that may increase the risk of low back pain (Cromie *et al.,* 2001 and Kumar *et al.,* 2004) could have contributed to the development of current low back pain in these therapists.

One-year prevalence and career prevalence of low back pain

The one-year prevalence and career prevalence of low back pain was highest in massage therapists (80% and 80% respectively) and occupational therapists (70% and 83% respectively).

Out of all the manual therapy professions, massage therapists indicated that they had the greatest dissatisfaction (Appendix Table 7.72) with their work.

Low job satisfaction tends to increase the risk of low back pain (Pope *et al.,* 1991 and Waddell, 1999) and is considered one of the best predictors for occurrence of occupational low back pain (Van Poppel *et al.,* 1998). The extent of the massage therapists' job dissatisfaction may thus have played a role in their development of low back pain (Pope *et al.,* 1991; Van Poppel *et al.,* 1998; Waddell, 1999; Van den Heuvel *et al.,* 2004 and Gheldof *et al.,* 2007). This may also explain why, although the massage therapists saw the least number of patients per day (4.5 patients) (Table 4.33 and 4.34) and worked for the least number of hours per week (27.75hrs) (Table 4.33 and 4.34), they still had the highest one-year prevalence of low back pain.

More than half of the occupational therapists in this study found their work both physically (Table 4.29) and psychologically (Table 4.28) stressful, which is noteworthy because psychological and physical work stress are related to the development of occupational low back pain (Morris, 2006). What's more, as many as 8.5% (Appendix Table 7.71) of the occupational therapists on medication (31%) (Appendix Table 7.70) in this study, were suffering with depression. Depression has been identified as a strong and independent predictor for the onset of an episode of low back pain (Carroll *et al.,* 2004) and according to Bogduk (2006) may be considered a risk factor and prognostic factor for low back pain. It is therefore possible that the combination of relatively high levels of physical and psychological stress (Morris, 2006) and / or depression (Carroll *et al.,* 2004 and Bogduk, 2006) may have contributed to the high one-year and career prevalence of low back pain in these therapists.

5.4 OBJECTIVE THREE: THE RISK FACTORS ASSOCIATED WITH CURRENT LOW BACK PAIN IN MANUAL THERAPISTS

5.4.1 BMI

BMI was found to be significantly and independently associated with current low back pain in South African manual therapists. As BMI increased by one unit, the risk of low back pain increased by 1.16 times (Table 4.9). This is in accordance with the findings of Bejia *et al.* (2005) who indicated that a high BMI was associated with an increased risk of low back pain in nurses and Vieira *et al.* (2005) who concluded that nurses and welders who were overweight [i.e. had a BMI > / = 25 (Bickley and Szilagyi, 2003)] were 1.38 times more likely to have had low back pain during their working life.

5.4.2 PREVIOUS ABDOMINAL SURGERY

In those manual therapists who had had previous abdominal surgery, the risk of low back pain was increased by 2.5 times (Table 4.9). The current study thus concurs with Ericksen *et al.* (2006) who documented in a systematic literature review and discussion that low back pain was associated with surgery involving an abdominal incision to access the bladder and urethra, hysterectomy, abortion, dilatation and curettage and childbirth.

The increased risk of low back pain after abdominal surgery could also have been a consequence of general or epidural anaesthesia which was necessary for the surgery (Jorenscn and Confait, 1997 and Louizos *et al.,* 2004), or, as is a possibility in gynaecologic surgery may have been due to injury and deconditioning of the abdominal or pelvic floor muscles which leads to core muscle dysfunction and predisposes the individual to future low back pain (Ericksen *et al.,* 2006).

5.4.3 <u>PREVIOUS TRAUMA</u>

Previous trauma to the low back, hips, knees or ankles increased the risk of developing low back pain by 3.7 times (Table 4.9) in manual therapists. This is in contrast to Smedley *et al.* (1995), who reported no relation between low back pain and severe trauma in nurses.

A possible explanation for the association identified between previous trauma to the low back, hips, knees or ankles and low back pain in manual therapists is that all of these structures are connected by the lower limb kinematic chain (Seymour, 2002). According to this concept, even if the trauma had not been directly to the low back and had instead occurred lower down (e.g. in the ankles), the resulting injury (Table 4.14 and 4.15 and Appendix Table 7.49 and 7.50) would lead to abnormal stresses and strains on joints throughout the body that could be implicated in the development of low back pain (Stoxen, 2008).

To conclude, it is possible that the high prevalence of low back pain (Table 4.5) recorded in manual therapists was influenced by previous trauma to the low back, hips, knees or ankles. However, further research on the link between previous trauma to the lower limb and low back pain in specific populations is recommended as a means of expanding on the depth of literature available on this topic.

5.4.4 <u>PHYSICAL WORK STRESS</u>

The factor with the highest association to low back pain in manual therapists in South Africa was a very physically stressful occupation (Table 4.9), which increased the risk by 3.1 times compared to an occupation with little physical stress or without physical stress. This is in agreement with Morris (2006), who determined in a systematic literature review that physical stress, as well as high perceived job demands and perceptions of intensified workload were factors that had been linked to low back pain in the workplace. In addition, our finding concurs with that of Tam and Yeung (2006) who noted that a higher rate of perceived effort at work was associated with low back pain in non-emergency ambulance workers and Trinkoff *et al.* (2003) who reported that as the perceived level of demand increased so did the odds of reported musculoskeletal disorders in nurses.

Manual therapists are involved in physically demanding work (Bernard *et al.,* 1997 and Morris, 2006) and many of their work activities / tasks increase their risk of developing low back pain (Pope *et al.,* 1991; Bork *et al.,* 1996; Tim, 1996; Bogduk, 1999; Holder *et al.,* 1999; Waddell, 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Nyland and Grimmer, 2003; Vieira and Kumar, 2004; Glover *et al.,* 2005; Fyfe, 2006, Morris, 2006; Lis *et al.,* 2007 and Campo, 2008). This proposes that, provided the manual therapists based their responses to what level of physical stress their job required in reality, professional knowledge and experience and were not influenced by any form of psychological overlay (Tam and Yeung, 2006), it is likely that increased levels of physical work stress would have contributed to the high prevalence of low back pain identified in manual therapists (Table 4.5).

5.4.5 NO ASSISTANT

Not having an assistant was associated with an increased risk of low back pain in manual therapists (Table 4.9). This is in accordance with literature that has highlighted the need for physiotherapists to be selective about their techniques and number of staff utilized for safe treatment handling (Hignett, 1995). It also supports research that has established patient handling with assistance is less risky than patient handling by only one person (Cromie *et al.,* 2001). In addition, the impact that “not having an assistant” may have on a manual therapist’s risk of occupational injury was further emphasised, albeit indirectly, by the fact that obtaining assistance when handling heavy patients was a preventive measure chosen by 66% of physiotherapists after acquiring a work-related musculoskeletal injury (Glover *et al.,* 2005).

To conclude; not having an assistant contributed to the high prevalence of low back pain in manual therapists (Table 4.5), which implies that having an assistant would be beneficial in terms of preventing low back pain and should be kept in mind in the development of preventive programs in the future.

5.4.6 HOSPITAL OR OTHER SETTINGS

The manual therapists who were not in private practice (i.e. worked in a hospital or other setting) were at a 4.1 times higher risk of developing low back pain compared to those who were in private practice (Table 4.9).

In terms of a hospital setting, our finding supports Bork *et al.* (1996) who similarly concluded that hospital-based physiotherapists had a greater prevalence of low back pain compared to non-hospital based physiotherapists. The higher level of physical dependence exhibited by hospital patients may explain the increased risk of low back pain associated with work in this setting (Chiou *et al.,* 1994; Bork *et al.,* 1996 and Rugelj, 2003).

In addition, working in “other” settings increased the risk of low back pain in manual therapists. The “other” work settings cited most frequently by respondents in this study were schools and house calls / home visits (Appendix U), both of which have been linked to the development of work-related musculoskeletal disorders in physiotherapists (Campo, 2008).

To conclude, the high prevalence of low back pain identified in manual therapists (Table 4.5) may have been related to the increased risk of low back pain associated with work in hospital or other settings. This finding suggests there may be some benefit in the development of customized preventive programs and strategies, with a shift of focus determined by the manual therapists work / clinical setting and the type of patients they treat (e.g. improving awareness and utilization of assistive devices and aides in hospital-based manual therapists treating dependent patients).

5.5 OBJECTIVE FOUR: A COMPARISON OF RESPONSES TO ALL QUESTIONS BETWEEN THE VARIOUS TYPES OF MANUAL THERAPISTS

In this section, the factors that were found to be significantly different between the various manual therapy professions in South Africa will be discussed and compared.

5.5.1 INDIVIDUAL FACTORS

5.5.1.1 GENDER

Women were better represented than men in the data of this study (Figure 4.1), as they were the majority in all professions except chiropractic, where there was a higher percentage of males (71%) (Table 4.10). The aromatherapists (100%), reflexologists (100%) and occupational therapists (98.3%) were almost all female (Table 4.10).

According to Pope *et al.* (1991), low back pain is as common in males as it is in females, until the work situation is taken into account, then this pattern changes and women in physically demanding jobs have a greater prevalence of low back pain. This was confirmed in research by Bork *et al.* (1996) and Glover *et al.* (2005) who both found that female physiotherapists had a greater prevalence of low back pain and Bejia *et al.* (2005) who identified the female gender as a risk factor associated with low back pain in nurses.

The finding of this study however, does not follow the trend observed in the literature (Pope *et al.,* 1991; Bork *et al.,* 1996; Bejia *et al.,* 2005 and Glover *et al.,* 2005), as the prevalence of low back pain in chiropractors, who were predominantly male, was often higher than the prevalence of low back pain identified in professions that were predominantly female (e.g. reflexologists, aromatherapists and occupational therapists) (Table 4.6, 4.7 and 4.8). Therefore to conclude, gender was not a factor that was strongly associated with low back pain in manual therapists.

5.5.1.2 <u>AGE</u>

The oldest participants in this study were the reflexologists (52.60 years), aromatherapists (50.57 years) and massage therapists (46 years) and the youngest participants were the biokineticists (28.78 years), chiropractors (32.86 years) and occupational therapists (34.15 years) (Table 4.12).

Reflexologists and aromatherapists were the only groups in this study with an average age of 50 years and over. Their one-year (Table 4.7) and career (Table 4.8) prevalence of low back pain was also consistently in the lower ranges compared to the other professions, either being the lowest or second lowest low back pain prevalence overall. This concurs with Bork *et al.* (1996), who determined that after the age of 50 years, the prevalence of occupational low back pain declined in physiotherapists but this is contrary to literature that has linked advanced age to low back pain in physiotherapists (Rugelj, 2003) and nurses (Bejia *et al.,* 2005).

According to Bork *et al.* (1996) the age-prevalence trend seen in older therapists might be related to a survivor bias whereby older therapists develop coping strategies to deal with the physical demands of their work and thus remain relatively injury free or alternatively may be the result of older therapists moving out of their profession into administrative positions that are less physically demanding. Therapists with low back pain may also have left the profession by this stage leading to an artificial decrease in reported low back pain in older individuals.

In addition, the low back pain prevalence recorded in the “younger” groups of manual therapists (e.g. biokineticists, chiropractors and occupational therapists) in this study was high (Table 4.6, 4.7 and 4.8). This supports several researchers who have identified a younger age (particularly between the ages of 20 to 30 years) for onset of work-related musculoskeletal injury and low back pain in physiotherapists (Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005).

To conclude, in accordance with the literature, low back pain prevalence was generally higher in the younger manual therapists (Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005) and lower in the older manual therapists (Bork *et al,* 1996).

5.5.1.3 WEIGHT, HEIGHT AND BMI

In terms of weight and height, the heaviest and tallest participants in this study were the chiropractors (78.62kg and 1.7471m) and biokineticists (74.28kg and 1.74m) while the lightest and shortest participants were the reflexologists (63.71kg and 1.6233m) and occupational therapists (64.66kg and 1.6329m) (Table 4.12). This may be related to the gender distribution in these professions, as male participants were predominantly chiropractors and biokineticists while reflexologists and occupational therapists were almost all female (Table 4.10). The manual therapists who were overweight in terms of their BMI [i.e. a BMI of > / = 25 (Bickley and Szilagyi, 2003)] were the chiropractors (25.7879) and aromatherapists (25.6511) (Table 4.12).

Aromatherapists had the highest point prevalence of low back pain (Table 4.6) in this study and a high one-year (Table 4.7) and career (Table 4.8) prevalence of low back pain was also recorded in chiropractors. This supports research that has linked high BMI's and being overweight to an increased risk of developing low back pain in nurses (Bejia *et al.,* 2005 and Vieira *et al.,* 2005).

The high BMI observed in chiropractors may, however have been misleading as the demographics of this group indicated that they were young (Table 4.12), healthy males (Table 4.10) involved in vigorous sport and physical activity such as jogging, cycling and weight training (Table 4.16, 4.17 and Appendix Q). Therefore, although it is possible that the high prevalence of low back pain recorded in chiropractors may have been associated with them being overweight, it is more likely that in this particular profession, some other factors (e.g. their level of physical activity and participation in sport or occupational factors) would have been responsible for the link.

Aromatherapists on the other hand, tended to be much older (Table 4.12) females (Table 4.10). Although they did exercise (Table 4.16 and 4.17), their preferred types of exercise, which included walking, pilates and yoga (Appendix S) was less vigorous than that of the chiropractors. It is thus more likely that the high BMI recorded in aromatherapists was realistic and reflective of their true physical stature, as being overweight in this group may have resulted from the sedentary lifestyle that many individuals adopt with increasing age (United States Government, 1993 and The Pepper Institute on Aging and Public Policy, 2006). It is also possible therefore that the high point prevalence of low back pain identified in aromatherapists was influenced by their BMI.

To conclude, the finding of this study agrees with the literature, however contradictory and inconsistent, which has highlighted that height, weight and body build as separate entities are not strongly correlated to the occurrence of low back pain in manual therapists (Pope *et al.,* 1991; Kirkaldy-Willis *et al.,* 1992 and Waddell, 1999), but that an increased BMI was associated with a greater risk of low back pain development in manual therapists (Bejia *et al.,* 2005 and Vieira *et al.,* 2005).

5.5.1.4 HIP INJURY AND KNEE INJURY

In this study, previous hip injury (Table 4.14) was highest in aromatherapists and massage therapists. Aromatherapists also reported previous knee injury (Table 4.15) more often than other manual therapists.

Injury to the lower limb and in particular to the hip and / or knee have not been found to be significant in any of the studies which evaluated every body region in their investigations of work-related musculsokeletal disorders in physiotherapists and nurses (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Rugelj, 2003; Smith *et al.,* 2003; Glover *et al,* 2005; Jang *et al.,* 2006 and Meijsen and Knibbe, 2007). It is thus unlikely that the high prevalence of hip and knee injury in aromatherapists and massage therapists would be causally related to their work as manual therapists. However, research has indicated that individuals who have a history of previous injury are at an increased risk of subsequent injury or re-injury (Schneider *et al.,* 2000; Arnason *et al.,* 2004 and Steffen *et al.,* 2008). It is therefore possible that work as aromatherapists and massage therapists may be implicated in the exacerbation or recurrence of previous hip and / or knee injuries in these therapists.

Also, low back pain may be associated with mechanical dysfunction lower down in the musculoskeletal system (Stoxen, 2008) based on the effects of the lower limb kinematic chain (Seymour, 2002). The high point prevalence of low back pain in aromatherapists (Table 4.6) and the high one-year (Table 4.7) and career (Table 4.8) prevalence of low back pain in massage therapists may thus have been related to their previous hip and / or knee injury leading to compensatory, altered or faulty biomechanics creating abnormal stresses and strains on joints throughout the body (Stoxen, 2008).

5.5.2 PSYCHOSOCIAL FACTORS

5.5.2.1 MARITAL STATUS

Aromatherapists, physiotherapists and occupational therapists were more likely to be married (Table 4.11). This finding could be age- and / or gender-related. Aromatherapists were on average 50 years while physiotherapists and occupational therapists tended to be in their mid to late thirties (Table 4.12). The majority of these manual therapists were also female (Table 4.10). One possible explanation for this finding would be that it is almost expected under normal circumstances in today's society, that especially females who are of an appropriate age, be settled and married (Statistics South Africa, 2005).

On the other hand, chiropractors (32.86 years) and biokineticists (28.8 years) who were mostly young (Table 4.12) males (Table 4.10) were predominantly single and the divorcees (Table 4.11) in this study were generally older, massage therapists (25%) and reflexologists (18.8%) (Table 4.12). These findings are in accordance with the trends in marital status identified among the general population of South Africa (Statistics South Africa, 2005).

According to Bejia *et al.* (2005), among hospital staff, low back pain and chronic low back pain were more frequent in married and divorced individuals, attributed to increased family dimensions. In support of this, the high point prevalence (Table 4.6) of low back pain in aromatherapists and the high one-year (Table 4.7) and career (Tabe 4.8) prevalence of low back pain in occupational therapists, massage therapists and physiotherapists may also have been influenced by their marital status.

Further research on this topic is recommended, as literature was limited and the exact link between marital status and low back pain is still unclear.

5.5.2.2 EXERCISE FREQUENCY, EXERCISE DURATION AND TYPE OF EXERCISE

Exercise, number of times per week and time per session were factors that were significantly different between professions (Table 4.16 and 4.17). The manual therapists who exercised the most number of times per week were the reflexologists (5x), biokineticists (4x) and chiropractors (4x). The biokineticists, chiropractors and massage therapists exercised for the longest duration per session (60mins). The biokineticists exercise routine may have been influenced by their work in gyms because of the accessibility and convenience of exercise in this setting.

Literature has revealed that regular exercise may have a positive effect on low back pain and may be linked to a reduced prevalence of low back pain (Tim, 1996; Van der Meulen, 1997; Yip, 2003; Sjolie, 2004; Bejia *et al.,* 2005; Vieira *et al.,* 2005 and Vlok, 2005). This may explain why reflexologists who exercised the most number of times per week (Table 4.16), also had a low prevalence of low back pain (Table 4.6, 4.7 and 4.8) when compared to the other manual therapists. Contrary to the literature, however, the prevalence of low back pain identified in biokineticists, chiropractors and massage therapists (Table 4.6, 4.7 and 4.8) who exercised frequently and for a longer duration (Table 4.16 and 4.17) was as high and even higher in some cases than the low back pain prevalence in manual therapists who exercised less frequently and for a shorter duration.

One explanation for this may be that the type of exercise preferred by these manual therapists affected their prevalence of low back pain (Table 4.18 – 4.23). This supports research that has revealed that the type and nature of the activity performed may modify the risk of low back pain (Morris, 2006; Renkawitz *et al.,* 2006 and McHardy *et al.,* 2007). The high prevalence of low back pain (Table 4.7 and 4.8) identified in chiropractors for example, could thus have been related to their participation in golf (Table 4.19), which has been implicated in low back pain development (McHardy *et al.,* 2007), or, their lack of participation in pilates (Table 4.22) that have been shown to be beneficial for core stabilization in low back pain management (Kirkaldy-Willis *et al.,* 1992 and Travell *et al.,* 1997). In addition, yoga which is an effective treatment for chronic low back pain (Sherman *et al.,* 2005), was highest in reflexologists (Table 4.20) and may have influenced their low back pain prevalence (Table 4.6, 4.7 and 4.8), which was in the lower ranges when compared to the other manual therapists.

To conclude, in contrast to the literature (Tim, 1996; Van der Meulen, 1997; Yip, 2003; Sjolie, 2004; Bejia *et al.,* 2005; Vieira *et al.,* 2005 and Vlok, 2005), frequent exercise and exercising for a longer duration was not associated with a reduced prevalence of low back pain in massage therapists, biokineticists and chiropractors although it may have been linked to the reflexologists' lower prevalence of low back pain. This study does however agree that the type of exercise performed may have influenced the manual therapists low back pain prevalence to some degree (Kirkaldy-Willis *et al.,* 1992; Travell *et al.,* 1997; Morris, 2006; Renkawitz *et al.,* 2006 and McHardy *et al.,* 2007).

5.5.2.3 PREGNANCY, NATURAL BIRTH AND NUMBER OF CHILDREN

In the current study, ever having been pregnant (Table 4.24), ever having given natural birth (Table 4.25) and total number of children (Table 4.26) was lowest in chiropractors and biokineticists. This may have been due to a combination of factors. These professions more than any of the other manual therapy professions tended to be male dominated (Table 4.10). In addition, chiropractors and biokineticists were the youngest (Table 4.12) manual therapists in this study, almost half of them were unmarried (Table 4.11) and most of them had just started out in practice with the average number of years they had been working, ranging from 3.75 years to 5 years (Table 4.33 and 4.34). These therapists seemed to not be at an ideal stage of their life to start a family and were most likely more focused on making a success of their career.

According to the literature, pregnancy and natural birth are linked to an increased risk of low back pain (Bullock *et al.,* 1987; Polden and Mantle, 1990; Howell and Chalmers, 1992; Vincent and Chestnut, 1998; Louizos *et al.*, 2004; Smith *et al.,* 2004; Bastiaanssen *et al.,* 2005 and Borggren, 2007). However, chiropractors and biokineticists who had low rates of pregnancy and natural birth still had a high prevalence of low back pain (Table 4.6, 4.7 and 4.8). Their low rate of pregnancy and natural birth was therefore not associated with a significantly lower prevalence of low back pain when compared to other manual therapists. Also, although having children was linked to the development of low back pain in nurses (Smith *et al.,* 2004; Smith *et al.,* 2006 and Dasappa, 2007), having no children was not associated with a lower prevalence of low back pain in chiropractors and biokineticists.

To conclude; pregnancy, natural birth and total number of children did not influence the prevalence of low back pain in chiropractors and biokineticists. The high prevalence of low back pain recorded in these manual therapists was thus most likely due to some other factors (e.g. occupational or work-related factors), however further research is required to confirm this.

5.5.2.4 <u>PSYCHOLOGICAL WORK STRESS</u>

Psychological work stress was lowest in massage therapists, biokineticists and chiropractors (Table 4.28 and 4.30).

Several researchers have concluded that psychological work factors [e.g. emotionally stressful or anxiety-provoking work (Morris, 2006)] and low back pain are related (Smedley *et al.,* 1995; Morris, 2006 and Smith *et al.,* 2006). Having low levels of psychological work stress however, was not associated with a lower prevalence of low back pain in massage therapists, biokineticists and chiropractors. In fact, the low back pain prevalence recorded in these manual therapists was high (Table 4.6, 4.7 and 4.8) and was comparable even to that of occupational therapists, most of whom did find their work psychologically stressful (Table 4.28 and 4.30).

To conclude, psychological work stress was not a factor that influenced low back pain prevalence in massage therapists, biokineticists and chiropractors. The high prevalence of low back pain recorded in these manual therapists was also, most likely due to some other factors (e.g. occupational or work-related factors), however further research is required to confirm this.

5.5.2.5 <u>PHYSICAL WORK STRESS</u>

Physical work stress was lowest in massage therapists, biokineticists and reflexologists (Table 4.29 and 4.30).

Massage therapists and reflexologists also saw the least number of patients per day (3 and 4.5 respectively) and worked for the least number of hours per week (20 hours and 27.75 hours respectively) (Table 4.33 and 4.34) when compared to the other manual therapists. This indicates that the majority of them may only have been working part time and would explain why their levels of perceived physical work stress was low.

The same explanation for low physical work stress could not be applied to the biokineticists, who rated their work schedule as a risk factor higher than other manual therapists (Table 4.45), saw a reasonable number of patients per day (6) and worked the most number of hours per week (45 hours) (Table 4.33 and 4.34). One possible explanation for the low levels of perceived physical work stress in biokineticists however, may be that they spent more of their day in interaction with patients (4.5 hours) (e.g. instructing patients) and less of their day physically performing manual therapy techniques (2 hours) (Table 4.31 and 4.32) when compared to other manual therapists in this study.

High levels of perceived physical work stress and demand have been linked to low back pain development (Trinkoff *et al.,* 2003 and Morris, 2006) and it was assumed that low levels of physical work stress would therefore be associated with less low back pain. This was however only true for the point prevalence of low back pain, which was lowest in massage therapists and reflexologists (Table 4.6). The one-year and career prevalence of low back pain (Table 4.7 and 4.8) in massage therapists, reflexologists and biokineticists was similar to that of the other manual therapists who had higher levels of physical work stress. The low level of physical work stress recorded in these manual therapists was thus not related to a reduced one-year and career prevalence of low back pain.

To conclude, although it is possible that physical work stress could have influenced the point prevalence of low back pain in massage therapists and reflexologists, it did not influence the one-year and career prevalence of low back pain in massage therapists, reflexologists or biokineticists. It is therefore likely that some other factors (e.g. occupational or work-related factors) must have contributed to the development of low back pain in these manual therapists, however further research is required to confirm this.

5.5.3 OCCUPATIONAL / WORK-RELATED FACTORS

5.5.3.1 NUMBER OF HOURS SPENT ON SPECIFIC ACTIVITIES IN AN EIGHT HOUR WORKING DAY

When compared to the other groups of manual therapists:

Aromatherapists spent more hours a day doing administrative work at a desk (4 hours) and performing manual therapy techniques (5 hours) (Table 4.31 and 4.32). Aromatherapists also had the highest point prevalence of low back pain (Table 4.6). This supports research that has linked, sitting for long periods of time (Pope *et al.,* 1991; Nyland and Grimmer, 2003; Fyfe, 2006 and Lis *et al.,* 2007), administrative work (Bejia *et al.* 2005) and performing manual therapy (Mior and Diakow, 1987; Tim, 1996; West and Gardner, 2001 and Rupert and Ebete, 2004) to an increased risk of low back pain.

Biokineticists and occupational therapists spent the most number of hours a day performing manual and / or physical activities (e.g. lifting) (3 hours) and biokineticists also spent the most time in interaction with patients (4.5 hours) (Table 4.31 and 4.32). The prevalence of low back pain recorded in biokineticists and occupational therapists was also high (Table 4.7 and 4.8) and may be attributed to the physical exertion (Vieira and Kumar, 2004) involved in the manual and / or physical activities they perform in practice. The finding of this study supports Smith *et al.* (2006), who found that the regular manual handling of patients was associated with a higher risk of low back pain in nurses. This study also agrees with the literature that has linked work activities such as lifting or transferring dependent patients, patient repositioning (Bork *et al.,* 1996; Tim, 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000, West and Gardner, 2001 and Campo, 2008) and carrying, lifting or moving heavy equipment (West and Gardner, 2001) to the development of work-related musculoskeletal injuries and low back pain in manual therapists.

To conclude, it is possible that the respective work activities mentioned may have influenced the prevalence of low back pain in aromatherapists (point prevalence), biokineticists and occupational therapists (one-year and career prevalence). However, these work activities, despite being performed for the most number of hours per day would not have been the only practice activities employed by these manual therapists. It is thus unlikely that these work activities would have been the sole cause of low back pain in the manual therapists. Instead, these work activities would have acted in combination with other factors (e.g. psychosocial factors) to contribute to the high prevalence of low back pain in these manual therapists.

5.5.3.2 <u>NUMBER OF YEARS PRACTICING</u>

Number of years practicing was highest in physiotherapists (13 years) and aromatherapists (11 years) (Table 4.33 and 4.34) in this study.

According to the trend observed in the literature, the majority of first episodes of work-related musculoskeletal injury in manual therapists occurred within the first five years of practice i.e. among the younger therapists and newly qualified graduates (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005) and was a phenomenon attributed to lack of experience (Cromie *et al.* 2000 and Tam and Yeung, 2006).

Consequently, it was assumed that many years of practice and experience might protect against the development of low back pain. This may have been the case in aromatherapists who had the lowest one-year and career prevalence of low back pain in this study. The one-year and career prevalence of low back pain in physiotherapists however was high (although never the highest or lowest when compared to the other professions) (Table 4.7 and 4.8) despite their 13 years of experience.

Therefore to conclude, having experience in terms of number of years practicing did not influence the one-year or career prevalence of low back pain in physiotherapists, but may in combination with other factors have played a role in reducing the one-year and career prevalence of low back pain in aromatherapists.

5.5.3.3 PATIENT CONTACT TIME: NUMBER OF PATIENTS SEEN PER DAY AND NUMBER OF HOURS WORKED PER WEEK

The number of patients seen per day was highest in physiotherapists, chiropractors and occupational therapists (Table 4.33 and 4.34). These manual therapists also had an associated high prevalence of low back pain (Table 4.6, 4.7 and 4.8). This supports several researchers including Bork *et al.* (1996), Tim (1996) and West and Gardner (2001) who concluded that treating an excessive number of patients per day may lead to over-exertion which contributes to an increased risk of developing occupational injury.

The number of hours worked per week was highest in biokineticists (45 hours) (Table 4.33 and 4.34). Biokineticists also had an associated high prevalence of low back pain (Table 4.6, 4.7 and 4.8). This supports a study by Holder *et al.* (1999), which recorded the highest injury prevalence in physiotherapists who worked between 41 and 50 hours per week and concurs with the literature that has linked an increased number of hours spent in direct patient contact to work-related injury in manual therapists (West and Gardner, 2001; Glover *et al.,* 2005 and Jang *et al.,* 2006).

In addition, seeing a large number of patients per day or working for an excessive number of hours per week would result in a demanding work schedule. This may explain why, as a job risk factor for low back pain, work schedule was rated highest by chiropractors and biokineticists (Table 4.45).
The high prevalence of low back pain recorded in these manual therapists may thus, also have been related to their heavy work schedule leading to over-exertion and fatigue (Cromie *et al.,* 2001; Kumar *et al.,* 2004 and Glover *et al.,* 2005).

To conclude, the high prevalence of low back pain identified in chiropractors, occupational therapists, physiotherapists and biokineticists in this study may have been associated with their heavy work schedule (Cromie *et al.,* 2001 and Kumar *et al.,* 2004) as they saw more patients per day (Bork *et al.,* 1996; Tim, 1996 and West and Gardner, 2001) and worked more hours per week (West and Gardner, 2001 and Glover *et al.,* 2005) when compared to the other manual therapy professions.

5.5.3.4 HOSPITAL VERSUS NON-HOSPITAL OR PRIVATE PRACTICE

More occupational therapists, physiotherapists and biokineticists worked in a hospital setting (Table 4.35) and less worked in a non-hospital / private practice (Table 4.36) when compared to the other manual therapy professions. The prevalence of low back pain recorded in occupational therapists, physiotherapists and biokineticists in this study was also high (Table 4.6, 4.7 and 4.8). This finding supports Bork *et al.* (1996) who concluded that hospital-based physiotherapists have a greater prevalence of low back pain, due to the higher level of physical dependence exhibited by hospital patients (e.g. patients in ICU care) (Chiou *et al.,* 1994; Bork *et al.,* 1996 and Rugelj, 2003).

Therefore to conclude, it is likely that work in a hospital setting may have influenced the prevalence of low back pain in occupational therapists, physiotherapists and biokineticists.

5.5.3.5 ASSISTANCE WITH MANUAL HANDLING

The use of assistance with manual handling activities was highest in occupational therapists and physiotherapists (Table 4.37), a significant number of whom also indicated that they employed an assistant (Appendix Table 7.77). In addition, occupational therapists and physiotherapists had a high one-year (Table 4.7) and career (Table 4.8) prevalence of low back pain. This does not support literature that has indicated obtaining assistance with patient handling is less risky for the therapist (Cromie *et al.,* 2001) and is a preventive measure chosen often by physiotherapists after acquiring a work-related musculoskeletal injury (Glover *et al.,* 2005).

