The epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality

A dissertation submitted in partial compliance with the requirements for a Master's Degree in Technology, in the Department of Chiropractic and Somatology at the Durban University of Technology.

By

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2017

I, Almay Lamprecht, do declare that this dissertation is representative of my own work in both conception and execution (except where acknowledgements indicate to the contrary).

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Approved for Final Submission:

_____ _____

Dr. K. Padayachy Date

M.Tech: Chiropractic (SA), PhD Anatomy

DEDICATION

I dedicate this work

To my Heavenly Father who has given me the means to complete this degree.

And

To my parents who have given me their unwavering support throughout this entire process.

ACKNOWLEDGEMENTS

To my parents, Jaco and Tina Lamprecht, thank you for giving me the opportunity to fulfil my dream and encouraging me with your love and support along the way.

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DUT for the research budget that was made available.

ABSTRACT

Background: Chiropractors are a unique group of health care professionals who are at risk for developing work-related musculoskeletal injuries. Diversity of daily practice imposes different physical demands on the chiropractor. The present study aims to determine the prevalence of work-related musculoskeletal injuries in chiropractors in eThekwini municipality and selected risk factors associated with work-related musculoskeletal injuries. There are very few studies available that look at the chiropractor holistically in terms of work-related musculoskeletal injuries. However, these existing studies suggest that chiropractors are at a greater risk for the development of work-related musculoskeletal injuries.

Method: The study design was a quantitative, cross-sectional, descriptive study utilising a self-administered questionnaire, developed specifically for this research, using an expert group and pilot study. The questionnaire contained sections on personal as well as practice demographics, with questions pertaining to the single most severe work-related musculoskeletal injury, as well as the second and third most severe work-related musculoskeletal injury. Risk factors for work-related musculoskeletal injury were tested by using chi square in the case of categorical variables. In the event of violation of the expected frequencies, the Fisher's exact test was used to obtain the p-value. Logistical regression was used to obtain odds rations in the presence of more than one explanatory variable. A p-value of <0.05 was used to indicate statistical significance.

Results: Sixty-two chiropractors responded, giving a response rate of 64%. The life-time prevalence of work-related musculoskeletal injuries was 69%. A predominance of injuries to the upper extremity (50%) and lower back (28.3%) were recorded. The hand/wrist was the most common anatomical site of injury (31.5%) followed by the lower back.

Number of years in practice was considered a risk factor for injury as most injuries occurred within the first five years of practice (41.6%). The likelihood of injury decreases with an increase in the number of years in practice.

The majority of injuries affected the soft tissue, including ligament sprains (27.5%) and muscle strains (26.6%) and occurred while the practitioner was performing manipulation (38.2%) of the lumbosacral (80.77%) area with the patient in the side posture (61.53%).

Conclusion: The results concur with other studies on work-related musculoskeletal injuries in chiropractors and add insight into risk factors predisposing this population to injury. Chiropractors need to understand the risk factors for occupational injury to implement strategies to avoid risk of injury.

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ABBREVIATIONS

%	Percentage
AHPCSA	Allied Health Professions Council of South Africa
CASA	Chiropractic Association of South Africa
DUT	Durban University of Technology
FG	Focus Group
Kg	Kilogrammes
M	Metres
N	Newton
PS	Pilot Study
SA	South Africa
SD	Standard deviation
UK	United Kingdom
USA	United States of America
T	Thoracic spine vertebra
WFC	World Federation of Chiropractic
WRMSI	Work-related musculoskeletal injury

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

The Chiropractic Association of South Africa (CASA) adopted the World Federation of Chiropractic's (WFC) definition of chiropractic (World Federation of Chiropractic 2001):

"*A health profession concerned with the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system, and the effects of these disorders on the function of the nervous system and general health. There is an emphasis on manual treatments including spinal adjustment and other joint and soft-tissue manipulation."*

Bork *et al.* (1996) conducted a study to determine work-related musculoskeletal injuries in physiotherapists and found a high prevalence of hand (29.6%) and back (45%) pain. Chiropractic and physiotherapy are both health care professions that specialise in the treatment of neuro-musculoskeletal disorders (Hunter 2004). Both professions utilise manual therapy in the treatment of patients.

Manual therapy is defined as "skilled hand movements intended to produce any or all of the following effects: improve tissue extensibility; increase range of motion of the joint complex; mobilize or manipulate soft tissues and joints; induce relaxation; change muscle function; modulate pain; and reduce soft tissue swelling, inflammation or movement restriction" by the International Federation of Orthopaedic Manipulative Physical Therapists. Chiropractic and physiotherapy have many similarities, including common subjects and techniques used (University of the Free State 2017; Durban Univeristy of Technology 2017). Manual therapy - for the purpose of this study - can be sub-divided into manipulative and non-manipulative techniques. Manipulative techniques are those techniques that are explicitly used in the treatment of articulations, while non-manipulative techniques are those methods used in the treatment of soft tissue.

Glover *et al.* (2005) found 32% (n = 3661) of physical therapists reported their worst injury occurred within five years of graduation. If compared to studies conducted among chiropractors, similar results were found with 37.3% (n=397) of chiropractors reporting their injuries occurred in

the first to fifth year of practice (Holm and Rose 2006). Therefore, it stands to reason that chiropractors in the eThekwini municipality too may report a high incidence of work-related musculoskeletal injuries.

Musculoskeletal disorders represent health problems of the locomotor apparatus i.e. of the muscles, tendons, skeleton, cartilage, ligaments and nerves (Luttmann *et al.* 2003) whereas work-related musculoskeletal injuries refer to conditions in which (National Center for Chronic Disease Prevention and Health Promotion 2013):

1. The work environment and performance of work contribute significantly to the condition; and/or
2. The condition is made worse or persists longer due to work conditions.

Kumar (2001) estimated that approximately 50% of the world's working population performs hazardous occupations. Performing such occupations requires substantial physical exertion, considerable repetition of those activities and a considerable amount of repetition of those activities, together with sustaining static postures over a significant period of time.

1.2 RESEARCH AIM

The purpose of this study was to determine the epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality and to compare these findings to similar studies.

1.3 PROBLEM STATEMENT

The need for this study is to determine if WRMSI among chiropractors in the eThekwini municipality also causes reduced working hours, fewer patients seen as well as modification of treatment techniques as well as address these problems.

1.4 RESEARCH OBJECTIVES

1. To determine the practice-lifetime prevalence of work-related musculoskeletal pain in chiropractors
2. To determine selected risk factors associated with work-related musculoskeletal pain in chiropractors
3. To determine the impact of work-related musculoskeletal pain in chiropractors

4. To determine any association between the prevalence of work-related musculoskeletal pain in chiropractors and selected risk factors associated with work-related musculoskeletal pain in chiropractors

1.5 RATIONALE FOR STUDY

The current literature with regards to the prevalence and consequences of WRMSI within South Africa (SA) is limited.

The findings of this study could assist in informing and developing new practice guidelines/ techniques to reduce or manage the prevalence of WRMSI and improve productivity and maintaining wellbeing of the chiropractor especially in the eThekwini municipality in which one of the teaching institutions is situated.

1.6 HYPOTHESIS

Chiropractors in the eThekwini municipality will have a high prevalence of work-related musculoskeletal injury.

1.7 DELIMITATIONS

In a study of this nature, the researcher relies on the respondents to have answered the questionnaire openly and honestly, therefore allowing the research to be the best approximation of work-related musculoskeletal injuries incurred by respondents. The outcomes of this study only include information from chiropractors that accepted the invitation to participate in this study, thus the results may only be generalised to similar population groups.

1.8 CONCLUSION

The aim of this study was to determine the epidemiology of work-related musculoskeletal pain among chiropractors in the eThekwini municipality.

With the research title being introduced in Chapter one, Chapter two will discuss related literature. Chapter three will examine the materials and methods used in obtaining the information required to meet the aims and objectives of the study. The results attained are presented in Chapter four. Chapter five presents the discussion of the results with the conclusion of the study and recommendations following in Chapter six.

CHAPTER TWO

LITERATURE REVIEW

2.1 MUSCULOSKELETAL INJURIES

The musculoskeletal system is designed to provide form, stability and movement in the human body. This system consists of bones, muscles, ligaments, tendons, joints, cartilage and connective tissue (Villa-Forte 2016).

Thus, musculoskeletal disorders represent disorders of the locomotor apparatus. These disorders include all forms of ill-health ranging from light temporary disorders - of which the symptoms disappear with rest or a change in activity - to long-lasting disabling injuries which become permanent (Luttmann *et al.* 2003).

The Bureau of labor statistics (2016) found that from 2011 onwards musculoskeletal disorder cases include the following:

- pinched nerve (radiculopathy);
- herniated disc;
- meniscus tear;
- sprains;
- strains;
- tears;
- hernia (traumatic and non-traumatic);
- pain;
- swelling and numbness;
- carpal or tarsal tunnel syndrome;
- Raynaud's syndrome or phenomenon;
- musculoskeletal system and connective tissue diseases and disorders,

when the event or exposure leading to the injury or illness is overexertion and bodily reaction, unspecified; overexertion involving outside sources; repetitive motion involving micro-tasks; other and multiple exertions or bodily reactions; and rubbed, abraded, or jarred by vibration (Bureau of labor statistics 2016).

According to the European agency for safety and health at work (2007) musculoskeletal injuries are the most commonly reported work-related disorder in the workplace.

Overall, occupational disease - and especially work-related musculoskeletal disorders - impose a significant cost burden on health care systems (International Labour Organization 2013; Piedrahita 2006).

2.2 WORK-RELATED MUSCULOSKELETAL INJURIES

Work-related musculoskeletal injuries (WRMSI) are a group of painful complaints involving the muscles, tendons and nerves which occurs in an occupational setting due to physical tasks carried out in normal work activities (Health and Safety Executive 2016; Canadian centre for occupational health and safety 2014; European agency for safety and health at work 2007). Most occupations require the use of the arms and hands, consequently WRMSI affect the hands, wrists, elbows, neck and shoulders. Back-related problems are a consequence of repetitive movements. (Canadian centre for occupational health and safety 2014; Darragh, Huddleston and King 2009).

Work-related musculoskeletal disorders are mostly cumulative, resulting from repeated exposure to loads at work over a period of time. The upper limbs, neck and lower back are particularly vulnerable to musculoskeletal disorders in the workplace (European agency for safety and health at work 2007).

Musculoskeletal disorders may be characterised as episodic disease when pain intensity decreases and increases later, or transient when pain fades with rest or activity modification. However, depending on the tissue involved and the forces acting upon the body, some musculoskeletal disorders may become persistent or irreversible (European agency for safety and health at work 2007). Injuries/disorders can be subdivided into occupational loading from long- lasting activities occurring over many years during the occupational lifetime or short-term loadings resulting predominantly in acute health disturbances. Long-lasting exposure may lead to chronic disorders (Luttmann *et al.* 2003).

Musculoskeletal disorders are further classified as specific or non-specific disorders. Specific musculoskeletal disorders have clear clinical features whereas non-specific musculoskeletal disorders present with pain without evidence of a clear specific disorder.

The factors that may contribute to musculoskeletal disorders can be grouped into four categories:

- Physical or biomechanical work-related factors
- Organisational or psychosocial work-related factors
- Individual or personal factors
- Factors relating to social content (European agency for safety and health at work 2007).

Physical factors include work procedures, equipment and environment that lead to biomechanical stress in the muscle, tendons, intervertebral discs and nerves. Principal physical work-related risk factors in relation to musculoskeletal disorders encompass force, repetition, awkward position/ posture or long-term static postures, vibration and working in low temperatures.

(Kumar 2001) estimated that approximately 50% of the world's working population performs hazardous occupations. Performing such occupations requires substantial physical exertion, considerable repetition of those activities and substantial repetition of those activities together with significant time spent in static postures. These unnatural behaviours place the mind and body under tremendous physical and psychosocial stress.

Risk factors for WRMSI include bending, straightening, gripping, holding, twisting, clasping and reaching, which are common daily movements. These movements are not fundamentally harmful, though successive repetitions have the potential for injury, which may be compounded by the speed of the movements and the limited recovery period between injuries (Canadian centre for occupational health and safety 2014; Ndetan *et al.* 2009a; Bonde *et al.* 2005). Static and/or constrained body positions, continual repetitive movement and force directed through smaller body parts (i.e. hand/wrist) along with a work pace not permitting adequate recovery time, predispose workers to WRMSI (Canadian centre for occupational health and safety 2014; Accident Compensation Corporation 2014; Ndetan *et al.* 2009b). Usually these factors act collectively to cause WRMSI (Canadian centre for occupational health and safety 2014; Darragh, Huddleston and King 2009; Bonde *et al.* 2005).

The main cause of disorders/injuries affecting muscles, tendons, joints, ligaments and bones are attributed to mechanical overload of the respective biological structures (Hess 2009; Luttmann *et*

al. 2003). Probable overload of tissues results from high intensity forces, or torque, acting on and inside the body. The muscles and tendons of the arm are loaded when manual force is used. Repetitive work may cause fatigue and injury when the same muscles and tendons are used for a substantial part of the working day. When placed in awkward postures, joints are more susceptible to injuries and muscles have less capacity to exert force. The combination of repetitive forceful work in an awkward posture poses a risk factor for the development of work-related musculoskeletal injuries (European agency for safety and health at work 2007).

In addition to mechanical overload, the duration of exposure - primarily determined by the number of repetitions per day - as well as total exposure time (hours per day or days per month) are important factors in the development of musculoskeletal disorders (Luttmann *et al.* 2003).

Tissues are overloaded when placed in awkward, constrained, asymmetric, repeated or prolonged postures which exceed the threshold of tolerable stresses of the tissue, causing subsequent injury. When muscles contract, by-products are created which are removed by the blood (Canadian centre for occupational health and safety 2014). Blood vessels within the muscles are compressed when placed in static postures for prolonged periods of time, causing micro-lesions in the muscle due to decreased oxygenation and nutrition and the build-up of by-products (Vieira and Kumar 2004). Tendons within sheaths are dependent on the production of lubricating fluid to ensure proper function. With excessive or monotonous movement the lubrication system may falter, resulting in friction between the tendon and the sheath, leading to the development of tenosynovitis. A ganglion cyst may form if the tendon sheath swells up with lubrication fluid. When tendons are continuously stretched, micro-tears can develop, leading to tendonitis (Canadian centre for occupational health and safety 2014). Thus, incorrect working posture leads to imbalance and fatigue or over-exertion which cause mostly muscle, tendon and ligament injuries that may result in discomfort and lower back pain (Vieira and Kumar 2004).

In 2014, musculoskeletal disorders accounted for 32% of all injuries reported (Bureau of labor statistics 2014). A total of 54% of all work related disorders reported by nursing assistants were attributed to musculoskeletal disorders (Bureau of labor statistics 2014). Thirty-nine percent of the total injuries and illnesses reported in the health care and social assistance industry in 2014 included musculoskeletal injuries.

The leading event resulting in occupational injuries/illnesses for all ownership in 2014 was overexertion and bodily reaction accounting for 33% of total cases (Bureau of labor statistics 2014).

Research conducted in the United Kingdom (UK) found that musculoskeletal conditions comprise 55% of all work-related illness. Acute back pain was the second highest ranked cause of short term absenteeism among manual workers (Zheltoukhova, O'Dea and Bevan 2012). The same study found musculoskeletal disorders as the second most commonly identified cause of long-term absence for manual workers (44%), closely followed by chronic back pain (42%) (Zheltoukhova, O'Dea and Bevan 2012).

Musculoskeletal disorders account for approximately 33% of all absenteeism from work in industrialised countries (Health and Safety Executive 2016; Luttmann *et al.* 2003). Back-related injuries are estimated to be the cause of 60% of absenteeism, followed by neck and upper extremity injuries (Luttmann *et al.* 2003). It is generally accepted that working conditions and work load are important factors for the development and continuance of these disorders (Collins, Janse Van Rensburg and Patricios 2011).

In 2014 a median of 13 days of recuperation were required for workers who sustained a musculoskeletal injury, in comparison to 9 days for other types of injuries. Sustaining a fracture required a median of 32 days to recuperate before returning to work (Bureau of labor statistics 2014). Most of these musculoskeletal disorders include sprains and strains as result of overexertion in lifting (Bureau of labor statistics 2014). A study conducted in Europe found musculoskeletal disorders to be the leading cause of temporary and permanent incapacity across Europe. Musculoskeletal disorders accounted for 49.9% of all absenteeism from work lasting three days or longer, and for 60% of permanent work incapacity. The study revealed participants lost an average of 246.6 minutes of work during the week preceding their participation in that study. An average work week was calculated to 1914 minutes; the time lost due to musculoskeletal disorders accounted for almost 13% of the work week (Zheltoukhova, O'Dea and Bevan 2012).

The leading types of injuries or illnesses for both males and females were sprains, strains, tears or soreness and pain. Males sustained sprains, strains or tears at a greater rate than females (41.7 cases per 10 000 full time workers, compared to 35.8 cases per 10 000 for females). Females incurred bruises and contusions at a greater rate than males with an incidence rate of

10.0 compared to a rate of 8.3 for males (Bureau of labor statistics 2014). It was found that females had a higher incidence rate and number of injuries and illnesses associated with repetitive motion compared to males (Bureau of labor statistics 2014).

2.3 CHIROPRACTIC PROFESSION

The Associated Health Service Professions Act No. 63 of 1982 was established by the Allied Health Professions Act of South Africa, formerly known as South African Associated Health Services Professions Board (Brantingham and Snyder 1999), a statutory body that acknowledged chiropractic as law abiding.

In line with the regulations in the Allied Health Professions Act, 1982 published under Government notice No. R.127 of 12/0/2001 as corrected by Government notice No.R266 of 26/3/2001, the following acts pertain to the scope of practice of chiropractors in South Africa (South Africa 1982):

"(a) The physical examination of any person, with or without the taking, reading and interpreting of X-ray plates, for the purpose of diagnosing any physical defect, illness or deficiency in such person.

(b) The treatment or prevention of any physical defect, illness or efficiency related to spinal, pelvic, spinovisceral and general neuromusculoskeletal conditions in any person by –

(i) manipulation or adjustment;

(ii) electrotherapy;

(iii) exercise therapy;

(iv) hydrotherapy;

(v) traction therapy;

(vi) thermal therapy;

(vii) vibration therapy;

(viii) immobilization therapy;

(ix) neuro-muscular reflex therapy;

(x) massage therapy;

(xi) acupuncture or acupressure therapy; or

(xii) remedies, dietary advice or dietary supplementation."

The chiropractic profession involves constant performance of various forms of manipulative therapy and other manual tasks in a variety of working postures, which subject the musculoskeletal system to potentially large repetitive mechanical loads. During the manipulative procedure, the chiropractor must accurately regulate several biomechanical variables including speed, force, amplitude, duration of applied force as well as the degree of load applied to the anatomical structure (Herzog 2010; Herzog, Kats and Symons 2001; Kawchuk 1993).

Manipulation is defined as a manual procedure that incorporates a direct thrust to generate movement in a joint beyond the physiological range of motion, not surpassing the anatomical limit (Gatterman 2005). More precisely, an adjustment is any chiropractic therapeutic procedure that uses precise force, leverage, direction, amplitude and velocity concentrated at specific joints or anatomical regions. Chiropractors influence joint and neurological function by employing these procedures (Gatterman 2005). Adjustments are most commonly applied to the spinal column, but may also be used in the treatment of the extremities and temporomandibular joint (Reed *et al.* 2014). Manipulative skills encompass a collection of psychomotor movement patterns, requiring several years of study and training (Byfield 2005; Cohen *et al.* 1995). Achieving good manipulative skills benefits both the patient who receives an effective pain-free manual intervention and the chiropractor who will evade unnecessary injury and maintain a flourishing professional career. To produce focussed and localised manipulative thrusts, suitable body posture and sophisticated bi-manual manoeuvres should be learnt (Byfield 2005). Lauren *et al.* (1997) found that a lack of coordination, strength and effective coupling of the musculature may potentially impair postural stability. Accordingly, chiropractors with a smaller physique may have an increased chance of injuring their shoulders and upper backs while performing more physically demanding manipulative procedures, especially with larger patients in the side lying position (Mior and Diakow 1987).

2.4 CHIROPRACTIC TECHNIQUES

Cooperstein and Gleberzon (2004) estimated that within the chiropractic profession roughly three hundred discrete chiropractic techniques are used worldwide. The most commonly applied manipulative procedure is the diversified technique - of which there are roughly five-hundred separate and distinct manipulations - applying a chiropractic adjustment to a specific anatomical site (Byfield 2005).

The application of spinal manipulative therapy is an active process whereby forces are produced and transferred by means of the upper body and shoulder through the arm and hand (Triano 2000). It is important to note that the hand does not contribute to the applied force; the hand acts only as a contact and transfer point. The hand has at least 12 areas which can be used to contact anatomical levers on the patient (Peterson and Bergmann 2002; Byfield 1996; Schafer and Faye 1989; Christensen 1984; States 1968; Grecco 1953). The most common contact points on the hand used when performing manipulations are illustrated in Figure 2.1:

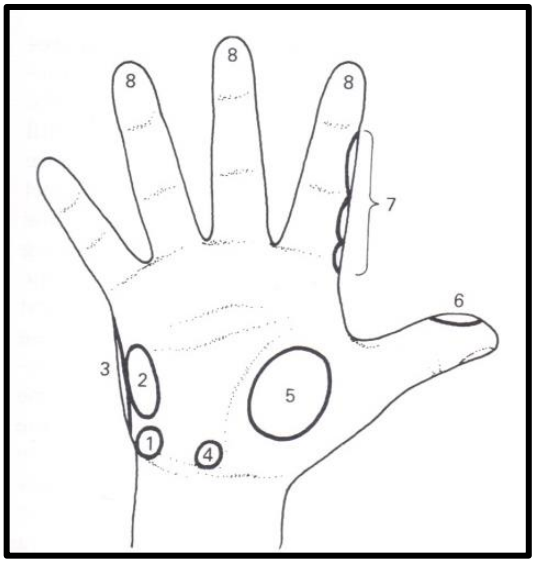

Figure 2. 1 The various common contact points

(Adapted from Byfield, 2005: 115)

- 1: Pisiform
- 2: Hypothenar
- 3: metacarpal
- 4: calcaneal (heel)
- 5: thenar
- 6: thumb
- 7: interphalangeal
- 8: fingertip (pad) or digital

During a manipulation, the hand is the most important short lever contact point used. The hand has the capability to accommodate numerous posturers required to suite the particular clinical situation and patient as well as the capacity to twist and mould to conform to more inaccessible anatomical contact points (Byfield 2005). Triano (2000) found the hand to be susceptible to unnecessary injury if incorrectly placed during the application of the manipulative thrust placing added stress on the soft tissue and joints of the hand and fingers.

Manipulations are performed with the patient in various positions. These positions are determined by the clinical scenario as well as the symptoms, individual needs and tolerances of the patient. Both the side lying and prone posture utilise the shoulder/arm thrust (Peterson and Bergmann 2002; Grice and Vernon 1992; Fligg 1984; Szaeaz 1984; Grice 1980). This specific thrusting technique can generate large forces over an extended distance. The manipulative force is generated in the shoulder girdle, transmitted along the arm, across the hand and transferred onto a moderately short anatomical lever (Byfield 2005). The amount of force applied is considerably influenced by the patient's position. The energy used and the force applied are inversely proportionate to the ability to control and stabilise patient movement. The side lying posture exhibits less control and accordingly more force in general. Conversely the prone position offers nearly total patient control, but attaining optimal joint tension is more difficult; possibly increasing the preload forces and compromising specificity (Byfield 2005). Several authors view the side lying posture as one of the more traditional and most effective positions for the treatment of the lumbar spine and pelvis (Peterson and Bergmann 2002; Byfield 1996; Cassidy, Kirkaldy-Willis and McGregor 1985). The side posture provides leverage via the femur, pelvis and upper body of the patient to produce a mechanical transition point at the desired intervertebral level (Triano 2000). This posture subjects both the patient and the practitioner to excessive twisting action which could lead to mechanical deformation of pain sensitive structures.

Chiropractors display an assortment of physical parameters during spinal adjustment (Herzog 2010; Herzog 2000). Forces applied to the sacroiliac joint in a side lying position fluctuated between 0 – 300 N preload and 200 – 1200 N for peak thrust force (Byfield 2005). A study conducted by Drover *et al.* (2004) compared forces applied by male and female chiropractors during thoracic spine manipulations. The study concluded that from a mechanical point of view female chiropractors delivered similar manual treatments to their male colleagues. The study indicated that a thrust of up to 1000 newtons is applied to the target site within approximately

150 milliseconds (Drover *et al.* 2004). An analysis of the three dimensions of direct contact forces in chiropractic spinal manipulative therapy proposes that the highest loads are at T4-5 and T8-9 levels and the lowest loads at the cervical levels, with T1-2 and sacroiliac loads between both extremes (Gosselin and Van Zoest 2003).

Aside from manipulation, chiropractors regularly use various non-manipulative techniques, commonly referred to as mobilisations. Mobilisations can be defined as a movement applied singularly or repetitively within, or at, the physiological range of motion, without imparting a thrust impulse, with the objective to re-establish joint mobility (Gatterman 2005). The distinguishing feature between manipulative and non-manipulative techniques is the application of a thrust force. Non-manipulative techniques may not cause as much biomechanical stress to the chiropractor's hands as a manipulation in a singular event, but the repetitive nature of non-manipulative techniques may have a greater cumulative effect (Mathews 2006).

2.5 PREVIOUS STUDIES REGARDING WORK-RELATED MUSCULOSKELETAL INJURIES IN CHIROPRACTORS

Many chiropractors are predisposed to the development of musculoskeletal injuries prior to beginning their professional careers (Greene, Goggins and Hess 2011). This may be attributed to performing repetitive adjusting techniques by the novice chiropractic student, leading to upper extremity injuries. Spinal injuries may result from receiving adjustments by inexperienced students (Kizhakkeveettil *et al.* 2014; Kuehnel, Beatty and Gleberzon 2008; Fyfe 2006). All these are predisposing factors for future injury.

Daily practice encompasses continuous application of several manipulative procedures and non-manipulative tasks in an assortment of postures which subject the musculoskeletal system to potentially large repetitive mechanical loads (Byfield 2005). The continual use of similar manipulative techniques and procedures day after day and year after year could lead to the development of chronic overuse syndrome as the result of poor biomechanical performance by the chiropractor (Lorme and Naqvi 2003). According to the literature, 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 (Rupert and Ebete 2004; Tim 1996; Mior and Diakow 1987).

Non-physical stress factors such as financial concerns and patient demands may independently contribute to the commencement of occupational related back pain.

Occupational posture has previously been identified as a predisposing factor for back, neck and shoulder pain (Pelissier *et al.* 2014). It stands to reason that the chiropractic profession might be predisposed to these problems. This stems from the necessity for the chiropractor to assume several postures combining forward flexion, lateral flexion and rotation during the administration of different manual interventions (Byfield 1996; Mior and Diakow 1987). Musculoskeletal pain and injuries may be exacerbated by chiropractors modifying their position to meet the patient's requirements as opposed to adapting the patient's position in line with their own needs (Sunell and Maschak 1996).

Many manipulative skills utilised in daily practice force the practitioner to assume a bent (flexion) posture, twisting (rotating) the trunk and generating a pulling action while simultaneously reaching and stretching around the patient. These all predispose the chiropractor to possible WRMSI (Byfield 2005). These postures are depicted in figures 2.2 to 2.5. The combination of forward flexion, lateral flexion and rotational movements positions the spinal joints at the end of their passive range, which could result in injury over a period of time as a consequence of fatigue or trivial uncontrolled movements (McGill 2002). Another risk factor is the constant lifting and readjusting of patients on the table prior to the manipulation (European Agency for Safety and Health at Work 2008).

