The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry in the eThekwini municipality

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I, Jolene Jacquire do hereby 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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DEDICATION

I will lift up mine eyes unto the hills, from whence cometh my help. My help cometh from the Lord, the maker of heaven and earth (Psalm 121:1-2). To my Lord and saviour, Jesus Christ. I dedicate this work to you. Thank you for your love, grace, mercy and guidance. I am nothing without you. All praise and glory goes to you for it is you that has brought this project to completion.

My wonderful parents, John and Bernice Jacquire. Thank you for all you have done for me and for being people of integrity, Proverbs 20:7 says “The righteous man walks in his integrity; his children are blessed.” Because of your values, morals and beliefs I am who I am today and I am blessed to be your child. Thank you for pushing me through in prayer and for your endless love.

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ABSTRACT

Background

The growing popularity and competitive nature of the beauty industry has resulted in beauty therapists performing an extensive range of treatments to meet the demand, often at the jeopardy of their own well-being. Treatments include massage, waxing, pedicures and facials. These techniques involve vigorous and repetitive movements that may lead to overuse and strain on the musculoskeletal system, resulting in injury. Work-related activities together with factors such as socio-demographic, psychosocial, environmental and anthropometric can influence the prevalence of work-related musculoskeletal disorders (WRMDs). There has been little investigation into the WRMDs of beauty therapists both locally and internationally.

Aim

The aim of this study was to determine the prevalence, selected risk factors and impact of self-reported work related musculoskeletal disorders (WRMDs) in beauty therapists working within the hotel spa industry in the eThekwini municipality.

Method

A cross sectional epidemiological design was used to survey 254 beauty therapists working in the hotel spa industry in the eThekwini municipality of Durban. A pre-validated questionnaire was hand delivered to beauty therapists working at all hotel spas that agreed to participate. Informed consent was obtained. The survey contained questions related to musculoskeletal pain, socio-demographic, psycho-social, lifestyle and occupational factors.

Results

A response rate of 70% was obtained (n=178). The majority of the respondents were female (94.3%; n=165), the mean age of the respondents was 27.74 (SD±4.83) years. The respondents had been working as beauty therapists for an average of 5.91 (SD±4.19; n=176) years and performed on average 27.89 (SD±13.33; n=170) treatments per week, working 47.38 (SD±13.36; n=175) hours per week. Those working overtime worked on average 5.43 (SD±2.94; n=59) hours of overtime per week. There was a high rate of reported WRMDs with the lifetime, current and 12 month period prevalence being 86% (n=153), 85% (n=151) and 83% (n=148), respectively. The area most affected were the low back followed by the neck, the hand and wrist. Ninety percent of the respondents indicated

that their pain was mild to moderate in nature, with half expressing an inability to cope with the pain, and 78% reporting that it interfered with their ability to work.

Mental exhaustion (p=0.032), suffering from a concomitant co-morbidity (p=0.031), years worked as a beauty therapist (p<0.001) and treating clients after hours (p=0.007) were significantly associated with the presence of musculoskeletal pain. Performing manual massage (p=0.043) and reporting feelings of exhaustion whilst performing specialised massage techniques (p=0.014) and applying makeup/eyelashes (p=0.022) were associated with the presence of WRMDs. Those who reported having co-worker (p=0.006) and managerial support (p<0.001) were less likely to experience musculoskeletal pain. In contrast, feeling frustrated by work (p=0.007), being under pressure (p=0.005) and over worked (p=0.009) increased the chances of experiencing WRMDs. Working with the back in an awkward position (p<0.001), standing for prolonged periods (p<0.001), lifting heavy loads (p=0.019) and working in a hot and humid environment (p<0.001) increased the risk of WRMDs.

Conclusion

WRMDs have a significant impact on beauty therapists' ability to work. Effective strategies to prevent and manage WRMDs in hotel spa beauty therapists is required, along with governmental regulation.