Therefore to conclude, despite the fact that occupational therapists and physiotherapists utilized assistance with manual handling the most, their low back pain prevalence was high and was comparable even to that of chiropractors (Table 4.7 and 4.8) who did not utilize assistance with manual handling at all (Table 4.37). Obtaining assistance with manual handling was thus not a factor that influenced the prevalence of low back pain in occupational therapists and physiotherapists.

5.6 OBJECTIVE FIVE: A COMPARISON OF THE RESPONSES ON THE EXPERIENCES OF LOW BACK PAIN AMONG THE VARIOUS TYPES OF MANUAL THERAPISTS WHO HAD LOW BACK PAIN IN THE LAST YEAR

5.6.1 PAIN-RELATED FACTORS

5.6.1.1 NUMBER OF ACUTE EPISODES

In contrast to the average one to four episodes of occupational low back pain documented in x-ray technologists (Kumar *et al.,* 2004), aromatherapists in this study reported a median of 12 acute episodes of low back pain last year (Table 4.38). This supports Waddell (1999) who concluded that a history of previous episodes of low back pain is one of the best-known predictors of a further episode and West and Gardner (2001) who revealed a high rate of recurrence of occupational injuries in physiotherapists.

The high number of acute episodes of low back pain experienced by the aromatherapists may have been related to their combination of a high point prevalence of low back pain (55.6%) (Table 4.6) and high frequency of low back pain, as up to 40% of aromatherapists were suffering from low back pain constantly (Appendix Table 7.2). These results imply that aromatherapists were experiencing more "current" low back pain than the other manual therapists. Those who continued to work while suffering with low back pain would thus have been more susceptible to having their low back pain exacerbated or aggravated by work activities / tasks (Waddell, 1999 and West and Gardner, 2001). This would lead to the development of acute episodes of low back pain and would also explain why many aromatherapists (40%) attributed exacerbation of their low back pain to clinical practice (Table 4.39).
In addition, aromatherapists were one of the "oldest" groups of manual therapists in this study with an average age of 50.57 years (Table 4.12) and a higher rate of low back pain has been noted in older physiotherapists (Rugelj, 2003). Therefore, in support of Rugelj (2003), the high number of acute

episodes of low back pain recorded in aromatherapists may also have been influenced by their age.

5.6.2 PAIN-RELATED / WORK-RELATED FACTORS

5.6.2.1 LOW BACK PAIN EXACERBATED BY CLINICAL PRACTICE

Occupational therapists (90.7%) and physiotherapists (82.9%) were more likely to say that their low back pain was exacerbated by clinical practice than the other professions (Table 4.39). This is in accordance with literature that has revealed, manual therapists believe their low back pain may be caused or aggravated by their work (Mior and Diakow, 1987 and Rugelj, 2003) and supports the outcomes of numerous research studies that found work activities / tasks were implicated by physiotherapists and chiropractors in the development and / or exacerbation of their low back pain in practice (Bork *et al.,* 1996; Tim, 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001; Nyland and Grimmer, 2003; Glover *et al.,* 2005; Fyfe, 2006 and Campo, 2008).

To conclude, occupational therapists and physiotherapists, who had a high prevalence of low back pain (Table 4.6, 4.7 and 4.8), almost all felt their low back pain was exacerbated by clinical practice. This finding may have been due to a combination of factors but was attributed in part to high perceived levels of physical work stress (Table 4.29) (Trinkoff *et al.,* 2003 and Morris, 2006), the frequent use of manual / physical activities in practice (Table 4.44 and Appendix Table 7.20) (Tim, 1996; West and Gardner, 2001; Smith *et al.,* 2006 and Campo, 2008) and work in a hospital setting (Table 4.35) (Chiou *et al.,* 1994; Bork *et al.,* 1996 and Rugelj, 2003), which were factors linked to low back pain in the literature that were highlighted in occupational therapists and physiotherapists in this study.

5.6.2.2 STAGE OF LIFE AT WHICH THE FIRST MAJOR EPISODE OF LOW BACK PAIN WAS EXPERIENCED

The following was found with regards to the stage of life at which manual therapists' first experienced low back pain:

Aromatherapists, reflexologists and massage therapists were most likely to experience low back pain before becoming a student. Based on their older average age and the number of years they had been in practice these manual therapists appeared to enter into manual therapy practice only later in life, as most were already in their late thirties, early forties when they became "students". Thus, if the low back pain first experienced by these manual therapists was not linked to the range of occupations they probably worked in prior to entering into manual therapy practice then it may have been due to some other un-related incident. To conclude, the low back pain reported by aromatherapists, reflexologists and massage therapists initially occurred before they became students and could therefore not have been related to their work as manual therapists.

Chiropractors and biokineticists were most likely to develop low back pain whilst a student (Table 4.40). This concurs with literature that has indicated low back pain is prevalent in manual therapy students (Nyland and Grimmer, 2003; Smith, 2004; Fyfe, 2006 and Leggat *et al.,* 2008) and supports Mitchell *et al.* (2008), who established a high prevalence of low back pain in nursing students and concluded that preventative low back pain strategies should be implemented even prior to the commencement of full time employment.

Occupational therapists and physiotherapists tended to develop low back pain for the first time whilst working as a manual therapist (Table 4.40). This is in accordance with the outcomes of previous studies that have shown a high prevalence of low back pain in physiotherapists (Bork *et al.,* 1996; Cromie *et al.,* 2000; West and Gardner, 2001; Rugelj, 2003 and Glover *et al.,* 2005). In addition, this finding agrees with Ellis (1993) who concluded that an increased risk of occupational low back pain exists among qualified therapists because their knowledge and understanding of correct patient handling skills may become compromised in a busy clinical setting. This may especially be true for the inexperienced, newly qualified graduates and younger therapists in whom occupational injuries are reported more commonly (Cromie *et al.,* 2000 and Glover *et al.,* 2005).

5.6.2.3 NUMBER OF YEARS WORKING AS A MANUAL THERAPIST BEFORE EXPERIENCING LOW BACK PAIN FOR THE FIRST TIME (I.E. IN PRACTICE)

Physiotherapists and occupational therapists tended to be working for longer periods of time compared to the other professions before their low back pain began (Table 4.41). The majority of physiotherapists, chiropractors, occupational therapists and biokineticists however, experienced low back pain for the first time within 0 to 5 years of practice (Table 4.41). This finding supports that of many researchers who similarly, have demonstrated that most first episodes of musculoskeletal injury in physiotherapists occurred within the first five years of practice, especially among the younger therapists and students (Bork *et al.,* 1996; Holder *et al.,* 1999; Cromie *et al.,* 2000; West and Gardner, 2001 and Glover *et al.,* 2005).

To summarize; chiropractors, biokineticists, physiotherapists and occupational therapists experienced a major episode of low back pain for the first time either as manual therapy students or once they were qualified and working as manual therapists (Table 4.40), where the majority experienced low back pain for the first time within 0 to 5 years of practice (Table 4.41). These are significant findings because they give some credibility to the "work-relatedness" of the low back pain recorded in these manual therapists, which is more likely to be linked to their occupation than if it had initially occurred before becoming a manual therapy student.

This study therefore agrees with the recommendation made by Glover *et al.* (2005) that intervention services aimed at reducing injury rates are most relevant for the newly qualified therapists who do not appear to be putting their training or other principles they teach their patients into practice when it comes to how they approach their work. In addition, focusing more attention on improving awareness of occupational low back pain particularly at the student level may prove to be beneficial.

5.6.3 OCCUPATIONAL / WORK-RELATED FACTORS

5.6.3.1 WORK ACTIVITIES / TASKS:

5.6.3.1.1 BENDING AND / OR TWISTING

Biokineticists were more likely to say that their low back pain was first noticed when bending or twisting (Table 4.42). This agrees with researchers who similarly, concluded that bending and / or twisting were problematic work activities linked to low back pain in physiotherapists and chiropractors (Tim, 1996; Cromie *et al.,* 2000; West and Gardner, 2001; Glover *et al.,* 2005 and Campo, 2008). Incidentally, biokineticists in this study also had a high prevalence of low back pain (Table 4.6 and 4.7) and it is possible that bending and / or twisting, which increases the risk of injury to the low back especially in the form of disc prolapse (Bogduk, 1999 and Waddell, 1999), may have played a role in the development of low back pain in these manual therapists.

5.6.3.1.2 INSTRUCTING PATIENTS

Only one biokineticist in this study indicated that his / her low back pain was first noticed when instructing a patient. The majority of biokineticists and other manual therapists however did not consider “instructing patients” to be a problematic work activity / task (Table 4.43). This finding concurs with that of Holder *et al.* (1999) who similarly, reported very few (2%) physiotherapists felt that “instructing patients” was the specific work activity that caused their occupational injury.

5.6.3.1.3 <u>LIFTING</u>

Occupational therapists were more likely to indicate that their low back pain was exacerbated during lifting (Table 4.44). This finding supports Bork *et al.* (1996); Tim (1996); Holder *et al.* (1999); Cromie *et al.* (2000) and West and Gardner (2001) who concluded that lifting was a problematic work activity / task that increased the risk of injury and occupational low back pain in manual therapists and concurs that labour intensive tasks may increase susceptibility to occupational musculoskeletal injury (Holder *et al.,* 1999).

Occupational therapists in this study also had a high one-year (Table 4.7) and career (Table 4.8) prevalence of low back pain and it is possible that the potential negative effects of lifting (Pope *et al.,* 1991) in practice, may have contributed to this.

5.6.3.1.4 <u>WORK SCHEDULE</u>

Biokineticists and chiropractors rated work schedule as a job risk factor for low back pain higher than the other manual therapy professions (Table 4.45). This finding may have been related to biokineticists working the most number of hours per week (45 hours) and chiropractors (as well as physiotherapists) who worked a 40 hour week, seeing more patients per day (9 patients) than the other manual therapists (Table 4.33 and 4.34). Research has revealed that demanding work schedules and the effects thereof may be associated with an increased risk of work-related injury (Lavender *et al.,* 2000; Cromie *et al.,* 2001 and Kumar *et al.,* 2004). The high prevalence of low back pain (Table 4.6, 4.7 and 4.8) recorded in biokineticists and chiropractors in this study may therefore, in support of the literature (Lavender *et al.,* 2000; Cromie *et al.,* 2001 and Kumar *et al.,* 2004), have been influenced by the heavy work schedules of these manual therapists.

To conclude, it is important that preventive strategies developed for manual therapists take into account their work schedules and place some emphasis on suggestions for avoiding overloading and fatigue [e.g. rest breaks, job rotation and varying the physical demands of work (Cromie *et al.,* 2001)].

5.6.3.2 WORK / CLINICAL SETTING

5.6.3.2.1 GENERAL MUSCULOSKELETAL OUTPATIENT SETTING

In this study it was the chiropractors and biokineticists who were most likely to indicate that they were working in a general musculoskeletal outpatient setting when experiencing low back pain for the first time (Table 4.46). Chiropractors were also more likely to indicate that their low back pain was exacerbated in this setting (Table 4.47).

Several studies in the literature (Bork *et al.,* 1996; Holder *et al.,* 1999 and Glover *et al.,* 2005) have concluded that work in the general musculoskeletal outpatient setting was associated more with the development of work-related musculoskeletal disorders of the wrists or hands than the low back in physiotherapists. The increased prevalence of wrist or hand injuries in the general musculoskeletal outpatient setting was attributed by these researchers, to manual therapy techniques (e.g. massage, joint mobilization) being performed more frequently in this setting when compared to other settings and performing manual therapy has been linked to a greater risk of work-related injuries in the upper extremities (especially wrist or hand injuries) (Bork *et al.,* 1996; Jang *et al.,* 2006 and Campo, 2008).

Still, despite the trend in the literature, there is no refuting the fact that performing manual therapy techniques (West and Gardner, 2001) and working in outpatient settings (Holder *et al.,* 1999; Glover *et al.,* 2005 and Campo, 2008) has been linked to occupational low back pain in physiotherapists. Manual therapy techniques are also not the only work activities / tasks that would be performed by manual therapists in the general musculoskeletal outpatient setting. It is therefore possible, based on the combination of these findings, for work in a general musculoskeletal outpatient setting to have exacerbated or in some way contributed to the development of low back pain in chiropractors and biokineticists, in whom high prevalences of low back pain was identified (Table 4.6, 4.7 and 4.8).

To conclude, this study was limited to investigating low back pain only and further research is recommended on manual therapists, to determine whether work in the general musculoskeletal outpatient setting is related to musculoskeletal disorders in other anatomical areas, as the literature has suggested (Bork *et al.*, 1996, Holder *et al.,* 1999 and Glover *et al.,* 2005).

5.6.3.2.2 NEUROLOGICAL REHABILITATION

Occupational therapists and physiotherapists were more likely to indicate that they were working in a neurological rehabilitation setting when experiencing low back pain for the first time (Table 4.48) and that work in this setting caused their low back pain to be exacerbated (Table 4.49).

This supports research by Chiou *et al.* (1994) who determined that hospital nurses working in neurological wards were at a high risk of developing low back pain as well as Holder *et al.* (1999) and Glover *et al.* (2005) who both concluded that working in rehabilitation environments was associated with reports of low back pain in physiotherapists. Holder *et al.* (1999) attributed this to work activities / tasks such as patient transfers, re-positioning and lifts, which were linked to low back pain development (Campo, 2008), being required more frequently in a neurological rehabilitation setting due to the level of physical dependence of patients in this setting.

To conclude, occupational therapists and physiotherapists had a high one-year (Table 4.7) and career (Table 4.8) prevalence of low back pain and it is possible based on the literature (Chiou *et al.,* 1994; Holder *et al.,* 1999; Glover *et al.,* 2005 and Campo, 2008), that work in a neurological rehabilitation setting may have exacerbated or in some way contributed to the development of low back pain in these therapists.

5.6.3.2.3 <u>PAEDIATRICS</u>

Occupational therapists were more likely to indicate that they were working in a paediatric setting when experiencing low back pain for the first time (Table 4.50) and that work in this setting exacerbated their low back pain (Table 4.51). This does not concur with the outcomes of research by Bork *et al.* (1996) and Cromie *et al.* (2000) who investigated the prevalence of work-related musculsokeletal disorders in all body regions and found that the paediatric setting was associated with a higher prevalence of knee complaints in physiotherapists, attributed to the amount of time spent kneeling and crouching (Cromie *et al.,* 2000).

Occupational therapists often treat patients who are more dependent (e.g. patients with physical disabilities) (Sabonis-Chafee, 1989) and work activities / tasks such as lifting and patient transfers (Holder *et al.,* 1999) are thus frequently required of occupational therapists in practice. Lifting has also been linked to low back pain (Pope *et al.,* 1991 and Waddell, 1999) and in the paediatric setting; lifting may be even more problematic because a false sense of security about lifting a small child may exist. As a result therefore, the therapist's risk of developing low back pain may increase if he / she consider it unnecessary to obtain assistance (Cromie *et al.,* 2001). This supports Tong *et al.* (2003) who showed that low back pain was more prevalent in caregivers of children with physical disabilities who required assistance (e.g. transfers from wheelchair to bath, up or down stairs and walking) compared to the caregivers of children with non-physically disabling medical conditions.

To conclude, despite the trend in the literature having indicated that the paediatric setting was associated with work-related musculoskeletal disorders of the knees more often than the low back in physiotherapists (Bork *et al.,* 1996 and Cromie *et al.,* 2000), occupational therapists implicated this setting in the development and exacerbation of their low back pain. This may be because occupational therapists often work with patients with physical disabilities and the dependence of these patients, even in a paediatric setting has been linked to the development of low back pain (Tong *et al.,* 2003). The high prevalence of low back pain (Table 4.7 and 4.8) identified in occupational therapists in this study may thus have been influenced by their work in a paediatric setting.

Further research is recommended to determine whether the paediatric setting is also associated with work-related musculsokeletal disorders of the knees in manual therapists, as the literature has suggested (Bork *et al.,* 1996 and Cromie *et al.,* 2000).

5.6.3.2.4 <u>LEARNING DIFFICULTIES AND PHYSICAL IMPAIRMENTS</u>

Biokineticists and occupational therapists were more likely to indicate that working in a learning difficulties and physical impairments clinical setting caused exacerbation of their low back pain (Table 4.52).

Some of the work activities / tasks which might be employed by manual therapists in a learning difficulties and physical impairments clinical setting, were assumed to include: maintenance of awkward postures for prolonged periods of time (e.g. sitting), lifting or transferring patients, assisting patients during gait activities, repetitive tasks and responding to sudden or unanticipated movements or falls. All of these work activities / tasks have been linked to the development of work-related musculoskeletal disorders in physiotherapists (Bork *et al.,* 1996; Holder *et al.,* 1999; West and Gardner, 2001; Glover *et al.,* 2005 and Lis *et al*., 2007). In addition, "physical impairments" imply that patients may exhibit higher levels of physical dependence on their therapist, which as a result also increases the therapist's risk of possible injury (Bork *et al.,* 1996; Holder *et al.,* 1999; Tong *et al.,* 2003 and Campo, 2008).

Furthermore, it is likely that manual therapists treating patients with learning difficulties would practice in school systems and Campo (2008) found that work in school systems was associated with the highest proportion of work-related musculoskeletal disorders in physiotherapists (31.3%).

To conclude, occupational therapists and biokineticists had a high prevalence of low back pain (Table 4.6, 4.7 and 4.8) and it is possible that work in a learning difficulties and physical impairments clinical setting could have played a role in exacerbating pre-existing low back pain in these therapists.

Literature available on the learning difficulties and physical impairments clinical setting was limited however and further research on this setting and its link to occupational low back pain in manual therapists is thus recommended.

CHAPTER SIX

CONCLUSION

6.1 CONCLUSIONS

The aim of this study was to determine the prevalence and risk factors for occupational low back pain in manual therapists and to determine and compare the prevalence and risk factors for occupational low back pain among various manual therapy professions.

The demographic composition of the study sample, which included: physiotherapists, occupational therapists, chiropractors, biokineticists, reflexologists, aromatherapists and massage therapists, was representative of the manual therapist population. Physiotherapists (43.3%) were the largest group of manual therapists in the study. Participants had a mean age of 37.6 years; the vast majority were female (84.5%) and White (88.4%), and most were either married (61.9%) or single (27.3%). The unbalanced distribution in terms of gender and ethnicity, although accurately representative of the manual therapist population, made gender and ethnic comparisons impossible. It could also be argued that the results of this study are thus most accurately representative of the White, female manual therapist population.

Low back pain is prevalent among manual therapists in South Africa. The results of this study revealed that in South African manual therapists, the point prevalence of low back pain was very high at 41%, the one-year prevalence was 59% and the career prevalence was 74%.

The factors that emerged as significant independent predictors of current low back pain in manual therapists were: BMI; previous abdominal surgery; previous trauma to the low back, hips, knees or ankles; a physically stressful job; not having an assistant and working in a hospital or other setting (e.g. gym, schools) [See Appendix U].

As BMI increased by one unit, the risk of low back pain increased by 1.16 times. Previous abdominal surgery increased the risk of low back pain by 2.5 times and having experienced trauma to the low back, hips, knees or ankles was associated with a 3.7 times greater risk of low back pain. The factor with the highest association to low back pain was a very physically stressful occupation, which increased the risk of low back pain by 3.1 times compared to an occupation with little physical stress or without physical stress. Not having an assistant was linked to an increased risk of low back pain and the manual therapists working in hospital or other settings were at a 4.1 times higher risk of low back pain compared to those in private practice.

It must be stressed that due to the cross-sectional design of this study, it is not possible to establish whether these factors are causally related to low back pain, or merely co-existing factors, or even due to reverse causality (i.e. occurred as a result of the low back pain).

The following was determined on comparison of low back pain prevalence among the various manual therapy professions: the point prevalence of low back pain was highest in aromatherapists (56%) and biokineticists (50%); the one-year prevalence of low back pain was highest in massage therapists (80%) and occupational therapists (70%) and the career prevalence of low back pain was also highest in occupational therapists (83%) and massage therapists (80%).

The factors that were significantly different between professions that may have influenced low back pain prevalence among certain manual therapists were: individual factors such as gender, age, weight, height, BMI, hip injury and knee injury; psychosocial factors such as marital status, exercise frequency, exercise duration, type of exercise, pregnancy, natural birth, number of children, psychological work stress and physical work stress and occupational / work-related factors such as the number of hours spent on specific activities in an eight hour working day, number of years practicing, number of patients seen per day, number of hours worked per week, work in a hospital versus a non-hospital or private practice and use of assistance with manual handling.

In addition, a comparison of responses on low back pain experience among the various types of manual therapists who had low back pain in the past year showed that:

Aromatherapists had suffered from a median of 12 acute episodes of low back pain whilst the other professions had fewer acute episodes. In terms of work activities / tasks, biokineticists' implicated bending and / or twisting in the development of their low back pain in practice and occupational therapists' implicated lifting in the excacerbation or recurrence of their low back pain in practice. Biokineticists and chiropractors also rated their work schedule as a problematic job risk factor for low back pain higher than other manual therapists. Work in specific clinical settings was reportedly associated with the development and / or exacerbation of low back pain in the following manual therapists: chiropractors and biokineticists found their low back pain was linked to work in the general musculoskeletal outpatient setting, physiotherapists and occupational therapists felt their low back pain was linked to work in neurological rehabilitation and occupational therapists indicated that their low back pain was linked to work in the paediatric setting. Like biokineticists, occupational therapists also thought that work in a learning difficulties and physical impairments clinical setting may have influenced their low back pain.

Furthermore, aromatherapists, reflexologists and massage therapists were most likely to experience low back pain for the first time before becoming a student while chiropractors, biokineticists, physiotherapists and occupational therapists experienced a major episode of low back pain for the first time either as students or once they were qualified and working as manual therapists, where the majority experienced low back pain for the first time within five years of practice. These are significant findings, because low back pain that occurred for the first time as a manual therapy student or while working as a manual therapist is more likely to be “work-related” than low back pain that occurred for the first time before becoming a student.

In support of this, occupational therapists (90.7%), physiotherapists (82.9%), chiropractors (76.5%) and biokineticists (69.2%) felt more often than other manual therapists that their low back pain was exacerbated by clinical practice and the physiotherapists (61.4%), occupational therapists (53.5%), chiropractors (52.9%) and biokineticists (46.2%) also believed more than other manual therapists that their low back pain was actually caused by their occupation.

The conclusion, based on the aims of this study is that low back pain is prevalent among South African manual therapists and that there are many work-related factors associated with their low back pain. There is also strong evidence to suggest low back pain in physiotherapists, occupational therapists, chiropractors and biokineticists in particular, is often work-related.

6.2 RECOMMENDATIONS

The first recommendation, based on the conclusions of this study, is the need for development of preventive programs and safe practice guidelines for manual therapists. Future intervention services designed to reduce the rates of occupational low back pain should especially be aimed at the newly qualified graduates and young manual therapists. Improving awareness of occupational low back pain and implementing preventive strategies at the student level in particular, may prove to be beneficial. Suggestions include:

- Developing customized preventive programs with a shift of focus depending on the manual therapist's work / clinical setting and the type of patient being treated (e.g. improving knowledge and utilization of assistive devices and aides in hospital-based manual therapists treating dependent patients).
- Emphasizing the importance of using assistance with manual handling and the potential benefits of employing an assistant.
- Developing preventive strategies that take into account the impact of heavy work schedules and highlight ways to avoid overloading and fatigue (e.g. rest breaks and job rotation).

The second recommendation, following the outcomes of this study, is for further investigation to be carried out to determine what the consequences or responses are to the development of occupational low back pain in manual therapists in South Africa.

The third recommendation is that further research be conducted on individual manual therapy professions, as a means of providing detailed insight into what the work in the various professions entails exactly and what aspects of work in the various professions increased their risk for occupational low back pain.

This study was limited to investigating low back pain only. The fourth recommendation therefore, is that every body region be evaluated in future studies of work-related musculoskeletal disorders in manual therapists, with particular reference to the relationship between the type of manual therapy work being performed and work-related musculoskeletal disorders. Studies of this nature would provide valuable information regarding the risk of various types of manual therapists for acquiring different musculoskeletal disorders.

Literature available on the following topics was limited and additional research is therefore recommended:

- The link between previous trauma to the lower limb and low back pain in specific populations (e.g. manual therapists, nurses).
- The exact link between marital status and low back pain.
- The learning difficulties and physical impairments clinical setting.

Other recommendations regarding study design and methodology, based on the problems / difficulties highlighted as a result of this study are as follows:

- This study was conducted as a postal survey but the postal system was very unreliable and it is therefore suggested that future researchers send questionnaires electronically via email instead.
- The questionnaire was administered at the end of the year when manual therapists were either very busy or were going on leave and as such, it is preferable that questionnaires be administered at the beginning of the year in future studies.
- A physical examination of the participants should have been used in conjunction with the questionnaire to allow for objective reporting on the various aspects of low back pain.
- A longitudinal study with a prospective study design, where subjects are initially low back pain free and are followed up over a period of time for the development of low back pain is also recommended as a means of eliminating confusion regarding causality of specific conditions.

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APPENDICES

Appendix A
PRE-FOCUS GROUP RESEARCH QUESTIONNAIRE

Section 1: Individual Factors

1) Please tick the appropriate box to indicate your profession.

Physiotherapist	
Occupational Therapist	
Biokineticist	
Reflexologist	
Aromatherapist	
Massage Therapist	

2) Age? _______Years.
3) Gender? MALE / FEMALE
4) Race? ________________.

5) Anthropometry and BMI.

5a) What is your weight in kilograms? _______KG
5b) What is your height in metres? ________m

5c) What is your body build?

Mesomorph (Medium and Athletically built)	
Ectomorph (Thin and slightly built)	
Endomorph (Heavy and broadly built)	

6) Postural/Structural Anomalies.

STATEMENT	YES	NO
1. Do you have a Scoliosis? E.g. Lumbar or Thoracic.		
2. Do you have a thoracic kyphosis?		
3. Do you have a lumbar hypolordosis?		
4. Do you have a lumbar hyperlordosis?		
5. Do you have a leg length discrepancy? 6a) Please specify the discrepancy in centimeters:_____cms 6b) Please specify the anatomical landmarks used to measure it. ____.		

Section 2: Psychosocial Factors

7) Exercise and Physical Fitness.

7a) Do you exercise? YES / NO
7b) If YES to 7a) above: How many times do you exercise per week? _______Times
7c) How long do you exercise per session? _________Minutes
7d) What type of exercise do you do?

1. Jogging		9. Rugby	
2. Swimming		10. Golf	
3. Cycling		11. Cricket	
4. Walking		12. Soccer	
5. Weightlifting		13. Softball	
6. Aerobics		14. None	
7. Squash		15. Other, please specify:	
8. Tennis		__________________.	

8) Do you smoke cigarettes? YES / NO

8a) If YES, to 8) above: How many cigarettes do you smoke per day? __________.
8b) How many years have you smoked for? ________Years.
8c) Do you have a previous history of smoking but have now stopped? YES / NO
8d) If YES, to 8c) above: How many cigarettes did you smoke per day? __________.
8e) How many years did you smoke for? _________Years.

8f) How many years have you stopped smoking for? _________ Years.

9) Do you drink alcohol? YES / NO

10) How many times have you been married? _________.
11) How many times have you been divorced? _________.

12) Please indicate the degree to which you like or dislike practicing as a manual therapist.

Great Satisfaction	
Satisfaction	
Neither satisfied or dis-satisfied	
Dissatisfaction	
Great Dissatisfaction	

13) Do you suffer from depressive states? YES / NO
13a) If YES, to 13) above: Are you taking antidepressant medication? YES / NO

14) How would you rate your occupational stress?

Very Stressful	
Stressful	
Little Stress	
No Stress	

Section 3: Occupational Factors

15) What work activity were you doing when injured?

1. Applying modalities	
2. Bending or Twisting	
3. Instructing a patient	
4. Lifting	
5. Maintaining a position for a prolonged period of time. Please specify the posture. E.g. standing, sitting, kneeling or bent over	
6. Performing manual therapy techniques	
7. Performing repetitive tasks	
8. Responding to an unanticipated or sudden movement by a patient	
9. Transferring a patient	
10. Working in an awkward or cramped position	
11. Working when physically fatigued	
12. Pushing or pulling	
13. Other. Please specify:	

16) In the following table are 18 potential job risk factors.
On a scale of 0-5; 0 being no problem and 5 being a major problem, please indicate to what extent each risk factor may be implicated in the development of your low back pain.

JOB RISK FACTOR	0	1	2	3	4	5
1. Performing the same task over and over						
2. Working in the same position for long periods of time						
3. Treating a large number of patients in 1 day						
4. Bending or twisting your back in an awkward way						
5. Lifting or transferring dependant patients						
6. Continuing to work when injured or hurt						
7. Reaching or working away from your body						
8. Performing manual therapy techniques						
9. Working in awkward or cramped positions						
10. Working near to or at your physical limits.						

11. Not enough rest breaks during the day						
12. Unanticipated sudden movement or fall by a patient						
13. Assisting patient during gait activities						
14. Lack of staff						
15. Carrying/lifting or moving heavy materials and equipment						
16. Working with confused or agitated patients						
17. Work schedule (e.g. overtime, on-call, irregular shifts)						
18. Inadequate training in injury prevention						
19. Other. Please specify:						

17) Work schedule and work history.
17a) For how many years have you been practicing as a manual therapist? _________Years.
17b) How many patients do you see per day? Please indicate the average or accurate number. ___________.
17c) How many hours do you work per week? _________Hours
17d) Do you use assistance with manual handling or patient handling activities? YES / NO
17e) Do you have an assistant? YES / NO

18) Work environment and ergonomics.
18a) Do you use height and/or angle adjustable work surfaces? YES / NO
18b) Do you consider your treatment/examination table height to be any of the following?

Too high	
Too low	
Neither too high or too low	

18c) Do you consider your chair height to be any of the following?

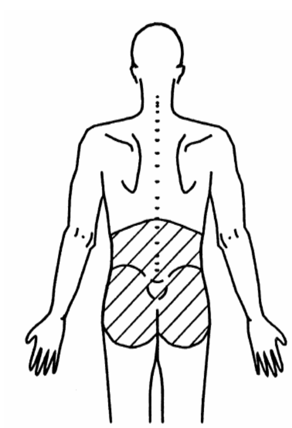
Too high	
Too low	
Neither too high or too low	

19) Please indicate in what type of work/clinical setting your low back pain first occurred?

1. Elderly Care	
2. General Muskuloskeletal Outpatient setting	
3. Neurological rehabilitation	
4. Pediatrics	
5. Hospital setting	
6. Non-Hospital setting/ Private practice	
7. Orthopedics	
8. Learning difficulties and Physical impairments	
9. Cardiothoracic/Respiratory care	
10. Oncology	
11. Other. Please specify:_________________.	

Section 4: Low Back Pain (LBP) History

DEFINITION: Any ache, pain or discomfort in the shaded area, whether or not it extends from there to one or both legs (sciatica).



20) Are you currently suffering from LBP as defined above? YES / NO
21) Have you suffered from LBP in the past 12 months? YES / NO
22) Have you ever experienced LBP in your career as a manual therapist? YES / NO
23) Have you suffered from LBP in the past month? YES / NO
24) Did you ever suffer from LBP before working as a manual therapist? YES / NO
25) How many days have you been absent from work in the past year due to low back pain?
______Days

26) What best describes the intensity of your LBP?