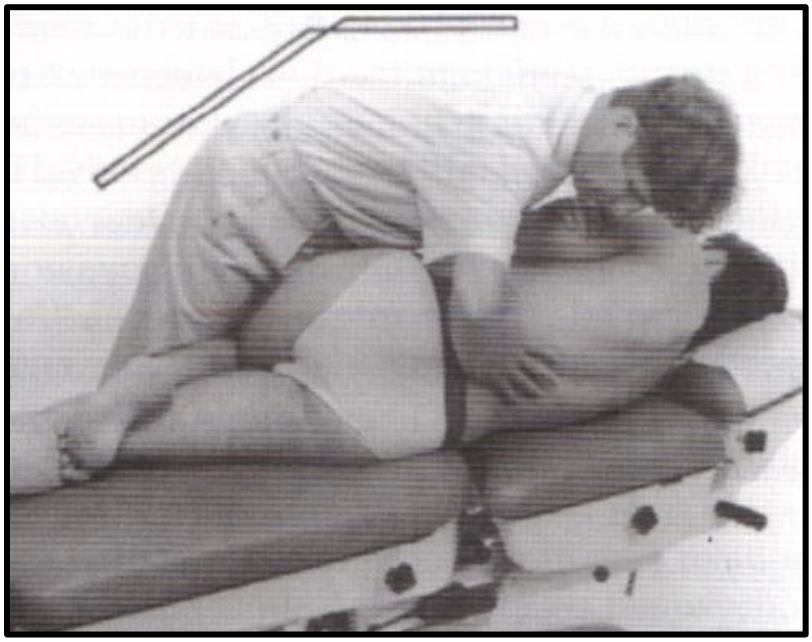

Figure 2. 2 Common manipulative posture with trunk flexion and rotation

(Adapted from Byfield 2005: 90)

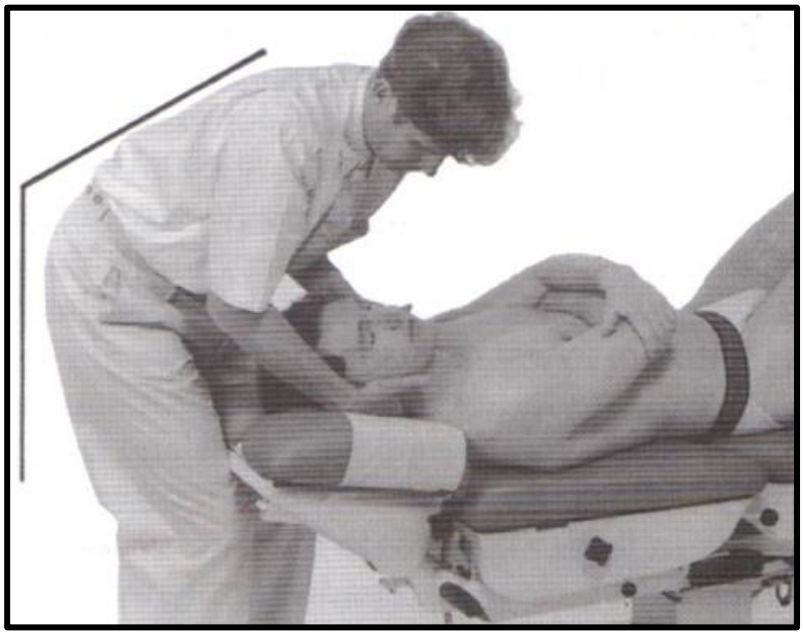

Figure 2. 3 Illustration of forward flexed posture

(Adapted from Byfield 2005: 90)

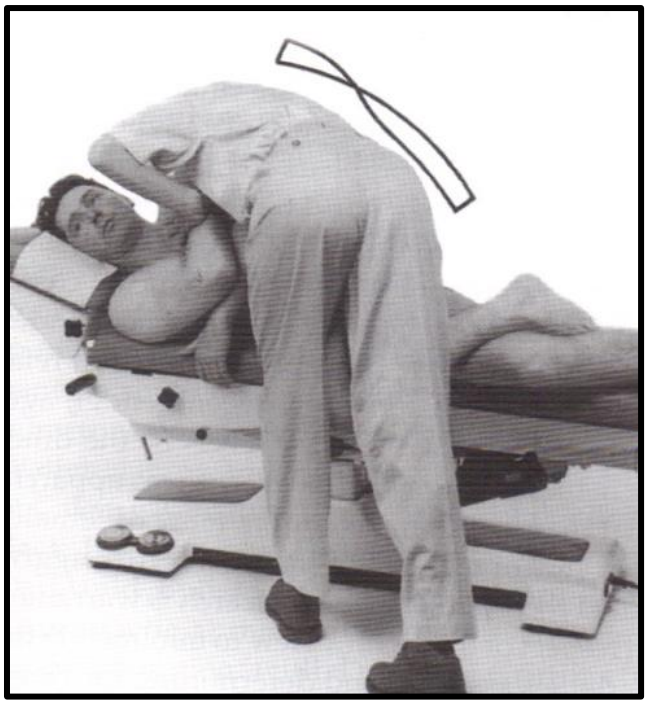

Figure 2. 4 Torque activity associated with certain manipulations

(Adapted from Byfield 2005: 91)

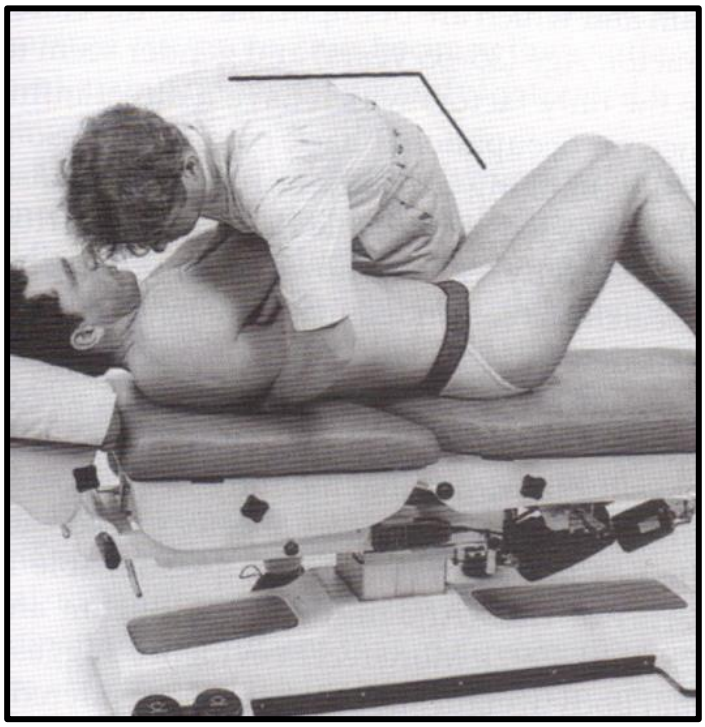

Figure 2. 5 Illustration of practitioner flexing around the patient

(Adapted from Byfield 2005: 91)

Soft tissue of the shoulder, elbow and wrist are equally at risk as result of poor posture and inappropriate force transmission along the kinematic chain, resulting in potential occupational related injuries (Byfield, Maher and McCarthy 2003). High patient workloads subject the upper extremity to considerable mechanical loads (Luttmann *et al.* 2003). The soft tissue of the upper back and shoulder girdle are especially susceptible to injury during manual thrusting as a result of the high loads encountered (Figure 2.6) (Byfield 2005). This could justify and contribute to the high incidence rate of overuse injuries in the chiropractic profession.

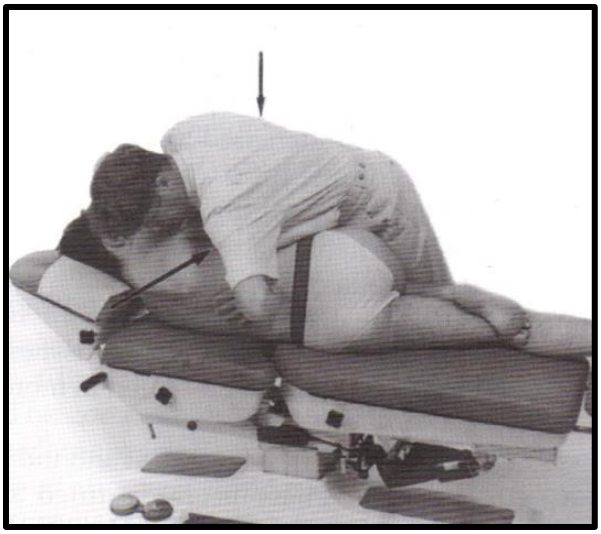

Figure 2. 6 Manual thrusting by the practitioner

(Adapted from Byfield 2005: 91)

Byfield, Maher and McCarthy (2003) investigated the prevalence of neck and shoulder pain in the Chiropractic profession in the UK and found 50% of the sample (n = 88) complained of current neck or shoulder pain with 5.7% indicating shoulder and neck pain. Results showed that the cervico-thoracic region was the most common area of neck complaints. Both male (48%) and female (68%) participants felt that their work aggravated their pain.

Homack (2005) studied the occupational injuries in practicing chiropractors in the New York State and established that anatomical structures most at risk of being injured were the lower back, shoulder and the wrist. The most commonly reported type of injury was muscular strain, followed by ligamentous strain. The most often cited causes of injury included patient handling and performing side lying manipulations.

In 2004 Rupert and Ebete conducted a study on the epidemiology of occupational injuries in chiropractic practice with at least 15 years of practice experience. They found that 57% (n = 451) of respondents reported work-related musculoskeletal injuries during their career. These musculoskeletal injuries were distributed as follows: wrist (52%), hand (50%), lower back (50%), shoulder (35%), neck (22%) and upper back (21%). The type of injuries reported included ligament strains (45%), muscle strains (43%), tendonitis (37%), injuries to inter-vertebral discs (26%) and degeneration (23%). The majority (82%) of the respondents stated that these injuries caused them to alter activities such as work position (64%), body mechanics (50%), delegation to other personnel (38%) and frequency of manual techniques (33%). In this particular study (n = 451) 62% of the participants described modifying patient care due to their symptoms, particularly treatment technique (53%), reducing the number of patients treated (21%) and reducing working hours (18%) as result of injuries encountered.

Holm and Rose (2006) determined the prevalence of work-related injuries among chiropractors in the United States (n= 159) and found that upper extremity injuries were most commonly reported, comprising of wrist/hand/fingers (42.9%), shoulder (25.8%) and elbow (11.9%). Lower back injuries were reported by 24.6% of the respondents. The majority of the injuries included soft tissue injuries such as ligament sprains (44.4%), tendonitis (35.5%) and muscle strains (32.5%). Most of the reported injuries occurred while either positioning a patient for manipulation (11.1%) or while performing a manipulation (66.7%). The areas manipulated whilst sustaining the injury included lumbosacral spine (37.1%) and the thoracic spine (21.6%). These injuries occurred most commonly with the patient being manipulated in the side lying position (37.8%). Furthermore, this study showed injuries were more likely to occur in the first to fifth year of practice, with 16.7% of the injuries necessitating at least one week or more off from practice and 2.4% resulting in permanent disability. A total of 30% of the participants ($\frac{119}{159}$) indicated a modification to their manipulation technique as result of an injury.

A study conducted by Mathews (2006) investigated the prevalence and factors associated with occupational overuse syndrome in the hands and wrists of chiropractors in SA (n=108). The study found a lifetime prevalence of either hand or wrist pain in 73% of the participants while 38% had hand and wrist pain. Affected participants claimed lumbar spine manipulations were the main cause of hand/wrist pain. Most hand and wrist pain occurred when manipulating patients in the side lying position (46%) followed by having patients lying prone (41%) and supine (35%).

Pereira (2009) investigated the prevalence and risk factors for occupational lower back pain in manual therapists in SA and found that chiropractors (n=21) saw nine patients per day and spent an average of 40 hours per week working hands on. Furthermore, the study showed that 76.5% of chiropractors (n=17) felt their lower back pain was exacerbated by clinical practice. The results showed that 82.4% (n=17) experienced lower back pain for the first time working as a manual therapist within five years of practice.

2.6 CONCLUSION

From the literature obtained utilising search engines such as Google Scholar and Summon it was evident that there is a higher prevalence of WRMSI in health care workers, which can be attributed to the labour intensive and physically demanding activities required in these professions (Ndetan *et al.* 2009a). Patient handling (including patient transfers, repositioning and lifting) and manual therapy (soft tissue work, mobilisation of joints and orthopaedic techniques) are the activities most commonly cited in association with WRMSI among health care professionals (Darragh, Campo and King 2012). Chiropractors are subjected to lifting, bending and twisting while performing manual therapy; these manual procedures involve rotation as well as forward and lateral flexion of the spine. These movements, combined with awkward positions due to a lack of awareness about their posture, (Kline 2005) cause increased loads on the lower back as well as the upper extremity which are risk factors for the development of work related musculoskeletal injuries (Darragh, Campo and King 2012; Ndetan *et al.* 2009a; Bork *et al.* 1996). The physical demands placed on chiropractors by their occupation places them at risk of developing similar musculoskeletal disorders to those that they treat (Greene, Goggins and Hess 2011).

CHAPTER THREE
METHODS AND MATERIALS

3.1 INTRODUCTION

This chapter is concerned with the methods and instruments used to conduct the research as well as the statistical methodology employed. The topics to be addressed include the study design, sampling method, the research tool, ethical considerations and statistical methodology employed in this study.

3.2 STUDY DESIGN

This study was epidemiological in nature; with the aim of establishing patterns in the occurrence of work related musculoskeletal injuries and associating these patterns with likely causes and then quantifying the association (Community Research and Development Information Service 2009). The study was therefore a quantitative, epidemiological, cross-sectional survey, in the form of a self-administered questionnaire.

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

3.3 ALLOCATION OF PARTICIPANTS

3.3.1 Sampling and selection procedure

A list was obtained from the Allied Health Professionals Council of South Africa (AHPCSA), containing the contact information of all registered chiropractors in the eThekwini municipality. The total population of chiropractors practising in the eThekwini municipality was invited to participate in the study therefore purposive sampling was used as only chiropractors were included.

3.3.2 Sample size

The total number of registered chiropractors in the eThekwini municipality was obtained from the AHPCSA on 16 January 2017. It was determined that the registered number of practicing

chiropractors in the eThekwini municipality equated to 127. A response rate of 60% and above was seen as acceptable to make generalisations.

3.3.3 Inclusion and exclusion criteria

3.3.3.1 Inclusion criteria:

- Participants must be registered with the AHPCSA as a chiropractor.
- Contact information of the chiropractor should be available to partake in the study
- Chiropractors must be clinically active in SA to partake in the survey (practice at least once a week treating a minimum of one patient).
- Participants must read the letter of information (Appendix B) and sign an Informed Consent form (Appendix C).

3.3.3.2 Exclusion criteria

- Questionnaires returned incomplete:
    - Questionnaires with missing data will still be used, provided missing data does not exceed 15% per question (Subar *et al.* 2001; Griffith *et al.* 1999; Brazier *et al.* 1992).
    - Questionnaires exceeding 15% missing data per question will not be used.
- Questionnaires returned without Informed Consent Form (Appendix C)

Chiropractors participating in the Focus Group (FG) and pilot study are to be excluded from the study.

Fifth year chiropractic students were recruited to partake in the pilot study. This was a decision made by the researcher to minimize the number of participants to be excluded from the already small study population.

3.4 MEASUREMENT TOOL

The data collection tool was a self-administered questionnaire (Appendix D).

3.4.1 Questionnaire development and background

The questionnaire was adapted from the questionnaire used by Holm and Rose (2006). Their study focussed on work-related musculoskeletal disorders in chiropractors:

- Questionnaire pertained to Work-related injuries of doctors of Chiropractic in the United States.
    - Permission to use the questionnaire was granted by Dr Kevin Rose (Appendix E)

The questionnaire was modified to suit a South African audience, and in particular the research objectives.

3.4.2 Focus group

The questionnaire will be tested by means of a focus group (FG). A FG is defined as a group of interacting individuals; classically seven to ten people with common interests or characteristics related to the topic. The group interactions are used as a way to gain information about the relevant topic (Marczak and Sewell 1999). The aim of the FG is to limit the potential of misinterpretation of questions by the research participants. This is done by critically assessing the questions offered in the questionnaire (Scollen and Scollen 1995). FG members will be encouraged to add, delete or modify for clarity questions presented by the researcher (Bernard 2000) as well as ensure that the questionnaire is well suited to a South African audience (Mouton 1996).

The FG will be able to contextualize the questionnaire (Salant and Dillman 1994) in order to enhance its face validity and reliability (Bernard 2000). Face validity is a subjective, superficial assessment of those involved in the research to determine whether the measurement procedure used in the study appears to be a valid measure of a given hypothesis (Laerd-Dissertation 2012; Leedy 1997) (i.e. does the questionnaire answer the research question?). Alternatively it refers to whether “on the face of it” the questionnaire seems clear cut, valid and easily interpreted by the participants of the FG (Hicks 2004; Bernard 2000).

The FG consisted of the following members:

- The researcher, who acted as the chairperson of the FG meeting
- The research supervisor who had guided the researcher through the research process
- Two qualified chiropractors who have been in practice less than five years
- Three qualified chiropractors who have been in practice more than five years
- The questionnaire was sent to a statistician prior to the FG meeting as he was unable to attend. The statistician’s comments were raised by the chairperson at the FG meeting.

Members of the focus group were chosen to fit represent the sample size demographics (less than 5 years in practice, more than 5 years in practice).

Before starting the FG proceedings, each participant was required to read the Letter of Information (Appendix F) and sign the Confidentiality Statement (Appendix G), Code of Conduct Statement (Appendix H) and Informed Consent Form (Appendix I). During the FG meeting, participants had the opportunity to raise any questions and to verify that they comprehended what was required off them. The questionnaire (Appendix J) was distributed to each participant and each question in the questionnaire was chronologically discussed by the participants at the FG meeting. Recommended changes were made based on unanimous agreement by participants. These changes were implemented, forming the post-FG questionnaire (Appendix which was used as the pre-pilot study group questionnaire.)

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.

3.4.2.1 Changes made from the pre-focus group to the post-focus group research questionnaire:

Question 1: Demographic detail

- Question 1.1 – no change
- Question 1.2 – no change
- Question 1.3
    - Change “Black” to “African “
    - Add another option of “Other (please specify)”
- Question 1.4
    - Change to “meters”
- Question 1.5
    - Change to “kilogrammes”

Question 2: Practice demographics

- Question 2.1
    - Remove tick boxes with a line for participant response
- Question 2.2
    - Remove tick boxes and replace with a line for participant response
- Question 2.3

    - Remove tick boxes and replace with a line for participant response
- Question 2.4
    - Formatting:
        - Changed to Likert scale
    - Add NIP as another option
- Question 2.5
    - Wording:
        - Changed to, “Non-manipulative techniques used on a daily basis (tick appropriate box indicating frequency of each option used)”
        - Change option of “modalities” to “electro-modalities”
    - Formatting
        - Options arranged in alphabetical order
        - The following options were also added:
            - Strapping
            - Stretching
            - None
        - Tick boxes replaced with Likert scale
- Add question number to next question – Question 2.6
    - Formatting:
        - Add tick boxes to Yes and No

Question 3: Work-related musculoskeletal injuries

Change heading to work-related musculoskeletal injuries: <u>SINGLE MOST SEVERE</u> work related musculoskeletal injury

- Question 3.1
    - Wording:
        - Removed “(all that apply)” from question
    - Formatting:
        - Separate Question 3.1 and 3.2
- Question 3.2
    - Formatting
        - “Other (please specify)” was included as an option
- Question 3.3

    - Formatting
        - Option (c) changed to, “Initial episode at work with subsequent flare ups?”
        - Option (d) was added, “Initial episode outside work with subsequent flare ups?”
            - “Please specify how injury occurred”
- Question 3.4
    - Wording:
        - Question changed to “Activity you were performing that caused your injury/aggravated existing injury”
    - Formatting:
        - Add another option “Other (please specify)”
- Question 3.5
    - Formatting:
        - Adjust spacing of “16-20 years”
- Question 3.6
    - Wording:
        - Change to, “How much time were you away from work due to this injury to date?”
    - Formatting:
        - Remove “Permanent disability”
        - Add option, “Are you still suffering from this injury? (please specify)”
- Question 3.7 - No change
- Question 3.8
    - Wording:
        - Changed to, “What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)”
- Question 3.9
    - Added Question 3.9
        - Do you have Income protection?
- Question 3.10
    - Added Question 3.10
    - Did you claim as a result of this injury?

- Question3.11
    - Added Question 3.11
    - Did your claim pay out?

Question 4:

Change heading to work-related musculoskeletal injuries: SECOND MOST SEVERE work-related musculoskeletal injury

- Question 4.1
    - Wording:
        - Removed “(all that apply)” from question
    - Formatting:
        - Separate Question 4.1 and 4.2
- Question 4.2
    - Formatting
        - “Other (please specify)” was included as an option
- Question 4.3
    - Formatting
        - Option (c) changed to, “Initial episode at work with subsequent flare ups?”
        - Option (d) was added, “Initial episode outside work with subsequent flare ups?”
            - “Please specify how injury occurred”
- Question 4.4
    - Wording:
        - Question changed to “Activity you were performing that caused your injury/aggravated existing injury”
    - Formatting:
        - Add another option “Other (please specify)”

- Question 4.5
    - Formatting:
        - Adjust spacing of “16-20 years”
- Question 4.6
    - Wording:

        - Change to, “How much time were you away from work due to this injury to date?”
    - Formatting:
        - Remove “Permanent disability”
        - Add option, “Are you still suffering from this injury? (please specify)”
- Question 4.7 - No change
- Question 4.8
    - Wording:
        - Changed to, “What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)”
- Question 4.9
    - Added Question 4.9
        - Do you have Income protection?
- Question 4.10
    - Added Question 4.10
        - Did you claim as a result of this injury?
- Question 4.11
    - Added Question 4.11
        - Did your claim pay out?

Question 5:

Change heading to work-related musculoskeletal injuries: <u>THIRD MOST SEVERE</u> work-related musculoskeletal injury

- Question 5.1
    - Wording:
        - Removed “(all that apply)” from question
    - Formatting:
        - Separate Question 5.1 and 5.2
- Question 5.2
    - Formatting
        - “Other (please specify)” was included as an option
- Question 5.3
    - Formatting

        - Option (c) changed to, “Initial episode at work with subsequent flare ups?”
        - Option (d) was added, “Initial episode outside work with subsequent flare ups?”
            - “Please specify how injury occurred”
- Question 5.4
    - Wording:
        - Question changed to “Activity you were performing that caused your injury/ aggravated existing injury”
    - Formatting:
        - Add another option “Other (please specify)”
- Question 5.5
    - Formatting:
        - Adjust spacing of “16-20 years”
- Question 5.6
    - Wording:
        - Change to, “How much time were you away from work due to this injury to date?”
    - Formatting:
        - Remove “Permanent disability”
        - Add option, “Are you still suffering from this injury? (please specify)”
- Question 5.7 - No change
- Question 5.8
    - Wording:
        - Changed to, “What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)”
- Question 5.9
    - Added Question 5.9
        - Do you have Income protection?
- Question 5.10
    - Added Question 5.10
    - Did you claim as a result of this injury?
- Question 5.11

- Added Question 5.11
- Did your claim pay out?

3.4.3 Pilot study

After the FG meeting, the suggested changes were implemented and the questionnaire was compiled into a post-focus group/pre-pilot questionnaire (Appendix J). The aim of the Pilot Study (PS) was to determine whether or not the research participants would be able to relate to the questionnaire as well as reveal any additional errors/contradictions as per the guidelines set out by Fink and Kosecoff (1985) which were indicated on the Pilot-Test Evaluation Form (Appendix L). The pilot study served as a "trial run" of the larger study in determining the feasibility of the questionnaire (Leon, Davis and Kraemer 2011; Porta 2008; Trochim 2000).

Before starting the Pilot study, each participant was required to read the Letter of Information (Appendix M), sign the Confidentiality Statement (Appendix N), Code of Conduct Statement (Appendix O) and Informed Consent Form (Appendix P).

According to Baker (1994) enrolling 10-20% of the total sample group is reasonable, thus for this particular study with a sample size of 97 (chiropractors in total of which fourteen were not currently in practice, three had retired, the seven chiropractors participating in the focus group were excluded and six did not wish to participate)10 participants were enrolled for the pilot study.

3.4.3.1 Changes made from post-focus group to main research questionnaire:

Question 1: Demographic detail

NOTE ADDED (in bold): **Tick appropriate box**

- Question 1.1: No change
- Question 1.2: No change
- Question 1.3: No change
- Question 1.4: No change
- Question 1.5: No change

Question 2: Practice demographics

- Question 2.1:
    - Wording:
        - "Time in practice (please specify number of years)"

- Question 2.2: No change
- Question 2.3: No change
- Question 2.4: NOTE ADDED (in bold): **Tick appropriate box**
- Question 2.5: No changes
- Question 2.6:
    - Wording:
        - "Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?"

Question 3:

- Formatting
    - "SINGLE MOST SEVERE" font size was increased to be more visible
- Question 3.1: NOTE ADDED (in bold): **Tick appropriate box**
- Question 3.2: No changes
- Question 3.3: No changes
- Question 3.4: No changes
- Question 3.5: No changes
- Question 3.6: No changes
- Question 3.7: No changes
- Question 3.8: No changes
- Question 3.9: No changes
- Question 3.10: No changes
- Question 3.11: No changes

Question 4:

- Formatting
    - "SECOND MOST SEVERE" font size was increased to be more visible
- Question 4.1: NOTE ADDED (in bold): **Tick appropriate box**
- Question 4.2: No changes
- Question 4.3: No changes
- Question 4.4: No changes
- Question 4.5: No changes

- Question 4.6: No changes
- Question 4.7: No changes
- Question 4.8: No changes
- Question 4.9: No changes
- Question 4.10: No changes
- Question 4.11: No changes

Question 5:

- Formatting
    - "THIRD MOST SEVERE" font size was increased to be more visible
- Question 5.1: NOTE ADDED (in bold): **Tick appropriate box**
- Question 5.2: No changes
- Question 5.3: No changes
- Question 5.4: No changes
- Question 5.5: No changes
- Question 5.6: No changes
- Question 5.7: No changes
- Question 5.8: No changes
- Question 5.9: No changes
- Question 5.10: No changes
- Question 5.11: No changes

3.5 DATA COLLECTION AND ANALYSIS

The data was collected from the sample of chiropractors in the eThekwini municipality by means of a questionnaire, which was developed from a previously published study (Holm and Rose 2006) and validated prior to the study through a focus group (Bernard 2000; Mouton 1996) and pilot testing (Bernard 2000).

The research questionnaire (Appendix D) was either emailed or hand delivered to the prospective participants together with a Letter of Information (Appendix B) and Informed Consent Form (Appendix C). The Letter of Information requested the chiropractors' participation and informed consent (Appendix) 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 of the researcher and research

supervisor were provided should any of the chiropractors have had any queries or questions regarding the study.

All chiropractors practicing in the eThekwini municipality was contacted either telephonically or via email whereby they were informed of the particular study, as well as given the opportunity to partake in the study. Contacting participants before sending the questionnaire has been shown to increase the probability of participants partaking in the study (Oracle 2012). Chiropractors agreeing to partake in the study had the option of either receiving an email or having a hard copy delivered to their practice for completion. The questionnaire was accompanied by a letter of information (Appendix B) (which introduced the research project by including the title of the study, the aims of the study and ethical considerations), letter of informed consent (Appendix N); which had to be completed and returned.

Chiropractors selecting to complete the emailed questionnaire were given four weeks to complete the questionnaire and letter of informed consent. Non-responders were contacted again, reminding them of the questionnaire and encouraging participation. Providing non-responders with a second option to complete the questionnaire has been shown to increase the response rate (Edwards 2002).

Non-responders were given the option of receiving the questionnaire via email or having the questionnaire delivered to their practice for completion.

The electronic questionnaire was sent from an email address (WRMSIquestionnaire@gmail.com) created especially for the questionnaire. The completed questionnaire, as well as the letter of informed consent was returned to this email address. Only the researcher had access to the completed questionnaires after which the names of the respondents were crossed off the list of participants, indicating who had responded. The researcher coded the participants to ensure confidentiality. These electronic questionnaires were printed and kept confidential.

Participants electing to complete a hard copy of the questionnaire were contacted to arrange a suitable time when the researcher met with the participant, delivered the questionnaire, letter of information and letter of informed consent for completion. After completion of the hard copy and the letter of informed consent, the chiropractor contacted the researcher to arrange collection of the questionnaire and letter of informed consent.

After all the questionnaires were completed, they were captured on an Excel spreadsheet in preparation for data analysis as outlined in the data analysis section of this proposal. All questionnaires were kept in a locked cabinet during this process.

All questionnaires and material pertaining to this study will be stored in the DUT Chiropractic Department for a period of five years after which the questionnaires will be shredded.

Participants were required to answer questions pertaining to the following:

- Participant demographics
- Practice demographics
- Work-related musculoskeletal injury

3.6 STATISTICAL METHODS

3.6.1 Statistical approach (Lind, Marchal and Mason 2004):

Descriptive statistics describe the organising and summarising of quantitative data. Univariate and bivariate analysis is most appropriate for descriptive statistics. Univariate analysis is concerned with measures of central tendency and measures of dispersion. The most appropriate measure of central tendency for interval data is the mean and the most appropriate measure of dispersion for interval data is the standard deviation. Bivariate analysis concerns the measurement of two variables at a time. Descriptive statistics are useful as they summarise results for an experiment, thereby allowing for more constructive research after more detailed analysis. Descriptive data analysis aims to describe the data by investigating the distribution of scores on each variable, and by determining whether the scores on different variables are related to each other. This can also be done using various types of tables and graphs. Data resulting from observations made on two different related categorical variables (bivariate) can be summarised using a table (two way frequency/contingency table) (Willemse 2009).

Linear regression and correlation enable the researchers to determine the connection between the actual dimensions of two or more variables (Stephens and Larry 2004). Logistical regression will be used to obtain odds ratios in the presence of more than one explanatory variable. The result is the impact of each variable on the odds ratio of the observed event of interest (Sperandei 2014). Binomial logistic regression estimates the probability of an event (in this

case, having an injury) occurring. If the estimated probability of the event occurring is greater than, or equal to, 0.5 (better than even chance), the event can be classified as occurring (e.g., having had an injury). The converse is also true. Binomial logistic regression is used to predict whether cases can be correctly predicted from the independent variables. Most methods are based on the observed and predicted classifications.

3.6.2 Hypothesis tests: p-values and statistical significance (Lind, Marchal and Mason 2004):

The data was analysed with SPSS version 24.0. The results present the descriptive statistics in the form of graphs, cross-tabulations and other figures, using the qualitative data collected. The traditional approach to reporting a result requires a statement of statistical significance. A p-value will be generated from a test statistic. A significant result is indicated with "$p < 0.05$".