Key Words: epidemiology, work-related musculoskeletal disorders / pain, cumulative trauma disorder, repetitive strain injury, occupational overuse, beauty therapy, spa industry, cosmetology, prevalence, risk factors

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List of symbols and abbreviations

=	Equals
>	Greater than
≥	Greater than or equal to
%	Percentage
<	Less than
≤	Less than or equal to
CI	Confidence interval
±SD	Standard Deviation
Kg	Kilograms
m	Meters
N	Number of participants (total sample)
n	Number of participants (sample sub-group)
Ƞ	Eta score
p	*p*-value showing statistical significance
BMI	Body Mass Index
BT	Beauty therapist
B.Tech	Bachelor of Technology
CAM	Complementary and Alternative Medicine
CIDESCO	Comite' International d'Esthetique et de Cosmetologie
CHE	Council on Higher Education
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
DoE	Department of Education
D.TECH	Doctoral Degree in Technology
DUT	Durban University of Technology

et al.	and others
FEDHASA	Federated Hospitality Association of South Africa
FET	Further Education and Training
GP	General practitioner
HEI	Higher education institution
IREC	Institutional Research Ethics Committee
LBP	Low Back Pain
LOIC	Letter of Information and consent
MSK	Musculoskeletal
M.Tech	Master of Technology
NCV	National Certificate Vocational
N. Dip	National Diploma
NQF	National Qualifications Framework
RHDC	Research and Higher Degrees Committee
SAAHSP	South African Association of Health and Skincare Professionals
SADHS	South African Demographic Health Survey
SASA	South African Spa Association
SATSA	South African Tourism Service Association
SAQA	South African Qualifications Authority
SD	Standard deviation
SES	Socio-economic status
SPSS	Statistical Package for the Social Sciences
UK	United Kingdom
UoT	University of Technology
USA	United States of America
WHO	World Health Organisation
WRMDs	Work-related musculoskeletal disorder/s

Definitions

Beauty therapist: For the purpose of this study a beauty therapist is one who works within the hotel spa industry and administers treatments such as facials, hair removal, hand and nail treatments (pedicures and manicures), bodywork (manual and/or electrical massage and/or body wraps). Beauty therapists may also be referred to as somatologists, cosmetologists and aestheticians (Tsigonia *et al.* 2009).

eThekwini: A municipality located in the province of Kwa-Zulu Natal (Ulwazi Programme 2015).

General health: For the purpose of this study general health will refer to certain health characteristics or exposures that may predispose the respondent to the development of WRMD such as self-reported overall health status including mental and physical well-being.

Lifetime prevalence: Refers to the experience of a condition at some point in an individual's life (Webb and Bain 2011).

Overuse: Refers to excessive or repetitive use of a body part (Quinn 2008).

Period prevalence: Refers to the number of individuals in a population affected by a condition during a specific period of time (Gerstman 2003).

Point prevalence: Refers to the number of individuals in a population affected by a condition at a specific point in time (Gerstman 2003).

Private Higher Education Institutions (HEIs): Most Private HEIs offering beauty therapy courses are registered and accredited by the Department of Education (DoE) and the Council on Higher Education (CHE) but some prefer accreditation by associations and/or professional boards such as South African Association of Health and Skincare Professionals (SAAHSP) and/or Comite' International d'Esthetique et de Cosmetologie (CIDESCO). Private HEIs offer diplomas or advanced diplomas. Study duration is at least 2 years (Campbell 2012).

Private modulised courses: Private modulised courses are mainly offered by companies as internships. Upon completion of the internship the student is awarded with a module certificate although

some education providers who do not offer internships may also offer module courses on a specific modality which produces a certificate (Borg 2015).

Private short courses: Short courses that may be offered by distribution companies and a certificate is awarded (Borg 2015).

Public Further Education and Training (FET) Colleges: FET colleges prepare an individual for a specific vocation, these colleges afford the individual with the opportunity to pursue further education and preparation for a specific profession (Grade 10-12/ NQF level 2-4). They are awarded a National certificate vocational (NCV).

Public Higher education Institutions (HEIs): Public HEI are registered with and accredited by the DoE and the CHE (Campbell 2012). Public HEIs that offer courses in beauty and aesthetics are the Universities of Technologies (UoTs). The qualifications awarded at these institutions consists of a 3 year National Diploma (N. Dip) (NQF level 5), Bachelor of technology (4th year) (NQF level 7), Master of Technology (M.Tech) and a Doctoral Degree in Technology (D.Tech) (NQF level 8) (Campbell 2012).

Risk factor: Refers to any variable, exposure or characteristic associated with an increased likelihood of developing a condition, injury or disease (Collins English Dictionary 2015).