No pain at the moment	
Mild	
Moderate	
Severe	
Worst imaginable	

27) Which term best describes the frequency of your LBP?

Never	
Infrequent (1-2 days/wk)	
Frequent (3-5 days/wk)	
Constant (Daily pain)	

28) What is the duration of each episode of your LBP? __________days.
29) How many episodes of LBP have your suffered from in the last year? _______.
30) Do you believe your LBP is due to your occupation? YES / NO
31) Are your symptoms of LBP exacerbated by clinical practice? YES / NO

32) If you answered YES, to 31) above: What work activities cause your Low back symptoms to recur? Please check all that apply.

1. Bending or Twisting	
2. Lifting	
3. Maintaining a position for long periods of time e.g. standing, sitting, kneeling	
4. Performing manual therapy techniques e.g. massage, mobilization	
5. Performing repetitive tasks	
6. Reaching or working away from the body	
7. Transferring patients	
8. Working in cramped/awkward positions	
9. Pushing or pulling	
10. Other. Please specify:	

33) What type of low back injury did you incur? What was the diagnosis?

1. N/A (No diagnosis)	
2. Degeneration	
3. Ligament Sprain	
4. Muscle Strain	
5. Neuropathy	
6. Vertebral disc involvement	
7. Other: Please specify:________________________.	

34) Has the LBP affected you outside of work in terms of activities of daily living and leisure activities? YES / NO
35) At what stage of your career did you experience a major episode of LBP for the first time? (I.e. How many years had you been working).

As a student	
0-5 years	
6-10 years	
11-15 years	
16-20 years	
20+ years	

Thank you for taking the time to complete this questionnaire.
Your co-operation is appreciated.

Appendix B

INFORMED CONSENT FORM

(TO BE COMPLETED BY THE PARTICIPANTS OF THE FOCUS GROUP)

DATE:

TITLE OF RESEARCH PROJECT:

The Prevalence and risk factors for occupational low back pain in manual therapists.

NAME OF SUPERVISOR:

Dr C. Korporaal (083 246 3562); M.Tech Chiropractic (TN), CCFC (TN), CCSP (USA), ICSSD (FICS).

NAME OF RESEARCH STUDENT:

Nicole Pereira [082 806 2794 / 031 204 2205 (D.U.T)]

Please circle the appropriate answer	**YES**	**/NO**
1. Have you read the research information sheet?	Yes	No
2. Have you had an opportunity to ask questions regarding this study?	Yes	No
3. Have you received satisfactory answers to your questions?	Yes	No
4. Have you had an opportunity to discuss this study?	Yes	No
5. Have you received enough information about this study?	Yes	No
6. Do you understand the implications of your involvement in this study?	Yes	No
7. Do you understand that you are free to:		
a) Withdraw from this study at any time?	Yes	No
b) Withdraw from the study at any time, without reasons given.	Yes	No
c) Withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban University of Technology.	Yes	No
8. Do you agree to voluntarily participate in this study?	Yes	No
9. Who have you spoken to regarding this study?		

____

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please print in block letters:

Focus Group Member: ________________________ Signature: ____________________

Witness Name: ______________________________ Signature:_____________________

Researcher's Name: __________________________ Signature:_____________________

Supervisor's Name: ______________________ Signature: ______________________

Appendix C
LETTER OF INFORMATION – FOCUS GROUP

Dear Participant,

I would like to welcome you and thank you for participating in the focus group of my study.

The title of my research project is:
The Prevalence and risk factors for occupational low back pain in manual therapists.

Name of Supervisor: Dr. C. Korporaal (083 246 3562); M.Tech Chiropractic (TN), CCFC (TN), CCSP (USA), ICSSD (FICS).
Name of Researcher: Nicole Pereira (082 806 2794)
Name of Institution: Durban University of Technology (031 204 2205)

In order to understand the outcomes required for the focus group it is important to understand the objectives set out for this study:

The aims and objectives of the study are; to determine the prevalence of occupational low back pain in manual therapists and to identify risk factors for occupational low back pain in manual therapists.

The ***first objective*** is defined as data collection and documentation with respect to:

- Patient demographics
- Individual risk factors
- Psychosocial risk factors
- Occupational risk factors
- Low back pain history

The ***second objective*** is defined as the interpretation of the data, to determine any relationships between the various factors documented in objective one and occupational low back pain.

Focus group:
The purpose of the focus group is to validate the research tool. Therefore, as members of the focus group, who have a practical perspective from experience in the field of manual therapy, you will be required to review and discuss the questionnaire. The discussions will focus on the changes that are necessary in order to alter the questionnaire into a manual therapist specific context. By identifying any inconsistencies with practice or areas that are not covered in the questionnaire which need to be further developed; especially in terms of risk factors for low back pain and in particular work-related risk factors, validity of the questionnaire will be ensured.

Your participation in this study is much appreciated and you can be assured that your comments and contributions will be kept confidential. The results of this focus group will only be used for research purposes.

If you have any further questions please feel free to contact me.

Yours sincerely,

Nicole Pereira (082 806 2794 / 031 204 2205 (D.U.T)

Appendix D
CONFIDENTIALITY STATEMENT – FOCUS GROUP DECLARATION

IMPORTANT NOTICE:
THIS FORM IS TO BE READ AND FILLED IN BY EVERY MEMBER PARTICIPATING IN THE FOCUS GROUP, BEFORE THE FOCUS GROUP MEETING CONVENES.

1. All information contained in the research documents and any information discussed during the focus group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. The returned questionnaires will be coded and kept anonymous in the research process.
3. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
4. The information from this focus group will be made public in terms of a journal publication, which will in no way identify any participants of this research.
5. Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Member represents	Member's Name	Signature	Contact Details

Appendix E
CODE OF CONDUCT

This form needs to be completed by every member of the Focus Group prior to the commencement of the focus group meeting.

As a member of this committee I agree to abide by the following conditions:

1. All information contained in the research documents and any information discussed during the focus group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.

2. Due respect to be given to every suggestion and comment by any member of the focus group and be debated with reference to the outcomes of the research.

3. The information gathered from this focus group by the researcher will be made public in terms of a mini dissertation and journal publication. The researcher will ensure that any participants in the focus group and research remain anonymous and confidential.

Member represents	Member's Name	Signature	Contact Details

Appendix F

POST-FOCUS GROUP RESEARCH QUESTIONNAIRE

Section 1:

1) Please tick the appropriate box to indicate your registered profession.

Aromatherapist	
Biokineticist	
Chiropractor	
Massage Therapist	
Occupational Therapist	
Physiotherapist	
Reflexologist	

2) Age? _______Years.

3) Gender? MALE / FEMALE

4) Please indicate your ethnicity by ticking the appropriate box.

Asian	
Black	
Coloured	
Indian	
White	
Other:	

5) Please tick the appropriate box to indicate your marital status.

	Tick	Number of times
Single		N/A
Married		
Divorced		
Widowed		

6a) What is your weight in kilograms? _______KG

6b) What is your height in metres? ________m.

6c) What is your body build?

Mesomorph (Medium and Athletically built)	
Ectomorph (Thin and slightly built)	
Endomorph (Heavy and broadly built)	

6d) Do you have any known musculoskeletal/structural anomalies?
e.g. scoliosis, leg length inequality.

YES	
NO	

6e) If YES, to Question 6d) above: Please specify what the musculoskeletal anomaly is?

____.

7) What is your primary function/activity during the day? Please tick the appropriate box to indicate how many hours in a working day you spend on each of the following activities.

	<1hr	Between 1-3hrs	Between 3-5hrs	Between 5-8hrs	>8hrs
1) Administrative work at a desk.					
2) In interaction with patients e.g. Instructing patients or performing assessments.					
3) Applying modalities.					
4) Performing manual therapy techniques e.g. massage					
5) Performing manual/physical activities e.g. lifting					
5) Lecturing or attending short courses etc. outside of the practice setting.					

8a) Have you had any previous surgery?

YES	
NO	

8b) Please specify the type of surgery and the year in which it took place.

Type of surgery e.g. Pelvic or abdominal	Year in which it took place e.g. 2005

9a) Have you had any previous trauma to your lower back, hips, knees or ankles that resulted in an injury requiring medical intervention?

YES	
NO	

If your answer to 9a) above is NO, please skip to Question 10a).

9b) On the following table, please indicate:

1) The location/s of any previous injury. .
2) Whether you would classify the trauma that resulted in your injury, as Acute Trauma or Repetitive Microtrauma*.*

(**Repetitive Microtrauma: Caused by activities that induce repetitive stress over time, resulting in injury)*

3) Approximately how long ago the injury occurred.

LOCATION OF PREVIOUS INJURY	Tick	Acute Trauma	Repetitive Microtrauma	Approximately how long ago did the injury occur.
E.g. Low back	***X***		***X***	***2yrs ago***
Low Back				
Hips				
Knees				
Ankles				

9c) Please specify the location of your most severe previous injury.

Lower back	
Hips	
Knees	
Ankles	

9d) If you've indicated a previous lower back injury. What was the diagnosis?

N/A	
Please specify the diagnosis: (if applicable)	

Section 2:

10a) Do you exercise? YES / NO
If your answer to 10a) above is NO, please skip to Question 11).

10b) Approximately how many times due you exercise per week? ______.
10c) How long do you exercise per session? __________Minutes
10d) What type of exercise do you do?

1. Jogging		8. Tennis	
2. Swimming		10. Golf	
3. Cycling		11. Cricket	
4. Walking		12. Soccer	
5. Weightlifting		13. Softball	
6. Aerobics		14. Rugby	
7. Squash		15.Other: Please specify: ______________________.	

]11a) Do you smoke cigarettes/pipe/cigars? YES / NO
If your answer to 11a) above is NO, please skip to Question 11d).

11b) Approximately how often do you smoke per day? ___________.

11c) How many years have you smoked for? ________ Years.

11d) Do you have a previous history of smoking but have now stopped? YES / NO
If your answer to 11d) above is NO, please skip to Question 12).
11e) Approximately how often did you smoke per day? __________.
11f) How many years did you smoke for? _________ Years.
11g) How many years have you stopped smoking for? _________ Years.

12a) Do you drink alcohol? YES / NO
If your answer to 12a) above is NO, please skip to Question 13).

12b) Approximately how many units of alcohol do you drink per day?
[Note: 1 unit of alcohol = 1 glass of wine(125ml) , 1 beer (340ml) or 1 tot of spirits (25ml)]

1	
2-3	
4-5	
6-7	
8+	

NOTE: Question 13 is not applicable to MALE RESPONDENTS. Please skip to Question 14a.
13a) How many times have you been pregnant?____________________.
13b) Please indicate:
1) The type and number of deliveries you have had and,
2) Whether those deliveries were in a hospital setting or non-hospital setting?

TYPE OF DELIVERY	IN HOSPITAL	NON-HOSPITAL	NUMBER
Natural birth (Non-caesarian section)			
Caesarian Section		N/A	

13c) Did you have an epidural injection with any of your deliveries? Y / N

14a) How many children do you have? _____________________.
14b) Into what age groups do your children fall? Tick all appropriate.

N/A	
Infant	
Toddler	
Child	
Teenager	
Adult	

15) Please indicate the degree to which you like or dislike practicing as a manual therapist.

Great Satisfaction	
Satisfaction	
Dissatisfaction	
Great Dissatisfaction	

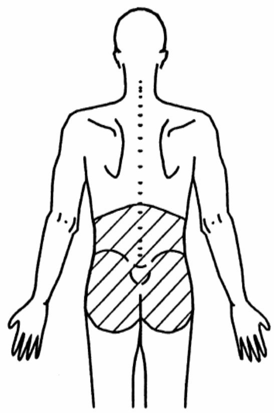
16a) Are you on any medication? Y / N
16b) If yes to 16a) above: Please indicate what you are taking the medication for:
____.

17) How would you rate your occupational stress?

	PSYCHOLOGICAL STRESS	PHYSICAL STRESS e.g. due to manual activities and physical workload or demands of your occupation
Very Stressful		
Stressful		
Little Stress		
No Stress		

Section 3:

DEFINITION: Any ache, pain or discomfort in the shaded area, whether or not it extends from there to one or both legs (sciatica).



18) Are you currently suffering from low back pain as defined above?

YES	
NO	

NOTE: If you have NEVER experienced LBP, please skip this Section and proceed to Section 4.

19) Have you experienced low back pain in any of the following time periods:
Tick the boxes where appropriate.

	YES	NO
In the past 4 weeks.		
In the past 1 year		
Ever in your career as a manual therapist.		
Before working as a manual therapist.		

20) How many days have you been absent from work in the past year due to low back pain?__________days

21) What best describes the intensity of your worst episode of low back pain in the past year?

N/A	
Mild	
Moderate	
Severe	
Worst imaginable	

22) Which term best describes the frequency of your low back pain?

Irregular or Seldom	
Infrequent (1-2 days/month)	
Frequent (3-5 days/wk)	
Constant (Daily pain)	

23) What is the approximate duration of each episode of your low back pain? ________days.
24) Approximately how many acute exacerbations of low back pain have your suffered from in the last year? _________.

25a) Are you currently suffering from any medical conditions/disorders which may be causing your lower back pain or contributing to your low back pain?

YES	
NO	

25b) If yes to 25a) above: Please specify the medical condition:
____.

26) Has the low back pain affected you outside of work in terms of activities of daily living and leisure activities? YES / NO

Section 4:

27) Do you believe your low back pain is due to your occupation? YES / NO
28) Are your symptoms of low back pain exacerbated by clinical practice? YES / NO

If you answered NO, to BOTH Questions 27) and 28) Please skip to Question 31.

29) What work (Practice) activity:

a) Were you doing when you experienced low back pain for the first time.
b) Causes exacerbation of your low back pain or causes your low back pain to recur.

	Activity you were doing when you experienced LBP for the first time.	Activities which cause your LBP to recur or be exacerbated.
1. Applying modalities		
2. Bending or Twisting		
3. Instructing a patient		
4. Lifting		
5. Maintaining a position for a prolonged period of time. E.g. standing, sitting, kneeling or bent over		
6. Performing manual therapy techniques		
7. Performing repetitive tasks		
8. Responding to an unanticipated or sudden movement by a patient		
9. Transferring a patient		
10. Working in an awkward or cramped position		
11. Working when physically fatigued		
12. Pushing or pulling		
13. Reaching and working away from the body.		
13. Other. Please specify:		
14. N/A		

30) In the following table are 18 potential job risk factors for low back pain. On a scale of 0-5; 0 being no problem and 5 being a major problem, please indicate to what extent you believe each risk factor may be implicated in the development of your low back pain.

JOB RISK FACTOR	0	1	2	3	4	5
1. Performing the same task over and over						
2. Working in the same position for long periods of time						
3. Treating a large number of patients in 1 day						
4. Bending or twisting your back in an awkward way						
5. Lifting or transferring dependant patients						
6. Continuing to work when injured or hurt						
7. Reaching or working away from your body						
8. Performing manual therapy techniques						
9. Working in awkward or cramped positions						
10. Working near to or at your physical limits.						
11. Not enough rest breaks during the day						
12. Unanticipated sudden movement or fall by a patient						
13. Assisting patient during gait activities						
14. Lack of staff						
15. Carrying/lifting or moving heavy materials and equipment						
16. Working with confused or agitated patients						
17. Work schedule (e.g. overtime, on-call, irregular shifts)						
18. Inadequate training in injury prevention						
19. Other. Please specify:						

31a) For how many years have you been practicing as a manual therapist? __________ Years.
31b) Approximately how many patients do you see per day? ____________.
31c) How many hours do you work per week? __________ Hours
31d) Do you have an assistant? YES / NO
31e) Do you use assistance with manual handling or patient handling activities? YES / NO

32a) Do you use height and/or angle adjustable work surfaces? YES / NO
32b) Do you consider your treatment/examination table height to be any of the following?

Too high	
Too low	
Neither too high or too low	

32c) Do you consider your chair height to be any of the following?

Too high	
Too low	
Neither too high or too low	

33a) Please indicate in what type of work/clinical setting your low back pain first occurred e.g. neurological rehabilitation, hospital setting, private practice, paediatrics.
____.
33b) Please indicate in what work/clinical setting your low back pain is exacerbated or caused to recur? ____.

34) At what stage your life did you first experience a major episode of low back pain?

Before becoming a student	
As a student	
Once you started working as a manual therapist.	

35) At what stage of your career did you experience a major episode of low back pain for the first time?   (I.e. How many years had you been working).

N/A	
0-5 years	
6-10 years	
11-15 years	
16-20 years	
21+ years	

Thank you for taking the time to complete this questionnaire.
Your co-operation is appreciated.

Appendix G

Pilot-test Evaluation Form

1 What is your opinion of the subject presented in this questionnaire?
(Please mark the most appropriate box)

- 1.1 Extremely interesting ☐
- 1.2 Interesting ☐
- 1.3 Average ☐
- 1.4 Boring ☐
- 1.5 Very boring ☐

2 Do you think the topics raised in this questionnaire were adequately covered?

- 2.1 Yes ☐
- 2.2 No ☐

3 What is your opinion about the covering letter?
(Please mark one box only)

- 3.1 Very clear ☐
- 3.2 Clear ☐
- 3.3 Adequate ☐
- 3.4 Unclear ☐
- 3.5 Needs revising ☐

4 How would you describe the instructions accompanying each of the questions?
(Please mark one box only)

- 4.1 Very clear ☐
- 4.2 Clear ☐
- 4.3 Adequate ☐
- 4.4 Unclear ☐
- 4.5 Needs revising ☐

5 Do you think the questionnaire is too long?

- 5.1 Yes ☐
- 5.2 No ☐

6 What is your opinion of the wording of the questionnaire?
(Please mark the appropriate box/es)

- 6.1 The meaning of **all questions** is absolutely clear ☐
- 6.2 The meaning of **most** questions is clear ☐
- 6.3 There is too much chiropractic/ medical jargon ☐
- 6.4 The questions will not be understood by lay persons ☐
- 6.5 The questionnaire needs to be revised because it is unclear ☐

If you had any difficulty answering any question/s, please write the number/s of the question/s in the space below with a suggestion on how the question/s can be improved?

____
____
____
____
____

Thank you for your most valuable time in helping me with my research project.
Please be reminded that the topics discussed above are strictly confidential.

Appendix H
RESEARCH QUESTIONNAIRE

Section 1:

1) Please tick the appropriate box to indicate your registered profession.

Aromatherapist	
Biokineticist	
Chiropractor	
Massage Therapist	
Occupational Therapist	
Physiotherapist	
Reflexologist	

2) Age? _______ Years.
3) Gender? MALE / FEMALE
4) Please indicate your ethnicity by ticking the appropriate box.

Asian	
Black	
Coloured	
Indian	
White	
Other:	

5) Please tick the appropriate box to indicate your marital status.

	Tick	Number of times
Single		N/A
Married		
Divorced		
Widowed		

6a) What is your weight in kilograms? _______ KG
6b) What is your height in metres? _______ m.

6c) What is your body build?

Mesomorph (Medium and Athletically built)	
Ectomorph (Thin and slightly built)	
Endomorph (Heavy and broadly built)	

6d) Do you have any known musculoskeletal/structural anomalies?
e.g. scoliosis, leg length inequality.

YES	
NO	

6e) If YES, to Question 6d) above: Please specify what the musculoskeletal anomaly is?
____.

7) Please tick the appropriate boxes to indicate how many hours in a working day you spend on each of the following activities.

	0hrs/ NAD	<1hr	Between 1-3hrs	Between 3-5hrs	Between 5-8hrs	>8hrs
1) Administrative work at a desk.						
2) In interaction with patients e.g. Instructing patients or performing assessments.						
3) Applying modalities.						
4) Performing manual therapy techniques e.g. massage						
5) Performing manual/physical activities e.g. lifting						
6) Lecturing or attending short courses etc. outside of the practice setting.						
7) Other: Please specify.						

8a) Please tick the appropriate block/s to indicate any previous surgery.

	Pelvic Surgery	Abdominal Surgery	Lower Back Surgery	Lower Limb Surgery
YES				
NO				

If you answered NO to ALL the options in Question 8a), please skip to Question 9a).

8b) Please specify the type of surgery and the year in which it took place.

Type of surgery e.g. Hysterectomy or Lower Back Surgery	Year in which it took place e.g. 2005

9a) Have you had any previous trauma to your low back, hips, knees or ankles that resulted in an injury for which you sought a second opinion from a colleague or other health care professional?

YES	
NO	

9b) On the following table, please indicate:

1) The location/s of any previous injury.
2) Whether you would classify the trauma that resulted in your injury, as Acute Trauma or Repetitive Microtrauma. *(*Repetitive Microtrauma: Caused by activities that induce repetitive stress over time, resulting in injury)*
3) Approximately how long ago the injury occurred.

LOCATION OF PREVIOUS INJURY	Tick	Acute Trauma	Repetitive Microtrauma	Approximately how long ago did the injury occur.
E.g. Low back	√		√	*2yrs ago*
Low Back				
Hips				
Knees				
Ankles				
N/A (I.e. You have NO history of previous injury to your lower back, hips, knees or ankles)				

9c) Please specify the location of your most severe previous injury.

Lower back	
Hips	
Knees	
Ankles	

9d) If you've indicated a previous lower back injury. What was the diagnosis?

N/A	
Please specify the diagnosis if applicable):	

Section 2:

10a) Do you exercise? YES / NO

If your answer to 10a) above is NO, please skip to Question 11a).

10b) Approximately how many times do you exercise per week? ______.

10c) How long do you exercise per session? __________ Minutes

10d) What type of exercise do you do?

1. Jogging		4. Tennis		7. Aerobics		10. Cycling		13.Weightlifting	
2. Swimming		5. Golf		8. Yoga		11. Walking		14.Cricket	
3. Soccer		6. Squash		9. Rugby		12. Pilates		15. Tae-bo	
								16. OTHER:	

11a) Do you smoke cigarettes/pipe/cigars? YES / NO
If your answer to 11a) above is NO, please skip to Question 11d).
11b) Approximately how many do you smoke per day? __________.
11c) How many years have you smoked for? ________Years.
11d) Do you have a previous history of smoking but have now stopped? YES / NO
If your answer to 11d) above is NO, please skip to Question 12).
11e) Approximately how many did you smoke per day? __________.
11f) How many years did you smoke for? _________Years.
11g) How many years have you stopped smoking for? _________Years.

12a) Do you drink alcohol? YES / NO
If your answer to 12a) above is NO, please skip to Question 13).
12b) Approximately how many units of alcohol do you drink per day?
[Note: 1 unit of alcohol = 1 glass of wine(125ml) , 1 beer (340ml) or 1 tot of spirits (25ml)]

1	
2-3	
4-5	
6-7	
8+	
Socially/Irregularly (e.g. only on weekends)	

NOTE: Question 13 is not applicable to male respondents. Please skip to Question 14a.
13a) Have you ever been pregnant? YES / NO
If your answer to 13a) above is NO, please skip to Question 14a).
13b) How many times have you been pregnant?___________________.
13c) Please indicate:
1) The type and number of deliveries you have had and,
2) Whether those deliveries were in a hospital setting or non-hospital setting?

TYPE OF DELIVERY	IN HOSPITAL	NON-HOSPITAL	NUMBER
Natural birth (Non-caesarian section)			
Caesarian Section		N/A	

13d) Did you have an epidural injection with any of your deliveries? YES / NO

14a) How many children do you have? __________.
14b) Please indicate into what age group/s your children fall and how many children you have in a specific age group? (e.g. 1 toddler or 3 teenagers)

N/A		Child	
Infant		Teenager	
Toddler		Adult	

15) Please indicate the degree to which you like or dislike practicing as a manual therapist.

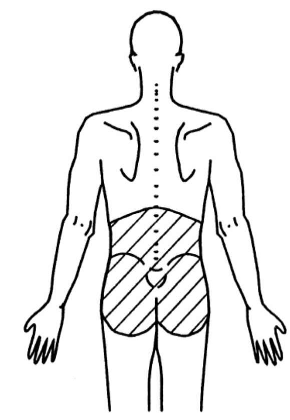
Great Satisfaction	
Satisfaction	
Dissatisfaction	
Great Dissatisfaction	

16a) Are you on any medication? YES / NO
16b) If yes to 16a) above: Please indicate what you are taking the medication for:
____.

17) How would you rate your occupational stress?

	PSYCHOLOGICAL STRESS	PHYSICAL STRESS e.g. due to manual activities and physical workload or demands of your occupation
Very Stressful		
Stressful		
Little Stress		
No Stress		

<u>Section 3:</u>
LOW BACK PAIN DEFINITION:
Any ache, pain or discomfort in the shaded area, whether or not it extends from there to one or both legs (sciatica).



18a) Are you currently suffering from low back pain as defined above?

YES	
NO	

18b) If yes to 18a) above: Is your low back pain associated with any leg pain?
(**Pain extending/radiating from your lower back down one or both of your legs.)*

YES	
NO	

NOTE: If you have NEVER experienced low back pain, please skip this Section and proceed to Section 4.

19) Have you experienced low back pain in any of the following time periods:
Tick the boxes where appropriate.

	YES	NO
In the past 4 weeks.		
In the past 1 year		
Ever in your career as a manual therapist.		
Before working as a manual therapist.		

20) How many days have you been absent from work in the past year due to low back pain?__________ days

21) What best describes the intensity of your worst episode of low back pain in the past year?

N/A	
Mild	
Moderate	
Severe	
Worst imaginable	

22) Which term best describes the frequency of your low back pain?

Irregular or Seldom	
Infrequent (1-2 days/month)	
Frequent (3-5 days/wk)	
Constant (Daily pain)	

23) Approximately how many acute exacerbations/episodes of low back pain have you suffered from in the last year? __________.
24) What is the approximate duration of each acute exacerbation/episode of your low back pain?________ days.

25a) Are you currently suffering from any medical conditions/disorders which may be causing your lower back pain or contributing to your low back pain?

YES	
NO	

25b) If yes to 25a) above: Please specify the medical condition:
____.

26) Has the low back pain affected you outside of work in terms of activities of daily living and leisure activities? YES / NO

Section 4:
27) Do you believe your low back pain is due to your occupation? YES / NO
28) Are your symptoms of low back pain exacerbated by clinical practice? YES / NO
If you answered NO, to BOTH Questions 27) and 28) Please skip to Question 31.

29) What work (practice) activity/ies:
   a) Were you doing when you experienced low back pain for the first time in practice.
   b) Causes exacerbation of your low back pain or causes your low back pain to recur.

	A. Activity you were doing when you experienced LBP for the first time.	B. Activities that cause your LBP to recur or be exacerbated.
1. N/A		
2. Applying modalities.		
3. Bending or Twisting		
4. Instructing a patient		
5. Lifting		
6. Maintaining a position for a prolonged period of time. E.g. standing, sitting, kneeling or bent over		
7. Performing manual therapy techniques		
8. Performing repetitive tasks		
9. Responding to an unanticipated or sudden movement by a patient		
10. Transferring a patient		
11. Working in an awkward or cramped position		
12. Working when physically fatigued		
13. Pushing or pulling		
14. Reaching and working away from the body		
15. Other. Please specify:		

30) In the following table are 18 potential job risk factors for low back pain. On a scale of 0-5; 0 being no problem and 5 being a major problem, please indicate to what extent you believe each risk factor may be implicated in the development of your low back pain.

JOB RISK FACTOR	0	1	2	3	4	5
1. Performing the same task over and over						
2. Working in the same position for long periods of time						
3. Treating a large number of patients in 1 day						
4. Bending or twisting your back in an awkward way						
5. Lifting or transferring dependant patients						
6. Continuing to work when injured or hurt						
7. Reaching or working away from your body						
8. Performing manual therapy techniques						
9. Working in awkward or cramped positions						
10. Working near to or at your physical limits.						
11. Not enough rest breaks during the day						
12. Unanticipated sudden movement or fall by a patient						
13. Assisting patient during gait activities						
14. Lack of staff						
15. Carrying/lifting or moving heavy materials and equipment						
16. Working with confused or agitated patients						
17. Work schedule (e.g. overtime, on-call, irregular shifts)						
18. Inadequate training in injury prevention						
19. Other. Please specify:						

31a) For how many years have you been practicing as a manual therapist? __________Years.
31b) Approximately how many patients do you see per day? ___________.

31c) How many hours do you work per week? __________ Hours
31d) Do you have an assistant? YES / NO
31e) Do you use assistance with manual handling or patient handling activities? YES / NO

32a) Do you use height and/or angle adjustable work surfaces? YES / NO
32b) Do you consider your treatment/examination table height to be any of the following?

Too high	
Too low	
Neither too high or too low	

32c) Do you consider your chair height to be any of the following?

Too high	
Too low	
Neither too high or too low	

33a) Please indicate your work/clinical setting:

Hospital	
Non-Hospital or Private practice	
Other: Please specify:	

33b) Please tick the appropriate boxes to indicate:
1) How you would describe the majority of work you were doing when you experienced low back pain for the first time in practice.
2) How you would describe the work that you feel causes your low back pain to recur or be exacerbated.

	1. Majority of work you were doing when you experienced low back pain for the first time in practice.	2. Work that you feel causes your low back pain to recur or be exacerbated.
1. HOSPITAL and NON-HOSPITAL:		
a) Elderly care		
b) General Muskuloskeletal Outpatient Setting		
c) Neurological Rehabilitation		
d) Paediatrics		
e) Learning Difficulties and Physical Impairments		
2. HOSPITAL:		
f) Cardiothoracic/Respiratory Care		
g) ICU Care		
h) Oncology		
i) Orthopedics		
3. OTHER: Please specify:		

34) At what stage of your life did you first experience a major episode of low back pain?

Before becoming a student	
As a student	
Once you started working as a manual therapist.	

35) For how many years **had** you been working as a manual therapist when you experienced **your first** major episode of low back pain? *E.g. If you experienced low back pain for the first time within 3 years of commencing work/practice as a manual therapist – tick 0-5yrs.*

N/A	
0-5 years	
6-10 years	
11-15 years	
16-20 years	
21+ years	

Thank you for taking the time to complete this questionnaire.
Your co-operation is appreciated.

Appendix I
Letter of Information

Dear Participant,

Welcome to my research study. Thank you for your interest.

Study Title:
The prevalence and risk factors for occupational low back pain in manual therapists.

Supervisor: Dr. C. Korporaal, M.Tech Chiropractic (TN), CCFC (TN), CSSP (USA), ICSSD (FICS). [083 246 3562]
Research Student: Nicole Pereira (082 806 2794)
Institution: Durban University of Technology (031 373 2205)

Purposes and Objectives of the Study:
You have been selected to participate in a study, which aims to determine the prevalence of occupational low back pain in manual therapists and to identify the risk factors for occupational low back pain in manual therapists.

Participation is voluntary and refusal to participate in this study will not result in adverse consequences of any kind. The research manuscript will be made available at the Durban University of Technology Library, in the form of a mini-dissertation and results as seen in the research abstract will be sent to you should you request it.

Procedures:
You will receive a letter of information and if you agree to participate in the study, will be required to complete and sign a letter of consent. You will then be required to complete the research questionnaire, which may take on average about 10-15 minutes.

All answers are strictly confidential, and you are therefore requested to be honest and answer all questions to the best of your knowledge.
Please note: You are free to withdraw from this study at any time without giving a reason.