Chi-square test will be used for nominal and ordinal data at a significance of 0.05, when Chi-square has been violated (expected value <5), Fisher's Exact Test will be used. SPSS version 24.0 will be used to analyse the data. Binary logistical regression was used to analyse the risk factors of injury.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

This chapter presents and explains the results of the study with particular emphasis on the statistical significance and relevant findings.

4.2 AIMS AND OBJECTIVES

The aim of the study was to determine the epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality and to compare these findings to similar studies.

To elucidate the information necessary to achieve the aims of the study as indicated above, the following objectives were identified:

- To determine the practice-lifetime prevalence of work-related musculoskeletal pain in chiropractors.
- To determine selected risk factors associated with work-related musculoskeletal pain in chiropractors.
- To determine the impact of work-related musculoskeletal pain in chiropractors.
- To determine any association between the prevalence of work-related musculoskeletal pain in chiropractors and selected risk factors associated with work-related musculoskeletal pain in chiropractors.

4.3 DATA SOURCES

4.3.1 Primary data sources

The primary source of data was the self-administrated research questionnaire, which was used to collect information from the chiropractors directly.

4.3.2 Secondary data source

The secondary sources of data included: books, research dissertations, journal publications and articles, internet websites and directories, electronic and telephonic communication with the

chiropractors in the study sample as well as the AHPCSA and personal communication with the research supervisor (Dr. K. Padayachy) and statistician (Mr. D. Singh). All of the above-mentioned data sources can be found in the References (pg. 77) of this study.

4.4 RESULTS

The relationships and the strength between categorical variables were analysed using Chi-squared methodology. In the event of violation of the expected frequencies the Fisher's exact test was used to obtain the p-value. A p-value of <0.05 was used to indicate statistical significance. The highlighted sig. values (p-values) are less than 0.05 (the level of significance), this implies statistical significance

4.4.1 Response rate

A list obtained from the AHPCSA showed a total of one-hundred-and-twenty-seven registered chiropractors within the eThekwini municipality. Fourteen of them indicated they were not in practice at the time of the questionnaire and three chiropractors have retired from the profession.

Of the hundred-and-ten practicing chiropractors in the eThekwini municipality, seven were excluded after participating in the focus group. Six of the remaining hundred-and-three chiropractors indicated they did not have time to participate/were not willing to participate in the study.

Ninety-seven chiropractors were invited to participate in the survey. Seventy-two of them indicated they were willing to participate and sixty two chiropractors completed the questionnaire.

A response rate of 64% ($^{62}/_{97}$) was calculated.

Non-responses

The non-responses in this study were due to various reasons. The non-responses were recorded on the basis of telephonic and/or electronic communication with a third party or with the participants themselves.

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

1. A change in telephone number or email address.
2. Participants had relocated their practice/emigrated (13).
3. Participants not being in practice at the time of the questionnaire (14)
4. Several subjects voluntarily chose to not participate (6). The reasons for this included the following:
    a. They did not wish to participate.
    b. They were too busy, thus time constraints prevented them from participating.
    c. They had retired (3).

Unusable responses

One unusable response was returned via email. The format of the questionnaire had been altered to a state which could not be utilised for data collection, therefore resulting in the final sample size of n=61.

4.4.2 Demographics of participants

4.4.2.1 Age

The mean age of participants in this study was 35.57 years (SD 8.421years) with a range from 26 to 69 years. There was no significant difference in age between males and females (p-value= 0.078).

4.4.2.2 Gender

The data in Table 4.1 reflects that the majority 55.7% of respondents were female.

Table 4. 1: **Gender of respondents**

	Male	Female	Total
Frequency	27	34	61
Percent	44.3	55.7	100

4.4.2.3 Ethnicity

Table 4.2 reflects that the majority of respondents were white (77%). The other ethnic groups were represented in smaller proportions with no Coloured respondents in the sample.

Table 4. 2: **Ethnicity of respondents**

	African	Indian	White	Total
Frequency	1	13	47	61
Percentage	1.6	21.3	77	100

4.4.2.4 Anthropometry: weight and height

Participants were asked to state their height and weight. Table 4.3 shows the tallest participant was 1.95m while the shortest was 1.53m (mean of 1.7m). The weight of the participants ranged from 48kg to 105kg (mean 72.8kg).

Table 4. 3: **Anthropometry of respondents**

	N	Mean	Median	Std. Deviation	Minimum	Maximum	Range
Height in metres	61	1.7159	1.71	0.11052	1.53	1.95	0.42
Weight in kilogrammes	61	72.798	70	14.7075	48	105	57

4.4.3 Practice demographics

4.4.3.1 Time in practice (specify number of years), average number of patients seen per working day and average number of hours spent on clinical practice per week (hands on work)

Table 4.4 shows the mean number of years spent in practice was 9.4years (SD = 7.7years) and ranged from nine months to forty years. The average number of patients seen per working day was 7.75 (SD = 5.189) ranging from one to twenty patients per day and the average number of hours spent in clinical practice equated to 23.22 hours per week (SD = 14.187). The minimum was two hours and the maximum was fifty hours per week.

Table 4. 4: **Time in practice (please specify number of years), average number of patients seen per working day and average number of hours spent on clinical practice per week (hands on work)**

	Time in practice (please specify number of years)	The average number of patients seen per working day?	Average number of hours spent in clinical practice per week (hands on work)
N	61	61	61
Mean	9.4385	7.75	23.221
Median	8.0000	7.00	25.000
Std. Deviation	7.70250	5.189	14.1876
Minimum	.75	1	2.0
Maximum	40.00	20	50.0
Range	39.25	19	48.0

4.4.3.2 Chiropractic technique used on a daily basis

Figure 4.1 show that 66.7% of respondents indicated they utilise Diversified on every patient. Figure 4.1 also depicts other chiropractic techniques used on a daily basis.

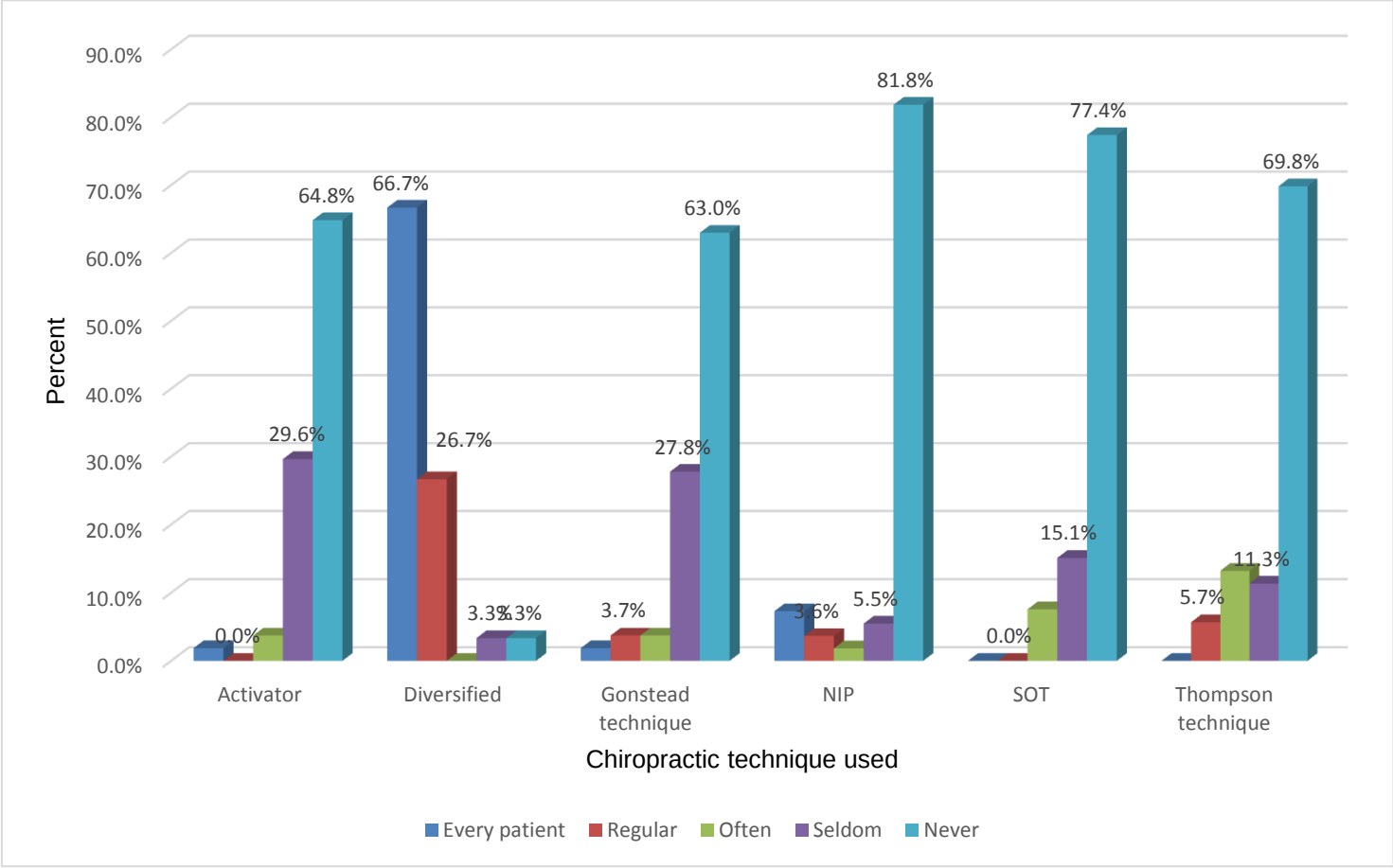

Figure 4. 1: **Chiropractic technique used on a daily basis**

4.4.3.3 Non-manipulative techniques used on a daily basis

Figure 4.2 depicts that 57.4% of participants use dry needling/acupressure on a regular basis. While 38.3% specified they use massage therapy regularly.

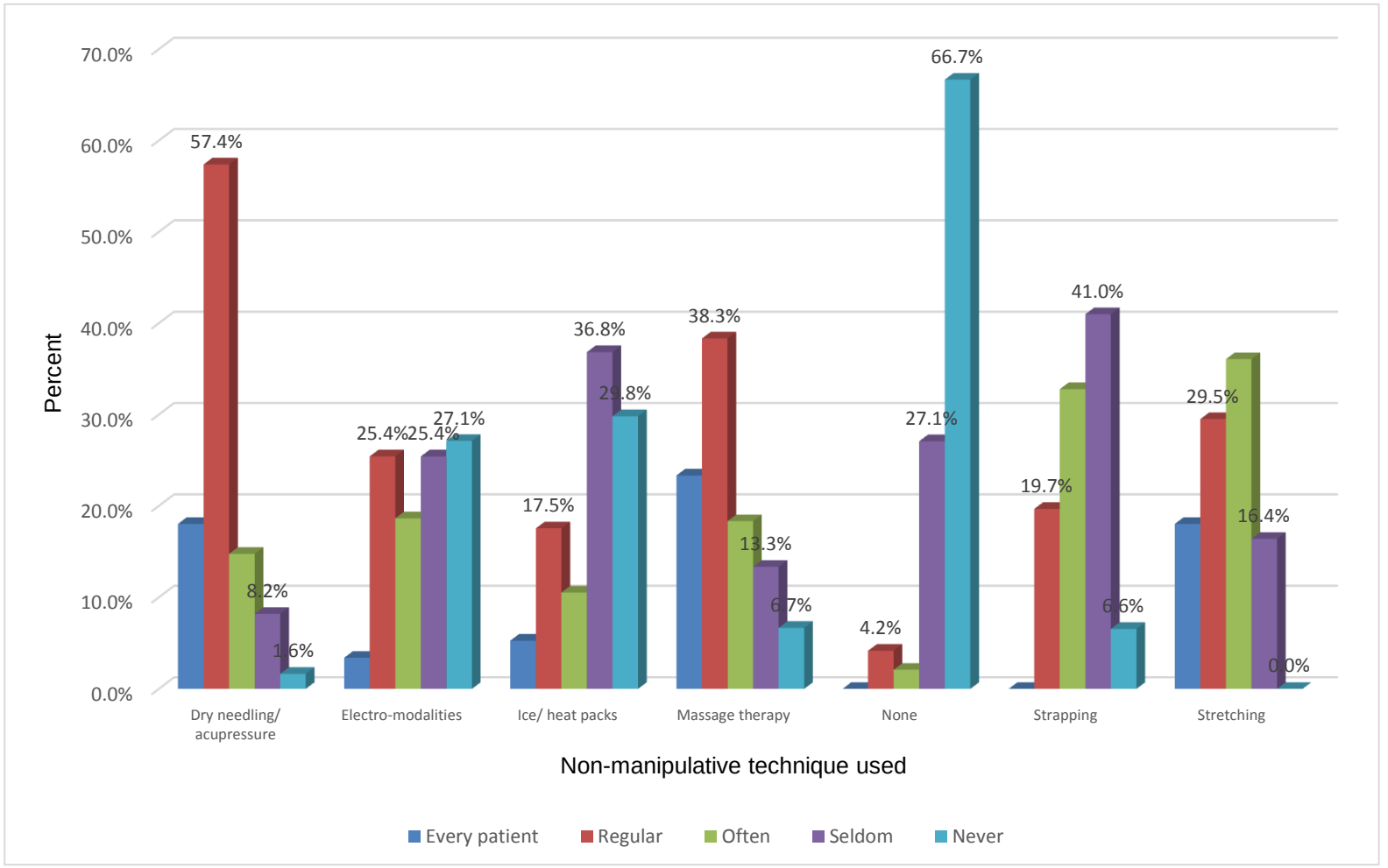

Figure 4. 2: **Non-manipulative techniques used on a daily basis**

4.4.4 Practice-lifetime prevalence of work-related musculoskeletal pain in chiropractors

4.4.4.1 Gender distribution of work-related musculoskeletal pain in chiropractors

Forty-two chiropractors (69%) reported experiencing a total of 92 injuries at ten anatomical sites arising while working as a chiropractor/or prior injury aggravated by the profession ($^{42}/_{61}$). A higher prevalence of WRMSI was found in females (Figure 4.3).

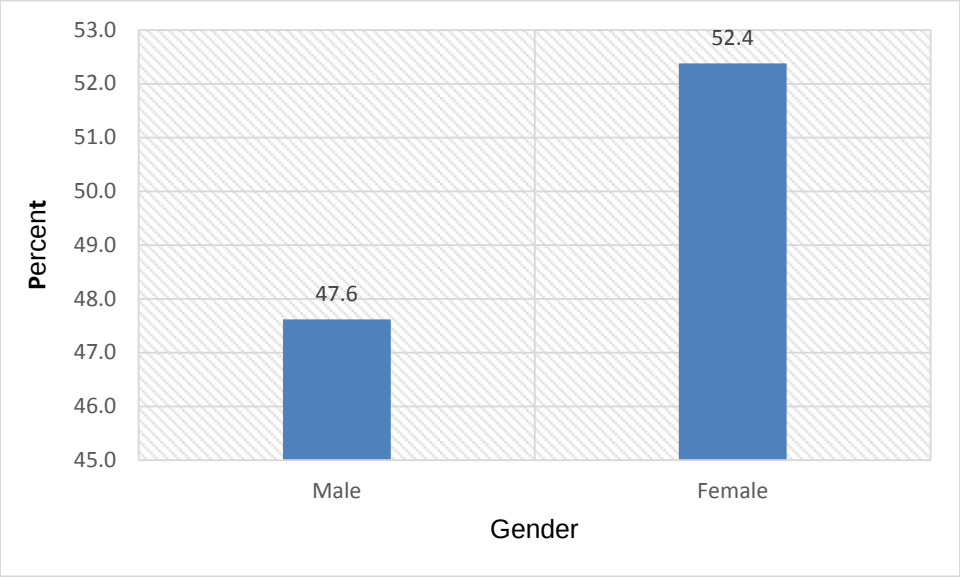

Figure 4. 3: **Gender distribution of WRMSI**

4.4.4.2 Body part affected by work-related musculoskeletal pain in chiropractors

The upper extremity was most commonly injured (Figure 4.4) that is hand/ wrist (31.5%), shoulder (15.2%) and elbow (3.3%). Lower back injuries were reported by 28.3% of the injured chiropractors.

The number of injuries decreased significantly when it came to the second and third occurrences for all body regions (Figure 4.4).

Figure 4.4 shows there were differing patterns for the three levels of severity. However, the differences observed were not significant, except for wrist / hand (p = 0.002).

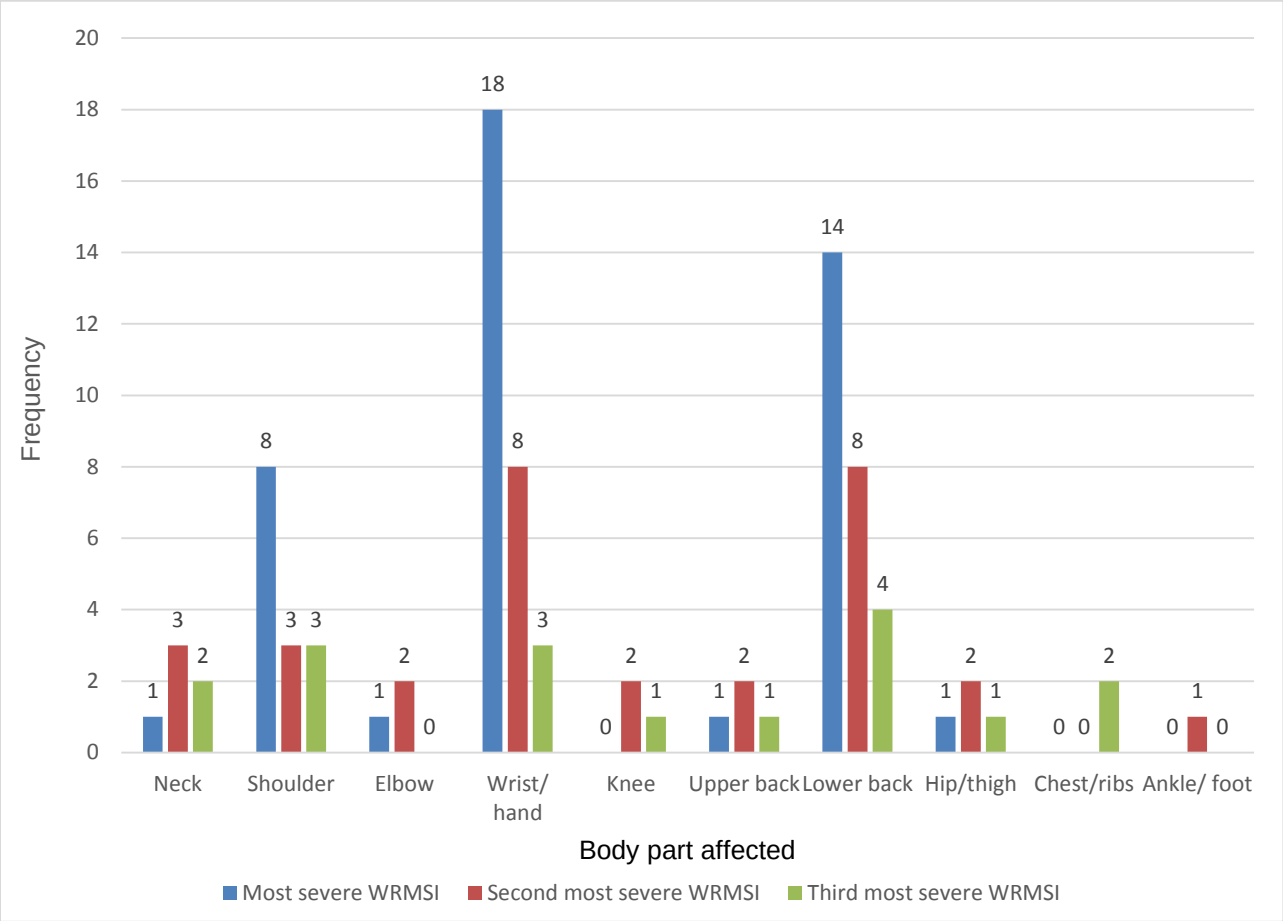

Figure 4. 4: Body part affected by WRMSI

4.4.4.3 Types of injuries

Most injuries involved soft tissue (Figure 4.5) that is ligamentous sprains (27.5%), muscular strains (26.6%) and tendonitis (14.7%). Significant p-values included muscle sprain (*p*= 0.0423) and other (*p*= 0.015).

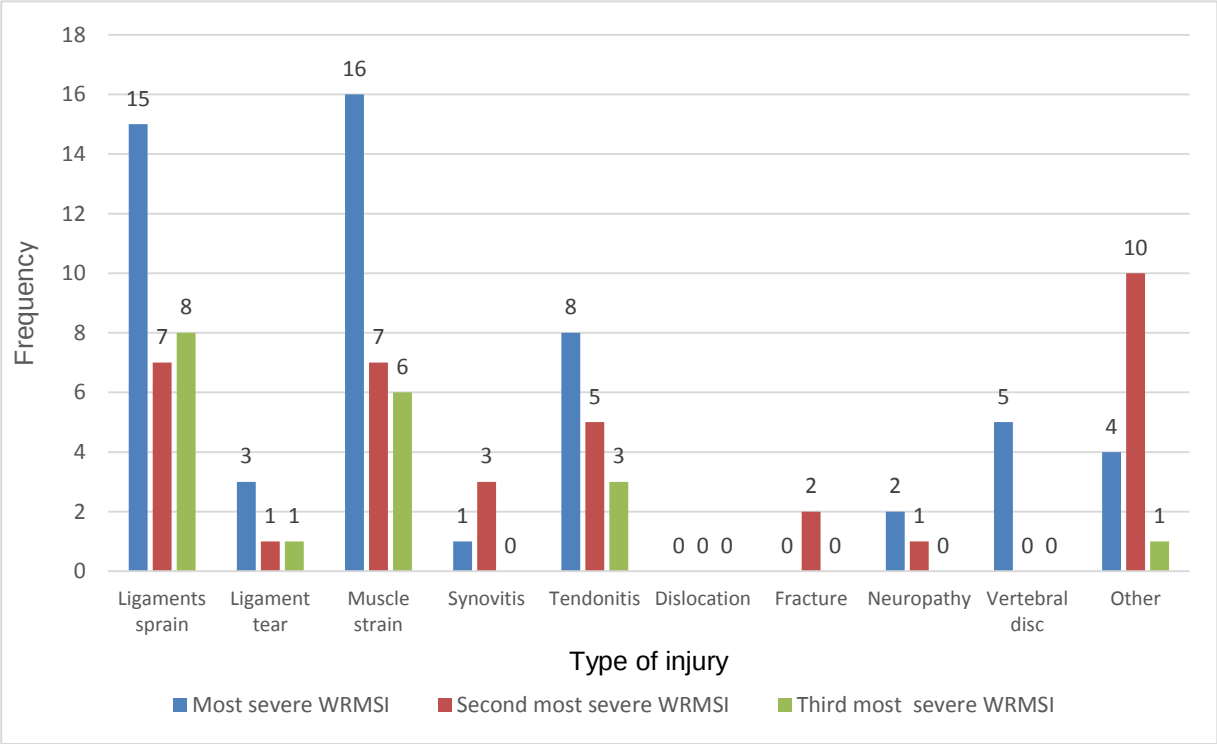

Figure 4. 5: **Type of injury that occurred**

Table 4.5 **Type of injury that occurred**

	Most severe WRMSI	Second most severe WRMSI	Third most severe WRMSI	Chi Square p-value
Ligaments sprain	15	7	8	0.150
Ligament tear	3	1	1	0.655
Muscle strain	16	7	6	0.043
Synovitis	1	3	0	0.317
Tendonitis	8	5	3	0.305
Dislocation	0	0	0	-
Fracture	0	2	0	-
Neuropathy	2	1	0	0.564
Vertebral disc	5	0	0	-
Other	4	10	1	0.015

4.4.4.4 Cause of injury

Most injuries reported were from cumulative trauma (43.8%); minimal injuries were reported for the remaining options given.

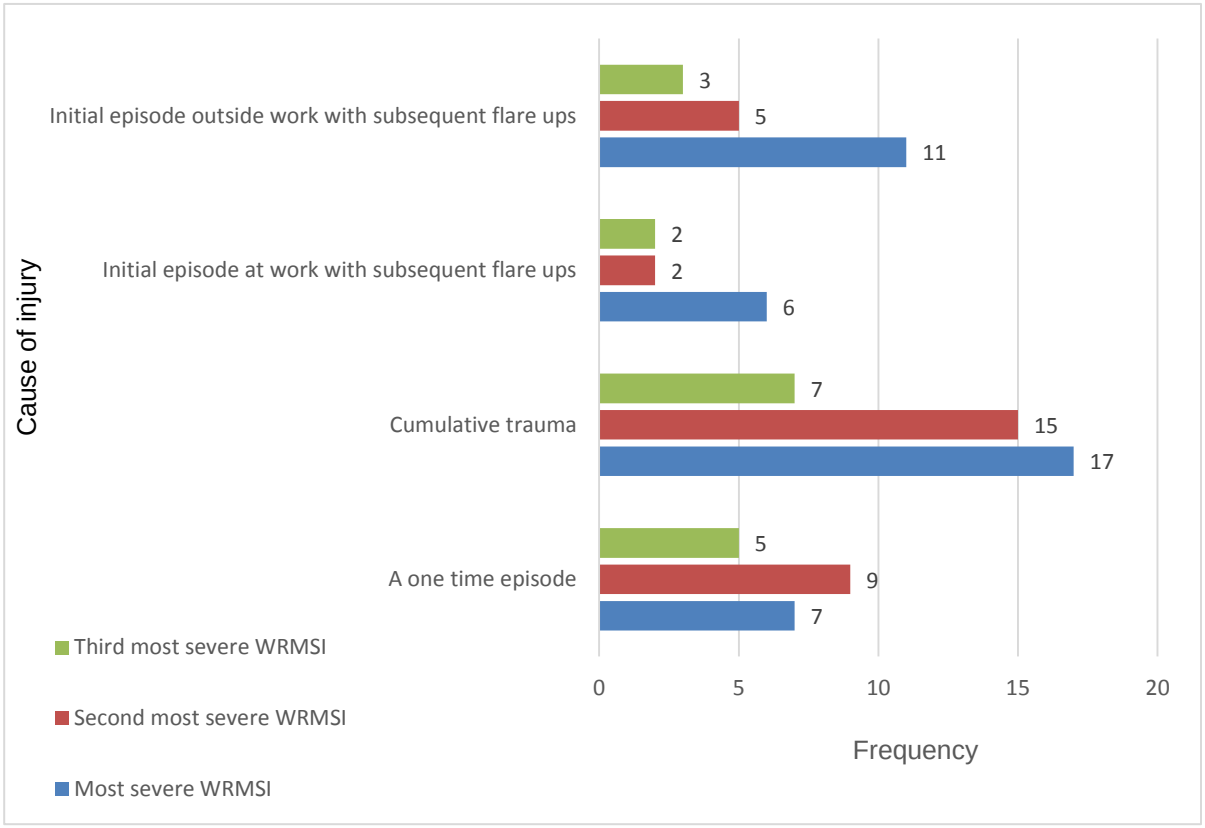

Figure 4. 6: **Was this injury a result of?**

4.4.5 Selected risk factors associated with work-related musculoskeletal pain in chiropractors.

The following risk factors for work related musculoskeletal injuries were calculated against the presence of previous injury.

4.4.5.1 Activity performed when injury occurred

Most injuries occurred while performing manipulations (p = 0.002) whereas positioning patients for manipulation and maintaining prolonged positions were also reported as causes of injury (Figure 4.7).