Spa owner: The spa owner is the proprietor of the spa establishment, be it the owner of the hotel or an independent owner of the spa affiliated to the hotel. The spa owner may also refer to one who has power of attorney such as management appointed to make decisions on behalf of the owner.

Medical history: For the purpose of the study medical history will refer to information pertaining to the respondent's medial history that may place the individual at risk for developing WRMD such as previous injury, illness, surgery and the presence of a comorbidity.

Musculoskeletal (MSK): Relates to the muscular and skeletal system of the body.

Musculoskeletal disorders: Refers to injury or dysfunction of the body's locomotor system which comprises the bones, muscles, tendons, ligaments, connective tissue, cartilage and joints (National Institute of Occupational Safety and Health 2012; Weinstein and Buckwalter 2005).

National Qualifications Framework (NQF): Refers to a comprehensive system of guidelines by which levels of learning achievements are registered. It allows for good quality training, education and national recognition of qualifications, knowledge and skills attained (South African Qualification Authority 2013).

Work-related musculoskeletal disorder (WRMDs): Work-related musculoskeletal disorders (WRMDs) refers to musculoskeletal injuries that result from a work-related event (Kumar *et al.* 2013; Salik and Ozcan 2004).

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Work-related musculoskeletal disorders (WRMDs) have been described in the literature as being highly prevalent amongst workers in various professions, particularly those involved in manual intensive jobs (Baek *et al.* 2015). The hotel spa industry is an immensely profitable industry (Richter and Jooste 2013), with fast paced and stressful lifestyles driving this global market (Lopaciuk and Loboda 2013). Beauty therapists are expected to have the theoretical and practical knowledge to meet the demand of industry (Richter and Jooste 2013). The type of tasks being performed, the environment in which the therapist works as well as increases in work demand may lead to compromise of the musculoskeletal system and predispose them to the development of WRMDs (Long *et al.* 2012). This chapter will discuss the background as well as aims, objectives and delimitations to this study.

1.2 Background to the study

Musculoskeletal (MSK) disorders are considered to be a major health problem around the world (Motamedzade and Moghimbeigi 2012) and have been identified in the literature as the most common causes of severe longstanding pain and physical disability (Banerjee *et al.* 2012). More than 1.7 billion of the world's populace suffer MSK pain (Leavitt 2012). MSK disorders are associated with reduced quality of life, functional limitations and financial cost for the individual, companies and the economy, absenteeism and reduced work productivity (Neupane *et al.* 2013).

Work-related musculoskeletal disorders (WRMDs) (Adegoke *et al.* 2008) otherwise referred to as occupational overuse syndromes (van Eerd *et al.* 2003;) or cumulative trauma disorder (Walker-Bone and Cooper 2005) or repetitive strain injuries (van Tulder *et al.* 2007) describe an accumulation of micro traumatic events that occur in the musculoskeletal system following occupational injuries and/or exposure to work-related risk factors. Therefore, WRMDs refer to musculoskeletal injuries that result

from a work-related event or exposure in the work setting or environment (Kang *et al.* 2014; Salik and Ozcan 2004).

Repetitive work activities become harmful when tissue loading exceeds physiological and anatomical limits (Helliwell and Taylor 2004). Common conditions that have been found to arise after occupational risk exposure are tendonitis/tenosynovitis especially affecting the joints of the upper limb; myalgia/muscular dysfunction; entrapment syndromes/nerve compression predominantly in the forearm and wrist and degenerative conditions of the spine, hip or knee joints (van Tulder *et al*. 2007; WHO 2003) with the resultant symptoms generally being pain, discomfort, numbness, stiffness, decreased range of motion and muscular strength, soft tissue swelling and inflammation (Kaergaard and Anderson 2000; Lee *et al.* 2005). Persistence of these symptoms can lead to chronicity (van Vuuren *et al.* 2007).

High mortality associated with sickness and disease is a priority issue in healthcare systems around the world, with chronic conditions having a lower mortality and higher morbidity which impacts premature retirement and occupational productivity (Chen *et al.* 2012). WRMDs account for the majority of occupational diseases globally (Kumar *et al.* 2013). In recent studies WRMDs among industrial workers increased from 15-22% over a four year period as well as an increase in the number of pain locations was recorded (Neupane *et al.* 2013).This is comparable with Bihari *et al.* (2013) who also found there to be an increase in MSK pain and disability in housewives who were exposed to ergonomic stress due to their various repetitive tasks.