Benefits:
By completing this questionnaire, you, as the respondent have the opportunity to help in highlighting the extent to which occupational low back pain affects professionals in your field of work and to identify the risk factors for low back pain in manual therapists. The results of the study will add to literature regarding the etiology of low back pain in an occupational setting where it is becoming more common and thus may be used for the purposes of future research and may also ultimately assist in the development of preventive programs and safe guidelines for practice in manual therapists in South Africa.

Confidentiality:
All information will be confidential and the results will be used for research purposes only. Completed questionnaires and informed consent forms will be received by a neutral third party who will separate the informed consent from the completed questionnaire, thus ensuring that any questionnaire returned to the researcher will be anonymous.

Remuneration:
There is no cost involved for your participation in this study. The questionnaire and related information has been sent to you with a business reply envelope, therefore, once you have completed the questionnaire and informed consent all you need to do is place it in the business reply envelope you received and post it.

Persons to contact for problems/questions:
Should you have any queries or questions regarding this study, please feel free to contact my supervisor or myself on the above telephone numbers.
If you are not satisfied with any aspect of this study, please feel free to forward your concerns to the Durban University of Technology Research and Ethics Committee.

Thank you for your participation and co-operation. Your time and assistance with this project is invaluable and is greatly appreciated.

Yours sincerely,

……………………… …
Nicole Pereira
(Research Student)

……………………………
Dr. Charmaine Korporaal
(Supervisor)

Appendix J

INFORMED CONSENT FORM

DATE:

TITLE OF RESEARCH PROJECT:

The prevalence and risk factors for occupational low back pain in manual therapists.

NAME OF SUPERVISOR:

Dr C. Korporaal (083 246 3562); M.Tech Chiropractic (TN), CCFC (TN), CCSP (USA), ICSSD (FICS).

NAME OF RESEARCH STUDENT:

Nicole Pereira [(082 806 2794/031 373 2205 (D.U.T)]

Please circle the appropriate answer	**YES /NO**	
1. Have you read the research information sheet?	Yes	No
2. Have you had an opportunity to ask questions regarding this study?	Yes	No
3. Have you received satisfactory answers to your questions?	Yes	No
4. Have you had an opportunity to discuss this study?	Yes	No
5. Have you received enough information about this study?	Yes	No
6. Do you understand the implications of your involvement in this study?	Yes	No
7. Do you understand that you are free to:		
a) Withdraw from this study at any time?	Yes	No
b) Withdraw from the study at any time, without reasons given?	Yes	No
c) Withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban Institute of Technology?	Yes	No
8. Do you agree to voluntarily participate in this study?	Yes	No
9.Who have you spoken to regarding this study?	Yes	No

____

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please print in block letters:

Respondent: ______________________ Signature: ______________________

Witness Name: ____________________ Signature:______________________

Appendix K

DURBAN UNIVERSITY of TECHNOLOGY

Faculty of Health Sciences

ETHICS CLEARANCE CERTIFICATE

Student Name	Nicole Pereira	Student No	20200741
Ethics Reference Number	FHSEC 038/07	Date of FRC Approval	16/08/2007
Research Title:	**The prevalence and risk factors for occupational low back pain in manual therapists.**		

In terms of the ethical considerations for the conduct of research in the Faculty of Health Sciences, Durban University of Technology, this proposal meets with Institutional requirements and confirms the following ethical obligations:

1. The researcher has read and understood the research ethics policy and procedures as endorsed by the Durban University of Technology, has sufficiently answered all questions pertaining to ethics in the DUT 186 and agrees to comply with them.
2. The researcher will report any serious adverse events pertaining to the research to the Faculty of Health Sciences Research Ethics Committee.
3. The researcher will submit any major additions or changes to the research proposal after approval has been granted to the Faculty of Health Sciences Research Committee for consideration.
4. The researcher, with the supervisor and co-researchers will take full responsibility in ensuring that the protocol is adhered to.
5. ***The following section must be completed if the research involves human participants:***

	YES	NO	N/A
❖ Provision has been made to obtain informed consent of the participants			
❖ Potential psychological and physical risks have been considered and minimised			
❖ Provision has been made to avoid undue intrusion with regard to participants and community			
❖ Rights of participants will be safe-guarded in relation to: - Measures for the protection of anonymity and the maintenance of Confidentiality.			
- Access to research information and findings.			
- Termination of involvement without compromise			
- Misleading promises regarding benefits of the research			

Pereira
SIGNATURE OF STUDENT/RESEARCHER — 11/03/08 DATE

SIGNATURE OF SUPERVISOR/S — 11/3/08 DATE

SIGNATURE OF HEAD OF DEPARTMENT — 11/3/08 DATE

pp
SIGNATURE: CHAIRPERSON OF RESEARCH ETHICS COMMITTEE — 11/3/08 DATE

APPENDIX L

LIST OF NON-SIGNIFICANT RESULTS TABLES

Table 7.1: Intensity of low back pain

Table 7.2: Frequency of low back pain

Table 7.3: Current medical conditions

Table 7.4: Impact on leisure activities and activities of daily living

Table 7.5: Low back pain due to your occupation as a manual therapist

Table 7.6: Applying modalities (A)[1]

Table 7.7: Applying modalities (B)[2]

Table 7.8: Bending and / or twisting (B)[1]

Table 7.9: Instructing patients (B)[2]

Table 7.10: Lifting (A)[1]

Table 7.11: Maintaining the same position for long periods of time (A)[1]

Table 7.12: Maintaining the same position for long periods of time (B)[2]

Table 7.13: Performing manual therapy techniques (A)[1]

Table 7.14: Performing manual therapy techniques (B)[2]

Table 7.15: Repetitive tasks (A)[1]

Table 7.16: Repetitive tasks (B)[2]

Table 7.17: Responding to an unanticipated or sudden movement by a patient (A)[1]

Table 7.18: Responding to an unanticipated or sudden movement by a patient (B)[2]

Table 7.19: Transferring a patient (A)[1]

Table 7.20: Transferring a patient (B)[2]

Table 7.21: Working in an awkward or cramped position (A)[1]

Table 7.22: Working in an awkward or cramped position (B)[2]

Table 7.23: Working when physically fatigued (A)[1]

Table 7.24: Working when physically fatigued (B)[2]

Table 7.25: Pushing or pulling (A)[1]

Table 7.26: Pushing or pulling (B)[2]

Table 7.27: Reaching and working away from the body (A)[1]

Table 7.28: Reaching and working away from the body (B)[2]

[1] A – Work activity / task being performed when low back pain was experienced for the first time in practice

[2] B – Work activity / task that caused recurrence or exacerbation of low back pain in practice

Appendix L

NON-SIGNIFICANT RESULTS TABLES

Table 7.1: Intensity of low back pain

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Intensity	N/A	Count	0	0	0	0	1	1	1	3
		% within Profession	.0%	.0%	.0%	.0%	2.3%	1.4%	9.1%	1.8%
	Mild	Count	2	0	8	5	17	28	4	64
		% within Profession	50.0%	.0%	61.5%	29.4%	38.6%	38.9%	36.4%	38.6%
	Moderate	Count	2	1	3	10	19	23	2	60
		% within Profession	50.0%	20.0%	23.1%	58.8%	43.2%	31.9%	18.2%	36.1%
	Severe	Count	0	4	1	2	7	18	4	36
		% within Profession	.0%	80.0%	7.7%	11.8%	15.9%	25.0%	36.4%	21.7%
	Worst imaginable	Count	0	0	1	0	0	2	0	3
		% within Profession	.0%	.0%	7.7%	.0%	.0%	2.8%	.0%	1.8%
Total		Count	4	5	13	17	44	72	11	166
		% within Profession	100.0 %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	30.946(a)	P=0.155								

Table 7.2: Frequency of low back pain

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Frequency	Irregular	Count	3	0	5	9	15	25	4	61
		% within Profession	75.0%	.0%	38.5%	52.9%	33.3%	34.7%	36.4%	36.5%
	Infrequent	Count	0	2	5	4	24	31	3	69
		% within Profession	.0%	40.0%	38.5%	23.5%	53.3%	43.1%	27.3%	41.3%
	Frequent	Count	1	1	1	3	4	10	2	22
		% within Profession	25.0%	20.0%	7.7%	17.6%	8.9%	13.9%	18.2%	13.2%
	Constant	Count	0	2	2	1	2	6	2	15
		% within Profession	.0%	40.0%	15.4%	5.9%	4.4%	8.3%	18.2%	9.0%
Total		Count	4	5	13	17	45	72	11	167
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	20.650(a)	P=0.297								

Table 7.3: Current medical conditions

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Medical conditions	yes	Count	1	0	2	1	11	6	2	23
		% within Profession	25.0%	.0%	15.4%	5.9%	24.4%	8.3%	18.2%	13.8%
	no	Count	3	5	11	16	34	66	9	144
		% within Profession	75.0%	100.0%	84.6%	94.1%	75.6%	91.7%	81.8%	86.2%
Total		Count	4	5	13	17	45	72	11	167
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	8.432(a)	P=0.208								

Table 7.4: Impact on leisure activities and activities of daily living

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Leisure activities	yes	Count	2	4	4	7	22	28	2	69
		% within Profession	66.7%	80.0%	30.8%	41.2%	50.0%	39.4%	22.2%	42.6%
	no	Count	1	1	9	10	22	43	7	93
		% within Profession	33.3%	20.0%	69.2%	58.8%	50.0%	60.6%	77.8%	57.4%
Total		Count	3	5	13	17	44	71	9	162
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	7.134(a)	P=0.309								

Table 7.5: Do you feel your low back pain is due to your occupation

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Due to occupation	yes	Count	1	1	6	9	23	43	2	85
		% within Profession	25.0%	20.0%	46.2%	52.9%	53.5%	61.4%	20.0%	52.5%
	no	Count	3	4	7	8	20	27	8	77
		% within Profession	75.0%	80.0%	53.8%	47.1%	46.5%	38.6%	80.0%	47.5%
Total		Count	4	5	13	17	43	70	10	162
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	10.032(a)	P=0.123								

Table 7.6: Applying modalities (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Applying modalities (A)	yes	Count	0	0	0	0	3	0	1	4
		% within Profession	.0%	.0%	.0%	.0%	7.3%	.0%	16.7%	2.9%
	no	Count	2	3	9	13	38	64	5	134
		% within Profession	100.0%	100.0%	100.0%	100.0%	92.7%	100.0%	83.3%	97.1%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	9.601(a)	P=0.142								

Table 7.7: Applying modalities (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
applying modalities (B)	yes	Count	0	0	0	1	3	3	0	7
		% within Profession	.0%	.0%	.0%	7.7%	7.3%	4.7%	.0%	5.1%
	no	Count	2	3	9	12	38	61	6	131
		% within Profession	100.0%	100.0%	100.0%	92.3%	92.7%	95.3%	100.0%	94.9%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	1.703(a)	P=0.945								

Table 7.8: Bending or twisting (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Bending or twisting (B)	yes	Count	0	0	2	7	19	22	1	51
		% within Profession	.0%	.0%	22.2%	53.8%	46.3%	34.4%	16.7%	37.0%
	no	Count	2	3	7	6	22	42	5	87
		% within Profession	100.0%	100.0%	77.8%	46.2%	53.7%	65.6%	83.3%	63.0%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	8.155(a)	P=0.227								

Table 7.9: Instructing patients (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Instructing patient (B)	yes	Count	0	0	0	0	2	0	0	2
		% within Profession	.0%	.0%	.0%	.0%	4.9%	.0%	.0%	1.4%
	no	Count	2	3	9	13	39	64	6	136
		% within Profession	100.0%	100.0%	100.0%	100.0%	95.1%	100.0%	100.0%	98.6%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	4.801(a)	P=0.570								

Table 7.10: Lifting (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Lifting (A)	yes	Count	0	1	5	2	16	21	1	46
		% within Profession	.0%	33.3%	55.6%	15.4%	39.0%	32.8%	16.7%	33.3%
	no	Count	2	2	4	11	25	43	5	92
		% within Profession	100.0%	66.7%	44.4%	84.6%	61.0%	67.2%	83.3%	66.7%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		6.240(a)	P=0.397							

Table 7.11: Maintaining the same position for long periods of time (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Maintaining position (A)	yes	Count	1	2	4	5	19	22	1	54
		% within Profession	50.0%	66.7%	44.4%	38.5%	46.3%	34.4%	16.7%	39.1%
	no	Count	1	1	5	8	22	42	5	84
		% within Profession	50.0%	33.3%	55.6%	61.5%	53.7%	65.6%	83.3%	60.9%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		3.937(a)	P=0.685							

Table 7.12: Maintaining the same position for long periods of time (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Maintaining position (B)	yes	Count	1	1	6	9	29	48	2	96
		% within Profession	50.0%	33.3%	66.7%	69.2%	70.7%	75.0%	33.3%	69.6%
	no	Count	1	2	3	4	12	16	4	42
		% within Profession	50.0%	66.7%	33.3%	30.8%	29.3%	25.0%	66.7%	30.4%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	6.898(a)	P=0.330								

Table 7.13: Performing manual therapy techniques (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Manual therapy (A)	yes	Count	2	0	2	3	6	11	1	25
		% within Profession	100.0%	.0%	22.2%	23.1%	14.6%	17.2%	16.7%	18.1%
	no	Count	0	3	7	10	35	53	5	113
		% within Profession	.0%	100.0%	77.8%	76.9%	85.4%	82.8%	83.3%	81.9%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	10.402(a)	P=0.109								

Table 7.14: Performing manual therapy techniques (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Manual therapy (B)	yes	Count	1	1	2	7	12	23	1	47
		% within Profession	50.0%	33.3%	22.2%	53.8%	29.3%	35.9%	16.7%	34.1%
	no	Count	1	2	7	6	29	41	5	91
		% within Profession	50.0%	66.7%	77.8%	46.2%	70.7%	64.1%	83.3%	65.9%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		4.383(a)	P=0.625							

Table 7.15: Performing repetitive tasks (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Repetitive tasks (A)	yes	Count	0	0	1	0	4	6	0	11
		% within Profession	.0%	.0%	11.1%	.0%	9.8%	9.4%	.0%	8.0%
	no	Count	2	3	8	13	37	58	6	127
		% within Profession	100.0%	100.0%	88.9%	100.0%	90.2%	90.6%	100.0%	92.0%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	2.550(a)	P=0.863								

Table 7.16: Performing repetitive tasks (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Repetitive tasks (B)	yes	Count	0	1	3	3	11	14	0	32
		% within Profession	.0%	33.3%	33.3%	23.1%	26.8%	22.2%	.0%	23.4%
	no	Count	2	2	6	10	30	49	6	105
		% within Profession	100.0%	66.7%	66.7%	76.9%	73.2%	77.8%	100.0%	76.6%
Total		Count	2	3	9	13	41	63	6	137
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		3.427(a)	P=0.754							

Table 7.17: Responding to an unanticipated or sudden movement by a patient (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Sudden movement (A)	yes	Count	0	0	1	0	8	7	0	16
		% within Profession	.0%	.0%	11.1%	.0%	19.5%	10.9%	.0%	11.6%
	no	Count	2	3	8	13	33	57	6	122
		% within Profession	100.0%	100.0%	88.9%	100.0%	80.5%	89.1%	100.0%	88.4%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	5.684(a)	P=0.459								

Table 7.18: Responding to an unanticipated or sudden movement by a patient (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Sudden movement (B)	yes	Count	0	0	0	2	14	13	0	29
		% within Profession	.0%	.0%	.0%	15.4%	34.1%	20.3%	.0%	21.0%
	no	Count	2	3	9	11	27	51	6	109
		% within Profession	100.0%	100.0%	100.0%	84.6%	65.9%	79.7%	100.0%	79.0%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		9.848(a)	P=0.131							

Table 7.19: Transferring a patient (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Transferring patient (A)	yes	Count	0	0	2	1	13	16	1	33
		% within Profession	.0%	.0%	22.2%	7.7%	31.7%	25.0%	16.7%	23.9%
	no	Count	2	3	7	12	28	48	5	105
		% within Profession	100.0%	100.0%	77.8%	92.3%	68.3%	75.0%	83.3%	76.1%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %
Pearson Chi-Square	5.049(a)	P=0.538								

Table 7.20: Transferring a patient (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
transferring patient (B)	yes	Count	0	0	1	4	18	22	1	46
		% within Profession	.0%	.0%	11.1%	30.8%	43.9%	34.4%	16.7%	33.3%
	no	Count	2	3	8	9	23	42	5	92
		% within Profession	100.0%	100.0%	88.9%	69.2%	56.1%	65.6%	83.3%	66.7%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	7.381(a)	P=0.287								

Table 7.21: Working in an awkward or cramped position (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Cramped position (A)	yes	Count	0	1	2	1	7	14	3	28
		% within Profession	.0%	33.3%	22.2%	7.7%	17.1%	21.9%	50.0%	20.3%
	no	Count	2	2	7	12	34	50	3	110
		% within Profession	100.0%	66.7%	77.8%	92.3%	82.9%	78.1%	50.0%	79.7%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	5.757(a)	P=0.451								

Table 7.22: Working in an awkward or cramped position (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Cramped position (B)	yes	Count	2	1	2	5	17	32	3	62
		% within Profession	100.0%	33.3%	22.2%	38.5%	41.5%	50.0%	50.0%	44.9%
	no	Count	0	2	7	8	24	32	3	76
		% within Profession	.0%	66.7%	77.8%	61.5%	58.5%	50.0%	50.0%	55.1%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	5.636(a)	P=0.465								

Table 7.23: Working when physically fatigued (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Fatigue (A)	yes	Count	1	1	2	2	4	6	1	17
		% within Profession	50.0%	33.3%	22.2%	15.4%	9.8%	9.4%	16.7%	12.3%
	no	Count	1	2	7	11	37	58	5	121
		% within Profession	50.0%	66.7%	77.8%	84.6%	90.2%	90.6%	83.3%	87.7%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		5.654(a)	P=0.463							

Table 7.24: Working when physically fatigued (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Fatigue (B)	yes	Count	1	1	2	4	10	22	2	42
		% within Profession	50.0%	33.3%	22.2%	30.8%	24.4%	34.4%	33.3%	30.4%
	no	Count	1	2	7	9	31	42	4	96
		% within Profession	50.0%	66.7%	77.8%	69.2%	75.6%	65.6%	66.7%	69.6%
Total		Count	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square		1.862(a)	P=0.932							

Table 7.25: Pushing or pulling (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
pushing/ pulling (A)	**yes**	**Count**	1	0	1	1	6	5	1	15
		% within Profession	50.0%	.0%	11.1%	7.7%	14.6%	7.8%	16.7%	10.9%
	no	**Count**	1	3	8	12	35	59	5	123
		% within Profession	50.0%	100.0%	88.9%	92.3%	85.4%	92.2%	83.3%	89.1%
Total		**Count**	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %	100.0%

Pearson Chi-Square	5.088(a)	P=0.533

Table 7.26: Pushing or pulling (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
pushing/ pulling (B)	**yes**	**Count**	0	0	3	3	11	13	1	31
		% within Profession	.0%	.0%	33.3%	23.1%	26.8%	20.3%	16.7%	22.5%
	no	**Count**	2	3	6	10	30	51	5	107
		% within Profession	100.0%	100.0%	66.7%	76.9%	73.2%	79.7%	83.3%	77.5%
Total		**Count**	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	2.796(a)	P=0.834

Table 7.27: Reaching and working away from the body (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Reaching (A)	**yes**	**Count**	2	0	2	3	7	10	2	26
		% within Profession	100.0%	.0%	22.2%	23.1%	17.1%	15.6%	33.3%	18.8%
	no	**Count**	0	3	7	10	34	54	4	112
		% within Profession	.0%	100.0%	77.8%	76.9%	82.9%	84.4%	66.7%	81.2%
Total		**Count**	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	10.872(a)	P=0.092

Table 7.28: Reaching and working away from the body (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Reaching (B)	**yes**	**Count**	1	1	2	5	17	31	3	60
		% within Profession	50.0%	33.3%	22.2%	38.5%	41.5%	48.4%	50.0%	43.5%
	no	**Count**	1	2	7	8	24	33	3	78
		% within Profession	50.0%	66.7%	77.8%	61.5%	58.5%	51.6%	50.0%	56.5%
Total		**Count**	2	3	9	13	41	64	6	138
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	2.760(a)	P=0.838

Table 7.29: Elderly care (A)

			Profession						Total	
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Elderly care (A)	**yes**	**Count**	0	1	2	2	4	20	0	29
		% within Profession	.0%	50.0%	18.2%	13.3%	9.5%	29.9%	.0%	20.7%
	no	**Count**	2	1	9	13	38	47	1	111
		% within Profession	100.0%	50.0%	81.8%	86.7%	90.5%	70.1%	100.0%	79.3%
Total		**Count**	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	8.977(a)	P=0.175

Table 7.30: Elderly care (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Elderly care (B)	yes	Count	1	1	4	2	7	20	0	35
		% within Profession	50.0%	50.0%	36.4%	13.3%	16.7%	29.9%	.0%	25.0%
	no	Count	1	1	7	13	35	47	1	105
		% within Profession	50.0%	50.0%	63.6%	86.7%	83.3%	70.1%	100.0%	75.0%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0 %	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	5.909(a)	P=0.433

Table 7.31: The learning difficulties and physical impairments clinical setting (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Learning difficulties and physical impairment (A)	yes	Count	0	0	1	0	10	5	0	16
		% within Profession	.0%	.0%	9.1%	.0%	23.8%	7.5%	.0%	11.4%
	no	Count	2	2	10	15	32	62	1	124
		% within Profession	100.0%	100.0%	90.9%	100.0%	76.2%	92.5%	100.0%	88.6%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	10.041(a)	P=0.123

Table 7.32: Cardiothoracic care (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Cardiothoracic (A)	yes	Count	0	0	0	0	0	3	0	3
		% within Profession	.0%	.0%	.0%	.0%	.0%	4.5%	.0%	2.1%
	no	Count	2	2	11	15	42	64	1	137
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	95.5%	100.0%	97.9%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	3.340(a)	P=0.765

Table 7.33: Cardiothoracic care (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Cardiothoracic (B)	yes	Count	0	0	0	0	0	5	0	5
		% within Profession	.0%	.0%	.0%	.0%	.0%	7.5%	.0%	3.6%
	no	Count	2	2	11	15	42	62	1	135
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	92.5%	100.0%	96.4%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	5.650(a)	P=0.464

Table 7.34: ICU care (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
ICU (A)	yes	Count	0	0	0	0	1	12	0	13
		% within Profession	.0%	.0%	.0%	.0%	2.4%	17.9%	.0%	9.3%
	no	Count	2	2	11	15	41	55	1	127
		% within Profession	100.0%	100.0%	100.0%	100.0%	97.6%	82.1%	100.0%	90.7%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %

Pearson Chi-Square	11.467(a)	P=0.075

Table 7.35: ICU care (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
ICU (B)	yes	Count	0	0	0	0	2	13	0	15
		% within Profession	.0%	.0%	.0%	.0%	4.8%	19.4%	.0%	10.7%
	no	Count	2	2	11	15	40	54	1	125
		% within Profession	100.0%	100.0%	100.0%	100.0%	95.2%	80.6%	100.0%	89.3%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	10.563(a)	P=0.103

Table 7.36: Orthopedics (A)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Orthopedics (A)	yes	Count	0	0	2	0	10	12	0	24
		% within Profession	.0%	.0%	18.2%	.0%	23.8%	17.9%	.0%	17.1%
	no	Count	2	2	9	15	32	55	1	116
		% within Profession	100.0%	100.0%	81.8%	100.0%	76.2%	82.1%	100.0%	82.9%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	5.488(a)	P=0.4 83

Table 7.37: Orthopedics (B)

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Orthopedics (B)	yes	Count	0	0	4	0	7	17	0	28
		% within Profession	.0%	.0%	36.4%	.0%	16.7%	25.4%	.0%	20.0%
	no	Count	2	2	7	15	35	50	1	112
		% within Profession	100.0%	100.0%	63.6%	100.0%	83.3%	74.6%	100.0%	80.0%
Total		Count	2	2	11	15	42	67	1	140
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square	8.342(a)	P=0.214

Table 7.38: Ethnicity – by profession

Crosstab

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Ethnicity	Asian	Count	0	1	0	1	0	3	0	5
		% within Profession	.0%	11.1%	.0%	4.8%	.0%	3.0%	.0%	2.2%
	Black	Count	0	0	0	0	4	1	1	6
		% within Profession	.0%	.0%	.0%	.0%	6.8%	1.0%	5.9%	2.6%
	Coloured	Count	0	0	0	0	1	6	0	7
		% within Profession	.0%	.0%	.0%	.0%	1.7%	5.9%	.0%	3.0%
	Indian	Count	0	0	0	1	3	4	1	9
		% within Profession	.0%	.0%	.0%	4.8%	5.1%	4.0%	5.9%	3.9%
	White	Count	7	8	18	19	51	87	15	205
		% within Profession	100.0%	88.9%	100.0%	90.5%	86.4%	86.1%	88.2%	88.4%
Total		Count	7	9	18	21	59	101	17	232
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.253(a)	24	.624
Likelihood Ratio	24.691	24	.423
Linear-by-Linear Association	.937	1	.333
N of Valid Cases	232		
a 28 cells (80.0%) have expected count less than 5. The minimum expected count is .15.			

Table 7.39: Build – by profession

Crosstab											
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Build	**mesomorph**	**Count**	5	5	14	14	34	71	10	153
		% within Profession	62.5%	55.6%	77.8%	66.7%	57.6%	70.3%	58.8%	65.7%
	ectomorph	**Count**	2	1	2	3	12	17	2	39
		% within Profession	25.0%	11.1%	11.1%	14.3%	20.3%	16.8%	11.8%	16.7%
	endomorph	**Count**	1	3	2	4	13	13	5	41
		% within Profession	12.5%	33.3%	11.1%	19.0%	22.0%	12.9%	29.4%	17.6%
Total		**Count**	8	9	18	21	59	101	17	233
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.341(a)	12	.758
Likelihood Ratio	8.045	12	.782
Linear-by-Linear Association	.007	1	.933
N of Valid Cases	233		
A 10 cells (47.6%) have expected count less than 5. The minimum expected count is 1.34.			

Table 7.40: Abnormalities – by profession

Crosstab											
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Abnormalities	**yes**	**Count**	2	2	4	4	4	17	3	36
		% within Profession	25.0%	25.0%	22.2%	19.0%	6.8%	16.8%	17.6%	15.5%
	no	**Count**	6	6	14	17	55	84	14	196
		% within Profession	75.0%	75.0%	77.8%	81.0%	93.2%	83.2%	82.4%	84.5%
Total		**Count**	8	8	18	21	59	101	17	232
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.542(a)	6	.476
Likelihood Ratio	6.093	6	.413
Linear-by-Linear Association	1.004	1	.316
N of Valid Cases	232		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.24.			

Table 7.41: Congenital vs acquired anomalies – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Congenital	congenital	Count	0	0	1	0	0	4	0	5
		% within Profession	.0%	.0%	25.0%	.0%	.0%	23.5%	.0%	14.3%
	Acquired	Count	0	1	1	1	1	5	2	11
		% within Profession	.0%	100.0%	25.0%	25.0%	25.0%	29.4%	66.7%	31.4%
	Unknown i.e. congenital or acquired	Count	1	0	2	3	2	6	1	15
		% within Profession	50.0%	.0%	50.0%	75.0%	50.0%	35.3%	33.3%	42.9%
	Acquired and unknown	Count	1	0	0	0	0	2	0	3
		% within Profession	50.0%	.0%	.0%	.0%	.0%	11.8%	.0%	8.6%
	Congenital and unknown	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	25.0%	.0%	.0%	2.9%
Total		Count	2	1	4	4	4	17	3	35
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.959(a)	24	.582
Likelihood Ratio	19.596	24	.719
Linear-by-Linear Association	.776	1	.378
N of Valid Cases	35		
a 33 cells (94.3%) have expected count less than 5. The minimum expected count is .03.			