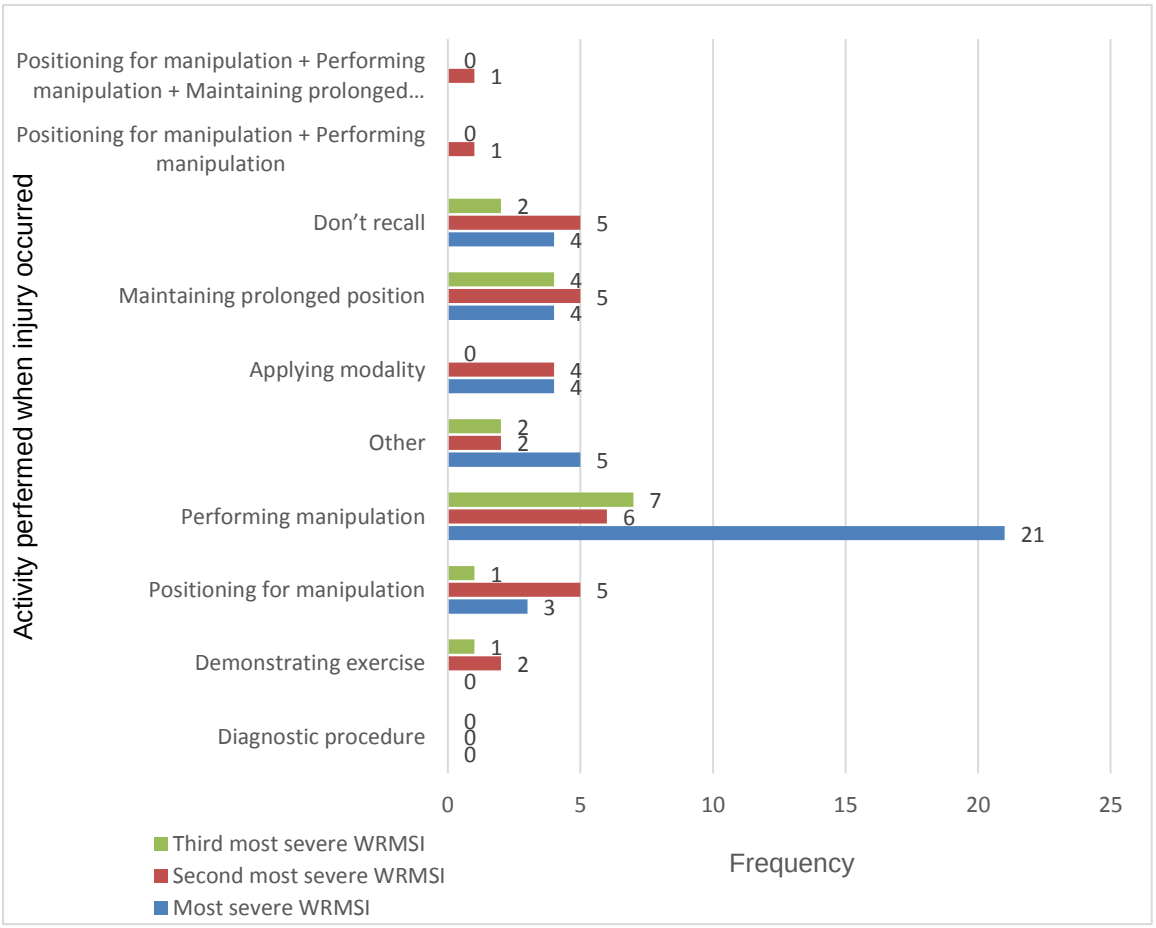

***Figure 4. 7*: Activity performed when injury occurred or aggravated existing injury**

4.4.5.2 Area adjusted when injury occurred while manipulating patient

The lumbosacral region was the area most commonly manipulated when the injury occurred (Figure 4.8). Hand/wrist and lower back injuries were significantly more likely to have been caused by manipulation of the lumbosacral spine.

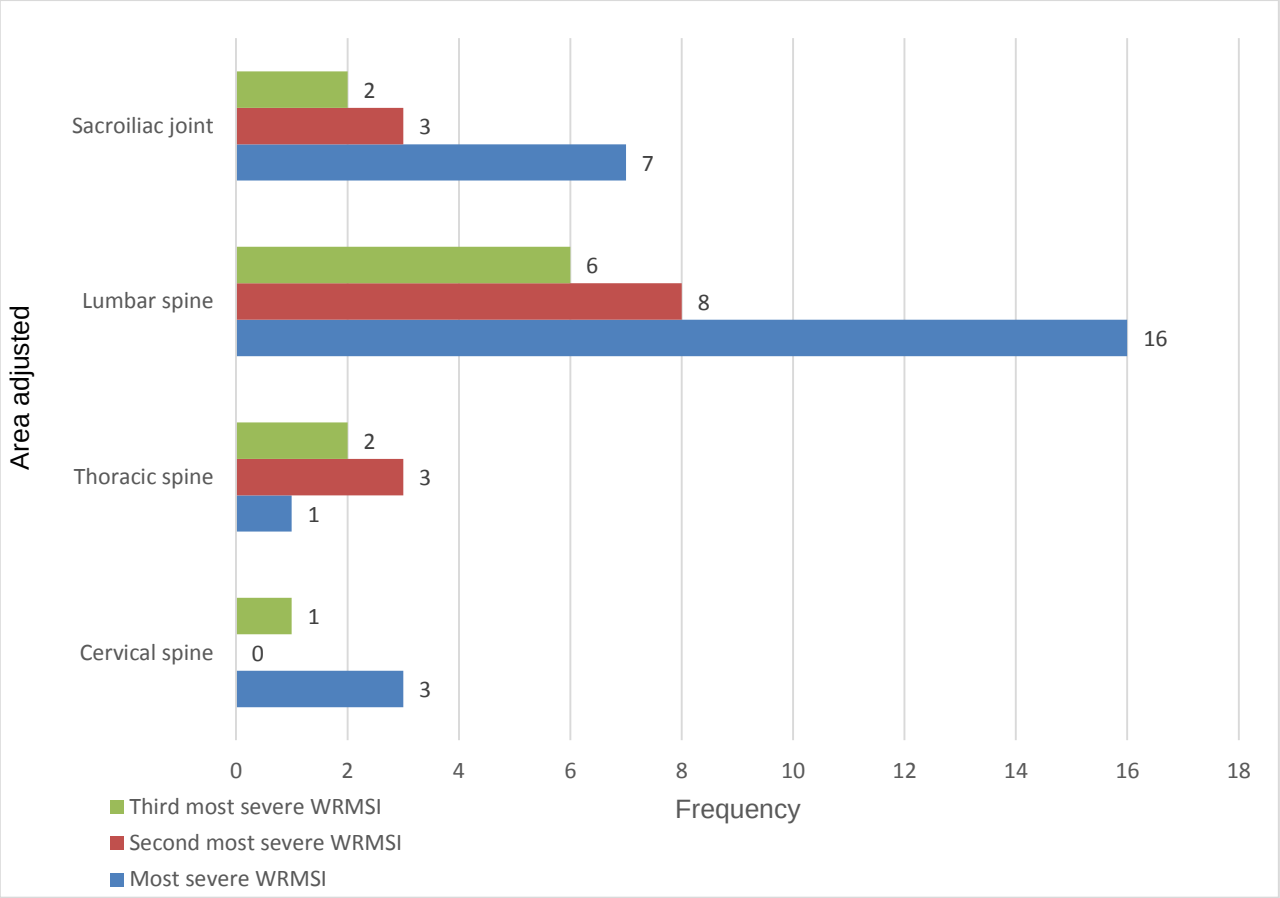

***Figure 4. 8*: Area adjusted when injury occurred while manipulating patient**

4.4.5.3 Patient position when injury occurred while manipulating patient

The majority of injuries occurred when the patient was manipulated in the side lying position (*p*= 0.021) (Figure 4.9).

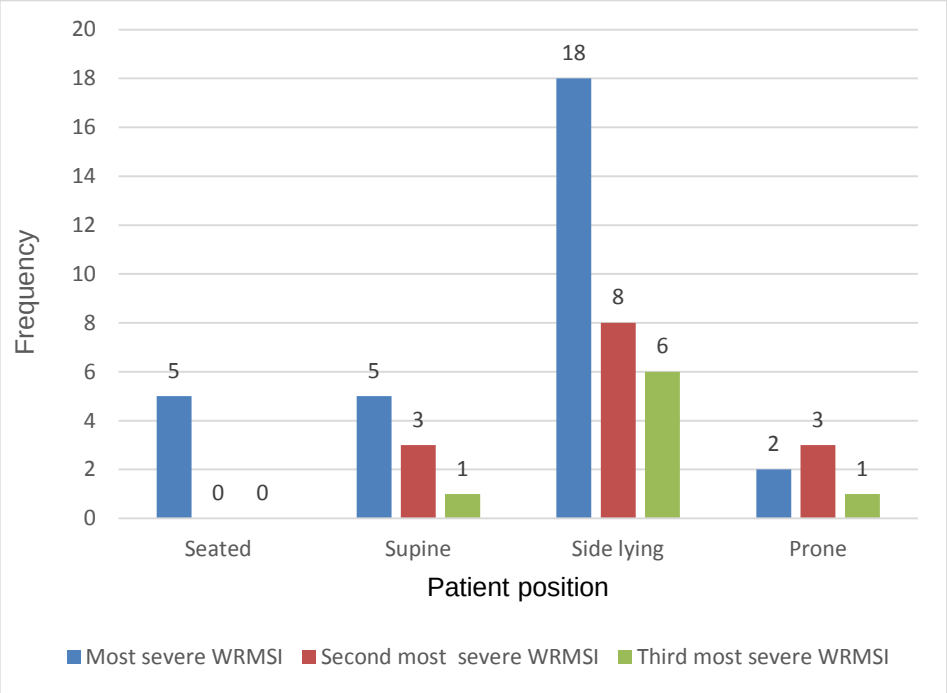

Figure 4. 9: **Patient position**

4.4.5.4 Number of years in practice when injury occurred

The majority of injuries (41.6%) occurred within the first to fifth year of practice (p=0.032).

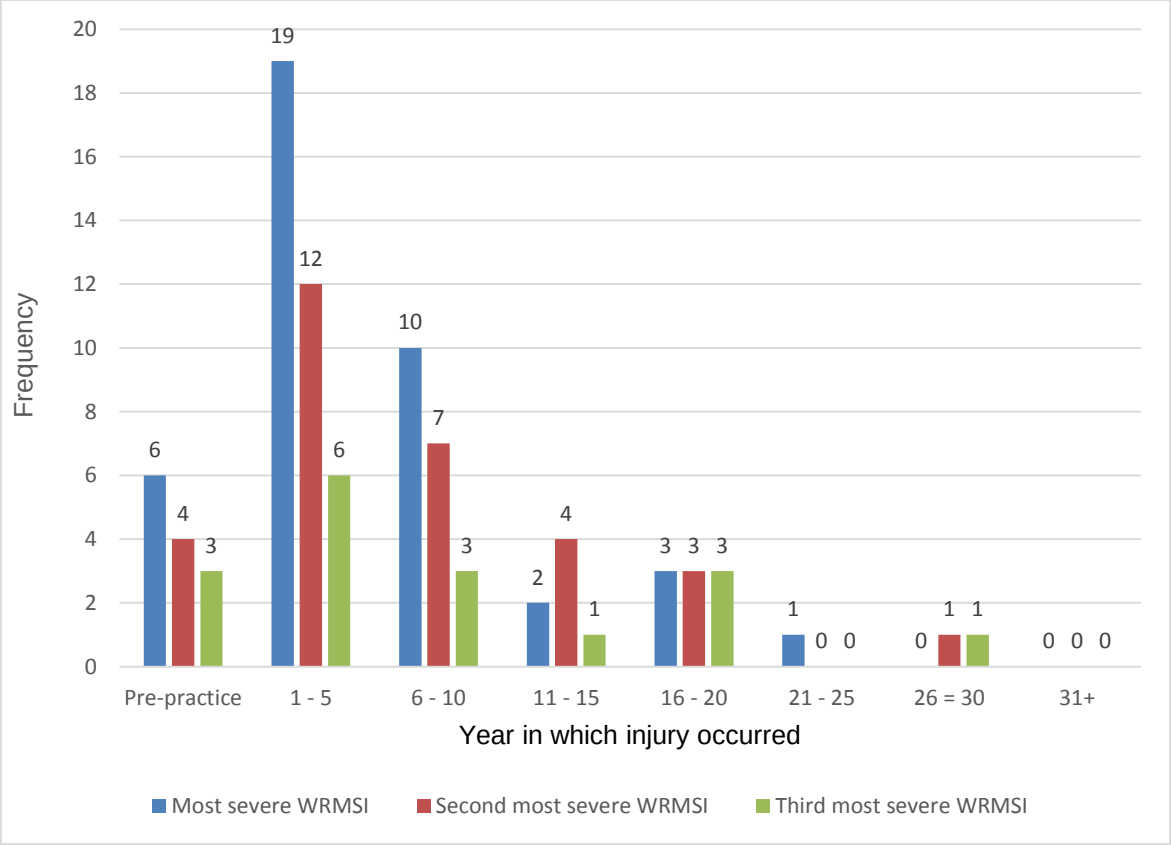

Figure 4. 10: **Year in which injury occurred**

The data indicates that the longer participants have spent in practice the less likely they are to sustain a WRMSI.

4.4.6 The impact of work-related musculoskeletal pain in chiropractors.

4.4.6.1 Time taken off practice (work) due to injury

Figure 4.11 shows the majority (78.7%) respondents did not need to take any time from practice as a result of the injury. However, 9% of the injuries required the chiropractor to take one or more week's leave from their practice, while 5.6% are still suffering with the injury.

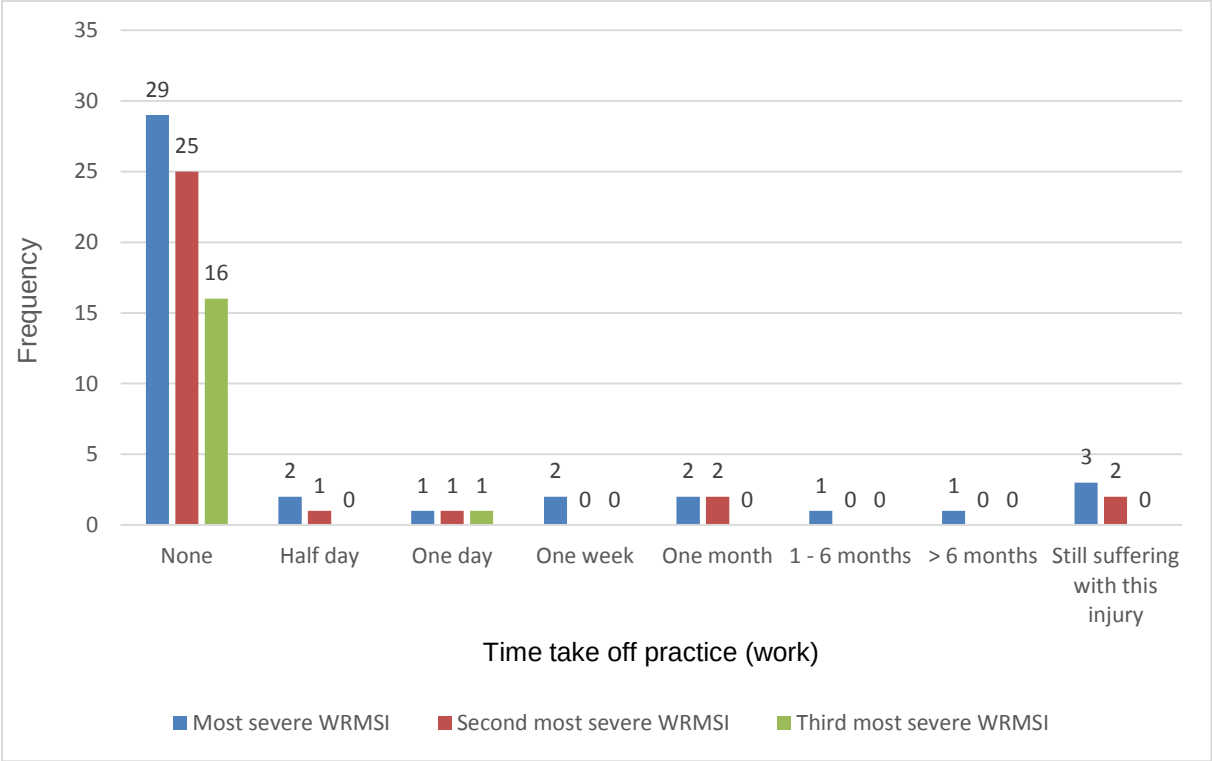

Figure 4. 11: **Time taken off practice (work) due to injury**

4.4.6.2 Changes made to practice following injury

The majority of chiropractors indicated that they did not make any changes following the injury (Figure 4.12).

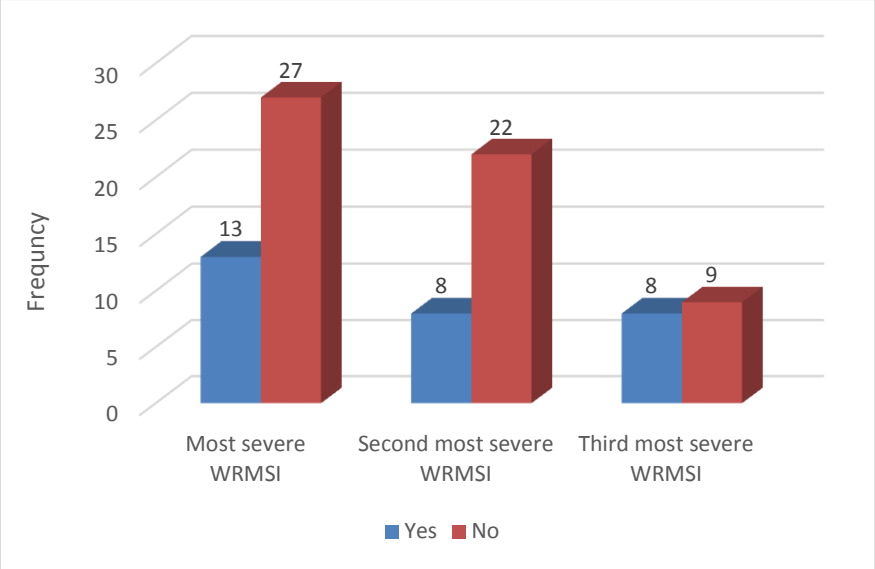

Figure 4. 12: **Have you made any changes due to the injury?**

The majority of changes made following injury included altering patient/practitioner position/ posture as well as modification of the technique as well as hand position (i.e. less wrist extension) and the contact point used.

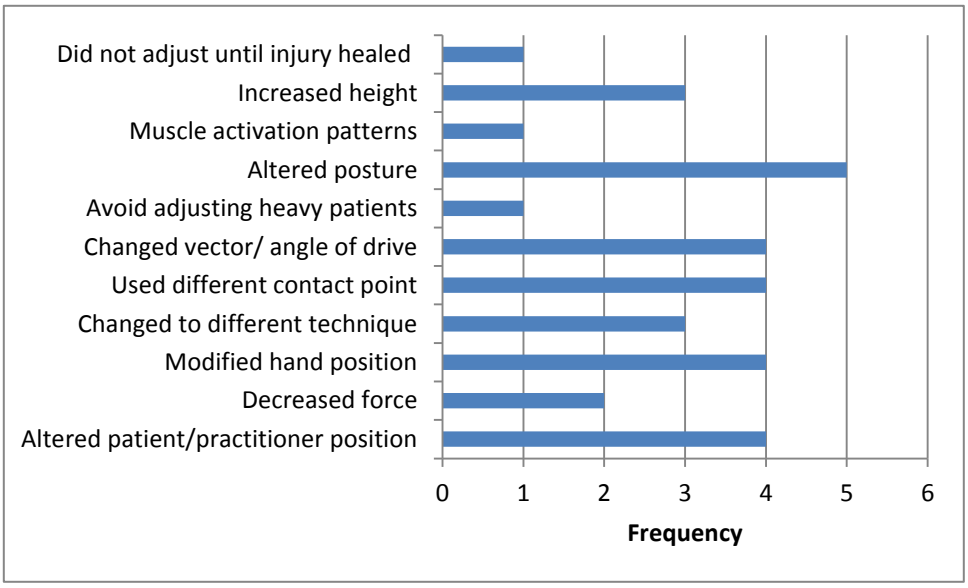

Figure 4. 13**: Changes made following the injury?**

4.4.6.3 Income protection

With regards to income protection, 70% of respondents indicated they had income protection (Figure 4.14). Only a small percentage of respondents claimed from income protection.

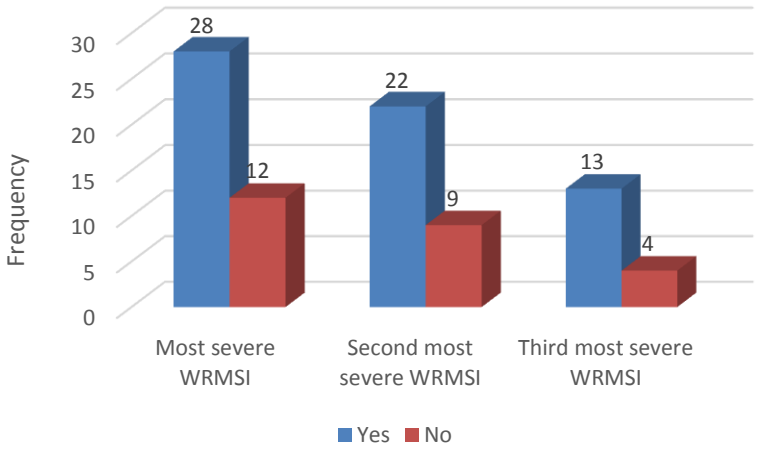

Figure 4. 14: Do you have income protection?

4.4.6.4 Did you claim from income protection?

Only six respondents indicated that they claimed for income protection due to the injury. All six claims submitted were successful (Figure 4.15).

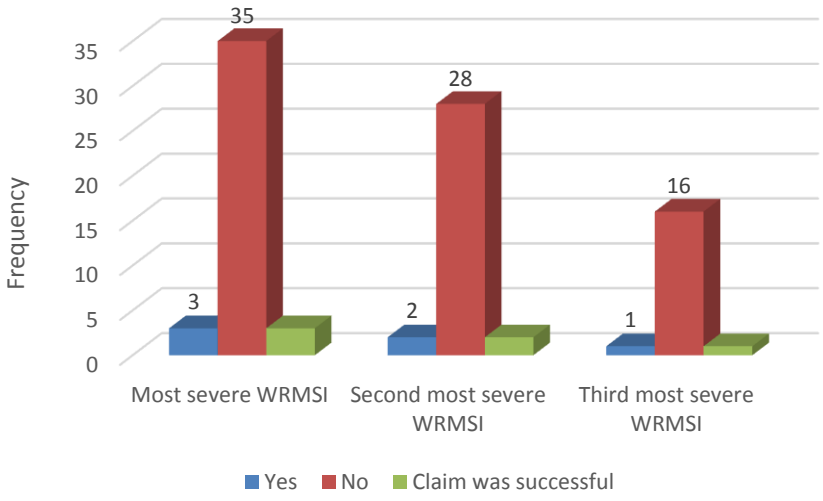

Figure 4. 15: Did you claim?

4.4.7 Any association between the prevalence of work-related musculoskeletal pain in chiropractors and selected risk factors associated with work-related musculoskeletal pain in chiropractors.

An introductory analysis was done to determine whether there was any relationship between each of the variables Q1.1 to Q2.5 and "Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?" (Q2.6)

4.4.7.1 Gender, age and race versus injury.

There was no relationship that could be analysed between gender (p = 0.775) (Table 4.6), age (p = 0.923) (Table 4.7), race (p = 0.188) (Table 4.8), height (p = 0.459) (Table 4.9), weight (p = 0.310) (Table 4.10) and the prevalence of work-related musculoskeletal injury.

Table 4.6 **Gender and work-related musculoskeletal injury**

			Have you experienced a WRMSI		Total
			Yes	No	
Gender	Male	Count	20	7	27
		% within Have you experienced a WRMSI	47.6%	41.2%	45.8%
	Female	Count	22	10	32
		% within Have you experienced a WRMSI	52.4%	58.8%	54.2%
Total		Count	42	17	59
		% within Have you experienced a	100.0%	100.0%	100.0 %

Fischer's Exact Test (p=0.775)

***Table 4.7* Age in years and work-related musculoskeletal injury**

			Have you experienced a WRMSI		Total
			Yes	No	
Age in years	25-30	Count	12	6	18
		% within Have you experienced a WRMSI	28.80%	35.40%	30.60%
	31-35	Count	7	1	8
		% within Have you experienced a WRMSI	16.80%	5.90%	13.60%
	36-40	Count	8	7	15
		% within Have you experienced a WRMSI	19.20%	41.30%	26%
	41-45	Count	10	3	13
		% within Have you experienced a WRMSI	24%	17.70%	22.10%
	46-50	Count	4	0	4
		% within Have you experienced a WRMSI	9.60%	0%	6.80%
	51-55	Count	0	0	0
		% within Have you experienced a WRMSI	0%	0%	0%
	56-60	Count	0	0	0
		% within Have you experienced a WRMSI	0%	0%	0%
	61-65	Count	0	0	0
		% within Have you experienced a WRMSI	0%	0%	0%
	66-70	Count	1	0	1
		% within Have you experienced a WRMSI	2.40%	0%	1.70%
Total	Count		42	17	59
	% within Have you experienced a WRMSI		100%	100%	100%

Fischer's Exact Test (p=0.923)

***Table 4.8* Race and work-related musculoskeletal injury**

			Have you experienced a WRMSI		Total
			Yes	No	
Race	African	Count	1	0	1
		% within Have you experienced a WRMSI	2.4%	0.0%	1.7%
	Indian	Count	6	6	12
		% within Have you experienced a WRMSI	14.3%	35.3%	20.3%
	White	Count	35	11	46
		% within Have you experienced a WRMSI	83.3%	64.7%	78.0%
Total		Count	42	17	59
		% within Have you experienced a WRMSI	100.0%	100.0%	100.0%

Fischer's Exact Test (p=0.188)

Table 4.9 Height in metres and work-related musculoskeletal injury

			% within Have you experienced a WRMSI		Total
			Yes	No	
Height in metres	1.5-1.59	Count	6	3	9
		% within Have you experienced a WRMSI	14.40%	17.70%	15.30%
	1.6-1.69	Count	11	5	16
		% within Have you experienced a WRMSI	26.40%	29.50%	27.20%
	1.7-1.79	Count	15	4	19
		% within Have you experienced a WRMSI	36.00%	23.60%	32.30%
	1.8-1.89	Count	7	4	11
		% within Have you experienced a WRMSI	16.80%	23.60%	18.70%
	1.9-1.99	Count	3	1	4
		% within Have you experienced a WRMSI	7.20%	5.90%	6.80%
Total		Count	42	17	59
		% within Have you experienced a WRMSI	100.0%	100.0%	100.0%

Fischer's Exact Test (p=0.459)

Table 4.10 Weight in kilogrammes and work-related musculoskeletal injury

			Have you experienced a WRMSI		Total
			Yes	No	
Weight in kilogrammes	41-50	Count	1	1	2
		% within Have you experienced a WRSKI	2.40%	5.90%	3.40%
	51-60	Count	6	4	10
		% within Have you experienced a WRSKI	14.40%	23.60%	17.00%
	61-70	Count	15	4	19
		% within Have you experienced a WRSKI	36%	23.60%	32.30%
	71-80	Count	8	2	10
		% within Have you experienced a WRSKI	19.20%	11.80%	17.00%
	81-90	Count	6	3	9
		% within Have you experienced a WRSKI	14.40%	17.70%	15.30%
	91-100	Count	3	3	6
		% within Have you experienced a WRSKI	7.20%	17.70%	10.20%
	101-110	Count	3	0	3
		% within Have you experienced a WRSKI	7.20%	0%	5.10%
Total		Count	42	17	59
		% within Have you experienced a WRSKI	100%	100%	100%

Fischer's Exact Test (p=0.310)

4.4.7.2 Time in practice, average number of patients seen per working day and number of hours spent in clinical practice versus work-related musculoskeletal injury

According to Tables 4.11, 4.12 and 4.13 there was no significant association between the number of years spent in practice (p = 0.720), the number of patients seen per day (p =0.307) or the number of hours spent in clinical practice (p = 0.734) and the prevalence of work-related musculoskeletal injuries.

Table 4.11 **Time in practice and work-related musculoskeletal injury**

			Have you experienced a WRMSI		Total
			Yes	No	
Time in practice	0-5	Count	16	8	24
		% within Have you experienced a WRMSI	38.40%	47.20%	40.80%
	6-10	Count	9	2	11
		% within Have you experienced a WRMSI	21.60%	11.80%	18.70%
	11-15	Count	5	5	10
		% within Have you experienced a WRMSI	12%	29.50%	17%
	16-20	Count	10	2	12
		% % within Have you experienced a WRMSI	24%	11.80%	20.40%
	21-25	Count	1	0	1
		% within Have you experienced a WRMSI	2.40%	0%	1.70%
	25-30	Count	0	0	0
		% within Have you experienced a WRMSI	0%	0%	0%
	31-35	Count	0	0	0
		% within Have you experienced a WRMSI	0%	0%	0%
	40-45	Count	1	0	1
		% within Have you experienced a WRMSI	2.40%	0%	1.70%
Total		Count	42	17	59
		% within Have you experienced a WRMSI	100%	100%	100%

Fischer's Exact Test (p=0.720)

Table 4.12 **Average number of patients seen per working day and work-related musculoskeletal injury**

			Have you experienced a WRMSI		Total
			Yes	No	
The average number of patients seen per working day?	1-5	Count	16	7	23
		% within Have you experienced a WRMSI	38.40%	41.30%	39.10%
	6-10	Count	17	8	25
		% within Have you experienced a WRMSI	40.80%	47.20%	42.50%
	11-15	Count	6	0	6
		% within Have you experienced a WRMSI	14.40%	0%	10.20%
	16-20	Count	3	2	5
		% within Have you experienced a WRMSI	7.20%	11.80%	8.50%
Total		Count	42	17	59
		% within Have you experienced a WRMSI	100%	100%	100%

Fischer's Exact Test (p=0.307)

Table 4.13 **Average number of hours spent in clinical practice per week and work-related musculoskeletal injury**

			Have you experienced a WRMSI		Total
			Yes	No	
Average number of hours spent in clinical practice per week (hands on work)	0-5	Count	8	3	11
		% within Have you experienced a WRMSI	19.20%	17.70%	18.70%
	6-10	Count	3	3	6
		% within Have you experienced a WRMSI	7.20%	17.70%	10.20%
	11-15	Count	2	1	3
		% within Have you experienced a WRMSI	4.80%	5.90%	5.10%
	16-20	Count	5	1	6
		% within Have you experienced a WRMSI	12%	5.90%	10.20%
	21-30	Count	9	2	11
		% within Have you experienced a WRMSI	21.60%	11.80%	18.70%
	31-40	Count	13	6	19
		% within Have you experienced a WRMSI	31.20%	35.40%	32.30%
	41-50	Count	2	1	3
		% within Have you experienced a WRMSI	4.80%	5.90%	5.10%
Total		Count	42	17	59
		% within Have you experienced a WRMSI	100%	100%	100%

Fischer's Exact Test (p=0.734)

4.4.7.3 Chiropractic technique used on a daily basis and work-related musculoskeletal injury

The only significant relation that was observed was for Gonstead technique (p = 0.012) and "Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?"