The prevalence of WRMDs has been previously reported for working populations such as computer users (Oha *et al.* 2014, Peek 2005), industrial workers (Major and Vézina, 2015), and healthcare professionals (Yasobant and Rajkumar 2015; Tinubu *et al.* 2010) and many other manual intensive occupations (Grobler 2013; Raad 2012; Tsigonia *et al.* 2009; Albert *et al.* 2008). In the literature low back pain is a frequently cited symptom affecting working populations (Dagenais *et al.* 2008). In South Africa, WRMDs affecting the back or neck are experienced by approximately 30 000 workers per year (van Vuuren *et al.* 2007). Whereas WRMDs affecting the neck and shoulder have been estimated to affect between 6-76% of working populations per year (Alipour *et al.* 2008; Driessen *et al.* 2008). In dentists, Hayes *et al.* (2009) found a high prevalence of WRMDs affecting the upper back in contrast to Kumar *et al.* (2013) who found that the low back was most commonly affected followed by the hand and wrist, neck and shoulder. In Nigerian nurses the most commonly affected region was the low

back followed by the neck (Tinubu *et al.* 2010). Depending on the type of tasks performed at work, various body sites may be affected by WRMDs (Sembajwe *et al.* 2013).

In addition to work-related risk factors, socio-demographic, environmental conditions and psychosocial risk factors relevant to the individual may affect the prevalence of MSK disorders (Tsigonia *et al.* 2009; Jang *et al.* 2006; Hales and Bernard 1996). A high prevalence of WRMDs has been identified among workers who are exposed to the aforementioned risk factors (Tsigonia *et al.* 2009; Alexopoulos *et al.* 2003; Nahit *et al.* 2001). Over the past 20 years, the burden of MSK conditions has risen by 45% and will continue to progress unless appropriate interventions or guidelines are in place (Leavitt 2012).

The beauty profession has shown exponential growth in the South African economy (Campbell 2012) in spite of it being a relatively young profession (Richter and Jooste 2013). It is highly lucrative, physically demanding and competitive (Richter and Jooste 2013). Increases in industry demand may lead to overwork and overuse of the MSK system (Veiersted *et al.* 2008). Associated with this is an increased risk of WRMDs specific to the type of tasks being executed and the environment in which the therapist works. Many factors may be responsible for the development of WRMDs (Fang 2011; WHO 2003) and they are most often associated with rapid or repetitive movements, manual exertion, heavy lifting, vibration and awkward positions (Punnet *et al*. 2010; Hales and Bernard 1996) or as a result of a single strenuous task or traumatic event (Erick and Smith 2011).

There is limited literature on WRMDs suffered by beauty therapists, both internationally and nationally. The profession of beauty and aesthetics is developing and rapidly expanding (Reid, 2006) and in the United Kingdom, it forms part of a multi-million pound industry (Black, 2002). The beauty industry is thriving and contributes enormously to the South African economy (Campbell 2012), however, in South Africa there is a paucity of information regarding WRMDs affecting beauty therapists. It is important to note that because of the growing popularity and competitive nature of the beauty industry, beauty therapists are expected to perform an extensive range of skin and body treatments to meet the demand of industry (Richter and Jooste 2013). Tasks performed by beauty therapists such as massage and waxing whilst operating electrical equipment, require repetitive movements and overuse, which places undue

strain on the MSK system of the practitioner (Cole *et al*. 2005; Malchaire *et al*. 2001; Burdorf and Sorock 1997).

The significance of identifying the risk factors that make beauty therapists susceptible to WRMDs, therefore, lies primarily in the need for prevention. Identification of the specific risk factors affecting beauty therapists in the current study may allow for the development of preventative programs and plans to overcome these risks safely. The construction of a regulatory body and guidelines are imperative in the protection of the beauty therapist as recommended by Okojie and Isah (2001).