Table 7.42: Kruskal-wallis test – time spent on various activities in a working day

Ranks			
	Profession	N	Mean Rank
Administrative work at a desk	Aromatherapist	9	157.44
	Biokineticist	18	104.61
	Chiropractor	21	107.90
	OT	59	138.36
	Physiotherapist	99	95.13
	Reflexologist	17	107.59
	Total	223	
Interaction with patients	Aromatherapist	9	101.00
	Biokineticist	18	165.83
	Chiropractor	21	129.43
	OT	59	117.05
	Physiotherapist	99	105.32
	Reflexologist	17	60.65
	Total	223	
applying modalities	Aromatherapist	9	126.22
	Biokineticist	18	122.75
	Chiropractor	21	84.50

	OT	59	101.53
	Physiotherapist	99	121.33
	Reflexologist	17	109.06
	Total	223	
Performing manual therapies	**Aromatherapist**	9	154.78
	Biokineticist	18	69.92
	Chiropractor	21	95.81
	OT	59	73.01
	Physiotherapist	99	140.70
	Reflexologist	17	122.12
	Total	223	
Performing physical activity	**Aromatherapist**	9	80.67
	Biokineticist	18	155.31
	Chiropractor	21	113.50
	OT	59	118.49
	Physiotherapist	99	110.02
	Reflexologist	17	69.88
	Total	223	
physicalactivity	**Aromatherapist**	9	81.33
	Biokineticist	18	155.14
	Chiropractor	21	114.93
	OT	59	118.77
	Physiotherapist	99	109.52
	Reflexologist	17	69.88
	Total	223	
Lecturing	**Aromatherapist**	9	157.67
	Biokineticist	18	122.92
	Chiropractor	21	116.64
	OT	59	112.53
	Physiotherapist	99	105.82
	Reflexologist	17	104.71
	Total	223	
Other	**Biokineticist**	1	16.50
	Chiropractor	1	16.50
	OT	6	10.50
	Physiotherapist	7	6.57
	Reflexologist	2	5.50
	Total	17	

Table 7.43: Post hoc tests – age, weight, height and BMI

Multiple Comparisons
Bonferroni

Dependent Variable	(I) Profession	(J) Profession	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
Age	**Massage therapist**	**Aromatherapist**	-4.571	5.470	1.000	-21.39	12.25
		Biokineticist	17.222(*)	4.558	.004	3.20	31.24

		Chiropractor	13.143	4.466	.076	-.59	26.88
		OT	11.855	4.106	.090	-.77	24.48
		Physiotherapist	7.611	4.008	1.000	-4.71	19.94
		Reflexologist	-6.600	4.684	1.000	-21.00	7.80
	Aromatherapist	**Massage therapist**	4.571	5.470	1.000	-12.25	21.39
		Biokineticist	21.794(*)	4.558	.000	7.78	35.81
		Chiropractor	17.714(*)	4.466	.002	3.98	31.45
		OT	16.426(*)	4.106	.002	3.80	29.05
		Physiotherapist	12.182	4.008	.056	-.14	24.51
		Reflexologist	-2.029	4.684	1.000	-16.43	12.38
	Biokineticist	**Massage therapist**	-17.222(*)	4.558	.004	-31.24	-3.20
		Aromatherapist	-21.794(*)	4.558	.000	-35.81	-7.78
		Chiropractor	-4.079	3.287	1.000	-14.19	6.03
		OT	-5.368	2.779	1.000	-13.91	3.18
		Physiotherapist	-9.612(*)	2.631	.007	-17.70	-1.52
		Reflexologist	-23.822(*)	3.577	.000	-34.82	-12.82
	Chiropractor	**Massage therapist**	-13.143	4.466	.076	-26.88	.59
		Aromatherapist	-17.714(*)	4.466	.002	-31.45	-3.98
		Biokineticist	4.079	3.287	1.000	-6.03	14.19
		OT	-1.288	2.625	1.000	-9.36	6.78
		Physiotherapist	-5.532	2.468	.546	-13.12	2.06
		Reflexologist	-19.743(*)	3.459	.000	-30.38	-9.10
	OT	**Massage therapist**	-11.855	4.106	.090	-24.48	.77
		Aromatherapist	-16.426(*)	4.106	.002	-29.05	-3.80
		Biokineticist	5.368	2.779	1.000	-3.18	13.91
		Chiropractor	1.288	2.625	1.000	-6.78	9.36
		Physiotherapist	-4.244	1.734	.319	-9.58	1.09
		Reflexologist	-18.455(*)	2.981	.000	-27.62	-9.29
	Physiotherapist	**Massage therapist**	-7.611	4.008	1.000	-19.94	4.71
		Aromatherapist	-12.182	4.008	.056	-24.51	.14
		Biokineticist	9.612(*)	2.631	.007	1.52	17.70
		Chiropractor	5.532	2.468	.546	-2.06	13.12
		OT	4.244	1.734	.319	-1.09	9.58
		Reflexologist	-14.211(*)	2.843	.000	-22.95	-5.47
	Reflexologist	**Massage therapist**	6.600	4.684	1.000	-7.80	21.00
		Aromatherapist	2.029	4.684	1.000	-12.38	16.43
		Biokineticist	23.822(*)	3.577	.000	12.82	34.82
		Chiropractor	19.743(*)	3.459	.000	9.10	30.38
		OT	18.455(*)	2.981	.000	9.29	27.62
		Physiotherapist	14.211(*)	2.843	.000	5.47	22.95
Weight	**Massage therapist**	**Aromatherapist**	-1.181	6.739	1.000	-21.89	19.53
		Biokineticist	-3.903	5.893	1.000	-22.01	14.21
		Chiropractor	-8.244	5.762	1.000	-25.95	9.46
		OT	5.714	5.225	1.000	-10.34	21.77
		Physiotherapist	2.168	5.097	1.000	-13.50	17.83

		Reflexologist	6.669	5.946	1.000	-11.60	24.94
	Aromatherapist	**Massage therapist**	1.181	6.739	1.000	-19.53	21.89
		Biokineticist	-2.722	5.662	1.000	-20.12	14.68
		Chiropractor	-7.063	5.525	1.000	-24.04	9.92
		OT	6.895	4.963	1.000	-8.36	22.15
		Physiotherapist	3.348	4.828	1.000	-11.49	18.19
		Reflexologist	7.850	5.717	1.000	-9.72	25.42
	Biokineticist	**Massage therapist**	3.903	5.893	1.000	-14.21	22.01
		Aromatherapist	2.722	5.662	1.000	-14.68	20.12
		Chiropractor	-4.341	4.455	1.000	-18.03	9.35
		OT	9.617	3.734	.224	-1.86	21.09
		Physiotherapist	6.071	3.553	1.000	-4.85	16.99
		Reflexologist	10.572	4.690	.528	-3.84	24.99
	Chiropractor	**Massage therapist**	8.244	5.762	1.000	-9.46	25.95
		Aromatherapist	7.063	5.525	1.000	-9.92	24.04
		Biokineticist	4.341	4.455	1.000	-9.35	18.03
		OT	13.958(*)	3.524	.002	3.13	24.79
		Physiotherapist	10.412(*)	3.332	.042	.17	20.65
		Reflexologist	14.913(*)	4.525	.024	1.01	28.82
	OT	**Massage therapist**	-5.714	5.225	1.000	-21.77	10.34
		Aromatherapist	-6.895	4.963	1.000	-22.15	8.36
		Biokineticist	-9.617	3.734	.224	-21.09	1.86
		Chiropractor	-13.958(*)	3.524	.002	-24.79	-3.13
		Physiotherapist	-3.546	2.281	1.000	-10.56	3.46
		Reflexologist	.955	3.817	1.000	-10.78	12.69
	Physiotherapist	**Massage therapist**	-2.168	5.097	1.000	-17.83	13.50
		Aromatherapist	-3.348	4.828	1.000	-18.19	11.49
		Biokineticist	-6.071	3.553	1.000	-16.99	4.85
		Chiropractor	-10.412(*)	3.332	.042	-20.65	-.17
		OT	3.546	2.281	1.000	-3.46	10.56
		Reflexologist	4.501	3.641	1.000	-6.69	15.69
	Reflexologist	**Massage therapist**	-6.669	5.946	1.000	-24.94	11.60
		Aromatherapist	-7.850	5.717	1.000	-25.42	9.72
		Biokineticist	-10.572	4.690	.528	-24.99	3.84
		Chiropractor	-14.913(*)	4.525	.024	-28.82	-1.01
		OT	-.955	3.817	1.000	-12.69	10.78
		Physiotherapist	-4.501	3.641	1.000	-15.69	6.69
Height (m)	**Massage therapist**	**Aromatherapist**	.02589	.04559	1.000	-.1143	.1661
		Biokineticist	-.02125	.03777	1.000	-.1374	.0949
		Chiropractor	-.02839	.03660	1.000	-.1410	.0842
		OT	.08589	.03330	.222	-.0165	.1883
		Physiotherapist	.02230	.03246	1.000	-.0775	.1221
		Reflexologist	.09542	.03857	.297	-.0232	.2140
	Aromatherapist	**Massage therapist**	-.02589	.04559	1.000	-.1661	.1143

		Biokineticist	-.04714	.03956	1.000	-.1688	.0745
		Chiropractor	-.05429	.03845	1.000	-.1725	.0640
		OT	.06000	.03532	1.000	-.0486	.1686
		Physiotherapist	-.00359	.03453	1.000	-.1098	.1026
		Reflexologist	.06952	.04032	1.000	-.0545	.1935
	Biokineticist	**Massage therapist**	.02125	.03777	1.000	-.0949	.1374
		Aromatherapist	.04714	.03956	1.000	-.0745	.1688
		Chiropractor	-.00714	.02874	1.000	-.0955	.0812
		OT	.10714(*)	.02439	.000	.0321	.1822
		Physiotherapist	.04355	.02324	1.000	-.0279	.1150
		Reflexologist	.11667(*)	.03121	.005	.0207	.2126
	Chiropractor	**Massage therapist**	.02839	.03660	1.000	-.0842	.1410
		Aromatherapist	.05429	.03845	1.000	-.0640	.1725
		Biokineticist	.00714	.02874	1.000	-.0812	.0955
		OT	.11429(*)	.02254	.000	.0450	.1836
		Physiotherapist	.05069	.02128	.381	-.0148	.1161
		Reflexologist	.12381(*)	.02978	.001	.0322	.2154
	OT	**Massage therapist**	-.08589	.03330	.222	-.1883	.0165
		Aromatherapist	-.06000	.03532	1.000	-.1686	.0486
		Biokineticist	-.10714(*)	.02439	.000	-.1822	-.0321
		Chiropractor	-.11429(*)	.02254	.000	-.1836	-.0450
		Physiotherapist	-.06359(*)	.01490	.001	-.1094	-.0178
		Reflexologist	.00952	.02561	1.000	-.0692	.0883
	Physiotherapist	**Massage therapist**	-.02230	.03246	1.000	-.1221	.0775
		Aromatherapist	.00359	.03453	1.000	-.1026	.1098
		Biokineticist	-.04355	.02324	1.000	-.1150	.0279
		Chiropractor	-.05069	.02128	.381	-.1161	.0148
		OT	.06359(*)	.01490	.001	.0178	.1094
		Reflexologist	.07312	.02451	.067	-.0023	.1485
	Reflexologist	**Massage therapist**	-.09542	.03857	.297	-.2140	.0232
		Aromatherapist	-.06952	.04032	1.000	-.1935	.0545
		Biokineticist	-.11667(*)	.03121	.005	-.2126	-.0207
		Chiropractor	-.12381(*)	.02978	.001	-.2154	-.0322
		OT	-.00952	.02561	1.000	-.0883	.0692
		Physiotherapist	-.07312	.02451	.067	-.1485	.0023
BMI	**Massage therapist**	**Aromatherapist**	-1.99771	2.32704	1.000	-9.1545	5.1591
		Biokineticist	-.94717	1.92776	1.000	-6.8760	4.9816
		Chiropractor	-2.13447	1.86809	1.000	-7.8798	3.6108
		OT	-.56317	1.69943	1.000	-5.7898	4.6634
		Physiotherapist	.03536	1.65663	1.000	-5.0596	5.1303
		Reflexologist	-.93128	1.96846	1.000	-6.9852	5.1227
	Aromatherapist	**Massage therapist**	1.99771	2.32704	1.000	-5.1591	9.1545
		Biokineticist	1.05054	2.01922	1.000	-5.1596	7.2606
		Chiropractor	-.13676	1.96233	1.000	-6.1719	5.8984
		OT	1.43454	1.80252	1.000	-4.1091	6.9782

		Physiotherapist	2.03308	1.76223	1.000	-3.3866	7.4528
		Reflexologist	1.06643	2.05811	1.000	-5.2633	7.3961
	Biokineticist	Massage therapist	.94717	1.92776	1.000	-4.9816	6.8760
		Aromatherapist	-1.05054	2.01922	1.000	-7.2606	5.1596
		Chiropractor	-1.18730	1.46693	1.000	-5.6988	3.3242
		OT	.38400	1.24507	1.000	-3.4452	4.2132
		Physiotherapist	.98253	1.18599	1.000	-2.6650	4.6300
		Reflexologist	.01589	1.59279	1.000	-4.8827	4.9145
	Chiropractor	Massage therapist	2.13447	1.86809	1.000	-3.6108	7.8798
		Aromatherapist	.13676	1.96233	1.000	-5.8984	6.1719
		Biokineticist	1.18730	1.46693	1.000	-3.3242	5.6988
		OT	1.57130	1.15052	1.000	-1.9671	5.1097
		Physiotherapist	2.16984	1.08631	.988	-1.1711	5.5108
		Reflexologist	1.20319	1.52002	1.000	-3.4716	5.8780
	OT	Massage therapist	.56317	1.69943	1.000	-4.6634	5.7898
		Aromatherapist	-1.43454	1.80252	1.000	-6.9782	4.1091
		Biokineticist	-.38400	1.24507	1.000	-4.2132	3.4452
		Chiropractor	-1.57130	1.15052	1.000	-5.1097	1.9671
		Physiotherapist	.59854	.76052	1.000	-1.7404	2.9375
		Reflexologist	-.36811	1.30720	1.000	-4.3884	3.6522
	Physiotherapist	Massage therapist	-.03536	1.65663	1.000	-5.1303	5.0596
		Aromatherapist	-2.03308	1.76223	1.000	-7.4528	3.3866
		Biokineticist	-.98253	1.18599	1.000	-4.6300	2.6650
		Chiropractor	-2.16984	1.08631	.988	-5.5108	1.1711
		OT	-.59854	.76052	1.000	-2.9375	1.7404
		Reflexologist	-.96664	1.25106	1.000	-4.8143	2.8810
	Reflexologist	Massage therapist	.93128	1.96846	1.000	-5.1227	6.9852
		Aromatherapist	-1.06643	2.05811	1.000	-7.3961	5.2633
		Biokineticist	-.01589	1.59279	1.000	-4.9145	4.8827
		Chiropractor	-1.20319	1.52002	1.000	-5.8780	3.4716
		OT	.36811	1.30720	1.000	-3.6522	4.3884
		Physiotherapist	.96664	1.25106	1.000	-2.8810	4.8143

* The mean difference is significant at the .05 level.

Table 7.44: Pelvic surgery – by profession

Crosstab

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Pelvic surgery	no	Count	8	7	18	20	54	96	14	217
		% within Profession	100.0%	77.8%	100.0%	95.2%	94.7%	96.0%	82.4%	94.3%
	yes	Count	0	2	0	1	3	4	3	13
		% within Profession	.0%	22.2%	.0%	4.8%	5.3%	4.0%	17.6%	5.7%
Total		Count	8	9	18	21	57	100	17	230
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.337(a)	6	.078
Likelihood Ratio	9.438	6	.150
Linear-by-Linear Association	.115	1	.735
N of Valid Cases	230		
a 6 cells (42.9%) have expected count less than 5. The minimum expected count is .45.			

Table 7.45: Abdominal surgery – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
abdominal surgery	no	Count	6	4	17	15	40	71	11	164
		% within Profession	75.0%	44.4%	94.4%	71.4%	70.2%	71.0%	64.7%	71.3%
	yes	Count	2	5	1	6	17	29	6	66
		% within Profession	25.0%	55.6%	5.6%	28.6%	29.8%	29.0%	35.3%	28.7%
Total		Count	8	9	18	21	57	100	17	230
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.339(a)	6	.214
Likelihood Ratio	9.539	6	.145
Linear-by-Linear Association	.309	1	.579
N of Valid Cases	230		
a 3 cells (21.4%) have expected count less than 5. The minimum expected count is 2.30.			

Table 7.46: Low back surgery – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
low back surgery	no	Count	8	8	18	21	56	96	17	224
		% within Profession	100.0%	88.9%	100.0%	100.0%	98.2%	96.0%	100.0%	97.4%
	yes	Count	0	1	0	0	1	4	0	6
		% within Profession	.0%	11.1%	.0%	.0%	1.8%	4.0%	.0%	2.6%
Total		Count	8	9	18	21	57	100	17	230
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.201(a)	6	.518
Likelihood Ratio	5.662	6	.462
Linear-by-Linear Association	.051	1	.821
N of Valid Cases	230		
a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .21.			

Table 7.47: Lower limb surgery – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
lower limb surgery	no	Count	6	7	15	19	52	90	15	204
		% within Profession	75.0%	77.8%	83.3%	90.5%	91.2%	90.0%	88.2%	88.7%
	yes	Count	2	2	3	2	5	10	2	26
		% within Profession	25.0%	22.2%	16.7%	9.5%	8.8%	10.0%	11.8%	11.3%
Total		Count	8	9	18	21	57	100	17	230
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.687(a)	6	.719
Likelihood Ratio	3.126	6	.793
Linear-by-Linear Association	2.132	1	.144
N of Valid Cases	230		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is .90.			

Table 7.48: Trauma – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Trauma	no	Count	5	3	7	5	32	47	8	107
		% within Profession	62.5%	33.3%	38.9%	25.0%	54.2%	47.5%	50.0%	46.7%
	yes	Count	3	6	11	15	27	52	8	122
		% within Profession	37.5%	66.7%	61.1%	75.0%	45.8%	52.5%	50.0%	53.3%
Total		Count	8	9	18	20	59	99	16	229
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.113(a)	6	.311
Likelihood Ratio	7.347	6	.290
Linear-by-Linear Association	.942	1	.332
N of Valid Cases	229		
a 4 cells (28.6%) have expected count less than 5. The minimum expected count is 3.74.			

Table 7.49: Low back injury – by profession

Crosstab

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Low back injury	no	Count	3	3	10	7	22	39	5	89
		% within Profession	60.0%	37.5%	58.8%	33.3%	44.0%	44.3%	50.0%	44.7%
	yes	Count	2	5	7	14	28	49	5	110
		% within Profession	40.0%	62.5%	41.2%	66.7%	56.0%	55.7%	50.0%	55.3%
Total		Count	5	8	17	21	50	88	10	199
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.239(a)	6	.778
Likelihood Ratio	3.258	6	.776
Linear-by-Linear Association	.068	1	.794
N of Valid Cases	199		

a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 2.24.

Table 7.50: Ankle injury – by profession

Crosstab

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Ankle injury	No	Count	3	6	11	14	40	68	8	150
		% within Profession	60.0%	75.0%	64.7%	66.7%	80.0%	77.3%	80.0%	75.4%
	yes	Count	2	2	6	7	10	20	2	49
		% within Profession	40.0%	25.0%	35.3%	33.3%	20.0%	22.7%	20.0%	24.6%
Total		Count	5	8	17	21	50	88	10	199
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.400(a)	6	.757
Likelihood Ratio	3.234	6	.779
Linear-by-Linear Association	2.158	1	.142
N of Valid Cases	199		

a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.23.

Table 7.51: Most severe previous injury – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Most severe previous injury	Lower back	Count	1	4	5	9	14	41	3	77
		% within Profession	33.3%	57.1%	41.7%	52.9%	53.8%	65.1%	42.9%	57.0%
	Hips	Count	0	1	0	0	1	2	0	4
		% within Profession	.0%	14.3%	.0%	.0%	3.8%	3.2%	.0%	3.0%
	Knees	Count	0	1	3	3	4	7	0	18
		% within Profession	.0%	14.3%	25.0%	17.6%	15.4%	11.1%	.0%	13.3%
	Ankles	Count	1	1	3	5	6	11	2	29
		% within Profession	33.3%	14.3%	25.0%	29.4%	23.1%	17.5%	28.6%	21.5%
	Lower back and hips	Count	0	0	0	0	0	0	1	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	.0%	14.3%	.7%
	Lower back and knees	Count	1	0	0	0	1	1	1	4
		% within Profession	33.3%	.0%	.0%	.0%	3.8%	1.6%	14.3%	3.0%
	Knees and ankles	Count	0	0	1	0	0	1	0	2
		% within Profession	.0%	.0%	8.3%	.0%	.0%	1.6%	.0%	1.5%
Total		Count	3	7	12	17	26	63	7	135
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	47.716(a)	36	.092
Likelihood Ratio	28.404	36	.813
Linear-by-Linear Association	1.160	1	.281
N of Valid Cases	135		
a 42 cells (85.7%) have expected count less than 5. The minimum expected count is .02.			

Table 7.52: Do you exercise – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Do you exercise	Yes	Count	7	9	18	19	52	87	16	208
		% within Profession	87.5%	100.0%	100.0%	95.0%	88.1%	86.1%	94.1%	89.7%
	no	Count	1	0	0	1	7	14	1	24
		% within Profession	12.5%	.0%	.0%	5.0%	11.9%	13.9%	5.9%	10.3%
Total		Count	8	9	18	20	59	101	17	232
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.630(a)	6	.466
Likelihood Ratio	8.478	6	.205
Linear-by-Linear Association	2.281	1	.131
N of Valid Cases	232		
a 5 cells (35.7%) have expected count less than 5. The minimum expected count is .83.			

Table 7.53: Swimming – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
swimming	yes	Count	0	1	4	6	9	14	6	40
		% within Profession	.0%	11.1%	22.2%	31.6%	17.3%	16.3%	37.5%	19.3%
	no	Count	7	8	14	13	43	72	10	167
		% within Profession	100.0%	88.9%	77.8%	68.4%	82.7%	83.7%	62.5%	80.7%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.031(a)	6	.236
Likelihood Ratio	8.678	6	.193
Linear-by-Linear Association	.410	1	.522
N of Valid Cases	207		

a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.35.

Table 7.54: Soccer – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Soccer	Yes	Count	0	0	1	0	1	2	0	4
		% within Profession	.0%	.0%	5.6%	.0%	1.9%	2.3%	.0%	1.9%
	no	Count	7	9	17	19	51	84	16	203
		% within Profession	100.0%	100.0%	94.4%	100.0%	98.1%	97.7%	100.0%	98.1%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.322(a)	6	.888
Likelihood Ratio	2.888	6	.823
Linear-by-Linear Association	.001	1	.971
N of Valid Cases	207		

a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .14.

Table 7.55: Tennis – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Tennis	yes	Count	0	0	2	3	0	4	0	9
		% within Profession	.0%	.0%	11.1%	15.8%	.0%	4.7%	.0%	4.3%
	no	Count	7	9	16	16	52	82	16	198
		% within Profession	100.0%	100.0%	88.9%	84.2%	100.0%	95.3%	100.0%	95.7%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.798(a)	6	.067
Likelihood Ratio	12.554	6	.051
Linear-by-Linear Association	1.254	1	.263
N of Valid Cases	207		
a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .30.			

Table 7.56: Squash – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Squash	yes	Count	1	0	2	3	4	7	0	17
		% within Profession	14.3%	.0%	11.1%	15.8%	7.7%	8.1%	.0%	8.2%
	no	Count	6	9	16	16	48	79	16	190
		% within Profession	85.7%	100.0%	88.9%	84.2%	92.3%	91.9%	100.0%	91.8%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.246(a)	6	.643
Likelihood Ratio	5.938	6	.430
Linear-by-Linear Association	.753	1	.386
N of Valid Cases	207		
a 6 cells (42.9%) have expected count less than 5. The minimum expected count is .57.			

Table 7.57: Aerobics – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
aerobics	yes	Count	1	0	3	2	11	14	3	34
		% within Profession	14.3%	.0%	16.7%	10.5%	21.2%	16.3%	18.8%	16.4%
	No	Count	6	9	15	17	41	72	13	173
		% within Profession	85.7%	100.0%	83.3%	89.5%	78.8%	83.7%	81.3%	83.6%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.186(a)	6	.785
Likelihood Ratio	4.646	6	.590
Linear-by-Linear Association	.917	1	.338
N of Valid Cases	207		
A 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.15.			

Table 7.58: Rugby – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Rugby	yes	Count	0	0	1	1	0	1	0	3
		% within Profession	.0%	.0%	5.6%	5.3%	.0%	1.2%	.0%	1.4%
	no	Count	7	9	17	18	52	85	16	204
		% within Profession	100.0%	100.0%	94.4%	94.7%	100.0%	98.8%	100.0%	98.6%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.345(a)	6	.500
Likelihood Ratio	4.905	6	.556
Linear-by-Linear Association	1.120	1	.290
N of Valid Cases	207		
a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .10.			

Table 7.59: Cycling – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Cycling	yes	Count	4	0	7	7	16	27	2	63
		% within Profession	57.1%	.0%	38.9%	36.8%	30.8%	31.4%	12.5%	30.4%
	no	Count	3	9	11	12	36	59	14	144
		% within Profession	42.9%	100.0%	61.1%	63.2%	69.2%	68.6%	87.5%	69.6%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.743(a)	6	.136
Likelihood Ratio	12.506	6	.052
Linear-by-Linear Association	.716	1	.398
N of Valid Cases	207		
a 4 cells (28.6%) have expected count less than 5. The minimum expected count is 2.13.			

Table 7.60: Cricket – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
cricket	yes	Count	0	0	1	1	0	0	0	2
		% within Profession	.0%	.0%	5.6%	5.3%	.0%	.0%	.0%	1.0%
	no	Count	7	9	17	18	52	86	16	205
		% within Profession	100.0%	100.0%	94.4%	94.7%	100.0%	100.0%	100.0%	99.0%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.287(a)	6	.158
Likelihood Ratio	6.979	6	.323
Linear-by-Linear Association	3.109	1	.078
N of Valid Cases	207		
a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .07.			

Table 7.61: Tae-bo – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
tae-bo	yes	Count	0	1	1	1	3	4	1	11
		% within Profession	.0%	11.1%	5.6%	5.3%	5.8%	4.7%	6.3%	5.3%
	no	Count	7	8	17	18	49	82	15	196
		% within Profession	100.0%	88.9%	94.4%	94.7%	94.2%	95.3%	93.8%	94.7%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.121(a)	6	.981
Likelihood Ratio	1.356	6	.968
Linear-by-Linear Association	.011	1	.918
N of Valid Cases	207		
a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .37.			

Table 7.62: Other – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Other	yes	Count	2	1	6	6	16	23	6	60
		% within Profession	28.6%	11.1%	33.3%	31.6%	30.8%	26.7%	37.5%	29.0%
	no	Count	5	8	12	13	36	63	10	147
		% within Profession	71.4%	88.9%	66.7%	68.4%	69.2%	73.3%	62.5%	71.0%
Total		Count	7	9	18	19	52	86	16	207
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.479(a)	6	.871
Likelihood Ratio	2.726	6	.842
Linear-by-Linear Association	.113	1	.736
N of Valid Cases	207		
a 4 cells (28.6%) have expected count less than 5. The minimum expected count is 2.03.			

Table 7.63: Do you smoke – by profession

Smoke * Profession Crosstabulation										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Smoke	yes	Count	1	1	3	1	2	5	1	14
		% within Profession	12.5%	11.1%	16.7%	4.8%	3.5%	5.1%	6.3%	6.1%
	no	Count	7	8	15	20	55	94	15	214
		% within Profession	87.5%	88.9%	83.3%	95.2%	96.5%	94.9%	93.8%	93.9%
Total		Count	8	9	18	21	57	99	16	228
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.366(a)	6	.498
Likelihood Ratio	4.272	6	.640
Linear-by-Linear Association	2.546	1	.111
N of Valid Cases	228		
a 6 cells (42.9%) have expected count less than 5. The minimum expected count is .49.			

Table 7.64: Quit smoking – by profession

quit smoking * Profession Crosstabulation										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
quit smoking	yes	Count	1	0	2	0	6	9	3	21
		% within Profession	33.3%	.0%	18.2%	.0%	14.0%	12.5%	25.0%	13.1%
	no	Count	2	4	9	15	37	63	9	139
		% within Profession	66.7%	100.0%	81.8%	100.0%	86.0%	87.5%	75.0%	86.9%
Total		Count	3	4	11	15	43	72	12	160
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.726(a)	6	.455
Likelihood Ratio	7.647	6	.265
Linear-by-Linear Association	.291	1	.589
N of Valid Cases	160		
a 7 cells (50.0%) have expected count less than 5. The minimum expected count is .39.			

Table 7.65: Kruskal-wallis test for exercise, smoking, alcohol and pregnancy

Ranks			
	Profession	**N**	**Mean Rank**
Times per week	**Aromatherapist**	9	81.00
	Biokineticist	18	116.94
	Chiropractor	19	106.76
	OT	51	83.34
	Physiotherapist	81	93.27
	Reflexologist	15	136.90
	Total	193	
Time per session	**Aromatherapist**	9	94.00
	Biokineticist	18	122.44
	Chiropractor	18	139.47
	OT	50	84.71
	Physiotherapist	82	89.73
	Reflexologist	13	76.27
	Total	190	
How many smoked	**Aromatherapist**	1	7.50
	Biokineticist	3	8.50
	Chiropractor	1	1.00
	OT	2	3.00
	Physiotherapist	4	6.88
	Reflexologist	1	10.50
	Total	12	
How many years smoked	**Aromatherapist**	1	11.50
	Biokineticist	3	5.00
	Chiropractor	1	7.50
	OT	2	1.50
	Physiotherapist	4	7.75
	Reflexologist	1	10.00
	Total	12	
How many smoked (quit)	**Biokineticist**	2	12.25
	OT	5	5.10
	Physiotherapist	7	9.36
	Reflexologist	3	12.50
	Total	17	
How many years smoked (quit)	**Biokineticist**	2	6.00
	OT	6	8.83
	Physiotherapist	8	10.63
	Reflexologist	3	13.33
	Total	19	
How many years quit	**Biokineticist**	2	10.25
	OT	6	6.08
	Physiotherapist	8	10.50
	Reflexologist	3	16.33
	Total	19	

How many units alcohol per day	Aromatherapist	4	56.50
	Biokineticist	13	72.08
	Chiropractor	18	74.67
	OT	39	72.08
	Physiotherapist	71	81.85
	Reflexologist	7	71.29
	Total	152	
How many times pregnant	Aromatherapist	8	68.94
	Biokineticist	3	37.33
	OT	27	49.17
	Physiotherapist	57	53.53
	Reflexologist	14	68.07
	Total	109	

Table 7.66: Alcohol – by profession

drink alcohol * Profession Crosstabulation

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
drink alcohol	yes	Count	5	4	13	18	40	71	7	158
		% within Profession	62.5%	44.4%	72.2%	85.7%	69.0%	71.0%	43.8%	68.7%
	no	Count	3	5	5	3	18	29	9	72
		% within Profession	37.5%	55.6%	27.8%	14.3%	31.0%	29.0%	56.3%	31.3%
Total		Count	8	9	18	21	58	100	16	230
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.415(a)	6	.108
Likelihood Ratio	10.243	6	.115
Linear-by-Linear Association	.077	1	.782
N of Valid Cases	230		

a 2 cells (14.3%) have expected count less than 5. The minimum expected count is 2.50.

Table 7.67: Caesarian section – by profession

Crosstab

			Profession						Total
			Masst	Aroma	Bio	OT	Physio	Reflex	
Caesar	1	Count	1	1	1	6	12	0	21
		% within Profession	100.0%	50.0%	50.0%	50.0%	44.4%	.0%	44.7%
	2	Count	0	0	1	3	10	2	16
		% within Profession	.0%	.0%	50.0%	25.0%	37.0%	66.7%	34.0%
	3	Count	0	1	0	3	5	0	9
		% within Profession	.0%	50.0%	.0%	25.0%	18.5%	.0%	19.1%
	4	Count	0	0	0	0	0	1	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	33.3%	2.1%
Total		Count	1	2	2	12	27	3	47
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.625(a)	15	.118
Likelihood Ratio	15.262	15	.433
Linear-by-Linear Association	.837	1	.360
N of Valid Cases	47		
a 20 cells (83.3%) have expected count less than 5. The minimum expected count is .02.			

Table 7.68: Epidural injection – by profession

Crosstab										
			Profession						Total
			Masst	Aroma	Bio	OT	Physio	Reflex	
Epidural	**yes**	**Count**	3	2	2	13	36	5	61
		% within Profession	60.0%	25.0%	66.7%	54.2%	66.7%	35.7%	56.5%
	no	**Count**	2	6	1	11	18	9	47
		% within Profession	40.0%	75.0%	33.3%	45.8%	33.3%	64.3%	43.5%
Total		**Count**	5	8	3	24	54	14	108
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.165(a)	5	.147
Likelihood Ratio	8.256	5	.143
Linear-by-Linear Association	.659	1	.417
N of Valid Cases	108		
a 6 cells (50.0%) have expected count less than 5. The minimum expected count is 1.31.			

Table 7.69: Kruskal-wallis test for number and age groups of children

Ranks			
	Profession	N	Mean Rank
How many children do you have	**Aromatherapist**	8	149.94
	Biokineticist	16	71.09
	Chiropractor	19	71.03
	OT	53	89.93
	Physiotherapist	93	111.82
	Reflexologist	17	145.24
	Total	206	
Number of infants	**Biokineticist**	1	6.50
	Chiropractor	1	6.50
	OT	4	6.50
	Physiotherapist	7	7.43
	Total	13	
Number of todlers	**Aromatherapist**	1	12.00
	Biokineticist	3	12.00
	Chiropractor	1	12.00
	OT	6	12.00

	Physiotherapist	13	12.92
	Total	24	
Number of children	Aromatherapist	1	26.00
	Biokineticist	4	13.25
	Chiropractor	2	26.00
	OT	6	19.33
	Physiotherapist	21	18.81
	Reflexologist	3	20.33
	Total	37	
Number of teenagers	Aromatherapist	2	14.00
	Chiropractor	1	32.00
	OT	10	12.50
	Physiotherapist	17	19.21
	Reflexologist	3	16.50
	Total	33	
Number of adult children	Aromatherapist	6	17.75
	Chiropractor	1	20.50
	OT	8	20.50
	Physiotherapist	18	23.00
	Reflexologist	11	25.91
	Total	44	

Table 7.70: Medication – by profession

On Medication * Profession Crosstabulation

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
On Medication	yes	Count	1	3	1	4	18	32	6	65
		% within Profession	16.7%	37.5%	5.6%	19.0%	31.0%	32.3%	37.5%	28.8%
	No	Count	5	5	17	17	40	66	10	160
		% within Profession	83.3%	62.5%	94.4%	81.0%	69.0%	66.7%	62.5%	70.8%
	sporadic	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
Total		Count	6	8	18	21	58	99	16	226
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.186(a)	12	.687
Likelihood Ratio	11.180	12	.514
Linear-by-Linear Association	3.525	1	.060
N of Valid Cases	226		

a 11 cells (52.4%) have expected count less than 5. The minimum expected count is .03.