Table 4.14 **Chiropractic technique used on a daily basis and work-related musculoskeletal injury**

	Every patient		Regular		Often		Seldom		Never		Chi Square
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Activator	1	2.60%	0	0%	2	5.20%	12	31.60%	23	60.50%	0.908
Diversified	29	69%	10	23.8	0	0%	1	2.40%	2	4.80%	0.545
Gonstead technique	1	2.70%	0	0%	2	5.40%	14	37.80%	20	54.10%	0.012
NIP	2	5.30%	2	5.30%	0	0%	2	5.30%	32	84.20%	0.581
SOT	0	0%	0	0%	3	8.10%	4	10.80%	30	81.10%	0.304
Thompson technique	0	0%	2	5.40%	6	16.20%	5	13.50%	24	64.90%	0.776

4.4.7.4 Non-manipulative technique used on a daily basis and work-related musculoskeletal injury

No correlation was found between the non-manipulative techniques used on a daily basis and “Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?”

Table 4.15 **Non-manipulative technique used on a daily basis and work-related musculoskeletal injury**

	Every patient		Regular		Often		Seldom		Never		Chi Square
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Dry needling/ acupressure	11	18.00%	34	57.60%	8	13.60%	5	8.50%	1	1.70%	0.911
Electro-modalities	2	3.40%	14	24.10%	11	19.00%	15	25.90%	16	27.60%	0.166
Ice/heat packs	3	5.40%	9	16.10%	6	10.70%	21	37.50%	17	30.40%	0.371
Massage therapy	14	24.10%	22	37.90%	11	19.00%	7	12.10%	4	6.90%	0.852
None	0	0.00%	2	4.20%	1	2.10%	13	27.10%	32	66.70%	0.416
Strapping	0	0.00%	12	20.30%	20	33.90%	23	39.00%	4	6.80%	0.579
Stretching	10	16.90%	18	30.50%	22	37.30%	9	15.30%	0	0.00%	0.720

4.4.7.5 Technique when injury occurred while manipulating patient

Table 4.16 and Table 4.17 shows that the diversified technique was the technique most commonly utilised when the most severe (p=0.011) and second most severe (p=0.023) work-related musculoskeletal injuries occurred.

Table 4.16 **Technique used/activity performed when MOST severe injury occurred**

			Activity you were performing that caused your injury/ aggravated existing injury?						
			Positioning for manipulation	Performing manipulation	Other	Applying modality	Maintaining prolonged position	Don't recall	Total
What technique did you use?	Diversified	Count	1	3	5	3	3	4	19
		% within Activity you were performing that caused your injury/ aggravated existing injury?	33.3%	14.3%	100.0%	75.0%	75.0%	100.0%	46.3%
		Count	2	18	0	1	1	0	22
		% within Activity you were performing that caused your injury/ aggravated existing injury?	66.6%	86.4%	0.0%	25.0%	25.0%	0.0%	52.8%
Total		Count	3	21	5	4	4	4	41
		% within Activity you were performing that caused your injury/ aggravated existing injury?	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Fischer's Exact Test (p=0.011)

Table 4.17 **Technique used/activity performed when SECOND most severe injury occurred**

			Activity you were performing that caused your injury/ aggravated existing injury?							
			Demonstrating exercise	Positioning for manipulation	Performing manipulation	Other	Applying modality	Maintaining prolonged position	Don't recall	Total
What technique did you use?	Diversified	Count	2	0	1	2	4	4	4	17
		% within Activity you were performing that caused your injury/ aggravated existing injury?	100.0%	0.0%	16.7%	100.0%	100.0%	80.0%	80.0%	57.8%
		Count	0	5	5	0	0	1	1	12
		% within Activity you were performing that caused your injury/ aggravated existing injury?	0.0%	100.0%	83.5%	0.0%	0.0%	20.0%	20.0%	40.8%
Total		Count	2	5	6	2	4	5	5	29
		% within Activity you were performing that caused your injury/ aggravated existing injury?	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0 %	100.0%

Fischer's Exact Test (p=0.023)

Table 4.18 **Technique used/activity performed when THIRD most severe injury occurred**

			Activity you were performing that caused your injury/ aggravated existing injury?						
			Demonstrating exercise	Positioning for manipulation	Performing manipulation	Other	Maintaining prolonged position	Don't recall	Total
What technique did you use?	Diversified	Count	1	1	3	1	3	2	11
		% within Activity you were performing that caused your injury/ aggravated existing injury?	100.0%	100%	42.9%	50%	75%	100%	64.7%
		Count	0	0	4	1	1	0	6
		% within Activity you were performing that caused your injury/ aggravated existing injury?	0.0%	0%	57.2%	50%	25%	0%	35.4%
Total		Count	1	1	7	2	4	2	17
		% within Activity you were performing that caused your injury/ aggravated existing injury?	100.0%	100.0%	100.0%	100.0 %	100.0%	100.0 %	100.0%

Fischer's Exact Test (p=1.00)

4.4.7.6 Logistical regression table

The "Variables in the Equation" table shows the contribution of each independent variable to the model and its statistical significance.

Table 4.19: **Logistical regression table - Personal demographics**

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	Gender(1)	-.412	.966	.182	1	.669	.662	.100	4.395
	Age in years	-.006	.040	.024	1	.877	.994	.918	1.076
	Race			2.396	2	.302			
	Race (1)	-20.318	40192.970	.000	1	1.000	.000	.000	.
	Race (2)	1.253	.810	2.396	1	.122	3.503	.716	17.129
	Height in metres	2.039	5.148	.157	1	.692	7.685	.000	185090.747
	Weight in kilogrammes	-.004	.028	.020	1	.889	.996	.944	1.052
	Constant	-3.990	8.458	.223	1	.637	.019		
a. Variable(s) entered on step 1: Gender, Age in years, Race, Height in metres, Weight in kilogrammes.									

The Wald test ("Wald" column) is used to determine statistical significance for each of the independent variables. The statistical significance of the test is found in the "Sig." column. From these results, none of the biographical variables added significantly to the model. The probability of an event occurring based on a one-unit change in an independent variable when all other independent variables are kept constant can be predicted. For example, it is noted that the odds of having an injury ("yes" category) is 0.669 times greater for males as opposed to females.

Table 4.20: **Logistical regression table- Practice demographics**

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp (B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	The average number of patients seen per working day?	-.269	.166	2.631	1	.105	.764	.552	1.058
	Average number of hours spent in clinical practice per week (hands on work)	.027	.043	.384	1	.535	1.027	.944	1.118
	Diversified	.471	.767	.377	1	.539	1.602	.356	7.209
	NIP	-.074	.616	.014	1	.904	.929	.278	3.104
	SOT	-.290	.702	.170	1	.680	.749	.189	2.962
	Electro-modalities	-.741	.468	2.509	1	.113	.477	.191	1.192
	Ice/ heat packs	-.850	.556	2.332	1	.127	.428	.144	1.272
	Massage therapy	-.057	.391	.021	1	.884	.945	.439	2.033
	None	-.951	.772	1.519	1	.218	.386	.085	1.754
	Strapping	1.266	.710	3.185	1	.074	3.548	.883	14.255
	Stretching	-.032	.627	.003	1	.960	.969	.284	3.311
	Constant	7.074	6.580	1.156	1	.282	1180.584		

a. Variable(s) entered on step 1: The average number of patients seen per working day?, Average number of hours spent in clinical practice per week (hands on work), Diversified, NIP, SOT, Electro-modalities, Ice/heat packs, Massage therapy, None, Strapping, Stretching.

There were no significant combinations in the regression models found above.

CHAPTER FIVE

DISCUSSION

5.1 INTRODUCTION

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

5.2 RESPONSE RATE

Response rates are calculated by dividing the number of usable responses returned by the total number eligible in the sample chosen (Finchman 2008). The response rate of 64% was much higher than 30% reported by Rupert and Ebete (2004) and the 42.2% reported by Holm and Rose (2006). According to Asch, Jedrziewski and Christakis (1997) low response rates are a common occurrence in surveys of physicians. Young (2005) however claims that surveys of physicians often have high validity even with lower response rates than surveys among the general public.

5.3 DEMOGRAPHICS

5.3.1 Age

The majority of respondents (24%) were between the ages of 31 and 40 years; followed by 29.5% being between the ages of 25-30 years of age. Ages ranged from 25 to 69 years. The average age was 35.5 years. This is in keeping with previous studies conducted in SA where the majority of chiropractors showed a tendency towards ages 25 – 38 years (Gordon 2012; Keyter 2010; De Gouveia 2009; Bunge 2007; Mathews 2006). Fyfe (2006) found the mean age of chiropractic students to be 22.7 years (SD 3.5years), while ages ranged from 18 to 37 years which could explain the majority of respondents being between the ages of 31-40 years of age.

This could be due to the fact that chiropractic is a relatively new profession in SA. The first intake of students in 1989 graduated in 1994. Preceding this, a chiropractic qualification could only be acquired abroad. In comparison, American-based studies showed a slightly higher mean age of chiropractors, ranging from 41-46 years (Holm and Rose 2006; Homack 2005). This could be attributed to the fact that the first chiropractic graduates were produced much earlier.

5.3.2 Gender

The majority of participants were female (55.7%). This sample was considerably different from previous studies carried out on chiropractors in SA in which the samples were predominantly male (Gordon 2012; Keyter 2010; De Gouveia 2009; Bunge 2007; Mathews 2006). It was not possible to determine the male to female ratio of chiropractors in South Africa as their gender had not been specified on the Allied Health Professions Councils register. The results of this study differ from international studies which showed a male predominance in the chiropractic profession (Holm and Rose 2006; Homack 2005; Rupert and Ebete 2004).

Historically, the chiropractic profession was male dominated. However, it seems the ratio of men to women is gradually starting to even out with an increasing number of women qualifying as chiropractors. According to the National Board of Chiropractic Examiners in a practice analysis survey completed in 2014, 72.9% of chiropractic practitioners were male and 27.1% were female. This increase in females is further demonstrated if compared to a similar practice analysis done in 1991, where it was shown that 86.7% were male (National Board of Chiropractic Examiners 2015).

5.3.3 Ethnicity

The sample in this study had a high prevalence of White participants (77%) with 21.3% being Indian and only 1.6% being African. These results were not surprising as the chiropractic profession is not well represented among the African population in SA or abroad (National Board of Chiropractic Examiners 2015; Myburgh and Mouton 2007). National Board of Chiropractic Examiners (2015) indicated Africans only represented a small percentage (1.2%) of the chiropractors in the United States of America (USA). In SA previous studies concur with these findings (Gordon 2012; Keyter 2010; Mathews 2006).

5.3.4 Time in practice (specify number of years), average number of patients seen per working day an average number of hours spent in clinical practice per week (hands on work)

The average time that the respondents have been in practice was 9.44 years. These figures correlate with previous South African studies which showed the majority of South African chiropractors had spent less than ten years in practice (Keyter 2010; De Gouveia 2009; Pereira 2009; Bunge 2007; Mathews 2006). These results differ from international studies which indicated the majority of chiropractors had been in practice for 16.4 years (Holm and Rose 2006).

The majority of respondents spent between 31-40 hours in clinical practice per week. This coincides with previous studies done on South African chiropractors, as well as international studies (National Board of Chiropractic Examiners 2015; Gordon 2012; Keyter 2010; Pereira 2009).

The average number of patients seen per day varied between 6-10; which coincides with the average of nine patients per day cited by Pereira (2009); however these figures are slightly less than the 11-20 cited by Mathews (2006). If the figures in this study were to be extrapolated to patients seen per week, it would equate to roughly 30-50 patients per week (on an average five-day week).

Large inconsistencies exist when these figures are compared to international studies. Holm and Rose (2006) reported a mean practice volume of 114 patients per week while the National Board of Chiropractic Examiners (2015) stated the majority of chiropractors treated between 50-99 patients per week.

The time spent with patients was roughly estimated. With the majority of respondents spending 36-40 hours per week in clinical practice, it would roughly equate to 8 hours per day, five days per week. If this is to be divided by 10 patients seen per day, it would equate to a crude estimate of 45-60 minutes spent per patient. In contrast, American chiropractors who also spend 40 hours per week in clinical practice, seeing 20 patients per day would equate to 24 mins spent per patient if 99 patients were seen per week. According to the study done by Holm and Rose, 114 patients were seen per week which would approximately equate to 23 patients seen per day with 21 minutes spent per patient.

South African chiropractors might have a lower practice volume in comparison to chiropractors overseas. This should help protect them against WRMSI as high practice volume has been identified as a risk factor for the development of WRMSI (Cromie, Robertson and Best 2000). However, the results found in this study stand in contrast to this, as 68.9% of chiropractors indicated they had suffered from a WRMSI as opposed to the 40.1% reported by Holm and Rose (2006).

The high prevalence might be attributed to the fact that South African chiropractors spend more time with their patients in the clinical setting.

5.3.5 Chiropractic techniques used on a daily basis

Questions pertaining to the manipulative technique utilised by the practitioner on a daily basis showed the majority of practitioners indicated Diversified technique (91.8%) was used on every patient or regularly as treatment technique. This is in line with previous South

African studies which showed Diversified as the most used (Gordon 2012; Keyter 2010; De Gouveia 2009; Mathews 2006) in line with international studies done (Holm and Rose 2006).

The Diversified technique was most commonly used. This was expected since the Diversified technique is taught in the curriculum at both Chiropractic schools in SA (University of Johannesburg 2017; Durban Univeristy of Technology 2017).

5.3.6 Non-manipulative technique used on a daily basis

The majority of respondents (75.4%) indicated they use dry needling (75.4%) either on every patient, or regularly, as an adjunct treatment to manipulation. This is consistent with findings reported by De Gouveia (2009) and Keyter (2010) that dry needling was one of the most utilised modalities in practice. Of the respondents, 60.7% indicated they used massage on every patient or regularly, which is slightly less than the 81.5% cited by De Gouveia (2009), but higher than the 43.6% reported by Gordon (2012).

5.4 OBJECTIVE ONE: PRACTICE LIFE-TIME PREVALENCE OF WRMSI

The practice lifetime prevalence of WRMSI in chiropractors in the eThekwini municipality was 69.85%. When compared to similar studies, relatively large differences are noted between the studies. Holm and Rose (2006) reported a prevalence of 40.1% (n=397), whereas Homack (2005) reported 84% (n=69) of chiropractors had sustained a WRMSI.

This study found a slighly higher prevalance of WRMSI amongst female respondents, however this could be due to the higher percentage of female participants (55.7%) in this study. Homack and Hedge (2016) reported a male dominace (57.9%) with respect to injuries reported. This is supported by Holm and Rose (2006) who found 95.2% of practitioners who reported three injuries were male.

The upper extremity was most vulnerable to WRMSI especially the hand/wrist, followed by the lower back. Hand/ wrist injuries could be ascribed to the technique used when manipulating patients. Placing the wrist in either flexion, extension, radial or ulnar deviation was found to be a risk factor for developing WRMSI. This, coupled with incorrect placement or inflexibility of the wrist during manipulative procedures, resulted in further biomechanical strain on the joints and soft tissue of the hand and wrist. Manipulation requires the wrist to be placed in a combination of the above-mentioned positions which predisposes the hand and wrist to injury (Holm and Rose 2006; Triano 2000). These results are similar to the findings of Homack and Hedge (2016), Holm and Rose (2006) and Rupert and Ebete (2004) who found hand/wrist injuries were most frequently reported.

Most injuries involved the soft tissue such as ligamentous sprains (27.5%) and muscular strains (26.6%) which correlate with previous international studies (Homack and Hedge 2016; Holm and Rose 2006). Scar tissue is less elastic in nature with more collagenic properties. By altering the properties of the tissue, the range of future use is invariably limited and increases the susceptibility to future injury (Byfield 2005); which explains the high prevalence of injury caused by cumulative trauma.

5.5 OBJECTIVE TWO: SELECTED RISK FACTORS ASSOCIATED WITH WRMSI IN CHIROPRACTORS

Most injuries occurred with manipulation of the lumbosacral spine of patients in the side lying posture. These results can be attributed to the fact that the majority of lumbosacral manipulations with the patient in a side lying position requires the chiropractor to assume a forward flexion position with a certain degree of trunk rotation. There is strong evidence in the literature that suggests lower back injuries are the consequence of awkward work postures, including non-neutral postures relating to forward flexion and trunk rotation (Luttmann *et al.* 2003; Bernard 1997). Maintaining static posture for prolonged periods of time causes static loading of the muscles which has been causally linked to the development of lower back pain (Bernard 1997).

It is difficult to report on the techniques used as the majority of chiropractors use more than one technique. However, diversified was most commonly cited/reported as the technique used when injured.

The majority of injuries occurred within the first five years of practice. This is supported by previous South African studies. Mathews (2006) investigated the prevalence of occupational overuse of the hand and wrist and reported a mean onset of 3.41 years. Another study conducted by Pereira (2009), found chiropractors experienced lower back pain for the first time within the first five years of practice. This is similar to the findings by Holm and Rose (2006) and other literature in the physiotherapy realm (Glover *et al.* 2005; West and Gardner 2001; Cromie, Robertson and Best 2000; Holder *et al.* 1999; Bork *et al.* 1996). Greene, Goggins and Hess (2011) stated that previous musculoskeletal injuries were a strong predictor for future injury which explains why the majority of injuries occurred within the first five years of practice This study found that 14.6% of the injuries occurred pre-practice. These results are in line with the study done by Ndetan *et al.* (2009b) who investigated injuries in chiropractic students and found that 30.95% (13/42) of the students sustained an injury pre-practice (i.e. while being a student). They ascribed the high prevalence of injuries in students to lack of experience while receiving and applying manipulations. This literature

can be used to infer that most newly graduated chiropractors are not using ideal biomechanics when manipulating patients.

5.6 OBJECTIVE THREE: THE IMPACT OF WRMSI IN CHIROPRACTORS

Although there was a large number of WRMSI reported, only a few of the respondents indicated they had taken time off practice following the injury. These results correspond to results found by Holm and Rose (2006) which indicated 69.8% of chiropractors did not require any time off practice. Findings reported by Darragh, Huddleston and King (2009) also showed almost all occupational and physical therapists who reported work-related injuries continued working.

Chiropractors are less likely to seek care, take time off practice or file a worker's compensation claim because of the ability to treat themselves and to recognise early symptoms of injury (Waldrop 2004). Chiropractors may treat their own symptoms, use colleagues or self-prescribe treatment programmes (Glover *et al.* 2005; Waldrop 2004). Another plausible reason for the lack of time taken off practice is that the majority of practitioners are sole proprietors. The questionnaire did not ask the chiropractor to divulge whether they are sole proprietors or hold an associate/partnership position. However, a practice analysis done in America in 2015 reported that 74.4% of chiropractors were sole proprietors (National Board of Chiropractic Examiners 2015), which could explain the lack of time taken off from practice due to the injury.

The greater majority of respondents indicated that they made no change to their practice following the injuries, only 33.33% indicated they made changes following the injury which agrees with results found by Holm and Rose (2006).

The most common changes included modification of patient or practitioner posture/position, modification of hand position and a change in the line of drive/ vector which is similar to changes described by Holm and Rose (2006) and Rupert and Ebete (2004).

Although the majority of respondents who suffered from WRMSI had income protection (70%), only a small number of them claimed due to the injury. Only six claims were reported and all were paid out successfully. According to the Professional Provident Society (2013), 20% of all claims were due to musculoskeletal and connective tissue disorders.

5.7 OBJECTIVE FOUR: DETERMINE ANY ASSOCIATION BETWEEN THE PREVALENCE OF WRMSI AND SELECTED RISK FACTORS WITH WRMSI IN CHIROPRACTORS

Associations between the prevalence of WRMSI and selected risk factors were tested using chi square tests in the case of categorical variables. Logistical regression analysis was used to assess the independent effects of various risk factors on work-related musculoskeletal injures, while controlling for confounders.

There was no significant relationship between gender, age, race, height, weight, time in practice, practice volume or hours spent in clinical practice and having sustained a work-related musculoskeletal injury. Holm and Rose (2006) reported similar findings.

Diversified technique was found to be significantly associated with work-related musculoskeletal injury in this study as the techniques used most commonly when the single most severe (p = 0.011) and second most severe (p = 0.023) work-related musculoskeletal injuries occurred. Other techniques significantly associated with "Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?" was the Gonstead technique (p = 0.012). Similar results were cited by Holm and Rose (2006)

5.8 HYPOTHESIS

The results that the study has produced allow for the null hypotheses to be rejected and the hypotheses to be fully accepted, which states:

- Chiropractors in the eThekwini municipality will have a high prevalence of work-related musculoskeletal injury.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter includes a summary of the results found in this study. Conclusions about the results are explained, the limitations of the study are stated and recommendations for future studies are provided.

6.2 CONCLUSION

This study determined that injuries to the upper limb and lower back were more prevalent than injuries to other anatomical regions. The hand/wrist was the most common anatomical site of injury in chiropractors, followed by the lower back. The majority of injuries affected the soft tissue, including muscle strains and ligament sprains.

Factors that increased the likelihood of a chiropractor sustaining a work-related musculoskeletal injury included the use of the diversified technique, particularly with the patient in the side lying position to manipulate the lumbosacral area.

Most injuries occurred within the first five years of practice and were related to cumulative trauma. However, only a third of chiropractors indicated they had made changes to their practice as a result of the injury.

6.3 LIMITATIONS

The sample population was drawn from the chiropractors practicing within the eThekwini municipality. Although a satisfactory response rate of 64% was achieved, future studies should aim to investigate a broader scope of practitioners in KwaZulu-Natal and nationally. This would ensure that the study could represent the entire chiropractic population adequately.

Chiropractors who have left the profession due to permanent disability were not included in this study and neither were chiropractors that were on extended leave (i.e. maternity leave) at the time of the questionnaire.

The ability to accurately recall injuries (recall bias) that may have occurred a long time ago (mean number of years spent in practice in this study was 9.43 years) is another limitation to the internal validity of the study.

6.4 RECOMMENDATIONS

Future studies should consider adding questions pertaining to:

- Did you diagnose yourself or was a formal diagnosis made by another health care professional?
- The type of practice the participants worked in (e.g. solo, associate/partner) which could have influenced the ability to take time off work. A sole proprietor might be less inclined to take time off.
- The use of a height adjustable treatment table was suggested/implemented.
- Time spent on non-manipulative techniques on a daily basis as these might predispose chiropractors to the development of WRMSI.
- The general health and lifestyle behaviours of chiropractors which could predispose to WRMSI.
- The size/ BMI of patients and the impact on contributing to the development of WRMSI in chiropractors.
- Effect climate conditions have on the prevalence of WRMSI

The response rate could be improved by scheduling set appointments with chiropractors, in which time the questionnaire is completed and returned back to the researcher upon completion.

Based upon the conclusion of this study, there is a need for preventative programmes and safe practice guidelines for chiropractors - especially intervention services designed to reduce the rate of work-related musculoskeletal pain among newly graduated practitioners.

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APPENDICES

APPENDIX A

ETHICAL APPROVAL

Institutional Research Ethics Committee
Faculty of Health Sciences
Room MS 49, Mansfield School Site
Gate 8, Ritson Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2900
Fax: 031 373 2407
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

24 November 2016

IREC Reference Number: **REC 61/16**

Ms A Lamprecht
P O Box 32629
Fichardtpark
Bloemfontein
9371

Dear Ms Lamprecht

The epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the questionnaire has been APPROVED; you may now proceed with data collection on the proposed project.

Kindly ensure that participants used for the pilot study are not part of the main study.

Yours Sincerely

[redacted]

Professor J K Adam
Chairperson: IREC

DUT DURBAN UNIVERSITY OF TECHNOLOGY
2016 -11- 24
INSITUTUTIONAL RESEARCH ETHICS COMMITTEE
P O BOX 1334 DURBAN 4000 SOUTH AFRICA

APPENDIX B

LETTER OF INFORMATION

LETTER OF INFORMATION

Dear Participant, I would like to welcome you into the research study.

Research Title:

The epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality

Supervisor: Dr. K. Padayachy, M.Tech Chiropractic

Research student: Almay Lamprecht, B.Tech Chiropractic

Brief Introduction and Purpose of the Study:

There is a higher prevalence of work-related musculoskeletal injuries in health care workers when compared to other sectors due to their labour-intensive and physically demanding work-activities. Patient handling (including patient transfers, repositioning and lifting) and manual therapy (soft tissue work, mobilisation of joints and orthopaedic techniques) are activities most commonly cited in association with work-related musculoskeletal injuries among health care professionals.

There is paucity in the literature on the epidemiology of work-related musculoskeletal injuries in chiropractors focusing on the entire chiropractic practitioner.

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.

Outline of the Procedures: You will receive a letter of information and if you agree to participate in the study, you will be required to complete and sign a letter of informed consent. You will then be required to complete the research questionnaire, which may take on average about 10-15 minutes.
Please note: you are free to withdraw from this research study at any time without giving a reason.

Benefits: By determining the epidemiology of work-related musculoskeletal injuries in chiropractors in eThekwini municipality - the prevalence, associated risk factors and causal features can be recognised and employed to create strategies to prevent/lessen work-related musculoskeletal injuries in the chiropractic profession. This will impact the practitioner beneficially while the patient has the advantage of receiving optimal care from their chiropractor.

Remuneration: There will be no monetary remuneration or costs for undertaking this study by any of the participants in this study.

Costs of the Study: There is no cost involved for your participation in this study. The questionnaire and related information will be sent to you via email, once done please email the completed questionnaire to WRMSIquestionnaire@gmail.com. If you elected to receive a hard copy of the questionnaire the questionnaire is hand delivered and taken on completion.

Confidentiality: Your participation is completely voluntary and all responses will be treated confidentially and results will be used for research purposes only. Completed questionnaires and consent forms will be received by the researcher who will separate the informed consent from the completed questionnaire after which participants will be coded to ensure confidentiality.

Persons to Contact in the Event of Any Problems or Queries: Please contact the researcher (WRMSIquestionnaire@gmail.com), my supervisor; Dr. K. Padayachy (keserip@hotmail.com) or the Institutional Research Ethics Administrator on 031 373 2900. Complaints can be reported to the Director: Research and Postgraduate Support, Prof S Moyo on 031 373 2577 or moyos@dut.ac.za
Thank you for your participation and cooperation.

Your time and assistance with this project is invaluable and is greatly appreciated.

APPENDIX C

INFORMED CONSENT

INFORMED CONSENT

Statement of Agreement to Participate in the Research Study:

I hereby confirm that I have been informed by the researcher, Almay Lamprecht about the nature, conduct, benefits and risks of this study (IREC Reference Number: REC 61/16)

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant
Date and Time
Tick box for informed consent ☐
I, Almay Lamprecht herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Full Name of Researcher **Date** **Signature**

APPENDIX D

RESEARCH QUESTIONNAIRE

1. Demographic detail (Tick appropriate box)

1.1 Gender

1.2 Age in years 00

1.3 Race (for statistical purposes only)

African ○

Coloured ○

Indian ○

White ○

Other ○ (If other, please specify)

1.4 Height in meters 0.00

1.5 Weight in kilogrammes 000

2 Practice demographics

2.1 Time in practice (please specify number of years) 00

2.2 The average number of patients seen per working day? 00

2.3 Average number of hours spent in clinical practice per week (hands on work) 00,0

2.4 Chiropractic technique/s used on a daily basis **(Tick appropriate box)**?

Activator	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Diversified	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Gonstead technique	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
NIP	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
SOT	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Thompson technique	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never

Other (please specify)

2.5 Non-manipulative techniques used on a daily basis (tick appropriate box indicating frequency of each option used):

Dry needling/ acupressure	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Electro-modalities	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Ice/ heat packs	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Massage therapy	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
None	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Strapping	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Stretching	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never

Other (please specify)

2.6 Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?

○ Yes – please fill out the questions below about your injury

○ No - you are done with the survey, thank you for your time

3 <u>Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury</u>

3.1 What body part was affected? **(Tick appropriate box)**

Neck	○	Upper back (thoracic)	○
Shoulder	○	Lower back	○
Elbow	○	Hip/ thigh	○
Wrist/ hand/ fingers	○	Chest/ ribs	○
Knee	○	Ankle/ foot	○

3.2 What type of injury was it (check all that apply)

Ligament sprain/ strain	☐	Dislocation	☐
Ligament / tendon tear	☐	Fracture	☐
Muscle strain	☐	Neuropathy	☐
Synovitis	☐	Vertebral disc injury	☐
Tendinitis	☐	Other	☐

If other, please specify)

3.3 Was this injury a result of:

○ A one-time episode?

○ Cumulative trauma?

○ Initial episode at work with subsequent flare ups?