In South Africa, the beauty industry is currently unregulated. Regulatory control allows for minimal training and registration requirements, ensuring quality in service and enforcing guidelines to control conduct of professions (Tulenko *et al.* 2012). The lack of regulation in the beauty therapy industry may place the therapist at increased risk of developing WRMDs (Borg 2015), as workers may be inappropriately trained and therefore placed at risk for injury development. By investigating WRMDs complaints in beauty therapists, this study will be able to provide knowledge as to whether these professionals are suffering with WRMDs and what potential risk factors may be associated with WRMDs. This information can then aid educational institutions and professional associations in appropriately training their members to prevent or decrease work-related pain and discomfort.

1.3 Aims and Objectives

1.3.1 Aim of the study

The aim of this study was to determine the prevalence of, and selected risk factors (socio-demographic, anthropometric, individual psychological, general health and medical history and work-related/occupational) for, and the impact of, WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality.

1.3.2 Objectives of the study

1) To determine the point and period (12 months) prevalence of WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

2) To determine the socio-demographic, anthropometric, individual psychological, general health and medical history and work-related/occupational risk factors for WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

3) To determine the impact of WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

1.4 Delimitations

When carrying out survey based studies, the researcher is required to rely on the responses of the sample of population and these responses are then used to make inferences about the greater population (Kelley *et al.* 2003). Therefore, in this research, it was assumed that beauty therapists would be open and honest when completing the questionnaire and that their responses would be thoughtful and reflect authenticity at the time of questionnaire completion. In self-reported survey based studies respondents may answer the questionnaire in a manner that makes them look good (Mouton 2002). This may lead to inaccurate reporting of behaviour or activities, which may influence the inferences made. In addition, fear that employers may have access to responses may influence self-report reliability (Donaldson and Grant-Vallone 2002). In an attempt to circumvent this, this study comprised of questions that were both work-related and non-work-related in an attempt to exclude MSK conditions from organic, systemic or traumatic causes. Participants were encouraged to be open and honest when completing the questionnaire and were assured that their personal responses would not be disclosed to their employers.

In order to determine the prevalence and find associations between risk factors, selected variables were investigated. It should be noted that other variables exist but were not investigated in this study and could therefore have influenced participants' responses.

1.5 Flow of dissertation

In Chapter One, the aims, objectives and rationale have been outlined in the context of the research problem.

Chapter Two presents an overview of MSK disorders and WRMDs in beauty therapists within the hotel spa industry, prevalence, risk factors and the impact of WRMDs in the occupational setting.

Chapter Three details the methodology utilised in this study to obtain the data. Questionnaire development and distribution as well as steps taken to ensure confidentiality and validity are outlined. Data reduction and the statistical analyses utilised to obtain the results can be found in chapter three.

Chapter Four reveals the results of the data analysis.

Chapter Five contextualizes the results in terms of the current literature.

Finally, Chapter Six concludes the study highlighting the important findings and making recommendations for future studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Musculoskeletal disorders have been well described in the literature as an economic burdens which affect countless individuals worldwide resulting in physical disability and pain (Banerjee *et al.* 2012; Brooks 2006). They are pathophysiologically diverse with the common symptoms being pain and/or functional limitations (Woolf and Pfleger 2003), many with a multifactorial causation (National Research Council and Institute of Medicine 2001). Many factors may contribute to the manifestation of MSK pain (Palmer and Smedley 2007). Working populations are at risk for developing MSK disorders (National Institute of Occupational Safety and Health 2009). In the United States of America (USA), MSK disorders occupy the majority of occupational injuries (Bureau of Labor Statistics 2010). In South Africa, there is a paucity of published studies regarding MSK disorders (Dias 2014). However, studies have shown that exposure to certain variables in certain occupations have been implicated in the development of MSK disorders when compared to other occupations not exposed to similar variables (National Institute of Occupational Safety and Health 2012; Bernard 1997). Thus, studies investigating working populations and MSK disorders are important to better understand cause, effect and impact so that preventative strategies can be implemented to manage this phenomenon (National Institute of Occupational Safety and Health 2009).

This chapter will present a brief overview of the beauty and hotel spa industry and work-related musculoskeletal disorders (WRMDs) will be discussed in relation to this profession.

The literature to write this review was sourced through the following databases: MEDLINE, Science Direct, EBSCOhost and ProQuest. Additional sources were obtained through the Durban University of Technology (DUT) library and Summon. The following search terms were used: beautician, beauty therapist, somatologists, cosmetologist, spa therapist, aesthetician, hotel spa therapist, occupational overuse

injury/syndrome, musculoskeletal pain, musculoskeletal disorders, work-related musculoskeletal disorders, repetitive strain injury and cumulative trauma disorder.