Table 7.71: Conditions / illnesses for which medication is being taken - by profession

q16bwhatfor * Profession Crosstabulation

			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
What for		Count	7	6	17	17	42	69	13	171
		% within Profession	87.5%	66.7%	94.4%	81.0%	71.2%	68.3%	76.5%	73.4%
	Allergies	Count	1	0	0	0	1	1	0	3
		% within Profession	12.5%	.0%	.0%	.0%	1.7%	1.0%	.0%	1.3%
	Asthma	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	asthma and rheumatoid arthritis	Count	0	1	0	0	0	0	0	1
		% within Profession	.0%	11.1%	.0%	.0%	.0%	.0%	.0%	.4%
	blood hypercoagulation	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	chronic polycystic ovary syndrome	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	Contraception	Count	0	0	0	1	0	5	0	6
		% within Profession	.0%	.0%	.0%	4.8%	.0%	5.0%	.0%	2.6%
	contraception and acne	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	contraception and allergies	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	contraception and depression	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	Depression	Count	0	0	1	0	5	0	0	6
		% within Profession	.0%	.0%	5.6%	.0%	8.5%	.0%	.0%	2.6%
	Diabetes	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	Epilepsy	Count	0	0	0	2	0	1	0	3
		% within Profession	.0%	.0%	.0%	9.5%	.0%	1.0%	.0%	1.3%
	generalised back and neck pain	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	glaucoma and HRT	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	hashimotos disease, diabetes and heart disease	Count	0	0	0	0	0	0	1	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	.0%	5.9%	.4%
	heart beat regulation	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	heart disease	Count	0	0	0	1	0	0	0	1
		% within Profession	.0%	.0%	.0%	4.8%	.0%	.0%	.0%	.4%
	Hernia	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	hiatus hernia - heartburn	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	HRT	Count	0	0	0	0	0	2	1	3
		% within Profession	.0%	.0%	.0%	.0%	.0%	2.0%	5.9%	1.3%
	Hypercholestrolemia	Count	0	0	0	0	0	0	1	1

		% within Profession	.0%	.0%	.0%	.0%	.0%	.0%	5.9%	.4%
	Hypertension	Count	0	1	0	0	0	3	0	4
		% within Profession	.0%	11.1%	.0%	.0%	.0%	3.0%	.0%	1.7%
	hypertension and arthritis	Count	0	0	0	0	0	0	1	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	.0%	5.9%	.4%
	hypertension and diabetes	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	hypertension and hypercholestrolemia	Count	0	0	0	0	0	2	0	2
		% within Profession	.0%	.0%	.0%	.0%	.0%	2.0%	.0%	.9%
	hypertension and osteoarthritis	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	hypertension, hypothyroidism and low back pain	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	hypothyroidism	Count	0	1	0	0	0	2	0	3
		% within Profession	.0%	11.1%	.0%	.0%	.0%	2.0%	.0%	1.3%
	hypothyroidism, hypertension, HRT, heartburn and arthritis	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	insulin resistance	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	irritable bowel syndrome	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	osteoperosis	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	raised intracranial pressure, hypercholestrolemia and insulin resistance	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	rheumatoid arthritis	Count	0	0	0	0	0	2	0	2
		% within Profession	.0%	.0%	.0%	.0%	.0%	2.0%	.0%	.9%
	Seizures	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	thyroid dysfunction (unspecified) and arthritis	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	type 1 diabetes	Count	0	0	0	0	0	1	0	1
		% within Profession	.0%	.0%	.0%	.0%	.0%	1.0%	.0%	.4%
	type 2 diabetes	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
	unspecified thyroid pathology and arthritis	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.7%	.0%	.0%	.4%
Total		Count	8	9	18	21	59	101	17	233
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	191.449(a)	234	.981
Likelihood Ratio	140.258	234	1.000
N of Valid Cases	233		

a 273 cells (97.5%) have expected count less than 5. The minimum expected count is .03.

Table 7.72: Job satisfaction – by profession

Like practising * Profession Crosstabulation										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Like practising	Great satisfaction	Count	4	8	10	15	25	57	13	132
		% within Profession	50.0%	88.9%	55.6%	71.4%	44.6%	57.0%	76.5%	57.6%
	satisfaction	Count	3	1	8	5	30	41	4	92
		% within Profession	37.5%	11.1%	44.4%	23.8%	53.6%	41.0%	23.5%	40.2%
	dissatisfaction	Count	0	0	0	0	1	1	0	2
		% within Profession	.0%	.0%	.0%	.0%	1.8%	1.0%	.0%	.9%
	Great dissatisfaction	Count	1	0	0	1	0	1	0	3
		% within Profession	12.5%	.0%	.0%	4.8%	.0%	1.0%	.0%	1.3%
Total		Count	8	9	18	21	56	100	17	229
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.215(a)	18	.148
Likelihood Ratio	21.092	18	.275
Linear-by-Linear Association	.026	1	.873
N of Valid Cases	229		
a 17 cells (60.7%) have expected count less than 5. The minimum expected count is .07.			

Table 7.73: Physical work stress – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
physicalstress	none or little stress	Count	4	2	8	7	21	27	10	79
		% within Profession	50.0%	28.6%	53.3%	35.0%	37.5%	28.4%	83.3%	37.1%
	Stressfull	Count	3	4	5	9	31	51	2	105
		% within Profession	37.5%	57.1%	33.3%	45.0%	55.4%	53.7%	16.7%	49.3%
	Very stressfull	Count	1	1	2	4	4	17	0	29
		% within Profession	12.5%	14.3%	13.3%	20.0%	7.1%	17.9%	.0%	13.6%
Total		Count	8	7	15	20	56	95	12	213
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.221(a)	12	.063
Likelihood Ratio	21.213	12	.047
Linear-by-Linear Association	.083	1	.773
N of Valid Cases	213		
a 10 cells (47.6%) have expected count less than 5. The minimum expected count is .95.			

Table 7.74: Median report on psychological and physical work stress

Report Median			
Profession	**Psychological stress**	**Physical stress**	**physicalstress**
Massage therapist	3.00	2.50	1.5000
Aromatherapist	2.00	2.00	2.0000
Biokineticist	3.00	3.00	1.0000
Chiropractor	3.00	2.00	2.0000
OT	2.00	2.00	2.0000
Physiotherapist	3.00	2.00	2.0000
Reflexologist	3.00	3.00	1.0000
Total	2.00	2.00	2.0000

Table 7.75: Kruskal-wallis test for psychological and physical work stress

Ranks			
	Profession	**N**	**Mean Rank**
Psychological stress	**Aromatherapist**	8	85.13
	Biokineticist	18	115.17
	Chiropractor	21	110.55
	OT	57	82.29
	Physiotherapist	96	116.32
	Reflexologist	16	156.47
	Total	216	
Physical stress	**Aromatherapist**	7	94.07
	Biokineticist	15	115.37
	Chiropractor	20	97.60
	OT	56	108.18
	Physiotherapist	95	92.78
	Reflexologist	12	158.46
	Total	205	
physicalstress	**Aromatherapist**	7	110.50
	Biokineticist	15	87.97
	Chiropractor	20	108.53
	OT	56	97.96
	Physiotherapist	95	112.98
	Reflexologist	12	52.75
	Total	205	

Table 7.76: Kruskal-wallis test for number of years practicing, patients seen per day and hours worked per week

Ranks			
	Profession	N	Mean Rank
Years practising	Aromatherapist	8	132.88
	Biokineticist	18	62.86
	Chiropractor	20	62.08
	OT	54	93.60
	Physiotherapist	95	126.32
	Reflexologist	16	117.19
	Total	211	
patients seen per day	Aromatherapist	7	40.43
	Biokineticist	18	95.03
	Chiropractor	20	116.88
	OT	53	103.28
	Physiotherapist	93	118.41
	Reflexologist	15	33.60
	Total	206	
hours per week	Aromatherapist	7	105.29
	Biokineticist	18	143.72
	Chiropractor	21	121.81
	OT	57	114.58
	Physiotherapist	98	105.14
	Reflexologist	16	58.50
	Total	217	

Table 7.77: Assistant – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Assistant	yes	Count	2	2	2	6	16	18	2	48
		% within Profession	25.0%	25.0%	11.1%	28.6%	28.6%	18.6%	12.5%	21.4%
	No	Count	6	6	16	15	40	79	14	176
		% within Profession	75.0%	75.0%	88.9%	71.4%	71.4%	81.4%	87.5%	78.6%
Total		Count	8	8	18	21	56	97	16	224
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.825(a)	6	.566
Likelihood Ratio	4.961	6	.549
Linear-by-Linear Association	.259	1	.611
N of Valid Cases	224		

a 5 cells (35.7%) have expected count less than 5. The minimum expected count is 1.71.

Table 7.78: Adjustable work surface – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Adjustable work surface	yes	Count	3	3	7	14	20	51	6	104
		% within Profession	42.9%	33.3%	38.9%	66.7%	35.1%	53.1%	37.5%	46.4%
	no	Count	4	6	11	7	37	45	10	120
		% within Profession	57.1%	66.7%	61.1%	33.3%	64.9%	46.9%	62.5%	53.6%
Total		Count	7	9	18	21	57	96	16	224
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.717(a)	6	.137
Likelihood Ratio	9.828	6	.132
Linear-by-Linear Association	.145	1	.703
N of Valid Cases	224		
a 4 cells (28.6%) have expected count less than 5. The minimum expected count is 3.25.			

Table 7.79: Table height – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Table height	too high	Count	0	0	3	1	2	7	0	13
		% within Profession	.0%	.0%	17.6%	4.8%	4.1%	7.5%	.0%	6.1%
	too low	Count	0	0	3	1	12	10	2	28
		% within Profession	.0%	.0%	17.6%	4.8%	24.5%	10.8%	12.5%	13.1%
	neither too high or low	Count	8	9	11	19	34	73	14	168
		% within Profession	100.0%	100.0%	64.7%	90.5%	69.4%	78.5%	87.5%	78.9%
	too high and too low	Count	0	0	0	0	1	3	0	4
		% within Profession	.0%	.0%	.0%	.0%	2.0%	3.2%	.0%	1.9%
Total		Count	8	9	17	21	49	93	16	213
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.956(a)	18	.335
Likelihood Ratio	23.480	18	.173
Linear-by-Linear Association	.022	1	.883
N of Valid Cases	213		
a 18 cells (64.3%) have expected count less than 5. The minimum expected count is .15.			

Table 7.80: Chair height – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Chair height	too high	Count	0	0	0	0	3	0	2	5
		% within Profession	.0%	.0%	.0%	.0%	5.5%	.0%	12.5%	2.3%
	too low	Count	0	0	2	0	6	6	0	14
		% within Profession	.0%	.0%	11.8%	.0%	10.9%	6.5%	.0%	6.4%
	neither too high or low	Count	7	9	15	21	45	87	14	198
		% within Profession	100.0%	100.0%	88.2%	100.0%	81.8%	93.5%	87.5%	90.8%
	too high and too low	Count	0	0	0	0	1	0	0	1
		% within Profession	.0%	.0%	.0%	.0%	1.8%	.0%	.0%	.5%
Total		Count	7	9	17	21	55	93	16	218
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.824(a)	18	.197
Likelihood Ratio	24.518	18	.139
Linear-by-Linear Association	1.385	1	.239
N of Valid Cases	218		

a 20 cells (71.4%) have expected count less than 5. The minimum expected count is .03.

Table 7.81: Other – by profession

Crosstab										
			Profession							Total
			Masst	Aroma	Bio	Chiro	OT	Physio	Reflex	
Other	yes	Count	1	1	3	0	11	15	2	33
		% within Profession	12.5%	11.1%	16.7%	.0%	18.6%	14.9%	11.8%	14.2%
	no	Count	7	8	15	21	46	84	14	195
		% within Profession	87.5%	88.9%	83.3%	100.0%	78.0%	83.2%	82.4%	83.7%
	99	Count	0	0	0	0	2	2	1	5
		% within Profession	.0%	.0%	.0%	.0%	3.4%	2.0%	5.9%	2.1%
Total		Count	8	9	18	21	59	101	17	233
		% within Profession	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.763(a)	12	.803
Likelihood Ratio	11.408	12	.494
Linear-by-Linear Association	1.403	1	.236
N of Valid Cases	233		

a 12 cells (57.1%) have expected count less than 5. The minimum expected count is .17.

Appendix M

SUMMARY OF RESULTS FOR MANUAL THERAPISTS

1) DEMOGRAPHICS

Two hundred and thirty three manual therapists participated in this study, which included: physiotherapists, occupational therapists, biokineticisits, chiropractors, reflexologists, aromatherapists and massage therapists. Physiotherapists made up the majority of the sample (43.3%) with massage therapists making up the minority (3.4%). The mean age of the manual therapists was 37.6yrs and they were primarily white (88.4%) females (84.5%). Anthropometrically, their mean weight was 68.6kg, height was 1.684m, BMI was 24.1932 and body build was mostly mesomorphic (65.1%).

2) INDIVIDUAL RISK FACTORS

Sixteen percent of the sample had a structural anomaly, of which, the majority was unknown (i.e. congenital or acquired) (42.9%), 31.4% were acquired and 14.3% were congenital. In terms of the specific anomalies cited: scoliosis was by far the most common, followed by leg length inequality and spondylolisthesis. The majority of the manual therapists who had had previous surgery had had abdominal surgery (28.7%). More than half of the respondents reported having some form of previous trauma to the low back, hips, knees or ankles (53.3%) and previous low back injury (55.3%). Previous ankle injury (24.6%) and knee injury (23.6%) was also reported by a significant number of manual therapists. The most severe previous injury was low back injury according to 57% of the manual therapists, followed by previous ankle injury (21.5%). The specific diagnoses cited by respondents for their low back injury was disc pathology, soft tissue injury or facet joint pathology in most cases.

3) PSYCHOSOCIAL RISK FACTORS

Sixty two percent of manual therapists were married whereas 27.3% were single and 8.2% were divorced. Approximately 90% of manual therapists exercise. On average they exercise three times a week for 45mins a session and their preferred types of exercise appeared to be: walking (47.3%), jogging (37.7%), cycling (30.4%) swimming (19.3%) and pilates (19.3%). Only a very small percentage (6.1%) of manual therapists indicated they smoke and had on average been smoking ten cigarettes per day for 12yrs. Thirteen percent of them had a history of smoking but had since quit. Up to 69% of manual therapists said they drink alcohol but this was mainly socially or irregularly (e.g. weekends).

Almost 60% of manual therapists had been pregnant and the average number of times was two. Thirty percent of the females reported they had given natural birth with 57% of them indicating they had had an epidural injection with their delivery. Of those females who had indicated having had caesarian-sections, 44.7% had had only one. The average total number of children which manual therapists had was one; with one infant, one toddler, two children, two teenagers and two adults being the average number per age group.

Almost 30% of the manual therapists were on medication. The condition / s for which they were taking medication was most commonly cardiovascular disease (e.g. hypertension and hypercholestrolemia), followed by endocrine disorders (e.g. hypothyroidism) and for contraceptive purposes, then rheumatological conditions (e.g. rheumatoid arthritis) and lastly diabetes, depression or hormone replacement therapy.

In terms of job satisfaction, manual therapists reported great satisfaction (57.6%) or satisfaction (40.2%) in most cases with only 1.3% of them feeling greatly dissatisfied with their work. Forty four percent of manual therapists considered their work psychologically stressful, while 41.7% indicated there was little psychological stress. Almost 50% of manual therapists considered their work physically stressful compared to the 32.4% who felt there was little physical work stress involved.

4) PAIN-RELATED FACTORS

The point prevalence of low back pain in manual therapists was very high (41%), while the one-year prevalence was 59% and the career prevalence was 74%. Approximately 14% of the manual therapists reported that they had a current medical condition that may have been causing or contributing to their low back pain and pregnancy was the medical condition most often reported by the manual therapists.

The intensity of the low back pain experienced by the majority of manual therapists was mild (38.6%) to moderate (36.1%) compared to 21.7% who reported having severe low back pain. The frequency of low back pain in manual therapists was mostly irregular / seldom or intermittent (36.5%) and infrequent (41.3%). On average participants experienced two acute episodes of low back pain in the past year that lasted on average two days. No manual therapists had been absent from work in the last year due to low back pain and in terms of disability, as many as 42.6% of manual therapists reported that their low back pain interfered with leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

More than half (52.5%) of the manual therapists in this study believe that their low back pain was caused by their occupation and 77.2% say their symptoms of low back pain are exacerbated by clinical practice. The stage of life at which most (50.7%) of the respondents experienced their first major episode of low back pain was only once they started work as manual therapists and 62.4% of them reported that they experienced low back pain for the first time in practice within 0-5years of working.

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average the manual therapists in this study had been in practice for 9yrs, saw eight patients per day and worked for 40hrs per week. Only 21.4% of them had an assistant and thus, only 26.5% used assistance with manual handling always with 3.6% using assistance sometimes. Forty six percent of manual therapists used adjustable work surfaces in practice, with the vast majority indicating that their table height (78.9%) and chair height (90.8%) was neither too high nor too low.

The average number of hours that manual therapists spent on various activities throughout the working day was as follows: administrative work at a desk – 3hrs, interaction with patients – 3hrs, applying modalities – 3hrs, performing manual therapy – 3hrs, performing manual / physical activities (e.g. lifting) – 2 hrs, lecturing – 2hrs and “other” – 3.5hrs. Most manual therapists reported that the following work activities / tasks were being performed when low back pain was experienced for the first time in practice: maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (39.1%), lifting (33.3%), bending or twisting (26.1%), transferring a patient (23.9%) and working in an awkward or cramped position (20.3%). Most manual therapists reported that the following work activities / tasks caused their low back pain to recur or be exacerbated in practice: maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (69.6%), working in an awkward or cramped position (44.9%), lifting (44.2%), reaching and working away from the body (43.5%) and bending or twisting (37%). The potential job risk factors for low back pain which were rated the highest (4) by most manual therapists on a scale of 0 to 5, 0 being no problem and 5 being a major problem, were: working in the same position for long periods of time, bending or twisting your back in an awkward way, lifting or transferring dependent patients and continuing to work when injured or hurt.

With regards to work / clinical setting, in general most manual therapists work in a non-hospital / private practice (78.9%) while 28.9% of manual therapists work in a hospital setting and14.2% work in “other’ settings. The specific work / clinical settings which were identified by most manual therapists as the work / clinical setting in which they were doing the majority of their work when they experienced low back pain for the first time in practice and / or in which their low back pain was caused to recur or be exacerbated was: neurological rehabilitation (47.9% and 47.9% respectively) followed by the general musculoskeletal outpatient setting (38.6% and 35%) and elderly care (20.7% and 25%).

Appendix N

SUMMARY OF RESULTS FOR PHYSIOTHERAPISTS

1) DEMOGRAPHICS

One hundred and one physiotherapists participated in this study making up the majority (43.3%) of the total manual therapist sample. Their mean age was 38.39yrs, 89% of them were female and in terms of ethnicity 86,1% were white followed by 5.9% who were coloured. Anthropometrically, their mean weight was 68.21kg, height was 1.6965m and BMI was 23.6180. Their body build was predominantly mesomorphic (70.3%) although 16.8% did indicate they were ectomorphs.

2) INDIVIDUAL RISK FACTORS

Seventeen percent of physiotherapists had a structural anomaly, of which, 35.3% were unknown (i.e. congenital or acquired), 29.4% were acquired and 23.5% were congenital. The majority of previous surgery had by physiotherapists was abdominal (29%) followed by lower limb surgery (10%) and over 50% of physiotherapists reported some form of previous trauma to their low back, hips, knees or ankles. In terms of their previous injuries, low back injury (55.7%) and ankle injury (22.7%) were the most common with low back injury being the most severe according to 65.1% of physiotherapists followed by ankle injury according to 17.5% of them.

3) PSYCHOSOCIAL RISK FACTORS

The marital status among physiotherapists showed that the majority were married (65%) or single (23%) but as many as 11% of them were divorced.
Eighty six percent of the physiotherapists exercised. On average they exercised three times a week for 45mins a session and their preferred types of exercise appeared to be: walking (50%), jogging (43%), cycling (31.4%), pilates (19.8%), aerobics (16.3%) and swimming (16.3%). Very few physiotherapists smoked (5.1%), but those who did, smoked on average eight cigarettes per day and had been smoking for 25yrs while 13% of the sample had a history of smoking but had since quit. Seventy one percent of physiotherapists drink alcohol, mostly socially or irregularly (e.g. weekends).

Sixty six percent of physiotherapists had been pregnant and the average number of times was two. Approximately 33% of this group reported they had given natural birth, with 66.7% of them indicating they had had an epidural injection with their delivery. Of those females who had indicated they had had caesarian sections, 44.4% had had one with 18.5% having had three. The average total number of children which physiotherapists had was one; with one infant, one toddler, two children, two teenagers and two adults being the average number per age group.

Thirty two percent of physiotherapists were on medication; which the majority were taking for contraception (5%), hypertension (3%), hypothyroidism (2%), rheumatoid arthritis (2%) and the combination of hypertension and hypercholestrolemia (2%).

In terms of job satisfaction, most physiotherapists found great satisfaction (57%) or satisfaction (41%) with their work. Psychological work stress in physiotherapists was found to be little according to 46.9%, stressful according to 41.7% and very stressful according to 4.2%. In terms of physical work stress, more than half of the physiotherapists (53.7%) reported that their work was physically stressful with a significant number indicating that it was very physically stressful (17.9%).

4) PAIN-RELATED FACTORS

The point prevalence for low back pain in physiotherapists was 38.6%, the one-month prevalence was 56.7% and the career prevalence was 76.7%. Up to 8% of physiotherapists reported that they currently had a medical condition that may have been causing or contributing to their low back pain.

The intensity of the low back pain experienced by physiotherapists was predominantly mild (38.9%) to moderate (31.9%) while as many as 25% suffered from severe low back pain. Although the frequency of low back pain in physiotherapists was mainly infrequent (43.1%), 13.9% experienced low back pain frequently and 8.3% had it constantly. On average, physiotherapists had at least one acute episode of low back pain in the past year that had lasted two days. No physiotherapists had been absent from work in the past year due to low back pain but in terms of disability, 39.4% of physiotherapists did find their low back pain affected leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

A high percentage of physiotherapists (61.4%) in this study believed that their low back pain was caused by their occupation and 82.9% reported their symptoms of low back pain were exacerbated by clinical practice. The stage of life at which most respondents first experienced a major episode of low back pain was only once they started work as physiotherapists according to 68.2% while 19.7% reportedly experienced low back pain as a student. More than half (55.6%) of the physiotherapists indicated that the number of years they had been working before experiencing low back pain for the first time in practice was 0 to 5yrs followed by 20.8% of them who indicated it was within 6 to 10yrs of practice.

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average, the physiotherapists in this study had been practicing for 13yrs, saw nine patients per day and worked for 40hrs per week. Although only 18.6% of them had an assistant, up to 33% used assistance with manual handling always and 3.1% used assistance sometimes. Fifty three percent of the physiotherapists use adjustable work surfaces. Despite the fact that the majority indicated their table (78.5%) and chair (93.5%) height was neither too high nor too low, 10.8% did report their table height was too low and 7.5% found it too high with 6.5% reporting their chair height was too low.

The average number of hours that physiotherapists spent on various activities throughout their working day was as follows: administrative work at a desk – 3hrs, interaction with patients – 3hrs, applying modalities – 3hrs, performing manual therapy – 4hrs, performing manual / physical activities (e.g. lifting) – 2 hrs, lecturing – 2hrs and "other" – 3hrs. Most manual therapists reported that the following work activities / tasks were being performed when low back pain was experienced for the first time in practice: maintaining a position for prolonged periods of time (34.4%), lifting (32.8%), transferring a patient (25%), working in an awkward or cramped position (21.9%) and performing manual therapy techniques (17.2%). Most manual therapists reported that the following work activities / tasks caused their low back pain to recur or be exacerbated in practice: maintaining a position for prolonged periods of time (75%), working in an awkward or cramped position (50%), reaching and working away from the body (48.4%), lifting (37.5%) and performing manual therapy (35.9%). The potential job risk factors for low back pain which were rated highest (4) by most physiotherapists on a scale of 0 to 5, 0 being no problem and 5 being a major problem were: working in the same position for long periods of time, bending or twisting the back in an awkward way, lifting or transferring dependent patients and continuing to work when injured or hurt. Work schedule and inadequate training in injury prevention were considered the least problematic and were rated a 0.

Most physiotherapists worked in a non-hospital / private practice setting (77.8%) but as many as 39.4% of physiotherapists worked in a hospital setting and 14.9% worked in "other" settings. The specific work / clinical settings which were identified by most manual therapists as the work / clinical setting in which they were doing the majority of their work when they experienced low back pain for the first time in practice and / or in which their low back pain was caused to recur or be exacerbated was: neurological rehabilitation (53.7%% and 56.7% respectively) followed by the general musculoskeletal outpatient setting (34.3% and 40.3% respectively) and elderly care (29.9% and 29.9% respectively).

Appendix O

SUMMARY OF RESULTS FOR OCCUPATIONAL THERAPISTS

1) DEMOGRAPHICS

Fifty-nine occupational therapists participated in the study, making up 25.3% of the total manual therapist sample. Their mean age was 34.15yrs and they were almost all female (98.3%). Although most occupational therapists were white (86.4%) there were a significant number of Black (6.8%) and Indian (5.1%) participants as well. Anthropometrically, their average weight was 65.66kg, height was 1.6329m, BMI was 24.2166 and the majority (58%) of them were mesomorphs followed by 22% who were endomorphic in build.

2) INDIVIDUAL RISK FACTORS

Only 6.8% of occupational therapists had structural anomalies of which 50% were unknown (i.e. congenital or acquired), 25% were acquired and 25% were congenital and unknown. Previous surgery in occupational therapists was mostly abdominal surgery (29.8%) and 45.8% of occupational therapists had some form of previous trauma to their low back, hips, knees or ankles. In terms of previous injuries, low back injury (56%) was the most common followed by knee injury (24%) and ankle injury (20%). According to more than half of the responding occupational therapists, their most severe previous injury was low back injury (53.8%), followed by ankle injury (21.1%).

3) PSYCHOSOCIAL RISK FACTORS

The majority of occupational therapists were married (62.7%) or single (32.2%) with only 3.4% of them being divorced. Eighty eight percent of them exercised. On average they exercised three times per week for 45mins per session and the type of exercise performed by most of the occupational therapists was: walking (46.2%), cycling (30.8%), jogging (28.8%), aerobics (21.2%) and swimming (17.3%). Only 4% of occupational therapists smoked. On average they smoked 3.5 cigarettes per day and had been smoking for 4.5yrs while 14% of the occupational therapists had a history of smoking but had since quit. Sixty nine percent of the respondents indicated they drink alcohol, mostly socially or irregularly (e.g. weekends).

Approximately 47% of the occupational therapists had been pregnant and the average number of times was two. A quarter (25.4%) of these respondents reported they had given natural birth with more than half of them (54.2%) having had an epidural injection with their delivery. Of those who had had caesarian sections, 50% had at least one while 25% had either two or three. The average total number of children which occupational therapists had was one; with one infant, one toddler, two children, one teenager and two adults being the average number per age group. Also, 31% of occupational therapists were on medication, which the majority were taking for depression (8.5%).

In terms of job satisfaction, most occupational therapists were satisfied (53.6%) or greatly satisfied (44.6%) with their work. Occupational therapists rated the psychological stress in their profession as stressful (68.4%) in most cases with almost 10% of the occupational therapists considering their work very psychologically stressful. Only 19.3% of occupational therapists felt their work involved little psychological work stress. In terms of physical work stress, more than half (55.4%) of the occupational therapists found their work physically stressful, 7.1% considered it to be very physically stressful and 32.1% reported little physical work stress.

4) PAIN-RELATED FACTORS

The point prevalence for low back pain in occupational therapists was 42.4%, the one-year prevalence was 69.8% and career prevalence of low back pain was 83%. As many as 24.4% of occupational therapists reported that they had a current medical condition that may have been causing or contributing to their low back pain.

In the majority of cases the intensity of the occupational therapists' low back pain was moderate (43.2%) or mild (38.6%) but as many as 15.9% of them indicated severe low back pain. Their low back pain was predominantly infrequent (53.3%) although 8.9% of the sample found their low back pain was frequent and 4.4% suffered with low back pain constantly. On average, occupational therapists had two acute episodes of low back pain in the past year with an average two day duration. No occupational therapists were absent from work in the past year due to low back pain but in terms of disability, 50% of them did find that their low back pain interfered with leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

More than half of the occupational therapists (53.5%) believed that their low back pain was caused by their occupation and 90.7% of them felt that their symptoms of low back pain were exacerbated by clinical practice. The stage of life at which the majority of occupational therapists first experienced a major episode of low back pain was only once they started working as an occupational therapist according to 53.5% of participants while 30.2% of them reported that they already had an episode of low back pain while studying. In addition, the number of years which most occupational therapists had been working when they experienced low back pain for the first time in practice was within 0 to 5yrs (71.1%).

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average, the occupational therapists in this study had been in practice for 7.5yrs, saw eight patients per day and worked for 40hrs per week. Twenty nine percent of them had an assistant with 38.2% using assistance with manual handling in practice always and 9.1% using assistance sometimes. Adjustable work surfaces were used by 35.1% of occupational therapists. The majority of occupational therapists felt their table (69.4%) and chair (81.8%) heights were neither too high nor too low; however, there were a small number of occupational therapists that indicated their table height and chair heights were too low (24.5% and 10.9% respectively) or too high (4.1% and 5.5% respectively).

The average number of hours that occupational therapists spent on various activities throughout their working day was as follows: administrative work at a desk – 3hrs, interaction with patients – 4hrs, applying modalities – 3hrs, performing manual therapy – 2hrs, performing physical / manual activities (e.g. lifting) – 3hrs, lecturing – 2hrs and “other' – 4hrs. Most manual therapists reported that the following work activities / tasks were being performed when low back pain was experienced for the first time in practice: maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (46.3%), lifting (39%), transferring a patient (31.7%), bending or twisting (29.3%) and responding to an unanticipated or sudden movement by a patient (19.5%). Most manual therapists reported that the following work activities / tasks caused their low back pain to recur or be exacerbated in practice: maintaining a position for prolonged periods of time (70.7%), lifting (68.3%), bending or twisting (46.3%), transferring a patient (43.9%), working in an awkward or cramped position (41.5%) and reaching and working away from the body (41.5%). The potential job risk factors for low back pain that were rated the highest (4) by most of the occupational therapists on a scale of 0 to 5, 0 being no problem and 5 being a major problem, were: working in the same position for long periods of time, bending or twisting your back in an awkward way, lifting or transferring dependent patients, continuing to work when injured or hurt, unanticipated or sudden movement or fall by a patient and carrying / lifting or moving heavy materials and equipment.