○ Initial episode outside work with subsequent flare ups?

(Please specify how injury occurred)

3.4 Activity you were performing that caused your injury/ aggravated existing injury?

Diagnostic procedure	○	Applying modality	○
Demonstrating exercise	○	Maintaining prolonged position	○
Positioning patient for manipulation	○	Don't recall/ nothing specific	○
Performing manipulative procedure	○	Other	○

If other, please specify

3.4.1 If injury occurred during manipulation:

3.4.1.1 What area were you adjusting?

3.4.1.2 What technique did you use?

3.4.1.3 Patient position in which you adjusted?

Seated	○
Supine	○
Side lying	○
Prone	○

3.5 Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury):

Pre-practice (as a student)	○	16 – 20 years	○
1 – 5 years	○	21 – 30 years	○

6 – 10 years	○	31 years +	○
11 – 15 years	○		

3.6 How much time were you away from work due to this injury to date?

None	○	1 month	○
½ a day	○	1 – 6 months	○
1 day	○	More than 6 months	○
1 week	○	Still suffering with this injury	○

(If still suffering, please specify)

3.7 Did you change your adjusting technique(s) as a result of the injury?

○ Yes ○ No

If YES, what did you change?

3.8 What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)

3.9 Do you have Income Protection?

○ Yes ○ No

3.10 Did you claim for this injury

○ Yes ○ No

3.11 Did your claim pay out?

○ Yes ○ No

4 **Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury**

4.1 What body part was affected? **(Tick appropriate box)**

Neck	○	Upper back (thoracic)	○
Shoulder	○	Lower back	○
Elbow	○	Hip/ thigh	○
Wrist/ hand/ fingers	○	Chest/ ribs	○
Knee	○	Ankle/ foot	○

4.2 What type of injury was it (check all that apply)

Ligament sprain/ strain	☐	Dislocation	☐
Ligament / tendon tear	☐	Fracture	☐
Muscle strain	☐	Neuropathy	☐
Synovitis	☐	Vertebral disc injury	☐
Tendinitis	☐	Other	☐

If other, please specify)

4.3 Was this injury a result of:

○ A one-time episode?

○ Cumulative trauma?

○ Initial episode at work with subsequent flare ups?

○ Initial episode outside work with subsequent flare ups?

(Please specify how injury occurred)

4.4 Activity you were performing that caused your injury/ aggravated existing injury?

Diagnostic procedure	○	Applying modality	○
Demonstrating exercise	○	Maintaining prolonged position	○
Positioning patient for manipulation	○	Don't recall/ nothing specific	○
Performing manipulative procedure	○		
Other	○		

If other, please specify

4.4.1 If injury occurred during manipulation:

4.4.1.1 What area were you adjusting?

4.4.1.2 What technique did you use?

4.4.1.3 Patient position in which you adjusted?

Seated	○
Supine	○
Side lying	○
Prone	○

4.5 Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury):

Pre-practice (as a student)	○	16 – 20 years	○
1 – 5 years	○	21 – 30 years	○
6 – 10 years	○	31 years +	○
1 – 15 years	○		

4.6 How much time were you away from work due to this injury to date?

None	○	1 month	○
½ a day	○	1 – 6 months	○
1 day	○	More than 6 months	○
1 week	○	Still suffering with this injury	○

(If still suffering, please specify)

4.7 Did you change your adjusting technique(s) as a result of the injury?

○ Yes ○ No

If YES, what did you change?

4.8 What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)

4.9 Do you have Income Protection?

○ Yes ○ No

4.10 Did you claim for this injury

○ Yes ○ No

4.11 Did your claim pay out?

○ Yes ○ No

5 **Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury**What body part was affected? **(Tick appropriate box)**

Neck	○	Upper back (thoracic)	○
Shoulder	○	Lower back	○
Elbow	○	Hip/ thigh	○
Wrist/ hand/ fingers	○	Chest/ ribs	○
Knee	○	Ankle/ foot	○

5.2 What type of injury was it (check all that apply)

Ligament sprain/ strain	☐	Dislocation	☐
Ligament / tendon tear	☐	Fracture	☐
Muscle strain	☐	Neuropathy	☐
Synovitis	☐	Vertebral disc injury	☐
Tendinitis	☐	Other	☐

If other, please specify)

5.3 Was this injury a result of:

○ A one-time episode?

○ Cumulative trauma?

○ Initial episode at work with subsequent flare ups?

○ Initial episode outside work with subsequent flare ups?

(Please specify how injury occurred)

5.4 Activity you were performing that caused your injury/ aggravated existing injury?

Diagnostic procedure	○	Applying modality	○
Demonstrating exercise	○	Maintaining prolonged position	○
Positioning patient for manipulation	○	Don't recall/ nothing specific	○
Performing manipulative procedure	○		
Other	○		

If other, please specify

5.4.1 If injury occurred during manipulation:

5.4.1.1 What area were you adjusting?

5.4.1.2 What technique did you use?

5.4.1.3 Patient position in which you adjusted?

Seated	○
Supine	○
Side lying	○
Prone	○

5.5 Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury):

Pre-practice (as a student)	○	16 – 20 years	○
1 – 5 years	○	21 – 30 years	○
6 – 10 years	○	31 years +	○
1 – 15 years	○		

5.6 How much time were you away from work due to this injury to date?

None	○	1 month	○
½ a day	○	1 – 6 months	○
1 day	○	More than 6 months	○
1 week	○	Still suffering with this injury	○

(If still suffering, please specify)

5.7 Did you change your adjusting technique(s) as a result of the injury?

○ Yes ○ No

If YES, what did you change?

5.8 What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)

5.9 Do you have Income Protection?

○ Yes ○ No

5.10 Did you claim for this injury

○ Yes ○ No

5.11 Did your claim pay out?

○ Yes ○ No

Thank you for your time

Kind regards

Almay Lamprecht

APPENDIX E

PERMISSION TO UTILISE QUESTIONNAIRE

Gmail **Almay Lamprecht <14mayq@gmail.com>**

RE: Article published in Journal of Manipulative and Physiological Therapeutics Volume 29, Number 7

Almay Lamprecht <14mayq@gmail.com> Sun, Feb 22, 2015 at 5:05 PM
To: KevinRose@scuhs.edu

Dear Professor Rose,

I am currently a 4th year chiropractic student at the Durban University of Technology in South Africa.

In order for me to graduate as a chiropractor I need to submit a dissertation to obtain my M.Tech in Chiropractic which mainly takes place in our 5th year of study, however to get the ball rolling on our research the University urges us to start some of the preparation associated with the research in our 4th year.

The article on WORK-RELATED INJURIES OF DOCTORS OF CHIROPRACTIC IN THE UNITED STATES that was placed in the Journal of Manipulative and Physiological Therapeutics intrigued me and I was thinking of doing a similar study in the South African context.

Thus I was wondering if you would be willing to share the questionnaire that was used in that particular study, just to give me an idea on how to structure the questions pertaining to this particular subject.

Any other useful information in conducting a similar study would be greatly appreciated.

Hope to hear from you soon

Kind regards

Almay Lamprecht

Gmail **Almay Lamprecht <14mayq@gmail.com>**

RE: Article published in Journal of Manipulative and Physiological Therapeutics Volume 29, Number 7

Kevin Rose <KevinRose@scuhs.edu> Mon, Feb 23, 2015 at 6:27 PM
To: Almay Lamprecht <14mayq@gmail.com>

Hi Almay,

Attached is the survey that we used. Best of luck with your studies.

Kevin

APPENDIX F

LETTER OF INFORMATION – FOCUS GROUP

Dear Participant, I would like to welcome you into the focus group of my study.

The title of my research project is:
The epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality

Supervisor: Dr. K. Padayachy, M.Tech Chiropractic
Research student: Almay Lamprecht, B.Tech Chiropractic

Background to the study:
There is a higher prevalence of work-related musculoskeletal injuries in health care workers when compared to other sectors due to their labour-intensive and physically demanding work-activities. Patient handling (including patient transfers, repositioning and lifting) and manual therapy (soft tissue work, mobilisation of joints and orthopaedic techniques) are activities most commonly cited in association with work-related musculoskeletal injuries among health care professionals. Chiropractors are subjected to lifting bending, twisting and performing manual therapy; these manual procedures involve rotation as well as flexing forward and laterally. These movements combined together with sustained awkward positions for extensive periods of time causes increased loads on the lower back as well as the upper extremity. These are all considered risk factors for the development of work-related musculoskeletal injuries.
There is paucity in the literature on the epidemiology of work-related musculoskeletal injuries in chiropractors focusing on the entire chiropractic practitioner.

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.

Aim and objectives of the study:

Aim:
To determine the epidemiology of work-related musculoskeletal pain among chiropractors in the eThekwini municipality.

Objectives:

1. To determine the practice-lifetime prevalence of work-related musculoskeletal pain in chiropractors
2. To determine selected risk factors associated with work-related musculoskeletal pain in chiropractors
3. To determine the impact of work-related musculoskeletal pain in chiropractors
4. Determine any association between the prevalence of work-related musculoskeletal pain in chiropractors and selected risk factors associated with work-related musculoskeletal pain in chiropractors

Procedure:

Before commencing the focus group discussion, kindly read and sign the informed consent form, confidentiality statement and code of conduct. Each member will then receive a copy of the questionnaire, after which each of the questions will be discussed in sequential order. Please recommend any suggestions that you may have regarding the questions in order to limit any misinterpretation by the respondents.

You are requested to comment on how the questionnaire should be modified in order to enhance the understanding of the questions. If inconsistencies are found or changes proposed, a unanimous vote is required to institute change to the questionnaire.

The questionnaire will not take too long to complete, as most of the questions require you to tick the appropriate answer. There are only a few short written responses that are required.

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

Persons to Contact in the Event of Any Problems or Queries:

Please contact the researcher (WRMSIquestionnaire@gmail.com), my supervisor; Dr K. Padayachy (keserip@hotmail.com) or the Institutional Research Ethics Administrator on 031 373 2900. Complaints can be reported to the Director: Research and Postgraduate Support, Prof S Moyo on 031 373 2577 or moyos@dut.ac.za

Thank you for your participation and cooperation. Your time and assistance with this project is invaluable and is greatly appreciated.

Almay Lamprecht	Dr K. Padayachy
Research student	Supervisor

APPENDIX G

CONFIDENTIALITY STATEMENT (FOCUS GROUP)

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.

CONFIDENTIALITY STATEMENT – FOCUS GROUP

DECLARATION

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.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Please complete Focus Group member:

Name and Surname	Sign

APPENDIX H

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. 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.

3. 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.

Member represents	**Name**	**Signature**	**Contact details**

APPENDIX I

INFORMED CONSENT/ ASSENT FORM

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

DATE:

TITLE OF RESEARCH PROJECT:

The epidemiology of work-related musculoskeletal injuries among chiropractors in the eThekwini municipality

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NAME OF SUPERVISOR: Dr. K. Padayachy

NAME OF RESEARCH STUDENT: Almay Lamprecht

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 withdraw from this study	
a) at any time?	Yes / No
b) at any time, without reasons given	Yes / No
c) 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 J

POST-FOCUS GROUP QUESTIONNAIRE

1. Demographic detail

1.1 Gender Select gender

1.2 Age in years 00

1.3 Race (for statistical purposes only)

African ○

Coloured ○

Indian ○

White ○

Other ○ (If other, please specify)

1.4 Height in meters 0.00

1.5 Weight in kilogrammes 000

2 Practice demographics

2.1 Time in practice (please specify) 00

2.2 The average number of patients seen per working day? 00

2.3 Average number of hours spent in clinical practice per week (hands on work) 00,0

2.4 Chiropractic technique/s used on a daily basis?

Activator	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Diversified	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Gonstead technique	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
NIP	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
SOT	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Thompson technique	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never

Other (please specify)

2.5 Non-manipulative techniques used on a daily basis (tick appropriate box indicating frequency of each option used):

Dry needling/ acupressure	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Electro-modalities	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Ice/ heat packs	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Massage therapy	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
None	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Strapping	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never
Stretching	○ Every Patient	○ Regular	○ Often	○ Seldom	○ Never

Other (please specify)

2.6 Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?

○ Yes – please fill out the questions below about your injury

○ No - you are done with the survey, thank you for your time

3 <u>Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury</u>

3.1 What body part was affected?

Shoulder	○	Upper back (thoracic)	○
Elbow	○	Lower back	○
Wrist/ hand/ fingers	○	Hip/ thigh	○
Neck	○	Chest/ ribs	○
Knee	○	Ankle/ foot	○

3.2 What type of injury was it (check all that apply)

Ligament sprain/ strain	☐	Dislocation	☐
Ligament / tendon tear	☐	Fracture	☐
Muscle strain	☐	Neuropathy	☐
Synovitis	☐	Vertebral disc injury	☐
Tendinitis	☐	Other	☐

If other, please specify)

3.3 Was this injury a result of:

○ A one-time episode?

○ Cumulative trauma?

○ Initial episode at work with subsequent flare ups?

○ Initial episode outside work with subsequent flare ups?

(Please specify how injury occurred)

3.4 Activity you were performing that caused your injury/ aggravated existing injury?

Diagnostic procedure	○	Applying modality	○
Demonstrating exercise	○	Maintaining prolonged position	○
Positioning patient for manipulation	○	Don't recall/ nothing specific	○
Performing manipulative procedure	○		
Other	○		

If other, please specify

3.4.1 If injury occurred during manipulation:

3.4.1.1 What area were you adjusting?

3.4.1.2 What technique did you use?

3.4.1.3 Patient position in which you adjusted?

Seated	○
Supine	○
Side lying	○
Prone	○

3.5 Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury):

Pre-practice (as a student)	○	16 – 20 years	○
1 – 5 years	○	21 – 30 years	○
6 – 10 years	○	31 years +	○
11 – 15 years	○		

3.6 How much time were you away from work due to this injury to date?

None	○	1 month	○
½ a day	○	1 – 6 months	○
1 day	○	More than 6 months	○
1 week	○	Still suffering with this injury	○

(If still suffering, please specify)

3.7 Did you change your adjusting technique(s) as a result of the injury?

○ Yes ○ No

If YES, what did you change?

3.8 What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)

3.9 Do you have Income Protection?

○ Yes ○ No

3.10 Did you claim for this injury

○ Yes ○ No

3.11 Did your claim pay out?

○ Yes ○ No

4 Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury

4.1 What body part was affected?

Neck	○	Upper back (thoracic)	○
Shoulder	○	Lower back	○
Elbow	○	Hip/ thigh	○
Wrist/ hand/ fingers	○	Chest/ ribs	○
Knee	○	Ankle/ foot	○

4.2 What type of injury was it (check all that apply)

Ligament sprain/ strain	☐	Dislocation	☐
Ligament / tendon tear	☐	Fracture	☐
Muscle strain	☐	Neuropathy	☐
Synovitis	☐	Vertebral disc injury	☐
Tendinitis	☐	Other	☐

If other, please specify)

4.3 Was this injury a result of:

○ A one-time episode?

○ Cumulative trauma?

○ Initial episode at work with subsequent flare ups?

○ Initial episode outside work with subsequent flare ups?

(Please specify how injury occurred)

4.4 Activity you were performing that caused your injury/ aggravated existing injury?

Diagnostic procedure	○	Applying modality	○
Demonstrating exercise	○	Maintaining prolonged position	○
Positioning patient for manipulation	○	Don't recall/ nothing specific	○
Performing manipulative procedure	○		
Other	○		

If other, please specify

4.4.1 If injury occurred during manipulation:

4.4.1.1 What area were you adjusting?

4.4.1.2 What technique did you use?

4.4.1.3 Patient position in which you adjusted?

Seated	○
Supine	○
Side lying	○
Prone	○

4.5 Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury):

Pre-practice (as a student)	○	16 – 20 years	○
1 – 5 years	○	21 – 30 years	○
6 – 10 years	○	31 years +	○
11 – 15 years	○		

4.6 How much time were you away from work due to this injury to date?

None	○	1 month	○
½ a day	○	1 – 6 months	○
1 day	○	More than 6 months	○
1 week	○	Still suffering with this injury	○

(If still suffering, please specify)

4.7 Did you change your adjusting technique(s) as a result of the injury?

○ Yes ○ No

If YES, what did you change?

4.8 What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)

4.9 Do you have Income Protection?

○ Yes ○ No

4.10 Did you claim for this injury

○ Yes ○ No

4.11 Did your claim pay out?

○ Yes ○ No

5 **<u>Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury</u>**What body part was affected?

Neck	○	Upper back (thoracic)	○
Shoulder	○	Lower back	○
Elbow	○	Hip/ thigh	○
Wrist/ hand/ fingers	○	Chest/ ribs	○
Knee	○	Ankle/ foot	○

5.2 What type of injury was it (check all that apply)

Ligament sprain/ strain	☐	Dislocation	☐
Ligament / tendon tear	☐	Fracture	☐
Muscle strain	☐	Neuropathy	☐
Synovitis	☐	Vertebral disc injury	☐
Tendinitis	☐	Other	☐

If other, please specify)

5.3 Was this injury a result of:

○ A one-time episode?

○ Cumulative trauma?

○ Initial episode at work with subsequent flare ups?

○ Initial episode outside work with subsequent flare ups?

(Please specify how injury occurred)

5.4 Activity you were performing that caused your injury/ aggravated existing injury?

Diagnostic procedure	○	Applying modality	○
Demonstrating exercise	○	Maintaining prolonged position	○
Positioning patient for manipulation	○	Don't recall/ nothing specific	○
Performing manipulative procedure	○		
Other	○		

If other, please specify

5.4.1 If injury occurred during manipulation:

5.4.1.1 What area were you adjusting?

5.4.1.2 What technique did you use?

5.4.1.3 Patient position in which you adjusted?

Seated	○
Supine	○
Side lying	○
Prone	○

5.5 Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury):

Pre-practice (as a student)	○	16 – 20 years	○
1 – 5 years	○	21 – 30 years	○
6 – 10 years	○	31 years +	○
11 – 15 years	○		

5.6 How much time were you away from work due to this injury to date?

None	○	1 month	○
½ a day	○	1 – 6 months	○
1 day	○	More than 6 months	○
1 week	○	Still suffering with this injury	○

(If still suffering, please specify)

5.7 Did you change your adjusting technique(s) as a result of the injury?

○ Yes ○ No

If YES, what did you change?

5.8 What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)

5.9 Do you have Income Protection?

○ Yes ○ No

5.10 Did you claim for this injury

○ Yes ○ No

5.11 Did your claim pay out?

○ Yes ○ No

Thank you for your time

Kind regards

Almay Lamprecht

APPENDIX K

PROPOSED QUESTIONNAIRE PRESENTED TO THE FOCUS GROUP

1. Demographic detail

1.1 Gender
- Male ☐
- Female ☐

1.2 Age in years _____

1.3 Race (for statistical purposes only)
- Black ☐
- Coloured ☐
- Indian ☐
- White ☐

1.4 Height in meter _____

1.5 Weight in kilogram _____

2. Practice demographics

2.1 Time in practice (***tick the appropriate box***)
- Less than 1 year ☐
- 1 – 5 years ☐
- 6 – 10 years ☐
- 11 – 15 years ☐
- 16 – 20 years ☐
- 21 – 30 years ☐
- 31 years ☐

2.2 The average number of patients seen per working day? (***tick the appropriate box***)
- 0 – 10 patients ☐
- 11 – 20 patients ☐
- 21 – 30 patients ☐
- 31 – 40 patients ☐
- More than 40 patients ☐

2.3 Average number of hours spent in clinical practice per week (hands on work
- Less than 20 hours per week ☐
- 20 – 30 hours per week ☐
- 31–40 hours per week ☐
- 41 – 50 hours per week ☐
- 50+ hours per week ☐

2.4 Chiropractic technique/s used on a daily basis? (***tick the appropriate box/es***)
- Activator technique ☐
- Diversified ☐
- Thompson technique ☐
- Other (please specify) _____
- Gonstead technique ☐
- Sacro-occipital technique ☐

2.5 Non-manipulative techniques used (***tick the appropriate box/es***)
- Ice/ heat packs ☐
- Dry needling/ acupressure ☐
- Other (please specify) _____
- Massage therapy ☐
- Modalities ☐

Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor?
Yes – please fill out the questions below about your injury
No - you are done with the survey, thank you for your time

Work related musculoskeletal injuries: most severe work related musculoskeletal injury

1. What body part/s was (were) affected? (check all that apply)
2. What type of injury was it (check all that apply

	1a. Neck	1b. Shoulder	1c. Elbow	1d. Wrist/ hand/ fingers	1e. Chest/ ribs	1f. Upper back (T/spine)	1g. Lower back	1h. Hip/thigh	1i. Knee	1j. Ankle/ Foot
2a. Ligament sprain/ strain										
2b. Ligament/ tendon tear										
2c. Muscle strain										
2d. Synovitis										
2e. Tendinitis										
2f. Dislocation										
2g. Fracture										
2h. Neuropathy										
2i. Vertebral disc injury										

3. Was this injury a result of:
   a. A one-time episode? ☐
   b. Cumulative trauma? ☐
   c. Initial episode with subsequent flare ups? ☐

4. What activity were you performing when you were injured?
   Diagnostic procedure ☐ Applying modality ☐
   Demonstrating exercise ☐ Maintaining prolonged position ☐
   Positioning patient for manipulation ☐ Don't recall/ nothing specific ☐
   Performing manipulative procedure ☐
   i. If injury occurred during manipulation:
      1. What area were you adjusting? _____
      2. What technique did you use? _____
      3. Patient position in which you adjusted?
         Seated ☐
         Supine ☐
         Side lying ☐
         Prone ☐

5. Year of practice in which injury occurred? (or 1st occurred if repetitious / chronic injury)
   Pre-practice (as a student) ☐ 16 – 20 years ☐
   1 – 5 years ☐ 21 – 30 years ☐
   6 – 10 years ☐ 31 years + ☐
   11 – 15 years ☐

6. How much time were you away from work due to this injury?

None	☐	1 month	☐
½ a day	☐	1 – 6 months	☐
1 day	☐	More than 6 months	☐
1 week	☐	Permanent disability	☐

7. Did you change your adjusting technique(s) as a result of the injury?
   a. Yes ☐
      i. If YES, what did you change? _____
   b. No ☐
   c. What other changes, if any, did you make to your practice as a result of this injury (be specific)

_____

Work related musculoskeletal injuries: 2nd most severe work related musculoskeletal injury

8. What body part/s was (were) affected? (check all that apply)

9. What type of injury was it (check all that apply)

	8a. Neck	8b. Shoulder	8c. Elbow	8d. Wrist/ hand/ fingers	8e. Chest/ ribs	8f. Upper back (T/spine)	8g. Lower back	8h. Hip/thigh	8i. Knee	8j. Ankle/ Foot
9a. Ligament sprain/ strain										
9b. Ligament/ tendon tear										
9c. Muscle strain										
9d. Synovitis										
9e. Tendinitis										
9f. Dislocation										
9g. Fracture										
9h. Neuropathy										
9i. Vertebral disc injury										

10. Was this injury a result of:
    a. A one-time episode? ☐
    b. Cumulative trauma? ☐
    c. Initial episode with subsequent flare ups? ☐

11. What activity were you performing when you were injured?
    Diagnostic procedure ☐ Applying modality ☐
    Demonstrating exercise ☐ Maintaining prolonged position ☐
    Positioning patient for manipulation ☐ Don't recall/ nothing specific ☐
    Performing manipulative procedure ☐

i. If injury occurred during manipulation:
1. What area were you adjusting? _____
2. What technique did you use? _____
3. Patient position in which you adjusted?
    Seated ☐
    Supine ☐
    Side lying ☐
    Prone ☐

12. Year of practice in which injury occurred? (or 1st occurred if repetitious / chronic injury)

Pre-practice (as a student)	☐	16 – 20 years	☐
1 – 5 years	☐	21 – 30 years	☐
6 – 10 years	☐	31 years +	☐
11 – 15 years	☐		

13. How much time were you away from work due to this injury?

None	☐	1 month	☐
½ a day	☐	1 – 6 months	☐
1 day	☐	More than 6 months	☐
1 week	☐	Permanent disability	☐

14. Did you change your adjusting technique(s) as a result of the injury?
    a. Yes ☐
        i. If YES, what did you change? _____
    b. No ☐
    c. What other changes, if any, did you make to your practice as a result of this injury (be specific)

    _____

Work related musculoskeletal injuries: 3rd most severe work related musculoskeletal injury

15. What body part/s was (were) affected? (check all that apply)

16. What type of injury was it (check all that apply)

	15a. Neck	15b. Shoulder	15c. Elbow	15d. Wrist/ hand/ fingers	15e. Chest/ ribs	15f. U☐ back (T/spine)	15g. Lower back	15h. Hip/thigh	15i. Knee	15j. Ankle/ Foot
16a. Ligament sprain/ strain										
1b. Ligament/ tendon tear										
16c. Muscle strain										
16d. Synovitis										
16e. Tendinitis										
16f. Dislocation										
16g. Fracture										
16h. Neuropathy										
16i. Vertebral disc injury										

17. Was this injury a result of:
    a. A one-time episode? ☐
    b. Cumulative trauma? ☐
    c. Initial episode with subsequent flare ups? ☐

18. What activity were you performing when you were injured?

Diagnostic procedure	☐	Applying modality	☐
Demonstrating exercise	☐	Maintaining prolonged position	☐
Positioning patient for manipulation	☐	Don't recall/ nothing specific	☐
Performing manipulative procedure	☐		

i. If injury occurred during manipulation:
    1. What area were you adjusting? _____
    2. What technique did you use? _____
    3. Patient position in which you adjusted?
        Seated ☐
        Supine ☐
        Side lying ☐
        Prone ☐

19. Year of practice in which injury occurred? (or 1st occurred if repetitious / chronic injury)

Pre-practice (as a student)	☐	16 – 20 years	☐
1 – 5 years	☐	21 – 30 years	☐
6 – 10 years	☐	31 years +	☐
11 – 15 years	☐		

20. How much time were you away from work due to this injury

None	☐	1 month	☐
½ a day	☐	1 – 6 months	☐
1 day	☐	More than 6 months	☐
1 week	☐	Permanent disability	☐

21. Did you change your adjusting technique(s) as a result of the injury?
    a. Yes ☐
        i. If YES, what did you change? _____
    b. No ☐
    c. What other changes, if any, did you make to your practice as a result of this injury (be specific)

_____

Thank you for your time

Kind regards

APPENDIX L

PILOT TEST EVALUATION FORM

1 What is your opinion of the subject presented in this questionnaire? (Please mark the most appropriate box)

- 1.1Extremely 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 ☐
- 6.4The questions will not be understood by lay person ☐
- 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 M

INFORMED CONSENT –PILOT STUDY

INFORMED CONSENT

Statement of Agreement to Participate in the Research Study:

I hereby confirm that I have been informed by the researcher, Almay Lamprecht about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: IREC 055/16.

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant

Date and Time

Tick box for informed consent ☐

I, Almay Lamprecht herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

APPENDIX N

CONDIFENTIALITY STATEMENT-PILOT STUDY

IMPORTANT NOTICE:

THIS FORM IS TO BE READ AND FILLED IN BY EVERY MEMBER PARTICIPATING IN THE FOCUS GROUP, BEFORE THE PILOT STUDY COMMENCES

CONFIDENTIALITY STATEMENT – PILOT STUDY

DECLARATION

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.

Once this form has been read and agreed to, please fill in the appropriate information below and sign to acknowledge agreement.

Please complete pilot study member:

Name and surname	Signature

APPENDIX O

CODE OF CONDUCT

This form needs to be completed by every member of the pilot study prior to the commencement of the pilot study

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 pilot study 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. None of the information shall be communicated to any other individual or organisation outside of this specific pilot testing as to the decisions of this pilot study.

3. The information from this pilot study will be made public in terms of a journal publication, which will in no way identify any participants of this research.

Member represents	**Name**	**Signature**	**Contact details**

APPENDIX P

INFORMED CONSENT- PILOT STUDY HARD COPY

Statement of Agreement to Participate in the Research Study:

I hereby confirm that I have been informed by the researcher, _____ (name of researcher), about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,

I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.

I may, at any stage, without prejudice, withdraw my consent and participation in the study.

I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____ _____ _____

Full Name of Participant **Date and Time** **Signature / Right Thumbprint**

I, _____ (name of researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____ _____ _____

Full Name of Researcher **Date** **Signature**

_____ _____ _____

Full Name of Witness (If applicable) **Date** **Signature**

_____ _____ _____

Full Name of Legal Guardian (If applicable) **Date** **Signature**

Full Name of Researcher **Date** **Signature**

APPENDIX Q

STATISTICAL RAW DATA

Age in years

Age in years					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10	1	1.6	1.6	1.6
	25	1	1.6	1.6	3.3
	26	3	4.9	4.9	8.2
	27	7	11.5	11.5	19.7
	28	2	3.3	3.3	23.0
	29	2	3.3	3.3	26.2
	30	3	4.9	4.9	31.1
	31	5	8.2	8.2	39.3
	32	1	1.6	1.6	41.0
	33	1	1.6	1.6	42.6
	35	1	1.6	1.6	44.3
	36	3	4.9	4.9	49.2
	37	4	6.6	6.6	55.7
	38	3	4.9	4.9	60.7
	39	3	4.9	4.9	65.6
	40	3	4.9	4.9	70.5
	41	4	6.6	6.6	70
	42	6	9.8	9.8	86.9
	43	1	1.6	1.6	88.5
	44	2	3.3	3.3	91.8
	46	3	4.9	4.9	96.7
	48	1	1.6	1.6	98.4
	69	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Race

Race					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	African	1	1.6	1.6	1.6
	Indian	13	21.3	21.3	23.0
	White	47	70	70	100.0
	Total	61	100.0	100.0	

Height in metres

Height in metres					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.53	1	1.6	1.6	1.6
	1.54	3	4.9	4.9	6.6
	1.56	2	3.3	3.3	9.8
	1.57	1	1.6	1.6	11.5
	1.58	2	3.3	3.3	14.8
	1.59	1	1.6	1.6	16.4
	1.60	2	3.3	3.3	19.7
	1.61	1	1.6	1.6	21.3
	1.62	3	4.9	4.9	26.2
	1.63	1	1.6	1.6	29
	1.64	1	1.6	1.6	29.5
	1.67	3	4.9	4.9	34.4
	1.68	4	6.6	6.6	41.0
	1.69	1	1.6	1.6	42.6
	1.70	4	6.6	6.6	49.2
	1.71	2	3.3	3.3	52.5
	1.72	3	4.9	4.9	54
	1.73	1	1.6	1.6	59.0
	1.74	1	1.6	1.6	60.7
	1.75	4	6.6	6.6	62
	1.76	1	1.6	1.6	68.9
	1.78	2	3.3	3.3	72.1
	1.79	2	3.3	3.3	75.4
	1.80	1	1.6	1.6	70
	1.81	1	1.6	1.6	78.7
	1.82	1	1.6	1.6	80.3
	1.83	3	4.9	4.9	85.2
	1.85	1	1.6	1.6	86.9
	1.86	1	1.6	1.6	88.5
	1.87	2	3.3	3.3	91.8
	1.88	1	1.6	1.6	93.4
	1.90	1	1.6	1.6	95.1
	1.92	1	1.6	1.6	96.7
	1.95	2	3.3	3.3	100.0
	Total	61	100.0	100.0	

Weight in killogrammes

Weight in kilogrammes					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	48.0	1	1.6	1.6	1.6
	50.0	1	1.6	1.6	3.3
	51.0	1	1.6	1.6	4.9
	53.0	3	4.9	4.9	9.8
	55.0	1	1.6	1.6	11.5
	56.0	2	3.3	3.3	14.8
	50	1	1.6	1.6	16.4
	60.0	3	4.9	4.9	21.3
	61.0	1	1.6	1.6	23.0
	62.0	2	3.3	3.3	26.2
	62.6	1	1.6	1.6	29
	64.0	2	3.3	3.3	31.1
	65.0	1	1.6	1.6	32.8
	66.0	2	3.3	3.3	36.1
	60	3	4.9	4.9	41.0
	68.0	3	4.9	4.9	45.9
	69.0	1	1.6	1.6	45
	70.0	4	6.6	6.6	54.1
	72.0	2	3.3	3.3	54
	73.0	1	1.6	1.6	59.0
	75.0	5	8.2	8.2	62
	78.1	1	1.6	1.6	68.9
	80.0	1	1.6	1.6	70.5
	81.0	1	1.6	1.6	72.1
	82.0	2	3.3	3.3	75.4
	85.0	2	3.3	3.3	78.7
	88.0	2	3.3	3.3	82.0
	89.0	1	1.6	1.6	83.6
	90.0	1	1.6	1.6	85.2
	91.0	1	1.6	1.6	86.9
	92.0	1	1.6	1.6	88.5
	95.0	2	3.3	3.3	91.8
	100.0	2	3.3	3.3	95.1
	101.0	1	1.6	1.6	96.7
	103.0	1	1.6	1.6	98.4
	105.0	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Time in practice

Time in practice (please specify number of years)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.75	3	4.9	4.9	4.9
	1.00	6	9.8	9.8	14.8
	1.50	1	1.6	1.6	16.4
	2.00	5	8.2	8.2	24.6
	3.00	5	8.2	8.2	32.8
	4.00	3	4.9	4.9	37
	5.00	2	3.3	3.3	41.0
	6.00	1	1.6	1.6	42.6
	00	1	1.6	1.6	44.3
	8.00	4	6.6	6.6	50.8
	9.00	3	4.9	4.9	55.7
	10.00	2	3.3	3.3	59.0
	11.00	1	1.6	1.6	60.7
	12.00	1	1.6	1.6	62.3
	13.00	3	4.9	4.9	62
	14.00	4	6.6	6.6	73.8
	15.00	2	3.3	3.3	70
	16.00	2	3.3	3.3	80.3
	100	3	4.9	4.9	85.2
	18.00	1	1.6	1.6	86.9
	19.00	4	6.6	6.6	93.4
	20.00	2	3.3	3.3	96.7
	22.00	1	1.6	1.6	98.4
	40.00	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Average number of patients seen per working day

The average number of patients seen per working day?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	8.2	8.2	8.2
	2	3	4.9	4.9	13.1
	3	4	6.6	6.6	19.7
	4	5	8.2	8.2	29
	5	7	11.5	11.5	39.3
	6	6	9.8	9.8	49.2
	7	2	3.3	3.3	52.5
	8	10	16.4	16.4	68.9
	9	1	1.6	1.6	70.5
	10	6	9.8	9.8	80.3
	12	3	4.9	4.9	85.2
	13	1	1.6	1.6	86.9
	15	2	3.3	3.3	90.2
	17	1	1.6	1.6	91.8
	20	5	8.2	8.2	100.0
	Total	61	100.0	100.0	

Average number of hours spent in clinical practice per week (hands on work)

Average number of hours spent in clinical practice per week (hands on work)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.0	3	4.9	4.9	4.9
	3.0	4	6.6	6.6	11.5
	4.0	3	4.9	4.9	16.4
	5.0	1	1.6	1.6	18.0
	6.0	2	3.3	3.3	21.3
	0	1	1.6	1.6	23.0
	8.0	2	3.3	3.3	26.2
	10.0	2	3.3	3.3	29.5
	13.0	1	1.6	1.6	31.1
	15.0	2	3.3	3.3	34.4
	18.0	2	3.3	3.3	37
	20.0	4	6.6	6.6	44.3
	23.0	1	1.6	1.6	45.9
	24.0	2	3.3	3.3	49.2
	25.0	3	4.9	4.9	54.1
	30.0	5	8.2	8.2	62.3
	31.0	1	1.6	1.6	63.9
	32.0	2	3.3	3.3	62
	32.5	1	1.6	1.6	68.9
	33.0	1	1.6	1.6	70.5
	35.0	2	3.3	3.3	73.8
	36.0	4	6.6	6.6	80.3
	40.0	9	14.8	14.8	95.1
	42.0	1	1.6	1.6	96.7
	45.0	1	1.6	1.6	98.4
	50.0	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Chiropractic technique used on a daily basis- Activator

Activator					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	1	1.6	1.9	1.9
	Often	2	3.3	3.7	5.6
	Seldom	16	26.2	29.6	35.2
	Never	35	54	64.8	100.0
	Total	54	88.5	100.0	
Missing	System	7	11.5		
Total		61	100.0		

Chiropractic technique used on a daily basis-Diversified

Diversified					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	40	65.6	66.7	66.7
	Regular	16	26.2	26.7	93.3
	Seldom	2	3.3	3.3	96.7
	Never	2	3.3	3.3	100.0
	Total	60	98.4	100.0	
Missing	System	1	1.6		
Total		61	100.0		

Chiropractic technique used on a daily basis- Gonstead

Gonstead technique					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	1	1.6	1.9	1.9
	Regular	2	3.3	3.7	5.6
	Often	2	3.3	3.7	9.3
	Seldom	15	24.6	28	30
	Never	34	55.7	63.0	100.0
	Total	54	88.5	100.0	
Missing	System	7	11.5		
Total		61	100.0		

Chiropractic technique used on a daily basis- NIP

NIP					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	4	6.6	3	3
	Regular	2	3.3	3.6	10.9
	Often	1	1.6	1.8	12.7
	Seldom	3	4.9	5.5	18.2
	Never	45	73.8	81.8	100.0
	Total	55	90.2	100.0	
Missing	System	6	9.8		
Total		61	100.0		

Chiropractic technique used on a daily basis-SOT

SOT					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Often	4	6.6	5	5
	Seldom	8	13.1	15.1	22.6
	Never	41	62	74	100.0
	Total	53	86.9	100.0	
Missing	System	8	13.1		
Total		61	100.0		

Chiropractic technique used on a daily basis- Thompson Technique

Thompson technique					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular	3	4.9	5.7	5.7
	Often	7	11.5	13.2	18.9
	Seldom	6	9.8	11.3	30.2
	Never	37	60.7	69.8	100.0
	Total	53	86.9	100.0	
Missing	System	8	13.1		
Total		61	100.0		

Chiropractic technique used on a daily basis- Other

Other					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	3.3	3.3	3.3
	n/a	58	95.1	96.7	100.0
	Total	60	98.4	100.0	
Missing	System	1	1.6		
Total		61	100.0		

Chiropractic technique used on a daily basis- if other, please specify

Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		59	96.7	96.7	96.7
	CBP	1	1.6	1.6	98.4
	leander traction (seldom)	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Non-manipulative technique used on a daily basis- Dry needling/ acupressure

Dry needling/ acupressure					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	11	18.0	18.0	18.0
	Regular	35	54	54	75.4
	Often	9	14.8	14.8	90.2
	Seldom	5	8.2	8.2	98.4
	Never	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Non-manipulative technique used on a daily basis-Electro-modailities

Electro-modalities					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	2	3.3	3.4	3.4
	Regular	15	24.6	25.4	28.8
	Often	11	18.0	18.6	45
	Seldom	15	24.6	25.4	72.9
	Never	16	26.2	21	100.0
	Total	59	96.7	100.0	
Missing	System	2	3.3		
Total		61	100.0		

Non-manipulative technique used on a daily basis- Ice/ heat packs

Ice/ heat packs					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	3	4.9	5.3	5.3
	Regular	10	16.4	15	22.8
	Often	6	9.8	10.5	33.3
	Seldom	21	34.4	36.8	70.2
	Never	17	29	29.8	100.0
	Total	57	93.4	100.0	
Missing	System	4	6.6		
Total		61	100.0		

Non-manipulative technique used on a daily basis- Massage therapy

Massage therapy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	14	23.0	23.3	23.3
	Regular	23	37	38.3	61.7
	Often	11	18.0	18.3	80.0
	Seldom	8	13.1	13.3	93.3
	Never	4	6.6	6.7	100.0
	Total	60	98.4	100.0	
Missing	System	1	1.6		
Total		61	100.0		

Non-manipulative technique used on a daily basis- None

None					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular	2	3.3	4.2	4.2
	Often	1	1.6	2.1	6.3
	Seldom	13	21.3	21	33.3
	Never	32	52.5	66.7	100.0
	Total	48	78.7	100.0	
Missing	System	13	21.3		
Total		61	100.0		

Non-manipulative technique used on a daily basis- Strapping

Strapping					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular	12	19.7	19.7	19.7
	Often	20	32.8	32.8	52.5
	Seldom	25	41.0	41.0	93.4
	Never	4	6.6	6.6	100.0
	Total	61	100.0	100.0	

Non-manipulative technique used on a daily basis- Stretching

Stretching					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Every patient	11	18.0	18.0	18.0
	Regular	18	29.5	29.5	45
	Often	22	36.1	36.1	83.6
	Seldom	10	16.4	16.4	100.0
	Total	61	100.0	100.0	

Non-manipulative technique used on a daily basis- Other

Other					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	7	11.5	12.1	12.1
	n/a	51	83.6	89	100.0
	Total	58	95.1	100.0	
Missing	System	3	4.9		
Total		61	100.0		

Non-manipulative technique used on a daily basis- if other, please specify

Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		54	88.5	88.5	88.5
	active release, ischemic compression	1	1.6	1.6	90.2
	graston (occasionally), ST manip (often), MET (often)	1	1.6	1.6	91.8
	home exercise	1	1.6	1.6	93.4
	ischemic compression (every px)	1	1.6	1.6	95.1
	neutral mobs, flexion distraction, Mckenzie	1	1.6	1.6	96.7
	rehab	1	1.6	1.6	98.4
	vibration therapy	1	1.6	1.6	100.0
	Total	61	100.0	100.0	

Prevalence of work-related musculoskeletal injuries in Chiropractors practicing in the eThekwini municipality

Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	42	68.9	71.2	71.2
	No	17	29	28.8	100.0
	Total	59	96.7	100.0	
Missing	System	2	3.3		
Total		61	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Body part affected

Neck					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Shoulder					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	19.0	100.0	100.0
Missing	System	34	81.0		
Total		42	100.0		

Elbow					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Wrist/ hand					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	18	42.9	100.0	100.0
Missing	System	24	51		
Total		42	100.0		

Upper back					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Lower back					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	14	33.3	100.0	100.0
Missing	System	28	66.7		
Total		42	100.0		

Hip/thigh					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Type of injury

Ligaments sprain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	15	35.7	100.0	100.0
Missing	System	27	64.3		
Total		42	100.0		

Ligament tear					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	1	100.0	100.0
Missing	System	39	92.9		
Total		42	100.0		

Muscle strain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	38.1	100.0	100.0
Missing	System	26	61.9		
Total		42	100.0		

Synovitis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Tendinitis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	19.0	100.0	100.0
Missing	System	34	81.0		
Total		42	100.0		

Neuropathy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	4.8	100.0	100.0
Missing	System	40	95.2		
Total		42	100.0		

Vertebral disc					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	11.9	100.0	100.0
Missing	System	37	88.1		
Total		42	100.0		

Other					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	4	9.5	100.0	100.0
Missing	System	38	90.5		
Total		42	100.0		

If other- please specify – Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		38	90.5	90.5	90.5
	C/T joint sprain	1	2.4	2.4	92.9
	carpal capsule tear with tenosynovitis	1	2.4	2.4	95.2
	facet sx + SI sx	1	2.4	2.4	96
	MLBP	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Cause of injury

Was this injury a result of …					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A one-time episode	7	16.7	11	11
	Cumulative trauma	17	40.5	41.5	58.5
	Initial episode at work with subsequent flare ups	6	14.3	14.6	73.2
	Initial episode outside work with subsequent flare ups	11	26.2	26.8	100.0
	Total	41	96	100.0	
Missing	System	1	2.4		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Initial episode outside work with subsequent flare ups – please specify how injury occurred

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		35	83.3	83.3	83.3
	lifelong LBP due to scoliosis + muscle imbalance	1	2.4	2.4	85.7
	mountain biking accident	1	2.4	2.4	88.1
	overuse injury	1	2.4	2.4	90.5
	pole fitness	1	2.4	2.4	92.9
	skiing accident	1	2.4	2.4	95.2
	sports injury	1	2.4	2.4	96
	Initial episode at work with subsequent flare ups	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Reason 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		41	96	96	96
	strain of anterior deltoid	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury –Activity performing that caused injury/ aggravated existing injury

Activity you were performing that caused your injury/ aggravated existing injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Positioning for manipulation	3	1	3	3
	Performing manipulation	21	50.0	51.2	58.5
	Other	5	11.9	12.2	70.7
	Applying modality	4	9.5	9.8	80.5
	Maintaining prolonged position	4	9.5	9.8	90.2
	Don't recall	4	9.5	9.8	100.0
	Total	41	96	100.0	
Missing	System	1	2.4		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – If Other – please specify:

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		35	83.3	83.3	83.3
	demonstrating manipulative procedure in class	1	2.4	2.4	85.7
	gym activity	1	2.4	2.4	88.1
	ischemic compression	1	2.4	2.4	90.5
	locum for year in different practices-poor ergonomics	1	2.4	2.4	92.9
	massage	1	2.4	2.4	95.2
	Maintaining prolonged position	1	2.4	2.4	96
	Other	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Reason 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		40	95.2	95.2	95.2
	massage and ischemic compression	1	2.4	2.4	96
	moving patient	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury –If injury occurred during manipulation: Area adjusted

Cervical spine					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	1	100.0	100.0
Missing	System	39	92.9		
Total		42	100.0		

Thoracic spine					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Lumbar spine					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	16	38.1	100.0	100.0
Missing	System	26	61.9		
Total		42	100.0		

Sacroiliac joint					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	7	16.7	100.0	100.0
Missing	System	35	83.3		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury –Technique used when injured:

What technique did you use?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		20	46	46	46
	diversified	9	21.4	21.4	69.0
	fist transverse	1	2.4	2.4	71.4
	lumbar roll	10	23.8	23.8	95.2
	PA lateral	1	2.4	2.4	96
	version resembling techniquee taught at tech	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Patient position in which adjustment was performed

Seated					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	11.9	100.0	100.0
Missing	System	37	88.1		
Total		42	100.0		

Supine					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	11.9	100.0	100.0
Missing	System	37	88.1		
Total		42	100.0		

Side lying					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	18	42.9	100.0	100.0
Missing	System	24	51		
Total		42	100.0		

Prone					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	4.8	100.0	100.0
Missing	System	40	95.2		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury –Year of practice in which injury occurred:

Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pre-practice	6	14.3	14.6	14.6
	1 - 5	19	45.2	46.3	61.0
	6 - 10	10	23.8	24.4	85.4
	11 - 15	2	4.8	4.9	90.2
	16 - 20	3	1	3	96
	21 - 25	1	2.4	2.4	100.0
	Total	41	96	100.0	
Missing	System	1	2.4		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – How much time were you away from work due to injury:

How much time were you away from work due to this injury to date?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	29	69.0	70.7	70.7
	Half day	2	4.8	4.9	75.6
	One day	1	2.4	2.4	78.0
	One week	2	4.8	4.9	82.9
	One month	2	4.8	4.9	88
	1 - 6 months	1	2.4	2.4	90.2
	> 6 months	1	2.4	2.4	92.7
	Still suffering with this injury	3	1	3	100.0
	Total	41	96	100.0	
Missing	System	1	2.4		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Still suffering – please specify:

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		39	92.9	92.9	92.9
	continual niggle	1	2.4	2.4	95.2
	don't stay off work	1	2.4	2.4	96
	intermittent wrist pain after working long days	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Reason 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		40	95.2	95.2	95.2
	but needs monitering + treatment	1	2.4	2.4	96
	intermittent periods of aggravation	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Did you change your adjusting technique as results of injury:

Did you change your adjusting technique(s) as a result of the injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	13	31.0	32.5	32.5
	No	27	64.3	65	100.0
	Total	40	95.2	100.0	
Missing	System	2	4.8		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury - If yes- specify:

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		30	71.4	71.4	71.4
	changed vector and practitioner position to minimise strain on shoulder	1	2.4	2.4	73.8
	angle/ locking/ body weight	1	2.4	2.4	76.2
	body position and angle of drive	1	2.4	2.4	78.6
	decreased arm force	1	2.4	2.4	81.0
	don't adjust heavy px	1	2.4	2.4	83.3
	less wrist extension	1	2.4	2.4	85.7
	modified hand position	1	2.4	2.4	88.1
	Positioning of hand and strapped hand before every adjustment	1	2.4	2.4	90.5
	posture and muscle activation patterns	1	2.4	2.4	92.9
	posture and positioning	1	2.4	2.4	95.2
	refine technique to use less force	1	2.4	2.4	96
	use drop piece adjusting while in aggravated periods	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Reason 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		40	95.2	95.2	95.2
	angle/ vector applied	1	2.4	2.4	96
	increased body	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – What other changes, if any, did you make:

What other changes, if any, did you make to your practice as a result of this injury ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		21	50.0	50.0	50.0
	n/a	5	11.9	11.9	61.9
	Ask patient to move themselves where possible, and try not to assist them by lifting them. I use drops on very heavy/large patients as the Roll is usually unattainable anyway.	1	2.4	2.4	64.3
	better chair for desk, ice disc while working, orthotics in closed shoes	1	2.4	2.4	66.7
	better low back strengthening	1	2.4	2.4	69.0
	Change bed height + created steps to increase height, learnt new techniques	1	2.4	2.4	71.4
	changed manipulative procedure	1	2.4	2.4	73.8
	decreased patient numbers	1	2.4	2.4	76.2
	less soft tissue massage/ ischemic compression, more needling	1	2.4	2.4	78.6
	less soft tissue therapy, dry needle more	1	2.4	2.4	81.0
	none	3	1	1	88.1
	px mvt	1	2.4	2.4	90.5
	stopped locuming, set up own practice with appropriate height bed + equipment that was more comfor for me	1	2.4	2.4	92.9
	stopped using fingers to apply ischemic compression to TPs	1	2.4	2.4	95.2
	Treated the injury then strengthened the area to prevent reoccurrence	1	2.4	2.4	96
	try sit and treat ST	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Do you have income protection:

Do you have Income Protection?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	28	66.7	70.0	70.0
	No	12	28.6	30.0	100.0
	Total	40	95.2	100.0	
Missing	System	2	4.8		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Did you claim for injury:

Did you claim for this injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	1	9	9
	No	35	83.3	92.1	100.0
	Total	38	90.5	100.0	
Missing	System	4	9.5		
Total		42	100.0		

Work related musculoskeletal injuries: SINGLE MOST SEVERE work related musculoskeletal injury – Was claim successful:

Did your claim pay out?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	1	16	16
	No	14	33.3	82.4	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury – Body part affected

What body part was affected?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neck	3	1	9.7	9.7
	Shoulder	3	1	9.7	19.4
	Elbow	2	4.8	6.5	25.8
	Wrist/ hand/fingers	8	19.0	25.8	51.6
	Knee	2	4.8	6.5	58.1
	Upper back	2	4.8	6.5	64.5
	Lower back	8	19.0	25.8	90.3
	Hip/thigh	2	4.8	6.5	96.8
	Ankle/ foot	1	2.4	3.2	100.0
	Total	31	73.8	100.0	
Missing	System	11	26.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury – Type of injury

Ligaments sprain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	7	16.7	100.0	100.0
Missing	System	35	83.3		
Total		42	100.0		

Ligament tear					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Muscle strain					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	7	16.7	100.0	100.0
Missing	System	35	83.3		
Total		42	100.0		

Synovitis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	3	1	100.0	100.0
Missing	System	39	92.9		
Total		42	100.0		

Tendinitis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	11.9	100.0	100.0
Missing	System	37	88.1		
Total		42	100.0		

Fracture					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	4.8	100.0	100.0
Missing	System	40	95.2		
Total		42	100.0		

Neuropathy					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	100.0	100.0
Missing	System	41	96		
Total		42	100.0		

Other					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	10	23.8	100.0	100.0
Missing	System	32	76.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury – If other- please specify:

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		32	76.2	76.2	76.2
	C/s subluxation	1	2.4	2.4	78.6
	facet joint sprain	1	2.4	2.4	81.0
	facet syndrome	2	4.8	4.8	85.7
	osteoarthritic changes to joints in fingers	1	2.4	2.4	88.1
	overuse	1	2.4	2.4	90.5
	repeated SI dysfunction	1	2.4	2.4	92.9
	SI injury	1	2.4	2.4	95.2
	SI syndrome	1	2.4	2.4	96
	tendinosis	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Reason 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		41	96	96	96
	sciatic nerve dural tension	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury - Cause of injury:

Was this injury a result of?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A one- time episode	9	21.4	29.0	29.0

	Cumulative trauma	15	35.7	48.4	74
	Initial episode at work with subsequent flare ups	2	4.8	6.5	83.9
	Initial episode outside work with subsequent flare ups	5	11.9	16.1	100.0
	Total	31	73.8	100.0	
Missing	System	11	26.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Initial episode outside of work with subsequent flare ups – please specify:

Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		40	95.2	95.2	95.2
	ballet dancing	1	2.4	2.4	96
	likely repetitive overuse as result of training	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Activity performed when injury occurred:

Activity you were performing that caused your injury/ aggravated existing injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Demonstrating exercise	2	4.8	6.5	6.5
	Positioning for manipulation	5	11.9	16.1	22.6
	Performing manipulation	6	14.3	19.4	41.9
	Other	2	4.8	6.5	48.4
	Applying modality	4	9.5	12.9	61.3
	Maintaining prolonged position	5	11.9	16.1	74
	Don't recall	5	11.9	16.1	93.5
	Positioning for manipulation + Performing manipulation	1	2.4	3.2	96.8
	Positioning for manipulation + Performing manipulation + Maintaining prolonged position	1	2.4	3.2	100.0
	Total	31	73.8	100.0	
Missing	System	11	26.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –If other- please specify:

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		29	69.0	69.0	69.0

	Don't recall	11	26.2	26.2	95.2
	Using hands	1	2.4	2.4	96
	Volume of work	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Area adjusted when injury occurred:

What area were you adjusting?(a)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Thoracic spine	3	1	23.1	23.1
	Lumbar spine	8	19.0	61.5	84.6
	Sacroiliac joint	2	4.8	15.4	100.0
	Total	13	31.0	100.0	
Missing	System	29	69.0		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Technique used when injury occurred:

What technique did you use?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		28	66.7	66.7	66.7
	AP supine	1	2.4	2.4	69.0
	diversified	6	14.3	14.3	83.3
	Diversified	1	2.4	2.4	85.7
	diversified lumbar roll	1	2.4	2.4	88.1
	lumbar roll	4	9.5	9.5	96
	Standing SI	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Patient position in which adjusted:

Patient position in which you adjusted?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Supine	3	1	21.4	21.4

	Side lying	8	19.0	51	78.6
	Prone	3	1	21.4	100.0
	Total	14	33.3	100.0	
Missing	System	28	66.7		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Year of practice when injury occurred:

Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pre-practice	4	9.5	12.9	12.9
	1 - 5	12	28.6	38.7	51.6
	6 - 10	7	16.7	22.6	74.2
	11 - 15	4	9.5	12.9	81
	16 - 20	3	1	9.7	96.8
	26 - 30	1	2.4	3.2	100.0
	Total	31	73.8	100.0	
Missing	System	11	26.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –How much time were you away from work due to injury:

How much time were you away from work due to this injury to date?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	25	59.5	80.6	80.6
	Half day	1	2.4	3.2	83.9
	One day	1	2.4	3.2	81
	One month	2	4.8	6.5	93.5
	Still suffering with this injury	2	4.8	6.5	100.0
	Total	31	73.8	100.0	
Missing	System	11	26.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –If still suffering – please specify:

Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		40	95.2	95.2	95.2

	Chronic problem with flare ups	1	2.4	2.4	96
	still working	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Change adjusting technique as result of injury:

Did you change your adjusting technique(s) as a result of the injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	19.0	26.7	26.7
	No	22	52.4	73.3	100.0
	Total	30	71.4	100.0	
Missing	System	12	28.6		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –If yes – please specify:

Reason 1					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		34	81.0	81.0	81.0
	changed to fist transverse	1	2.4	2.4	83.3
	decreased wrist extension	1	2.4	2.4	85.7
	increased height	1	2.4	2.4	88.1
	less low back flexion of Dr	1	2.4	2.4	90.5
	new position for adjustment	1	2.4	2.4	92.9
	use palp and not knuckles	1	2.4	2.4	95.2
	usilise different contacts as well as other fingers	1	2.4	2.4	96
	utilised non-dominant hand whenever possible	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Reason 2					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		40	95.2	95.2	95.2
	stand on step	1	2.4	2.4	96
	less strain on knee+ back	1	2.4	2.4	100.0

	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Any other changes made:

What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		25	59.5	59.5	59.5
	n/a	2	4.8	4.8	64.3
	Again, ask the patients to move their own body weight where possible. Not adjust large patients in roll position, use drops instead.	1	2.4	2.4	66.7
	don't take more than 12-15 patients per day	1	2.4	2.4	69.0
	I stopped doing soft tissue work	1	2.4	2.4	71.4
	less soft tissue therapy to reduce time bent over	1	2.4	2.4	73.8
	more sitting and less standing	1	2.4	2.4	76.2
	none	3	1	1	83.3
	reduced patient numbers for few days, early holiday	1	2.4	2.4	85.7
	sat down on gym ball while doing soft tisse	1	2.4	2.4	88.1
	Stand on platform for som work	1	2.4	2.4	90.5
	standing with better posture, raising tx bed	1	2.4	2.4	92.9
	Starting instructing my patients (especially my heavier patients) in how to get into the correct position themselves in order to save myself from having to physically put them into the correct position.	1	2.4	2.4	95.2
	strenghten shoulder	1	2.4	2.4	96
	stretch, get maintenance tx	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Do you have income protection:

Do you have Income Protection?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	52.4	71.0	71.0

	No	9	21.4	29.0	100.0
	Total	31	73.8	100.0	
Missing	System	11	26.2		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Did you claim for this injury:

Did you claim for this injury ?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	4.8	6.7	6.7
	No	28	66.7	93.3	100.0
	Total	30	71.4	100.0	
Missing	System	12	28.6		
Total		42	100.0		

Work related musculoskeletal injuries: SECOND MOST SEVERE work related musculoskeletal injury –Did your claim pay out:

Did your claim pay out?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	2	4.8	15.4	15.4
	No	10	23.8	76.9	92.3
	n/a	1	2.4	7	100.0
	Total	13	31.0	100.0	
Missing	System	29	69.0		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Body part affected:

What body part was affected?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neck	2	4.8	11.8	11.8