Mostly occupational therapists worked in a non-hospital / private practice (63.2%) but as many as 43.9% worked in a hospital setting and 18.6% reported working in “other” settings. The specific work / clinical settings which were identified by most manual therapists as the work / clinical setting in which they were doing the majority of their work when they experienced low back pain for the first time in practice and / or in which their low back pain was caused to recur or be exacerbated was: neurological rehabilitation (71.4% and 59.5% respectively), paediatrics (42.9% and 50% respectively), learning difficulties and physical impairments (23.8% and 35.7% respectively) and orthopaedics in a hospital setting (23.8% and 16.7% respectively).

Appendix P

SUMMARY OF RESULTS FOR BIOKINETICISTS

1) DEMOGRAPHICS

Eighteen biokineticists participated in the study, making up 7.7% of the total manual therapist sample. Their mean age was 28.78yrs, ethnically they were white (100%) and although the majority were female (61.1%) there was also a large number of male biokineticists (38.9%). Anthropometrically, their mean weight was 74.28kg, height was 1.74m, BMI was 24.6006 and body build was mesomorphic (77.8%) predominantly with a significant percentage reporting they were ectomorphic (11.1%) and endomorphic (11.1%).

2) INDIVIDUAL RISK FACTORS

As many as 22.2% of biokineticists had structural anomalies, of which, 50% were unknown (i.e. congenital or acquired), 25% were acquired and 25% were congenital. Previous surgery was not common but the majority of biokineticists who had had previous surgery had lower limb (16.7%) and abdominal surgery (5.6%). Sixty one percent of biokineticists had a history of previous trauma to their low back, hips, knees or ankles. In terms of previous injury it was previous knee injury (47.1%) that was cited by the majority of biokineticists, followed by low back injury (41.2%) and ankle injury (35.3%). The most severe previous injury was low back injury according to 41.7% of the respondents followed by knee injury (25%) and ankle injury (25%).

3) PSYCHOSOCIAL RISK FACTORS

Biokineticists in this study were either married (55.6%) or single (44.4%). All of the biokineticists exercised (100%). On average, they exercised four times per week for 60mins per session and their preferred types of exercise included: jogging (66.7%), weight training (38.9%), cycling (38.9%), pilates (33.3%), "other" (33.3%) and swimming (22.2%). About 17% of biokineticists smoked. On average they smoked ten cigarettes per day and had been smoking for 10 yrs. Eighteen percent of them had a history of smoking but had since quit. Alcohol was drunk by 72.2% of the biokineticists but mostly socially or irregularly (e.g. weekends).

In terms of previous pregnancies, 27.3% of biokineticists had been pregnant. The average number of times they had been pregnant was two. Only 5.6% of this group reported they had given natural birth with as many as 66.7% of them indicating they had had an epidural injection with their delivery. Of those who had had caesarian-sections, 50% had one and

50% had two. The total number of children biokineticists had on average was 0, with one infant, one toddler or one child being the average number per age group.

Only 5.6% of the biokineticists were on medication, which they were taking for depression (5.6%).

Biokineticists found their work either greatly satisfying (55.6%) or satisfying (44.4%). In terms of psychological work stress, work as a biokineticist involved little psychological work stress according to the majority (61.1%) but was rated as psychologically stressful by 27.8% of participants and very psychologically stressful by 11.1% of them. The physical work stress in biokineticists was rated similarly, with the majority (53.3%) indicating there was little physical work stress involved, followed by 33.3% who found it physically stressful and 13.3% who reported it was very physically stressful.

4) <u>PAIN-RELATED FACTORS</u>

The point prevalence of low back pain in biokineticists was 50%, the one-year prevalence was 62.5% and career prevalence was 68.8%. Fifteen percent of biokineticists reported they had a current medical condition that may have been causing or contributing to their low back pain.

The intensity of low back pain in biokineticists was predominantly mild (65.5%) to moderate (23.1%) but 7.7% of this group indicated their low back pain was severe or was the worst imaginable. The frequency of low back pain was cited as irregular / seldom or infrequent in most cases (38.5% and 38.5% respectively) but 7.7% had frequent low back pain and 15.4% suffered from low back pain constantly.   On average, biokineticists had 2.5 acute episodes of low back pain in the past year that lasted an average duration of two days. No biokineticists had been absent from work in the past year due to low back pain but in terms of disability, 31% of them felt their low back pain had interfered with leisure activities and activities of daily living.

5) <u>PAIN-RELATED / WORK-RELATED FACTORS</u>

Forty six percent of biokineticists believed that their low back pain was caused by their occupation and 69% felt their symptoms of low back pain were exacerbated by clinical practice. The stage of life at which the majority of biokineticists experienced a major episode of low back pain for the first time was as a student (46.2%) and once they started working as a manual therapist (38.5%) while most biokienticists experienced an episode of low back pain in practice for the first time within 0 to 5yrs (69.2%) of working.

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average the biokineticists in this study had been in practice for 5yrs, saw six patients per day and worked 45hrs per week. Only a small percentage of them (11.1%) actually had an assistant and thus an equally small percentage (16.7%) used assistance with manual handling. Thirty nine percent of biokineticists utilized adjustable work surfaces. The majority found their table and chair heights to be neither too high nor too low however, however, table height was reported to be too high (17.6%) or too low (17.6%) some of the participants and chair height was also reportedly too low according to 11.8% of biokineticists.

The average number of hours spent by biokineticists on various activities throughout their working day was as follows: administrative work at a desk – 2.5hrs, interaction with patients – 4.5hrs, applying modalities – 3hrs, performing manual therapy – 2 hrs, performing physical / manual activities (e.g. lifting) – 3hrs and lecturing – 2hrs. Most manual therapists reported that the following work activities / tasks were being performed when low back pain was experienced for the first time in practice: bending or twisting (66.7%), lifting (55.6%) and maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (44.4%). The work activities / tasks which the majority of biokineticists felt, caused their low back pain to recur or be exacerbated in practice, were: maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (66.7%), lifting (33.3%), performing repetitive tasks (33.3%) and pushing or pulling (33.3%). The potential job risk factors for low back pain which were rated the highest (4) by most of the biokineticists on a scale of 0 to 5, 0 being no problem and 5 being a major problem, were: treating a large number of patients in one day, bending or twisting your back in an awkward way, lifting or transferring dependent patients, continuing to work when injured or hurt and carrying / lifting or moving heavy materials and equipment.

In general, biokineticists appeared to work predominantly in a non-hospital / private practice setting (83.3%), although a small number did work in a hospital (5.6%) or “other” (16.7%) setting. The specific work / clinical settings in which most biokineticists were working when they experienced low back pain for the first time in practice were: the general musculoskeletal outpatient setting (63.6%), elderly care (18.2%) and orthopaedics in hospital (18.2%). The specific work / clinical settings in which the majority of biokineticists felt their low back pain tended to be exacerbated or caused to recur was: elderly care (36.4%), neurological rehabilitation (36.4%), the learning difficulties and physical impairments clinical setting (36.4%) and orthopaedics in hospital (36.4%).

Appendix Q

SUMMARY OF RESULTS FOR CHIROPRACTORS

1) DEMOGRAPHICS

Twenty-one chiropractors participated in this study, making up 9% of the total sample of manual therapists. Their mean age was 32.86yrs and the majority were male (71.45) and white (90.5%). Anthropometrically, their mean weight was 78.62kg, height was 1.7471m and BMI was 25.7879. Chiropractors had a mesomorphic body build (66.7%) in most cases, but endomorphic (9%) and ectomorphic (14.3%) body builds were also reported.

2) INDIVIDUAL RISK FACTORS

Nineteen percent of the chiropractors had structural anomalies, of which 75% were unknown (i.e. congenital or acquire) and 25% were acquired. Previous surgery was predominantly abdominal (28.6%) followed by lower limb surgery (9.5%). Seventy five percent of chiropractors had some form of previous trauma to their low back, hips, knees or ankles and low back injury (66.7%) appeared to be the most common previous injury, followed by knee injury (38.1%) and ankle injury (33.3%). Low back injury (52.9%) was also the most severe injury according to more than half of the chiropractors.

3) PSYCHOSOCIAL RISK FACTORS

There were no divorcees among the chiropractors and the majority were either married (52.4%) or single (47.6%). Ninety five percent of the chiropractors exercised. On average, they exercised four times per week for 60mins per session and the types of exercise preferred by the majority of chiropractors was: jogging (42.1%), golf (36.8%), weight training (36.8%) and cycling (36.8%). Only 4.8% of the chiropractors smoked, on average 0.5 cigarettes per day, for 25 yrs. In addition, 85.7% drank alcohol but mostly socially or irregularly (e.g. weekends).

None of the female chiropractors participating in this study had ever been pregnant and the average total number of children which chiropractors had appeared to be 0. Chiropractors who did have children however had one infant, one toddler, two children, three teenagers or two adults in terms of the average number of children per age.

Nineteen percent of the chiropractors were on medication, which the majority were taking for epilepsy (9.5%), contraception (4.8%) and cardiovascular disease (4.8%).

In terms of job satisfaction, the majority of chiropractors felt great satisfaction (71.4%) or satisfaction (23.8%). As many as 4.8% of chiropractors were however, greatly dissatisfied with their job. Psychological work stress in chiropractic was reported to be little (52.4%) in the majority of cases but a significant number did find it psychologically stressful (42.9%) and 4.8% reported it was very stressful psychologically. In terms of physical work stress, the majority of respondents considered chiropractic to be physically stressful (45%) with 20% reporting that it was very physically stressful.

4) PAIN-RELATED FACTORS

The point prevalence of low back pain in chiropractors was 47.6%, the one-year prevalence was 52.4% and career prevalence was 71.4%. Approximately 6% of chiropractors reported they had a current medical condition that may have been causing or contributing to their low back pain.

The intensity of the chiropractors' low back pain was predominantly moderate (58.5%) although severe pain was reported by 11.8% of the subjects. A low back pain episode occurred irregularly or seldom according to more than half of the chiropractors (52.9%) although it did occur frequently in 17.6% of them and was constant in 5.9% of them. The average number of acute episodes of low back pain in chiropractors in the last year was one, with an average duration of two days. No chiropractors were absent from work in the past year due to low back pain and in terms of disability, 41% of them felt their low back pain interfered with leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

Fifty three percent of chiropractors believed that their low back pain was caused by their occupation and 76.5% of them felt their low back pain was exacerbated by clinical practice. The stage of life at which the majority of chiropractors experienced their first major episode of low back pain was as a student (50%) with up to 25% of them having already experienced low back pain before becoming a student. The first major episode of low back pain to occur in practice occurred within the first five years of work according to 82.4% of chiropractors.

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average, the chiropractors in this study had been working 3.75yrs; saw nine patients per day and worked for 40hrs per week. Twenty seven percent of them had an assistant but none of the chiropractors used assistance with manual handling. The majority of chiropractors used adjustable work surfaces (66.7%) and although in most cases table height and chair height were considered to be neither too high nor too low, 4.8% of chiropractors did indicate that their table height was too low while 4.8% said it was too high.

The number of hours spent by chiropractors on various activities throughout their working day was as follows: administrative work at a desk – 3hrs, interaction with patients – 4hrs, applying modalities – 2hrs, performing manual therapy – 3hrs, performing physical / manual activity – 2hrs, lecturing – 2hrs and “other” – 6hrs. The work activities / tasks that the majority of chiropractors were performing when they experienced low back pain for the first time in practice were as follows: bending or twisting (46.2%), maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (38.5%), performing manual therapy techniques (23.1%) and reaching and working away from the body (23.1%). The work activities / tasks that the majority of chiropractors felt caused their low back pain to recur or be exacerbated in practice were: maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (69.2%), bending or twisting (53.8%), performing manual therapy techniques (53.8%), reaching and working away from the body (38.5%) and working in an awkward or cramped position (38.5%). The potential job risk factors for low back pain which were rated highest by the majority of chiropractors on a scale of 0 to 5, 0 being no problem and 5 being a major problem, were: treating a large number of patients in one day (4.5), continuing to work when injured or hurt (4.5), working in the same position for long periods of time (4), bending or twisting your back in an awkward way (4) and lifting or transferring dependent patients (4).

In general, chiropractors worked in a non-hospital / private practice (95.2%) with only a very small number working in a hospital setting (4.8%). The specific work / clinical settings which were identified by most manual therapists as the work / clinical setting in which they were doing the majority of their work when they experienced low back pain for the first time in practice and / or in which their low back pain was caused to recur or be exacerbated was in the general musculoskeletal outpatient setting (93.3% and 80% respectively) and elderly care (13.3% and 13.3% respectively).

Appendix R

SUMMARY OF RESULTS FOR REFLEXOLOGISTS

1) DEMOGRAPHICS

Seventeen reflexologists participated in this study, making up 7.3% of the total sample of manual therapists. Their mean age was 52.6yrs, they were all (100%) female and although they were predominantly white (88.2%), 5.9% of them were Indian and 5.9% were Black. Anthropometrically, their mean weight was 63.71kg, height was 1.6233m and BMI was 24.5847. The majority were mesomorphs (58.8%) followed by 29.4% who were endomorphs and 11.8% who were ectomorphs..

2) INDIVIDUAL RISK FACTORS

Eighteen percent of the reflexologists had structural anomalies of which 66.7% were acquired and 33.3% were unknown (i.e. congenital or acquired). Abdominal surgery (35.3%) was the most common previous surgery had by reflexologists, followed by pelvic surgery (17.6%) and lower limb surgery (11.8%). Half (50%) of the reflexologist sample had had previous trauma to their low back, hips, knees or ankles and 50% of them had a history of previous low back injury while 20% had a history of previous ankle injury. The most severe previous injury was low back injury (42.9%) followed by ankle injury (28.6%).

3) PSYCHOSOCIAL RISK FACTORS

Marital status varied considerably among reflexologists in this study, with the majority being married (56.3%) and equal numbers being divorced (18.8%) and widowed (18.8%). Ninety four percent of reflexologists exercised. On average they exercised five times per week for 45mins per session and their preferred types of exercise appeared to be: walking (68.8%), yoga (43.8%), swimming (37.5%) and “other” (37.5%). Six percent of reflexologists smoked, on average they smoked 15 cigarettes per day and had been smoking for 40yrs. As many as 25% of reflexologists had a history of smoking but had since quit while less than half of the subjects (43.8%) drink alcohol, mostly socially or irregularly (e.g. weekends).

Eighty two percent of reflexologists in this study had been pregnant and the average number of times they had been pregnant was 2.5 times. Approximately 65% of them reported they had given natural birth with 36% of them indicating they had had an epidural injection with their delivery. Of those women who had indicated they had had caesarian sections, 66.7% had two while 33.3% of them had four. The average total number of children which reflexologists had was two; with no infants, no toddlers, two children, two teenagers and two adults being the average number per age group.

Thirty eight percent of reflexologists were on medication, which the majority were taking for the combination of hashimoto's disease, diabetes and heart disease (5.9%), the combination of hypertension and arthritis (5.9%), hormone replacement therapy (5.9%) and hypercholestrolemia (5.9%).

All reflexologists considered their work to be either greatly satisfying (76.5%) or satisfying (23.5%). In terms of psychological work stress, the majority (50%) of participants felt there was little psychological work stress involved in reflexology, 31.3% said there was no psychological work stress involved and only 18.8% of the subjects felt reflexology was psychologically stressful. Similarly in terms of physical work stress, the majority (58.3%) of reflexologists felt their work involved only a little physical work stress while 25% felt it involved no physical work stress and only 16.7% found it physically stressful.

4) PAIN-RELATED FACTORS

The point prevalence of low back pain in reflexologists was 33.3%, the one-year prevalence was 50% and career prevalence was 50%. Eighteen percent of reflexologists reported they had a current medical condition that may have been causing or contributing to their low back pain.

The intensity of low back pain in reflexologists varied, but was equally distributed between severe (36.4%) and mild (34.4%) pain. The frequency of low back pain was predominantly irregular / seldom (36.4%) or infrequent (27.3%) but frequent and constant pain was cited by 18.2% of the respondents respectively. On average, reflexologists suffered from one acute episode of low back pain in the past year with a duration of 1.25days. No reflexologists were absent from work in the past year due to low back pain and in terms of disability, 22% of them felt their low back pain interfered with leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

Twenty percent of the reflexologists believed their low back pain was caused by their occupation and 20% felt their symptoms of low back pain were exacerbated by clinical practice. The stage of life at which the majority of reflexologists experienced their first major episode of low back pain was before becoming a student (75%) and the majority of reflexologists experienced low back pain for the first time in practice within 0 to 5yrs (44.4%) and 11 to 15yrs (33.3%) of working.

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average, reflexologists in this study had been working for 10yrs, saw three patients per day and worked for 20hrs per week. Thirteen percent of them had an assistant although only 6.3% of them used assistance with manual handling. Adjustable work surfaces was utilized by 37.5% of reflexologists and although the majority (87.5%) of them felt their table and chair height was neither too high nor too low, 12.5% of them did indicate their table height was too low and their chair height was too high (12.5%).

The average number of hours that reflexologists spent on various activities throughout their working day was as follows: administrative work at a desk – 3hrs, interaction with patients – 3 hrs, applying modalities – 3hrs, performing manual therapy – 4hrs, performing physical / manual activity – 2hrs, lecturing – 2hrs and “other” – 3hrs. The work activities / tasks that the majority of chiropractors were performing when they experienced low back pain for the first time in practice were as follows: bending or twisting (50%), working in an awkward or cramped position (50%) and reaching and working away from the body (33.3%). The work activities / tasks that the majority of chiropractors felt caused their low back pain to recur or be exacerbated in practice were: reaching and working away from the body (50%), working in an awkward or cramped position (50%), working when physically fatigued (33.3%) and maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (33.3%). The potential job risk factors for low back pain which were rated highest by the majority of reflexologists on a scale of 0 to 5, 0 being no problem and 5 being a major problem, were: working in the same position for long periods of time (4.5), continuing to work when injured or hurt (4) and working in awkward or cramped positions (4).

In general, the work / clinical setting in which most reflexologists practiced was a non-hospital / private practice (93.8%), followed by “other” settings (11.8%). No reflexologists worked in a hospital setting. None of the specific work / clinical settings were implicated by reflexologists in the development and / or exacerbation of their low back pain.

Appendix S

SUMMARY OF RESULTS FOR AROMATHERAPISTS

1) DEMOGRAPHICS

Nine aromatherapists participated in this study making up 3.9% of the total manual therapist sample. Their mean age was 50.57yrs, they were all female (100%) and were predominantly white (88.9%) although a significant number were Asian (11.1%). Anthropometrically, their mean weight was 71.56kg, height was 1.6929m, BMI was 25.6511 and body build was mesomorphic (55.6%) or endomorphic (33.3%) in the majority of cases.

2) INDIVIDUAL RISK FACTORS

Twenty five percent of the aromatherapists had structural anomalies of which all were acquired (100%) anomalies. In terms of previous surgery, abdominal surgery (55.6%) was the most common followed by an equal distribution between pelvic (22.2%) and lower limb (22.2%) surgery. As many as 66.7% of them had had some form of previous trauma to their low back, hips, knees or ankles. The majority of aromatherapists in this study indicated that they had had previous knee injury (62.5%) and that was followed by low back injury (50%) and hip injury (37.5%). The most severe previous injury according to the majority of aromatherapists was their low back injury (57.1%).

3) PSYCHOSOCIAL RISK FACTORS

Seventy eight percent of the aromatherapists were married and 11.1% were divorced. All (100%) of the aromatherapists exercised. On average they exercised three times a week for 45mins per session and the types of exercise performed by most of them included: walking (77.8%), pilates (44.4%) and yoga (33.3%). Eleven percent of the respondents smoked, on average they smoked ten cigarettes per day and had been smoking for 41yrs. Forty four percent of the aromatherapists drank alcohol, on average, 3.5 units per day.

Eighty nine percent of the aromatherapists in this study had been pregnant and the average number of times they had been pregnant was three. As many as 78% of them reported they had given natural birth with 25% indicating they had an epidural injection with their delivery. Of those who had indicated they had had caesarian sections, 50% had one and 50% had had three. The average total number of children which aromatherapists had was two; with 0 infants, one toddler, two children, 1.5 teenagers and two adults being the average number per age group.

Thirty eight percent of aromatherapists were on medication, which the majority were taking for the combination of asthma and rheumatoid arthritis (11.1%), hypertension (11.1%) and hypothyroidism (11.1%).

All aromatherapists considered their work to be either greatly satisfying (88.9%) or satisfying (11.1%). In terms of psychological work stress, the majority of aromatherapists felt their work involved either little psychological stress (37.5%) or considered it psychologically stressful (37.5%) while 25% found it very psychologically stressful. In terms of physical work stress, more than half of the aromatherapists (57.1%) considered their work physically stressful, followed by 28.6% who felt there was little physical stress and 14.3% who said it was very physically stressful.

4) PAIN-RELATED FACTORS

The point prevalence of low back pain in aromatherapists was 55.6%, the one-year prevalence was 12.5% and the career prevalence was 37.5%. No aromatherapists reported having any other medical condition/s that may have been causing or contributing to their low back pain.

The average intensity of the low back pain in aromatherapists was severe (80%) or moderate (20%) and the frequency was found to be constant (40%) or infrequent (40%) in most cases. The aromatherapists appeared to have suffered from approximately 12 acute episodes of low back pain in the past year with each episode lasting an average duration of 1.75days. No aromatherapists had been absent from work in the past year due to low back pain but in terms of disability as many as 80% of them felt their low back pain interfered with leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

Twenty percent of the aromatherapists believed that their low back pain was caused by their occupation and 40% felt their symptoms of low back pain were exacerbated by clinical practice. The stage of life at which the majority of aromatherapists (80%) had experienced a major episode of low back pain for the first time was before becoming a student, while in 20% of them it was as a student. In terms of the number of years they had been working when experiencing low back pain for the first time in practice; 40% reported it was within 0 to 5yrs and 40% reported it was within 6 to 10yrs of work.

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average, aromatherapists had been in practice for 11yrs, saw five patients per day and worked for 40hrs per week. Twenty five percent of them had an assistant and 25% thus used assistance with manual handling. Up to 33.3% of them made use of adjustable work surfaces and all aromatherapists indicated that their table and chair heights were neither too high nor too low.

The average number of hours spent by aromatherapists on various activities throughout their working day was as follows: administrative work at a desk – 4hrs, interaction with patients – 3hrs, applying modalities – 3 hrs, performing manual therapy – 5hrs, performing physical / manual activities – 2hrs and lecturing – 3hrs. The specific work activities / tasks that the majority of aromatherapists reported: a) they were doing when experiencing low back pain for the first time in practice and; b) exacerbated their low back pain or caused it to recur were: maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (66.7% and 33.3% respectively), lifting (33.3% and 33.3% respectively), working in an awkward or cramped position (33.3% and 33.3% respectively) and working when physically fatigued (33.3% and 33.3% respectively). Additional work activities / tasks that the aromatherapists indicated they were doing when their low back pain was exacerbated or caused to recur in practice were: reaching and working away from the body (33.3%), performing repetitive tasks (33.3%) and performing manual therapy techniques (33.3%). The potential job risk factors for low back pain that were rated highest by the majority of aromatherpists on a scale of 0-5, 0 being no problem and 5 being a major problem, were: continuing to work when injured or hurt (4.5), working in the same position for long periods of time (4), treating a large number of patients in 1 day (4) and working in awkward or cramped positions (4).

All aromatherapists worked in a non-hospital / private practice and 11.1% also indicated they worked in “other” settings. No aromatherapists worked in a hospital setting. The specific work / clinical setting in which the majority of aromatherapists were doing most of their work when experiencing low back pain for the first time in practice was in elderly care (50%). The specific work / clinical settings in which the majority of aromatherapists found their low back pain was exacerbated or caused to recur was in elderly care (50%) and the general musculoskeletal outpatient setting (50%).

Appendix T

SUMMARY OF RESULTS FOR MASSAGE THERAPISTS

1) DEMOGRAPHICS

Eight massage therapists participated in this study making up 3.4% of the total manual therapist sample. Their mean age was 46yrs; in terms of gender, 75% were female and 25% were male and in terms of ethnicity, all of them were white (100%). Massage therapists had a mean weight of 70.38kg, height of 1.7188m and BMI of 23.6534. Their body build was primarily mesomorphic (62.5%) with 25% being ectomorphs and 12.5% being endomorphs.

2) INDIVIDUAL RISK FACTORS

Twenty five percent of the massage therapists had structural anomalies of which 50% were unknown (i.e. congenital or acquire) and 50% were acquired and unknown. Previous surgery was equally distributed between abdominal surgery (25%) and lower limb surgery (25%). Approximately 38% of the respondents had had previous trauma to their low back, hips, knees or ankles and previous injuries were reported by most massage therapists to have occurred in the low back (40%), knees (40%) and ankles (40%). The most severe previous injury was found to be low back injury (33.3%), ankle injury (33.3%) and the combination of low back and knee injury (33.3%).

3) PSYCHOSOCIAL RISK FACTORS

Half of the massage therapists were married (50%), a quarter of them were divorced (25%) and 12.5% of them were widowed. Eighty eight percent of them exercised. On average they exercised 3.5 times per week for 60mins per session and their preferred types of exercise appeared to be: walking (71.4%), cycling (57.1%), pilates (42.9%), jogging (28.6%) and "other" (28.6%). According to the findings of this study, 12.5% of the massage therapists were currently smokers who smoked on average 2.5 cigarettes per day and had been smoking for an average of 3yrs. Thirty three percent of them had a history of smoking but had since quit and 63% them reported they drink alcohol mostly socially or irregularly (e.g. weekends).

Eighty three percent of the female massage therapists had been pregnant and the average number of times they had been pregnant was two. Fifty percent of them reported they had given natural birth with which 60% of them had had an epidural injection. All of those who had indicated they had had caesarian sections, had only one. The average total number of children which massage therapists had was two; with 0 infants, 0 toddlers, two children, one teenager and two adults being the average number per age group.

Seventeen percent of the massage therapists were on medication, which the majority were taking for allergies (12.5%).

Although the majority of massage therapists were either greatly satisfied (50%) or satisfied (37.5%) in their jobs, as many as 12.5% of them indicated great dissatisfaction. In terms of psychological work stress, 57.1% of the massage therapists felt there was little psychological stress involved in their profession and 42.9% said there was no psychological stress involved. In terms of physical work stress, although 50% reported little physical work stress, 37.5% reported that massage therapy was physically stressful and 12.5% of them considered it to be very physically stressful.

4) PAIN-RELATED FACTORS

The point prevalence of low back pain in massage therapists was 25%, the one-year prevalence was 80% and the career prevalence was 80%. Twenty five percent of the massage therapists reported they had a current medical condition that may have been causing or contributing to their low back pain.

The intensity of low back pain in massage therapists was mild (50%) to moderate (50%) and the frequency was predominantly irregular or seldom (75%) but did occur frequently in 25% of cases. The average number of acute episodes of low back pain that they suffered from in the past year was one, usually with an average duration of one day. No massage therapists had been absent from work in the past year due to low back pain but in terms of disability, approximately 67% of the respondents felt their low back pain interfered with leisure activities and activities of daily living.

5) PAIN-RELATED / WORK-RELATED FACTORS

Twenty five percent of massage therapists believed their low back pain was caused by their occupation and 50% of them felt their symptoms of low back pain were exacerbated by clinical practice. The stage of life at which most massage therapists first experienced a major episode of low back pain was before becoming a student (66.7%) and as a student (33.3%) while the average number of years massage therapists had been working when experiencing low back pain for the first time in practice was 0 to 5yrs (50%).

6) OCCUPATIONAL / WORK-RELATED RISK FACTORS

On average massage therapists had been practicing for 10.5yrs, saw 4.5 patients per day and worked for 27.75hrs per week. Twenty five percent of them had an assistant although none of them indicated that they used assistance with manual handling. As many as 43% of massage therapists utilized adjustable work surfaces and all of them thus felt that their table and chair heights were neither too high nor too low.

The number of hours that massage therapists spent on various activities throughout their working day was as follows: administrative work at a desk – 2hrs, interaction with patients – 2hrs, applying modalities – 3 hrs, performing manual therapy - 4.5hrs, performing physical / manual activity – 1hr, lecturing – 1hr and "other" – 4hrs. The specific work activities / tasks that the majority of massage therapists indicated they were doing when experiencing low back pain for the first time in practice were: performing manual therapy techniques (100%), reaching and working away from the body (100%), maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (50%), pushing and pulling (50%) and working when physically fatigued (50%). The specific work activities / tasks that the majority of massage therapists reportedly felt caused their low back pain to be exacerbated in practice were: working in an awkward or cramped position (100%), maintaining a position for a prolonged period of time (e.g. standing, sitting, kneeling or bent over) (50%), performing manual therapy techniques (50%), working when physically fatigued (50%) and reaching and working away from the body (50%). The potential job risk factors for low back pain that were rated highest by the majority of massage therapists on a scale of 0 to 5, 0 being no problem and 5 being a major problem, were: continuing to work when injured or hurt (5), treating a large number of patients in one day (4), lifting or transferring dependent patients (4), working in awkward or cramped positions (4) and an unanticipated sudden movement or fall by a patient (4).

In terms of their work / clinical setting, in general, the majority of massage therapists worked in a non-hospital / private practice (87.5%) with 12.5% of them working in "other" settings. No massage therapists worked in a hospital setting. The specific work / clinical setting which the majority of massage therapists identified as the one in which they were doing most of their work when experiencing low back pain for the first time in practice was a general musculoskeletal outpatient setting (50%). The specific work / clinical settings which the majority of massage therapists identified as the settings in which their low back pain was exacerbated or caused to recur was the general musculoskeletal outpatient setting (50%) and in elderly care (50%).

Appendix U

A SUMMARISED COMPARISON OF THE RESPONSES TO EACH QUESTION BETWEEN PROFESSIONS

1) DEMOGRAPHICS

Response: The majority of participants were physiotherapists (43.4%) and occupational therapists (25.3%) whereas massage therapists (3.4%) and aromatherapists (3.9%) were the minority. *[See Table 4.1]*

Age: The oldest participants in the study were the reflexologists (52.60yrs), aromatherapists (50.57yrs) and massage therapists (46yrs) and the youngest participants were biokineticists (28.78yrs) followed by chiropractors (32.86yrs) and occupational therapists (34.15yrs). *[See Table 4.12]*

Gender: The females in this study were predominantly aromatherapists (100%), reflexologists (100%) and occupational therapists (98.3%) whereas males were predominantly chiropractors (71.4%), biokineticists (38.9%) and massage therapists (25%). *[See Table 4.10]*

Ethnicity: The majority of respondents in all professions were White. The most Asians in this study were aromatherapists (11.1%); Blacks were mostly occupational therapists (6.8%) and reflexologists (5.9%); most Coloureds were physiotherapists (5.9%) and most Indian participants tended to be reflexologists (5.9%), occupational therapists (5.1%) and chiropractors (4.8%). *[See Appendix Table 7.38]*

Weight: The heaviest participants were the chiropractors (78.62kg) and biokineticists (74.28kg) while the lightest participants were the reflexologists (63.71kg) and occupational therapists (64.66kg). *[See Table 4.12]*

Height: The tallest participants were the chiropractors (1.7471m) and biokineticists (1.74m) while the shortest participants were the reflexologists (1.6233m) and occupational therapists (1.6329m). *[See Table 4.12]*

BMI: The manual therapists with the highest BMI's were the chiropractors (25.7879) and aromatherapists (25.6511) while physiotherapists (23.6180) and massage therapists (23.6534) had the lowest BMI's. *[See Table 4.12]*

Body Build: The majority of mesomorphs in this study were biokineticists (77.8%) and physiotherapists (70.3%), ectomorphs were massage therapists (25%) and occupational therapists (20.3%) and endomorphs were aromatherapists (33.3%) and reflexologists (29.4%). *[See Appendix Table 7.39]*

2) <u>INDIVIDUAL RISK FACTORS</u>

<u>Structural anomalies:</u> Mostly it was the massage therapists (25%), aromatherapists (25%) and biokineticists (22.2%) who reported having some musculoskeletal / structural anomaly. *[See Appendix Table 7.40]*

<u>Congenital versus acquired anomalies:</u> Most of the congenital anomalies were found in biokineticists (25%) and physiotherapists (23.5%) whereas the acquired anomalies were most often found in aromatherapists (100%) and reflexologists (66.7%). Anomalies, which were unkown (i.e. they could have been congenital or acquired), were found especially in chiropractors (75%) followed by occupational therapists (50%), biokineticists (50%) and massage therapists (50%). *[See Appendix Table 7.41]*

<u>The types of structural anomalies specified by respondents:</u> The specific musculoskeletal / structural anomaly, which was by far the most common in this study, was scoliosis; followed by leg length inequality and spondylolisthesis. Other congenital anomalies mentioned, included: lumbarisation, congenital fusion, kyphosis and Scheuermann's disease. Other acquired anomalies mentioned, included: whiplash, dropped foot, central dislocation of hip and fracture of the pelvis and osteoperosis.

<u>Previous surgery:</u> Pelvic and abdominal surgery was reported most often by aromatherapists (22.2% and 55.6% respectively) and reflexologists (17.6% and 35.3%). Low back surgery was also most often reported by aromatherapists (11.1%) and lower limb surgery was reported most often by massage therapists (25%) and aromatherapists (22.2%). *[See Appendix Table 7.44-7.47]*

<u>Previous trauma:</u> The manual therapists with the greatest history of previous trauma to the low back, hips, knees or ankles were, chiropractors (75%) followed by aromatherapists (66.7%) and biokineticists (61.1%). *[See Appendix Table 7.48]*

<u>Previous injury:</u> According to the data collected, low back injury was most common in chiropractors (66.7%), aromatherapists (62.5%) and occupational therapists (56%); hip injury was most common in aromatherapists (37.5%) and massage therapists (20%); knee injury was most common in aromatherapists (62.5%), biokineticists (47.1%) and massage therapists (40%) and ankle injury was most common in massage therapists (40%), biokineticists (35.3%) and chiropractors (33.3%). *[See Table 4.14 and 4.15 and Appendix Table 7.49 and 7.50]*

Most severe previous injury: Low back injury was reportedly the most severe injury in physiotherapists (65.1%), aromatherapists (57.1%), occupational therapists (53.8%) and chiropractors (52.9%) while hip injury was reported most often to be the most severe injury by aromatherapists (14.3%), knee injury by biokineticists (25%) and chiropractors (17.6%) and ankle injury by massage therapists (33.3%) and chiropractors (28.6%). *[See Appendix Table 7.51]*

Diagnosis in the case of low back injury: Of those respondents who had indicated a previous low back injury, the type / s of diagnoses specified most frequently by far, was disc pathology, followed by soft tissue injury and facet joint pathology. In this study, disc pathology included disc bulge / protrusion, disc herniation and disc degeneration; soft tissue injury included overuse, muscle spasm and strain and ligamentous sprains and facet joint pathology included facet joint syndrome, spondylosis / degeneration, facet joint arthrosis and osteoarthritis. The other diagnoses cited by respondents, however less frequently, were: mechanical low back pain, instability, sciatica, sacro-iliac joint pathology and acquired or congenital anomalies such as scoliosis or spondylolisthesis.

3) PSYCHOSOCIAL RISK FACTORS

Marital status: Most of the single participants in this study were chiropractors (47.6%), biokineticists (44.4%) and occupational therapists (32.2%). The married participants were mostly aromatherapists (77.8%), physiotherapists (65%) and occupational therapists (62.7%) while divorcees were predominantly massage therapists (25%), reflexologists (18.8%) and aromatherapists (11.1%). Widows / widowers were mostly reflexologists (18.8%) and massage therapists (12.5%). *[See Table 4.11]*

Exercise: The participants who most often said YES they do exercise were: aromatherapists (100%), biokineticists (100%) and chiropractors (95%). *[See Appendix Table 7.52]*

Types of exercise: The manual therapists who most often indicated they performed a certain type of exercise were as follows:

Jogging: Biokineticists (66.7%) and physiotherapists (43%).
Swimming: Reflexologists (37.5%) and chiropractors (31.6%).
Soccer: Biokineticists (5.6%) and physiotherapists (2.3%).
Tennis: Chiropractors (15.8%) and biokineticists (11.1%).
Golf: Chiropractors (36.8%) and biokineticists (11.1%).
Walking: Aromatherapists (77.8%) and massage therapists (71.4%).
Weights: Biokineticists (38.9%) and chiropractors (36.8%).
Tae-bo: Aromatherapists (11.1%) and reflexologists (6.3%).
Squash: Chiropractors (15.8%) and massage therapists (14.3%).

Yoga: Reflexologists (43.8%) and aromatherapists (33.3%).

Rugby: Biokineticists (5.6%) and chiropractors (5.3%).

Cycling: Massage therapists (57.1%), biokineticists (38.9%) and chiropractors (36.8%).

Pilates: Aromatherapists (44.4%), massage therapists (42.9%) and biokineticists (33.3%) .

Cricket: Biokineticists (5.6%) and chiropractors (5.3%).

Other: Reflexologists (37.5%), Biokineticists (33.3%) and chiropractors (31.6%). [The "other" specific types of exercise cited, were as follows: gym and gym type activities such as low resistance training, home programs, circuits, stretching, power plate, spinning, water aerobics, callonetics and trampoline; martial arts including karate and thai chi; dancing such as belly dancing, ballroom dancing, ballet and folk dancing; team ball sports including hockey and netball; water sport such as paddling, canoeing, surfing and kite boarding; horse riding; outdoor adventure type sport such as hiking, cross country racing and rock climbing and gardening / DIY.] [*See Table 4.18-4.23 and Appendix Tables 7.53-7.62]*

Exercise – number of times per week: The manual therapists who exercised most often were: reflexologists (5x), biokineticists (4x) and chiropractors (4x). All the other manual therapists exercised 3x per week. *[See Table 4.16]*

Exercise – time per session: The manual therapists who exercised for the longest time per session were: massage therapists (60mins), biokineticists (60mins) and chiropractors (60mins). All other manual therapists exercised for 45mins per session. *[See Table 4.16]*

Smoking: The majority of smokers were biokineticists (16.7%), followed by massage therapists (12.5%) and then aromatherapists (11.1%). *[See Appendix Table 7.63]*

Number of cigarettes smoked per day: Reflexologists smoked the most number of cigarettes per day (15), followed by aromatherapists (10) and biokineticists (10). Chiropractors (0.5) smoked the least number of cigarettes per day. *[See Table 4.16]*

Number of years current smokers had been smoking for: Aromatherapists (41yrs) and reflexologists (40yrs) had been smoking for the longest time whereas massage therapists (3yrs) and occupational therapists (4.5yrs) had been smoking for the shortest time. *[See Table 4.16]*

Quit smoking: It was mostly massage therapists (33.3%), reflexologists (25%) and biokineticists (18.8%) who had a history of smoking but had since quit. *[See Table 4.16 and Appendix Table 7.64]*

<u>Alcohol consumption:</u> The manual therapists who said YES most often to drinking alcohol were: chiropractors (85.7%), biokineticists (72.2%) and physiotherapists (71%). *[See Appendix Table 7.66]*

<u>Number of alcohol units drunk per day:</u> Aromatherapists appeared to consume the most alcohol, drinking on average 3.5 units of alcohol per day. All the other manual therapists drank mostly only socially or irregularly (e.g. weekends). *[See Table 4.16]*

<u>Ever been Pregnant:</u> The manual therapists who most often indicated they had been pregnant were the aromatherapists (88.9%), followed by massage therapists (83.35) and reflexologists (82.4%). The groups with the least number of participants who had been pregnant were chiropractors (0%) and biokineticists (27.3%). *[See Table 4.24]*

<u>Number of pregnancies:</u> Aromatherapists (3x) had been pregnant the most number of times followed by reflexologists (2.5x). *[See Table 4.16]*

<u>Natural birth:</u> Mostly it was the aromatherapists (77.8%), reflexologists (64.7%) and massage therapists (50%) who had given natural birth, while the groups who indicated it least were chiropractors (0%) and biokineticists (5.6%). *[See Table 4.25]*

<u>Caesarian sections:</u> Of the participants in this study who had had caesarian sections; it was mostly the massage therapists (100%) who had only one; two caesarian sections was most often indicated by reflexologists (66.7%) and biokineticists (50%), three caesarian sections was most often reported by aromatherapists (50%) and occupational therapists (25%) and four caesarian sections was most common in reflexologists (33.3%). *[See Appendix Table 7.67]*

<u>Epidural injection:</u> Biokineticists (66.7%) and physiotherapists (66.7%) were the manual therapists who most often indicated that they had had an epidural injection, followed by massage therapists (60%) and occupational therapists (54.2%). *[See Appendix Table 7.68]*

<u>Total number of children:</u> Massage therapists, aromatherapists and reflexologists had the most number of children, which was two, compared to biokineticists and chiropractors who had no children. *[See Table 4.26]*

<u>Number and age groups of children (in manual therapists who had children):</u> The manual therapists who had children who appeared most likely to have at least one infant or toddler were: biokineticists, chiropractors, occupational therapists and physiotherapists. The manual therapists who appeared to have the most children (i.e. two) were: massage therapists, aromatherapists, chiropractors, reflexologists and physiotherapists; the most teenagers, which was three, was had by chiropractors and all manual therapists had an average number of two adult children except for biokineticists. *[See Table 4.26]*

Medication: It was predominantly the aromatherapists (37.5%) and reflexologists (37.5%) followed by physiotherapists (32,3%) and occupational therapists (31%) who were on medication. The manual therapists who had indicated least that they were on medication were the biokineticists (5.6%). *[See Appendix Table 7.70]*

Conditions / illnesses for which the medication was being taken: The condition / s which most of the manual therapists were taking medication for was cardiovascular disease (e.g. hypertension, hypercholestrolemia, blood hypercoagulation and for heartbeat regulation). Endocrine disorders (e.g. hyper- and hypo- thyroidism and polycystic ovarian syndrome) and contraception were next, followed by rheumatological conditions (e.g. rheumatoid and osteoarthritis), depression, hormone replacement therapy and diabetes (type 1 and type 2 diabetes mellitus and insulin resistance). Other conditions that therapists cited as reasons for their need of medication included: neurological conditions (e.g. epilepsy, seizures, glaucoma, and raised intra-cranial pressure), allergies, gastro-intestinal disorders (e.g. irritable bowel syndrome, heartburn and hernia), back pain, osteoperosis and acne. Medication taken for the following specific medical disorders or purposes were identified frequently and were thus most common among certain groups of manual therapists:

- Allergies > in massage therapists (12.5%).
- Contraception > in physiotherapists (5%) and chiropractors (4.8%).
- Depression > in occupational therapists (8.5%) and biokineticists (5.6%).
- Epilepsy > in chiropractors (9.5%).
- Hormone replacement therapy (HRT) > in reflexologists (5.9%).
- Hypertension > in aromatherapists (11.1%) and physiotherapists (3%).
- Hypothyroidism > in aromatherapists (11.1%) and physiotherapists (2%). *[See Appendix Table 7.71]*

Job satisfaction: The manual therapists who had indicated most that they had great satisfaction in their jobs were the aromatherapists (88.9%), reflexologists (76.5%) and chiropractors (71.4%) while satisfaction was expressed most by occupational therapists (53.6%), biokineticists (44.4%) and physiotherapists (41%). Dissatisfaction was reported most by occupational therapists (1.8%) and physiotherapists (1%) while great dissatisfaction was found especially in massage therapists (12.5%) and chiropractors (4.8%). *[See Appendix Table 7.72]*

Psychological work stress: The manual therapists who most often rated their work as very psychologically stressful were the aromatherapists (25%) and biokineticsts (11.1%), while those who most often reported their work as psychologically stressful were the occupational therapists (68.4%), chiropractors (42.9%) and physiotherapists (41.7%). Little psychological stress was reported most often by biokineticists (61.1%), massage therapists (57.1%) and chiropractors (52.4%) and no psychological stress was found mostly in massage therapists (42.9%) and reflexologists (31.3%). *[See Table 4.28]*

Physical work stress: Chiropractors (20%) and physiotherapists (17.9%) were the manual therapists who most often reported their work to be very physically stressful. The manual therapists who rated their work as physically stressful in most cases were aromatherapists (57.1%) followed by occupational therapists (55.4%) and physiotherapists (53.7%) and little physical work stress was reported most frequently by reflexologists (58.3%), biokineticists (53.3%) and massage therapists (50%). Reflexologists (25%) were also the manual therapists in whom no physical stress was reported most commonly. *[See Table 4.29]*

4) PAIN-RELATED FACTORS

Point prevalence: The point prevalence of low back pain was found to be highest in aromatherapists (55.6%), followed by biokineticists (50%) and chiropractors (47.6%). It was lowest in massage therapists (25%). *[See Table 4.6]*

One-year prevalence: The one-year prevalence of low back pain was found to be highest in massage therapists (80%), followed by occupational therapists (69.8%) and biokineticists (62.5%). It was lowest in aromatherapists (12.5%). *[See Table 4.7]*

Career prevalence: The career prevalence of low back pain was found to be highest in occupational therapists (83%), followed by massage therapists (80%), physiotherapists (76.7%) and chiropractors (71.4%). It was lowest in aromatherapists (37.5%). *[See Table 4.8]*

Current medical conditions: The manual therapists who indicated most often that they currently had a medical condition that may have been causing or contributing to their low back pain were the massage therapists (25%), occupational therapists (24.4%) and reflexologists (18.2%). *[See Appendix Table 7.3]*

Specific current medical conditions possibly causing low back pain: Pregnancy was by far the most common condition reported by the manual therapists, followed by disc pathology and scoliosis, obesity and arthritis, endometriosis, dropped foot, a possible de-myelinating condition and facet joint arthrosis.

Intensity: The manual therapists who most often reported a “mild” intensity of low back pain were the biokineticists (65.1%); massage therapists (50%), physiotherapists (38.9%) and occupational therapists (38.6%). A "moderate" intensity of low back pain was mostly found in chiropractors (58.8%) and massage therapists (50%). Aromatherapists (80%) and reflexologists (36.4%) reported most frequently that they suffered from "severe" low back pain and low back pain that was the "worst imaginable" was most common in biokineticists (7.7%) and physiotherapists (2.8%). *[See Appendix Table 7.1]*

<u>Frequency:</u> "Irregular / seldom or intermittent" low back pain was most common in massage therapists (75%) and chiropractors (52.9%), while "infrequent" low back pain was most common in occupational therapists (53.3%) and physiotherapists (43.1%). "Frequent" low back pain was most common in massage therapists (25%) and aromatherapists (20%) while "constant" low back pain was found predominantly in aromatherapists (40%) followed by reflexologists (18.2%) and biokineticists (15.4%). *[See Appendix Table 7.2]*

<u>Absenteeism:</u> No manual therapists had been absent from work due to their low back pain (i.e. 0 days). *[See Table 4.38]*

<u>Number of acute episodes of low back pain last year:</u> The group of manual therapists who had suffered with the most acute episodes of low back pain in the last year were the aromatherapists who had had on average 12 episodes; biokineticists were next with 2.5 episodes, followed by occupational therapists who had had 2 episodes. *[See Table 4.38]*

<u>Duration of acute episodes:</u> According to the data collected, the longest time (in days) that the acute episodes of low back pain lasted in the manual therapists was two days and this was recorded in biokineticists, chiropractors, occupational therapists and physiotherapists. *[See Table 4.38]*

<u>Disability:</u> When asked whether their low back pain affected leisure activities and activities of daily living, the manual therapists who most often said, "YES" were, aromatherapists (80%) followed by massage therapists (66.7%) and occupational therapists (50%). *[See Appendix Table 7.4]*

5) <u>PAIN-RELATED / WORK-RELATED FACTORS</u>

<u>Do you believe your low back pain is due to your work:</u> The manual therapists who felt more often than others that their low back pain was caused by their occupation were the physiotherapists (61.4%) followed by the occupational therapists (53.5%), chiropractors (52.9%) and biokineticists (46.2%). *[See Appendix Table 7.5]*

<u>Is your low back pain exacerbated by your work:</u> The manual therapists who reported most often that their symptoms of low back pain were exacerbated by clinical practice were the occupational therapists (90.7%) followed by the physiotherapists (82.9%), chiropractors (76.5%) and biokineticists (69.2%). *[See Table 4.39]*

<u>Stage of life at which a major episode of low back pain was experienced for the first time:</u> The manual therapists who experienced low back pain predominantly before they became a student were aromatherapists (80%), reflexologists (75%) and massage therapists (66.7%). Low back pain which occurred for the first time as a student was reported most frequently in chiropractors (50%), biokineticists (46.2%) and massage therapists (33.3%). The manual therapists who most often indicated that their low back pain only really occurred once they had started working / practicing were, physiotherapists (68.2%), occupational therapists (53.5%), biokineticists (38.5%) and chiropractors (25%). *[See Table 4.40]*

<u>Number of years the manual therapists had been working when experiencing low back pain for the first time in practice:</u> Chiropractors (82.4%), occupational therapists (71.1%), biokineticists (69.2%) and physiotherapists (55.6%) were the manual therapists who predominantly experienced low back pain for the first time in practice within 0 to 5yrs. Aromatherapists (40%), biokineticists (23.1%) and physiotherapists (20.8%) were those therapists who most frequently experienced low back pain for the first time in practice within 6 to 10yrs, thereafter, experiencing low back pain within 11 to15yrs of practice was most common in reflexologists (33.3%), within 16 to 20yrs was most common in physiotherapists (2.8%) and after 21yrs was also predominantly the physiotherapists (9.7%). *[See Table 4.41]*

6) <u>OCCUPATIONAL / WORK-RELATED RISK FACTORS</u>

<u>6a) GENERAL WORK FACTORS</u>

<u>Number of years practicing:</u> The manual therapists who had been in practice for the most number of years were physiotherapists (13yrs), followed by aromatherapists (11yrs) and massage therapists (10.5yrs). Chiropractors (3.75yrs) and biokineticists (5yrs) had been in practice for the least number of years. *[See Table 4.33 and 4.34]*

<u>Number of patients seen per day:</u> The manual therapists who saw the most number of patients per day were chiropractors (9 patients) and physiotherapists (9 patients) followed by occupational therapists (8 patients). Reflexologists (3 patients) and massage therapists (4.5 patients) saw the least number of patients per day. *[See Table 4.33 and 4.34]*

<u>Number of hours worked per week:</u> Biokineticists worked the most number of hours per week (45hrs) and besides reflexologists (20hrs) and massage therapists (27.75hrs) who worked the least number of hours, all the other manual therapists worked on average 40hrs per week. *[See Table 4.33 and 4.34]*

Assistant: It was mostly the chiropractors (28.6%) and occupational therapists (28.6%) that reportedly had an assistant, followed by aromatherapists (25%) and massage therapists (25%). *[See Appendix Table 7.77]*

Use of assistance with manual handling: Mostly, it was occupational therapists (38.2%) and physiotherapists (33%) who made use of assistance with manual handling. No chiropractors (0%) or massage therapists (0%) indicated that they use assistance with manual handling. *[See Table 4.37]*

Use of adjustable work surfaces: Mostly it was chiropractors (66.7%), physiotherapists (53.1%) and massage therapists (42.9%) who made use of adjustable work surfaces. The manual therapists who made the least use of adjustable work surfaces were aromatherapists (33.3%) and occupational therapists (35.1%). *[See Appendix Table 7.78]*

Table height: All of the massage therapists and aromatherapists reported that their table height was neither too high nor too low. A table height, which was considered too high, was found most frequently in biokineticists (17.6%) and physiotherapists (7.5%) and a table height, which was considered too low, was indicated most often by occupational therapists (24.5%), biokineticists (17.6%) and reflexologists (12.5%). *[See Appendix Table 7.79]*

Chair height: All of the massage therapists, aromatherapists and chiropractors reported that their chair height was neither too high nor too low. A chair height, which was considered too high, was found most frequently in reflexologists (12.5%) and occupational therapists (5.5%) and a chair height, which was considered too low, was indicated most often by biokineticists (11.8%) and occupational therapists (10.9%). *[See Appendix Table 7.80]*

6b) WORK ACTIVITIES / TASKS

TIME (HRS) SPENT ON VARIOUS ACTIVITIES THROUGHOUT A WORKING DAY:

The manual therapists who spent the most number of hours throughout their working day on various work activities / tasks were as follows:

Administrative work at a desk: Aromatherapists (4hrs) spent the most time on administrative work followed by chiropractors, occupational therapists and reflexologists who all spent 3hrs on this activity.

In interaction with patients: Biokineticists (4.5hrs) spent the most time in interaction with their patients, followed by chiropractors and occupational therapists who spent 4hrs on this activity.

Applying modalities: All manual therapists spent 3hrs applying modalities except for chiropractors who spent 2hrs applying modalities.
Performing manual therapy techniques: Aromatherapists (5hrs) and massage therapists (4.5hrs) spent the most time performing manual therapy followed by physiotherapists and reflexologists who spent 4hrs on this activity.
Performing manual / physical activities: Biokineticists and occupational therapists spent the most time (3hrs) on manual / physical activities.
Lecturing or attending short courses: The most time spent by manual therapists on lecturing or attending short courses outside of practice was by the aromatherapists (3hrs). All the other manual therapists spent an average of 2hrs on this activity.
"Other": Biokineticists and chiropractors (6hrs) spent the most amount of time on "other" activities. ["Other" specifics included the following: driving / travelling, teaching pilates / yoga / callanetics, meetings / seminar conveyancer, working at a rugby club for a rugby team, supervising, counselling or facilitating group therapy and professional sports training.] *[See Table 4.31 and 4.32]*

THE WORK ACTIVITIES / TASKS BEING PERFORMED WHEN LOW BACK PAIN WAS EXPERIENCED FOR THE FIRST TIME IN PRACTICE:

The following manual therapists most often reported they were performing the following specific work activities / tasks when they experienced low back pain for the first time in practice:

Applying modalities: Reflexologists (16.7%) and occupational therapists (7.3%).
Bending or twisting: Biokineticists (66.7%), reflexologists (50%) and chiropractors (46.2%).
Instructing a patient: Biokineticists (11.1%).
Lifting: Biokineticists (55.6%), occupational therapists (39%) and aromatherapists (33.3%).
Maintaining a position for a prolonged period of time: Aromatherapists (66.7%), massage therapists (50%) and occupational therapists (46.3%).
Performing manual therapy techniques: Massage therapists (100%), chiropractors (23.1%) and biokineticists (22.2%).
Performing repetitive tasks: Biokineticists (11.1%), occupational therapists (9.8%) and physiotherapists (9.4%).
Responding to an unanticipated or sudden movement by a patient: Occupational therapists (19.5%), biokineticists (11.1%) and physiotherapists (10.9%).
Transferring a patient: Occupational therapists (31.7%), physiotherapists (25%) and biokineticists (22.2%).
Working in an awkward or cramped position: Reflexologists (50%), aromatherapists (33.3%) and biokineticists (22.2%).

Working when physically fatigued: Massage therapists (50%), aromatherapists (33.3%) and biokineticists (22.2%).

Pushing or pulling: Massage therapists (50%), reflexologists (16.7%) and occupational therapists (14.6%).

Reaching and working away from the body: Massage therapists (100%), reflexologists (33.3%) and chiropractors (23.1%). *[See Figure 4.3, Table 4.42 and 4.43 and Appendix Table 7.6,7.10,7.11,7.13,7.15,7.17,7.19,7.21,7.23,7.25 and 7.27].*

THE WORK ACTIVITIES / TASKS BEING PERFORMED WHEN LOW BACK PAIN WAS EXACERBATED OR CAUSED TO RECUR IN PRACTICE:

The following manual therapists most often reported that the following specific work activities / tasks caused their low back pain to recur or be exacerbated:

Applying modalities: Chiropractors (7.7%) and occupational therapists (7.3%).

Bending or twisting: Chiropractors (53.8%), occupational therapists (46.3%) and physiotherapists (34.4%).

Instructing a patient: Occupational therapists (4.9%).

Lifting: Occupational therapists (68.3%), physiotherapists (37.5%) and biokineticists and aromatherapists (33.35% each).

Maintaining a position for a prolonged period of time: Physiotherapists (75%), occupational therapists (70.7%) and chiropractors (69.25%).

Performing manual therapy techniques: Chiropractors (53.8%), massage therapists (50%) and physiotherapists (35.9%).

Performing repetitive tasks: Biokineticists (33.3%), aromatherapists (33.3%) and occupational therapists (26.8%).

Responding to an unanticipated or sudden movement by a patient: Occupational therapists (34.1%), physiotherapists (20.3%) and chiropractors (15.4%).

Transferring a patient: Occupational therapists (43.9%), physiotherapists (34.4%) and chiropractors (30.8%).

Working in an awkward or cramped position: Massage therapists (100%), physiotherapists (50%) and reflexologists (50%).

Working when physically fatigued: Massage therapists (50%), physiotherapists (34.4%) and aromatherapists and reflexologists (33.3% each).

Pushing or pulling: Biokineticists (33.3%), occupational therapists (26.8%) and chiropractors (23.1%).

Reaching and working away from the body: Massage therapists and reflexologists (50% each) and physiotherapists (48.4%). [*See Figure 4.4, Table 4.44 and Appendix Tables 7.7.9,7.12,7.14,7.16,7.18,7.20,7.22,7.24,7.26 and 7.28]*

<u>RATING OF POTENTIAL JOB RISK FACTORS FOR LOW BACK PAIN:</u>

The following manual therapists rated these specific job risk factors for low back pain the highest:

<u>Performing the same task over and over:</u> Massage therapists, biokineticists and chiropractors (rating = 3).
<u>Working in the same position for long periods of time:</u> Reflexologists (rating = 4.5).
<u>Treating a large number of patients in one day:</u> Chiropractors (rating = 4.5).
<u>Bending or twisting the back in an awkward way:</u> Biokineticists, chiropractors, occupational therapists and physiotherapists (rating = 4).
<u>Lifting or transferring dependent patients:</u> Massage therapists, biokineticists, chiropractors, occupational therapists and physiotherapists (rating = 4).
<u>Continuing to work when injured or hurt:</u> Massage therapists (rating = 5), followed by aromatherapists and chiropractors (rating = 4.5).
<u>Reaching or working away from your body:</u> Chiropractors and reflexologists (rating = 3)
<u>Performing manual therapy techniques:</u> Aromatherapists, biokineticists and chiropractors (rating = 3).
<u>Working in awkward or cramped positions:</u> Massage therapists, aromatherapists and reflexologists (rating = 4).
<u>Working near to or at your physical limits:</u> All manual therapists, except reflexologists, gave this risk factor a high rating of 3.
<u>Not enough rest breaks during the day:</u> Massage therapists, aromatherapists, biokineticists and occupational therapists (rating = 3).
<u>Unanticipated sudden movement or fall by a patient:</u> Massage therapists and occupational therapists (rating = 4).
<u>Assisting patient during gait activities:</u> Biokineticists (rating = 3)
<u>Lack of staff:</u> Biokineticists and occupational therapists (rating =2).
<u>Carrying / lifting or moving heavy material and equipment:</u> Biokineticists and occupational therapists (rating = 4).
<u>Working with confused or agitated patients:</u> Biokineticists (rating = 2).
<u>Work schedule:</u> Chiropractors and biokineticists (rating = 3).
<u>Inadequate training in injury prevention:</u> Biokineticists, chiropractors and occupational therapists (rating = 1). *[See Figure 4.5 and Table 4.45]*

6c) WORK / CLINICAL SETTING:

Hospital versus non-hospital / private practice: Occupational therapists (43.9%) and physiotherapists (39.4%) were the manual therapists most likely to be working in a hospital whereas aromatherapists (100%), chiropractors (95.2%), reflexologists (93.8%) and biokineticists (83.3%) tended to be working more in a non-hospital / private practice setting. *[See Table 4.35 and 4.36]*

"Other" settings: Occupational therapists (18.6%), biokineticists (16.7%) and physiotherapists (14.9%) reported working in "other" settings most often.
[The "other" settings cited by respondents in this study, included the following: community health centre / public health clinics; frail care; schools; special schools; gym; hydro / spa / beauty salon; home visits / house calls; administrative /educational or business type positions (e.g. lecturer, research, medico-legal practice, provincial head office, health risk company) and the sports field.]

THE SPECIFIC WORK / CLINICAL SETTINGS IN WHICH MANUAL THERAPISTS WERE DOING THE MAJORITY OF THEIR WORK WHEN EXPERIENCING LOW BACK PAIN FOR THE FIRST TIME IN PRACTICE:

The manual therapists who most often implicated work in the following specific work / clinical settings in the development of their low back pain were as follows:

Elderly care: Aromatherapists (50%), physiotherapists (29.9%) and biokineticists (18.2%).
General musculoskeletal outpatient setting: Chiropractors (93.3%), biokineticists (63.6%) and massage therapists (50%).
Neurological rehabilitation: Occupational therapists (71.4%), physiotherapists (53.7%) and biokineticists (9.1%).
Paediatrics: Occupational therapists (42.9%) and physiotherapists (9%).
Learning difficulties and physical impairments: Occupational therapists (23.8%), biokineticists (9.1%) and physiotherapists (7.5%).
Cardiothoracic / respiratory care: Physiotherapists (4.5%).
ICU care: Physiotherapists (17.9%) and occupational therapists (2.4%).
Orthopaedics (in hospital): Occupational therapists (23.8%), biokineticists (18.2%) and physiotherapists (17.9%). *[See Table 4.46,4.48 and 4.50 and Appendix Tables 7.29,7.31,7.32,7.34 and 7.36]*

<u>THE SPECIFIC WORK / CLINICAL SETTINGS IN WHICH MANUAL THERAPISTS FELT WORK CAUSED THEIR LOW BACK PAIN TO RECUR OR BE EXACERBATED:</u>

The manual therapists who most often implicated work in the following specific work / clinical settings in the exacerbation of their low back pain were as follows:

<u>Elderly care:</u> Massage therapists (50%), aromatherapists (50%) and biokineticists (36.4%).
<u>General musculoskeletal outpatient setting:</u> Chiropractors (80%), massage therapists (50%) and aromatherapists (50%).
<u>Neurological rehabilitation:</u> Occupational therapists (59.5%), physiotherapists (56.7%) and biokineticists (36.4%).
<u>Paediatrics:</u> Occupational therapists (50%) and physiotherapists (13.4%).
<u>Learning difficulties and physical impairments:</u> Biokineticists (36.4%), occupational therapists (35.7%) and physiotherapists (7.5%).
<u>Cardiothoracic / respiratory care:</u> Physiotherapists (7.5%).
<u>ICU care:</u> Physiotherapists (19.4%) and occupational therapists (4.8%).
<u>Orthopaedics (in hospital):</u> Biokineticists (36.4%), physiotherapists (25.4%) and occupational therapists (16.7%). *[See Table 4.47,4.49,4.51 and 4.52 and Appendix Tables 7.30,7.33,7.35 and 7.37]*