	Shoulder	3	1	16	29.4
	Wrist/ hand/fingers	3	1	16	41
	Knee	1	2.4	5.9	52.9
	Upper back	1	2.4	5.9	58.8
	Lower back	4	9.5	23.5	82.4
	Hip/thigh	1	2.4	5.9	88.2
	Chest/ribs	2	4.8	11.8	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Type of injury:

What type of injury was it?(a)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ligaments sprain	8	19.0	50.0	50.0
	Muscle strain	5	11.9	31.3	81.3
	Tendinitis	2	4.8	12.5	93.8
	Other	1	2.4	6.3	100.0
	Total	16	38.1	100.0	
Missing	System	26	61.9		
Total		42	100.0		

What type of injury was it?(b)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ligament tear	1	2.4	33.3	33.3
	Muscle strain	1	2.4	33.3	66.7
	Tendinitis	1	2.4	33.3	100.0
	Total	3	1	100.0	
Missing	System	39	92.9		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –If other – please specify:

Reason				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid		41	96	96	96
	Patella femoral pain syndrome	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Cause of injury:

Was this injury a result of?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A one-time episode	5	11.9	29.4	29.4
	Cumulative trauma	7	16.7	41.2	70.6
	Initial episode at work with subsequent flare ups	2	4.8	11.8	82.4
	Initial episode outside work with subsequent flare ups	3	1	16	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Initial episode outside work with subsequent flare ups – please specify:

Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		41	96	96	96
	rugby injury	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Activity performed that caused injury/ aggravated existing injury:

Activity you were performing that caused your injury/ aggravated existing injury?				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Demonstrating exercise	1	2.4	5.9	5.9
	Positioning for manipulation	1	2.4	5.9	11.8
	Performing manipulation	7	16.7	41.2	52.9
	Other	2	4.8	11.8	64.7
	Maintaining prolonged position	4	9.5	23.5	88.2
	Don't recall	2	4.8	11.8	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –If other- please specify:

Reason					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		41	96	96	96
	massage	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –If injury occurred while manipulating – area adjusted:

What area were you adjusting?(a)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cervical spine	1	2.4	12.5	12.5
	Thoracic spine	2	4.8	25.0	35
	Lumbar spine	4	9.5	50.0	85
	Sacroiliac joint	1	2.4	12.5	100.0
	Total	8	19.0	100.0	
Missing	System	34	81.0		
Total		42	100.0		

What area were you adjusting?(b)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lumbar spine	2	4.8	66.7	66.7
	Sacroiliac joint	1	2.4	33.3	100.0

	Total	3	1	100.0	
Missing	System	39	92.9		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Technique used:

What technique did you use?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		36	85.7	85.7	85.7
	AP thumb	1	2.4	2.4	88.1
	diversified	4	9.5	9.5	96
	lumbar roll	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Patient position in which adjusted:

Patient position in which you adjusted?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Supine	1	2.4	12.5	12.5
	Side lying	6	14.3	75.0	85
	Prone	1	2.4	12.5	100.0
	Total	8	19.0	100.0	
Missing	System	34	81.0		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Year in practice in which injury occurred:

Year of practice in which injury occurred (or 1st occurred if repetitious / chronic injury)				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Pre-practice	3	1	16	16
	1 - 5	6	14.3	35.3	52.9
	6 - 10	3	1	16	70.6
	11 - 15	1	2.4	5.9	76.5
	16 - 20	3	1	16	94.1
	26 = 30	1	2.4	5.9	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –How much time were you away from work due to injury:

How much time were you away from work due to this injury to date?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	16	38.1	94.1	94.1
	One day	1	2.4	5.9	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Changes made to adjusting technique as result of injury:

Did you change your adjusting technique(s) as a result of the injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	8	19.0	41	41
	No	9	21.4	52.9	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury – If yes – please specify:

Reason				
	Frequency	Percent	Valid	Cumulative

				Percent	Percent
Valid		37	88.1	88.1	88.1
	avoided contact with injured finger, used opposite hand when possible	1	2.4	2.4	90.5
	couldn't perform adjustment until injury healed	1	2.4	2.4	92.9
	less bending	1	2.4	2.4	95.2
	placed px in more compromising position that has less strain on shoulder	1	2.4	2.4	96
	use different technique	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Any other changes made:

What other changes, if any, did you make to your practice as a result of this injury (be specific e.g. environmental/ treatment technique etc.)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		34	81.0	81.0	81.0
	n/a	1	2.4	2.4	83.3
	avoided use of injured hand and finger	1	2.4	2.4	85.7
	none	1	2.4	2.4	88.1
	Platform to stand on Core strengthening + maintaining strong core+ worked on flexibility of hamstrings, QLs, gluts and lats	1	2.4	2.4	90.5
	sit down whenever possible during tx or change body position	1	2.4	2.4	92.9
	standing with better posture, raising tx bed	1	2.4	2.4	95.2
	strengthen core	1	2.4	2.4	96
	try not to lift px	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Do you have income protection:

Do you have Income Protection?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	13	31.0	76.5	76.5
	No	4	9.5	23.5	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Did you claim for this injury:

Did you claim for this injury?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	5.9	5.9
	No	16	38.1	94.1	100.0
	Total	17	40.5	100.0	
Missing	System	25	59.5		
Total		42	100.0		

Work related musculoskeletal injuries: THIRD MOST SEVERE work related musculoskeletal injury –Did your claim pay out:

Did your claim pay out?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	2.4	11.1	11.1
	No	7	16.7	78	88.9
	n/a	1	2.4	11.1	100.0
	Total	9	21.4	100.0	
Missing	System	33	78.6		
Total		42	100.0		

WRMSI vs Gender

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Gender	Male	Count	20	7	27
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	46%	41.2%	45.8%
	Female	Count	22	10	32
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	52.4%	58.8%	54.2%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests WRMSI vs Gender

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.202[a]	1	0.653	0.776	0.437	
Continuity Correction[b]	0.026	1	0.872			
Likelihood Ratio	0.203	1	0.652	0.776	0.437	
Fisher's Exact Test				0.776	0.437	
Linear-by-Linear Association	.199[c]	1	0.656	0.776	0.437	0.206
N of Valid Cases	59					

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 78.

b. Computed only for a 2x2

c. The standardized statistic is .446.

Directional Measures			
			Value
Nominal by Interval	Eta	Gender Dependent	0.059
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.059

WRMSI vs Age in years:

			Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Age in years	25-30	Count	12	6	18
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	28.80%	35.40%	30.60%
	31-35	Count	7	1	8
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	16.80%	5.90%	13.60%
	36-40	Count	8	7	15
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	19.20%	41.30%	26%
	41-45	Count	10	3	13
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	24%	170%	22.10%
	46-50	Count	4	0	4
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	9.60%	0%	6.80%
	51-55	Count	0	0	0
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	0%	0%	0%
	56-60	Count	0	0	0
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	0%	0%	0%
	61-65	Count	0	0	0
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	0%	0%	0%
	66-70	Count	1	0	1
		% within Have you experienced a WRMSI as a chiropractor/or prior injury aggravated by your profession?	2.40%	0%	1.70%
Total	Count		42	17	59
	% within Have you experienced a WRMSI		100%	100%	100%

Chi-Square Tests – WRMSI vs Age in years						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	16.097[a]	22	0.811	0.921		
Likelihood Ratio	19.169	22	0.635	0.944		
Fisher's Exact Test	16.158			0.923		
Linear-by-Linear Association	.382[b]	1	0.536	0.548	0.280	0.011
N of Valid Cases	59					
a. 46 cells (100.0%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is -.618.						

Directional Measures			
			Value
Nominal by Interval	Eta	Age in years Dependent	0.081
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.522

WRMSI vs Race:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Race	African	Count	1	0	1
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.4%	0.0%	1.7%
	Indian	Count	6	6	12
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	14.3%	35.3%	20.3%
	White	Count	35	11	46
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	83.3%	64.7%	78.0%
Total		Count	42	17	59
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests – WRMSI vs Race

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.569[a]	2	0.168	0.188		
Likelihood Ratio	3.613	2	0.164	0.188		
Fisher's Exact Test	3.485			0.188		
Linear-by-Linear Association	.785[b]	1	0.376	0.435	0.264	0.125
N of Valid Cases	59					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .29.

b. The standardized statistic is -.886.

Directional Measures			
			Value
Nominal by Interval	Eta	Race Dependent	0.116
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.246

WRMSI vs Height:

			% within Have you experienced a WRMSI		Total
			Yes	No	
Height in metres	1.5-1.59	Count	6	3	9
		% within Have you experienced a WRMSI	14.40%	170%	15.30%
	1.6-1.69	Count	11	5	16
		% within Have you experienced a WRMSI	26.40%	29.50%	220%
	1.7-1.79	Count	15	4	19
		% within Have you experienced a WRMSI	36.00%	23.60%	32.30%
	1.8-1.89	Count	7	4	11
		% within Have you experienced a WRMSI	16.80%	23.60%	18.70%
	1.9-1.99	Count	3	1	4
		% within Have you experienced a WRMSI	20%	5.90%	6.80%
Total		Count	42	17	59
		% within Have you experienced a WRMSI	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs height						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	33.811[a]	32	0.380	0.397		
Likelihood Ratio	41.037	32	0.131	0.436		
Fisher's Exact Test	30.575			0.459		
Linear-by-Linear Association	.360[b]	1	0.548	0.554	0.281	0.000
N of Valid Cases	59					
a. 66 cells (100.0%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is -.600.						

Directional Measures			
			Value
Nominal by Interval	Eta	Height in metres Dependent	0.079
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.757

WRMSI vs Weight:

			Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Weight in kilogrammes	41-50	Count	1	1	2
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.40%	5.90%	3.40%
	51-60	Count	6	4	10
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	14.40%	23.60%	100%
	61-70	Count	15	4	19
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	36%	23.60%	32.30%
	71-80	Count	8	2	10
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	19.20%	11.80%	100%
	81-90	Count	6	3	9
		% within Have you experienced WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	14.40%	170%	15.30%
	91-100	Count	3	3	6
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	20%	170%	10.20%
	101-110	Count	3	0	3
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	20%	0%	5.10%
Total		Count	42	17	59
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100%	100%	100%

Chi-Square Tests- WRMSI vs Weight						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	36.898[a]	34	0.336	0.310		
Likelihood Ratio	45.397	34	0.092	0.307		
Fisher's Exact Test	33.793			0.310		
Linear-by-Linear Association	.121[b]	1	0.728	0.731	0.368	0.002
N of Valid Cases	59					
a. 70 cells (100.0%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is -.348.						

Directional Measures			
			Value
Nominal by Interval	Eta	Weight in kilogrammes Dependent	0.046
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.791

WRMSI vs Time in practice

			Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Time in practice	0-5	Count	16	8	24
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	38.40%	420%	40.80%
	6-10	Count	9	2	11
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	21.60%	11.80%	18.70%
	11-15	Count	5	5	10
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	12%	29.50%	17%
	16-20	Count	10	2	12
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	24%	11.80%	20.40%
	21-25	Count	1	0	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.40%	0%	1.70%
	25-30	Count	0	0	0
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	0%	0%	0%
	31-35	Count	0	0	0
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	0%	0%	0%
	40-45	Count	1	0	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.40%	0%	1.70%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100%	100%	100%

Chi-Square Tests- WRMSI vs Time in pratice						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	20.485[a]	22	0.553	0.633		
Likelihood Ratio	25.851	22	0.258	0.592		
Fisher's Exact Test	18.445			0.720		
Linear-by-Linear Association	.981[b]	1	0.322	0.329	0.166	0.005
N of Valid Cases	59					
a. 46 cells (100.0%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is -.991.						

Directional Measures			
			Value
Nominal by Interval	Eta	Time in practice (please specify number of years) Dependent	0.130
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.589

WRMSI vs Average number of patients seen per working day:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
The average number of patients seen per working day?	1-5	Count	16	7	23
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	38.40%	41.30%	39.10%
	6-10	Count	17	8	25
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	40.80%	420%	42.50%
	11-15	Count	6	0	6
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	14.40%	0%	10.20%
	16-20	Count	3	2	5
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	20%	11.80%	8.50%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100%	100%	100%

Chi-Square Tests- WRMSI vs Average number of patients seen per working day						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	16.387[a]	14	0.290	0.287		
Likelihood Ratio	18.696	14	0.177	0.360		
Fisher's Exact Test	14.806			0.307		
Linear-by-Linear Association	.095[b]	1	0.757	0.778	0.399	0.022
N of Valid Cases	59					
a. 29 cells (96.7%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is -.309.						

Directional Measures			
			Value
Nominal by Interval	Eta	The average number of patients seen per working day? Dependent	0.041
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.527

WRMSI vs Number of hours spent in clinical practice per week

			Have you experienced a WRMKI arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Average number of hours spent in clinical practice per week (hands on work)	0-5	Count	8	3	11
		% within Have you experienced WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	19.20%	170%	18.70%
	6-10	Count	3	3	6
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	20%	170%	10.20%
	11-15	Count	2	1	3
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	4.80%	5.90%	5.10%
	16-20	Count	5	1	6
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	12%	5.90%	10.20%
	21-30	Count	9	2	11
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	21.60%	11.80%	18.70%
	31-40	Count	13	6	19
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	31.20%	35.40%	32.30%
	41-50	Count	2	1	3
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	4.80%	5.90%	5.10%
Total		Count	42	17	59
		% within Have you experienced a WRMSI arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100%	100%	100%

Chi-Square Tests- WRMSI vs number of hours spent in clinical practice per week						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	23.139[a]	25	0.569	0.678		
Likelihood Ratio	28.533	25	0.284	0.675		
Fisher's Exact Test	21.433			0.734		
Linear-by-Linear Association	.013[b]	1	0.911	0.912	0.460	0.006
N of Valid Cases	59					
a. 51 cells (98.1%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is .112.						

Directional Measures			
			Value
Nominal by Interval	Eta	Average number of hours spent in clinical practice per week (hands on work) Dependent	0.015
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.626

WRMSI vs Chiropractic technique used on daily basis – Activator

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Activator	Every patient	Count	1	0	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.6%	0.0%	1.9%
	Often	Count	2	0	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.3%	0.0%	3.8%
	Seldom	Count	12	4	16
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	31.6%	26.7%	30.2%
	Never	Count	23	11	34
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	60.5%	73.3%	64.2%
Total		Count	38	15	53
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Activator

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.545[a]	3	0.672	0.759		
Likelihood Ratio	2.352	3	0.503	0.661		
Fisher's Exact Test	1.220			0.908		
Linear-by-Linear Association	1.294[b]	1	0.255	0.329	0.181	0.105
N of Valid Cases	53					

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .28.

b. The standardized statistic is 1.138.

Directional Measures			
			Value
Nominal by Interval	Eta	Activator Dependent	0.158
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.171

WRMSI vs Chiropractic technique used on daily basis – Diversified

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Diversified	Every patient	Count	29	10	39
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	69.0%	58.8%	66.1%
	Regular	Count	10	6	16
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	23.8%	35.3%	21%
	Seldom	Count	1	1	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.4%	5.9%	3.4%
	Never	Count	2	0	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	4.8%	0.0%	3.4%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Diversified						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.027[a]	3	0.567	0.615		
Likelihood Ratio	2.510	3	0.473	0.652		
Fisher's Exact Test	2.104			0.545		
Linear-by-Linear Association	.012[b]	1	0.913	1.000	0.495	0.115
N of Valid Cases	59					
a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .58.						
b. The standardized statistic is .109.						

Directional Measures			
			Value
Nominal by Interval	Eta	Diversified Dependent	0.014
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.185

WRMSI vs Chiropractic technique used on daily basis – Gonstead:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Gonstead technique	Every patient	Count	1	0	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.7%	0.0%	1.9%
	Regular	Count	0	2	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	0.0%	12.5%	3.8%
	Often	Count	2	0	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.4%	0.0%	3.8%
	Seldom	Count	14	1	15
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	38%	6.3%	28.3%
	Never	Count	20	13	33
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	54.1%	81.3%	62.3%
Total		Count	37	16	53
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Gonstead						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	11.187[a]	4	0.025	0.011		
Likelihood Ratio	13.321	4	0.010	0.008		
Fisher's Exact Test	10.164			0.012		
Linear-by-Linear Association	.348[b]	1	0.555	0.631	0.356	0.119
N of Valid Cases	53					
a. 7 cells (70.0%) have expected count less than 5. The minimum expected count is .30.						
b. The standardized statistic is .590.						

Directional Measures			
			Value
Nominal by Interval	Eta	Gonstead technique Dependent	0.082
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.459

WRMSI vs Chiropractic technique used on daily basis – NIP

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
NIP	Every patient	Count	2	1	3
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.3%	6.7%	5.7%
	Regular	Count	2	0	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.3%	0.0%	3.8%
	Often	Count	0	1	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	0.0%	6.7%	1.9%
	Seldom	Count	2	1	3
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.3%	6.7%	5.7%
	Never	Count	32	12	44
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	84.2%	80.0%	83.0%
Total		Count	38	15	53
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests – WRMSI vs NIP						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.421[a]	4	0.490	0.588		
Likelihood Ratio	3.951	4	0.413	0.699		
Fisher's Exact Test	3.313			0.581		
Linear-by-Linear Association	.018[b]	1	0.892	1.000	0.485	0.101
N of Valid Cases	53					
a. 8 cells (80.0%) have expected count less than 5. The minimum expected count is .28.						
b. The standardized statistic is -.136.						

Directional Measures			
			Value
Nominal by Interval	Eta	NIP Dependent	0.019
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.254

WRMSI vs Chiropractic technique used on daily basis – SOT:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
SOT	Often	Count	3	1	4
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	8.1%	6.7%	7%
	Seldom	Count	4	4	8
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	10.8%	26.7%	15.4%
	Never	Count	30	10	40
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	81.1%	66.7%	76.9%
Total		Count	37	15	52
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.061[a]	2	0.357	0.304		
Likelihood Ratio	1.904	2	0.386	0.509		
Fisher's Exact Test	2.164			0.304		
Linear-by-Linear Association	.480[b]	1	0.488	0.622	0.320	0.146
N of Valid Cases	52					

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.15.

b. The standardized statistic is -.693.

Directional Measures			
			Value
Nominal by Interval	Eta	SOT Dependent	0.097
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.199

WRMSI vs Chiropractic technique used on daily basis – Thompson technique

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Thompson technique	Regular	Count	2	1	3
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.4%	6.7%	5.8%
	Often	Count	6	1	7
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	16.2%	6.7%	13.5%
	Seldom	Count	5	1	6
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	13.5%	6.7%	11.5%
	Never	Count	24	12	36
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	64.9%	80.0%	69.2%
Total		Count	37	15	52
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Thompson Technique						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.539[a]	3	0.673	0.742		
Likelihood Ratio	1.683	3	0.641	0.758		
Fisher's Exact Test	1.462			0.776		
Linear-by-Linear Association	.596[b]	1	0.440	0.523	0.282	0.103
N of Valid Cases	52					
a. 6 cells (75.0%) have expected count less than 5. The minimum expected count is .8						
b. The standardized statistic is .772.						

Directional Measures			
			Value
Nominal by Interval	Eta	Thompson technique Dependent	0.108
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.172

WRMSI vs Chiropractic technique used on daily basis – Other:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Other	Yes	Count	2	0	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	4.9%	0.0%	3.4%
	n/a	Count	39	17	56
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	95.1%	100.0%	96.6%
Total		Count	41	17	58
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Other

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.859[a]	1	0.354	0.578	0.496	
Continuity Correction[b]	0.019	1	0.892			
Likelihood Ratio	1.417	1	0.234	0.578	0.496	
Fisher's Exact Test				1.000	0.496	
Linear-by-Linear Association	.844[c]	1	0.358	0.578	0.496	0.496
N of Valid Cases	58					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .59.

b. Computed only for a 2x2

c. The standardized statistic is .919.

Directional Measures			
			Value
Nominal by Interval	Eta	Other Dependent	0.122
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.122

WRMSI vs Non- manipulative technique used on daily basis- Dry needling

Crosstab					
			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Dry needling/ acupressure	Every patient	Count	8	3	11
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	19.0%	16%	18.6%
	Regular	Count	25	9	34
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	59.5%	52.9%	56%
	Often	Count	5	3	8
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	11.9%	16%	13.6%
	Seldom	Count	3	2	5
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	1%	11.8%	8.5%
	Never	Count	1	0	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.4%	0.0%	1.7%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Dry needling						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.108[a]	4	0.893	0.911		
Likelihood Ratio	1.351	4	0.853	0.911		
Fisher's Exact Test	1.545			0.911		
Linear-by-Linear Association	.130[b]	1	0.719	0.751	0.414	0.116
N of Valid Cases	59					
a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is .360.						

Directional Measures			
			Value
Nominal by Interval	Eta	Dry needling/ acupressure Dependent	0.047
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.137

WRMSI vs Non-manipulative technique used on daily basis – Electro-modalities:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Electro-modalities	Every patient	Count	0	2	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	0.0%	12.5%	3.4%
	Regular	Count	9	5	14
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	21.4%	31.3%	24.1%
	Often	Count	8	3	11
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	19.0%	18.8%	19.0%
	Seldom	Count	13	2	15
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	31.0%	12.5%	25.9%
	Never	Count	12	4	16
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	28.6%	25.0%	26%
Total		Count	42	16	58
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Electro-modalities						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	293[a]	4	0.121	0.125		
Likelihood Ratio	409	4	0.116	0.149		
Fisher's Exact Test	6.229			0.166		
Linear-by-Linear Association	2.787[b]	1	0.095	0.121	0.061	0.024
N of Valid Cases	58					
a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .55.						
b. The standardized statistic is -1.669.						

Directional Measures			
			Value
Nominal by Interval	Eta	Electro-modalities Dependent	0.221
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.355

WRMSI vs Non-manipulative technique used on daily basis- Ice/ heat packs

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Ice/ heat packs	Every patient	Count	2	1	3
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	4.8%	1%	5.4%
	Regular	Count	5	4	9
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	11.9%	28.6%	16.1%
	Often	Count	5	1	6
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	11.9%	1%	10.7%
	Seldom	Count	15	6	21
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	35.7%	42.9%	35%
	Never	Count	15	2	17
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	35.7%	14.3%	30.4%
Total		Count	42	14	56
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Ice/ heat packs						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.879[a]	4	0.423	0.439		
Likelihood Ratio	3.948	4	0.413	0.515		
Fisher's Exact Test	4.102			0.371		
Linear-by-Linear Association	2.316[b]	1	0.128	0.164	0.085	0.032
N of Valid Cases	56					
a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .75.						
b. The standardized statistic is -1.522.						

Directional Measures			
			Value
Nominal by Interval	Eta	Ice/ heat packs Dependent	0.205
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.263

WRMSI vs Non-manipulative technique used on daily basis - Massage therapy

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Massage therapy	Every patient	Count	11	3	14
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	26.2%	18.8%	24.1%
	Regular	Count	14	8	22
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	33.3%	50.0%	39%
	Often	Count	8	3	11
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	19.0%	18.8%	19.0%
	Seldom	Count	6	1	7
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	14.3%	6.3%	12.1%
	Never	Count	3	1	4
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	1%	6.3%	6.9%
Total		Count	42	16	58
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Massage therapy						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.748[a]	4	0.782	0.832		
Likelihood Ratio	1.804	4	0.772	0.828		
Fisher's Exact Test	1.695			0.852		
Linear-by-Linear Association	.111[b]	1	0.739	0.807	0.424	0.094
N of Valid Cases	58					
a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is 1.10.						
b. The standardized statistic is -.334.						

Directional Measures			
			Value
Nominal by Interval	Eta	Massage therapy Dependent	0.044
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.174

WRMSI vs Non-manipulative technique used on daily basis- None

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
None	Regular	Count	2	0	2
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	5.9%	0.0%	4.2%
	Often	Count	1	0	1
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	2.9%	0.0%	2.1%
	Seldom	Count	7	6	13
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	20.6%	42.9%	21%
	Never	Count	24	8	32
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	70.6%	51%	66.7%
Total		Count	34	14	48
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMKSI vs None						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.320[a]	3	0.345	0.389		
Likelihood Ratio	4.015	3	0.260	0.366		
Fisher's Exact Test	2.936			0.416		
Linear-by-Linear Association	.003[b]	1	0.957	1.000	0.579	0.163
N of Valid Cases	48					
a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .29.						
b. The standardized statistic is .054.						

Directional Measures			
			Value
Nominal by Interval	Eta	None Dependent	0.008
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.263

WRMSI vs Non-manipulative technique used on daily basis- Strapping:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Strapping	Regular	Count	8	4	12
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	19.0%	23.5%	20.3%
	Often	Count	16	4	20
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	38.1%	23.5%	33.9%
	Seldom	Count	16	7	23
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	38.1%	41.2%	39.0%
	Never	Count	2	2	4
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	4.8%	11.8%	6.8%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Strapping						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.782[a]	3	0.619	0.694		
Likelihood Ratio	1.751	3	0.626	0.694		
Fisher's Exact Test	2.044			0.579		
Linear-by-Linear Association	.248[b]	1	0.618	0.630	0.370	0.115
N of Valid Cases	59					
a. 3 cells (35%) have expected count less than 5. The minimum expected count is 1.15.						
b. The standardized statistic is .498.						

Directional Measures			
			Value
Nominal by Interval	Eta	Strapping Dependent	0.065
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.174

WRMSI vs Non-manipulative technique used on daily basis- Stretching:

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Stretching	Every patient	Count	6	4	10
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	14.3%	23.5%	16.9%
	Regular	Count	12	6	18
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	28.6%	35.3%	30.5%
	Often	Count	17	5	22
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	40.5%	29.4%	33%
	Seldom	Count	7	2	9
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	16.7%	11.8%	15.3%
Total		Count	42	17	59
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Stretching						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.377[a]	3	0.711	0.747		
Likelihood Ratio	1.364	3	0.714	0.747		
Fisher's Exact Test	1.473			0.720		
Linear-by-Linear Association	1.207[b]	1	0.272	0.295	0.173	0.066
N of Valid Cases	59					
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.59.						
b. The standardized statistic is -1.098.						

Directional Measures			
			Value
Nominal by Interval	Eta	Stretching Dependent	0.144
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.153

WRMSI vs Non-manipulative technique used on daily basis-Other

			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Total
			Yes	No	
Other	Yes	Count	5	2	7
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	12.8%	11.8%	12.5%
	n/a	Count	34	15	49
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	82%	88.2%	85%
Total		Count	39	17	56
		% within Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	100.0%	100.0%	100.0%

Chi-Square Tests- WRMSI vs Other

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	.012[a]	1	0.913	1.000	0.643	
Continuity Correction[b]	0.000	1	1.000			
Likelihood Ratio	0.012	1	0.912	1.000	0.643	
Fisher's Exact Test				1.000	0.643	
Linear-by-Linear Association	.012[c]	1	0.913	1.000	0.643	0.338
N of Valid Cases	56					

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.13.

b. Computed only for a 2x2

c. The standardized statistic is .109.

Directional Measures			
			Value
Nominal by Interval	Eta	Other Dependent	0.015
		Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession? Dependent	0.015

88: Interpreting and Reporting on the Output of a Binomial Logistic Regression Analysis

DEMOGRAPHICS

All assumptions were met to proceed with the regression, including the Box Tidwell test which assumes that the relationships between the continuous predictors and the logit (log odds) is linear.

Three main s are required to understand the results from the binomial logistic regression procedure. These are presented below.

Variance explained

The amount of variation in the dependent variable can be explained by the model (the equivalent of R^2 in multiple regression) is given in the below.

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	66.907[a]	.065	.093
a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.			

This contains the Cox & Snell R Square and Nagelkerke R Square values, which are both methods of calculating the explained variation. These values are sometimes referred to as *pseudo* R^2 values. However, they are interpreted in the same manner, but with more caution. Therefore, the explained variation in the dependent variable based on our model ranges from 6.5% to 9.3%, depending on whether the Cox & Snell R^2 or Nagelkerke R^2 methods is referenced, respectively. Nagelkerke R^2 is a modification of Cox & Snell R^2, the latter of which cannot achieve a value of 1.

Category prediction

Binomial logistic regression estimates the probability of an event (in this case, having an injury) occurring. If the estimated probability of the event occurring is greater than or equal to 0.5 (better than even chance), the event can be classified as occurring (e.g., having had an injury). The converse is also true. Binomial logistic regression is used to predict whether cases can be correctly predicted from the independent variables. Most methods are based on the observed and predicted classifications.

Classification [a]					
	Observed		Predicted		
			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Percentage Correct
			Yes	No	
Step 1	Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	Yes	39	3	92.9
		No	14	3	16
	Overall Percentage				71.2
a. The cut value is .500					

"The cut value is .500". This means that if the probability of a case being classified into the "yes" category is greater than .500, then that particular case is classified into the "yes" category. Otherwise, the case is classified as in the "no" category (as mentioned previously).

Overall the predictions were correct 42 out of 59 times, for an overall success rate of 71.2%.

PRACTICE DEMOGRAPHICS

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	42.042[a]	.235	.336
a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.			

Classification [a]					
	Observed		Predicted		
			Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?		Percentage Correct
			Yes	No	
Step 1	Have you experienced a work-related musculoskeletal injury arising out of employment as a chiropractor/or prior injury aggravated by your profession?	Yes	31	1	96.9
		No	7	6	46.2
	Overall Percentage				82.2
a. The cut value is .500					