2.2 Beauty therapy and the hotel spa industry

The Hotel spa has become an attractive addition to the tourism industry (Georgiev and Vasileva 2010). The International Spa Association (2004) defines a spa as an establishment where therapeutic services are offered incorporating wellness and renewal of the mind, body and spirit. According to a Spafinder Wellness 365 consumer survey (2014), there was a high percentage of hotel patrons seeking spa treatments especially for a healthy and rejuvenating experience. Wellness tourism reports a steady growth in the hotel spa industry in South Africa (Global Wellness Institute 2014, Akinboade and Braimoh 2010) and due to the popularity of this industry it has led to job creation for beauty therapists.

The beauty industry is popular, thriving and rapidly expanding (Campbell 2012; Reid 2006). It incorporates wellness and holistic treatments to combat the stress and strain of daily life. Beauty therapists obtain theoretical and technical training (Sharma and Black 2001) to be able to perform a variety of facial, body (Strausfogel 2010; Vosloo 2009) and health treatments (Reid 2006). These holistic treatments are commonly offered at spas, salons, beauty clinics and fitness centres (Saha 2008).

2.2.1 Scope of practice

The scope of practice of a beauty therapist in South Africa is to safely and efficiently identify, advise and perform appropriate curative, preventative and aesthetic treatments on the body of the client (Durban University of Technology 2013). These treatments include massage therapy, reflexology, aromatherapy, aesthetics, manicures, pedicures, facial therapy, exercise and nutritional guidance (Reid 2006). Beauty therapy is a multi-faceted vocation aimed at holistic treatment of various skin and body conditions. Beauty therapists may elect to work independently or in conjunction with healthcare professionals through recommendations, referrals and supportive practices (Durban University of Technology 2013). The scope of practice

of a beauty therapist is broad and for purposes of discussion has been divided into two categories: massage therapy and beauty and aesthetics.

2.2.1.1 Massage therapy

Massage therapy has been used in different cultures across the world for thousands of years (Barn 2015). Massage has gradually become part of alternative medicine since the 1970s (Harvard Men's Health Watch 2006), but today it's considered as complementary and alternative medicine (CAM) (Barn 2015; Barnes *et al.* 2008). It is used in the management of chronic pain syndromes and disease prevention, as well as for general well-being (van der Riet *et al.* 2011). Massage therapy patrons often have a great expectancy and belief concerning the benefits of massage, these high expectations place a great burden on the therapists (Blau *et al*. 2013; Boulanger *et al.* 2012). Massage therapists are prone to sustaining overuse injuries due to the nature of the work. Massage techniques involves the use of one's body to carry out repetitive movements often in non-neutral positions as well as varied amounts of force and strength of the upper extremity (Bureau of Labor Statistics 2016; Fritz 2000), injury occurs when the postural and physical demands exerted on the body are stressed beyond physiological limits (Jang *et al.* 2006). Several other risk factors may play a role in increasing the risk of development of WRMDs injury in therapists performing massage such as poor ergonomic setting (e.g. incorrect table height), inadequate work environments, performing excessive number of treatments and insufficient rest between treatments (Cromie *et al.* 2000).

Massage can be categorised into manual and mechanical massage techniques: There are four common manual massage techniques, namely:

- Swedish massage which involves the rhythmical manipulation of the tissues of the body, thereby stimulating the deep muscles (Weerapong *et al.* 2005). It consists of four techniques: effleurage, petrissage, tapotment and vibration (Roseberry 2009). These methods require repetitive movements of the hand and wrist often involving rapid rhythmical, slapping, pounding or chopping movements (Simon 2014).
- Aromatherapy is another commonly used manual massage technique where massage is combined with essential oils to bring about healing, relaxation, physical and psychological effects such as stress relief and a reduction in anxiety. During this massage technique the oils utilised in the massage may

have a therapeutic effect on the client (Labrique-Walusis *et al.* 2010; Sunnydale 2010).

- Reflexology is a form of therapy aimed at stimulation of specific reflexes. The therapist applies pressure and touch to certain parts of the body which are said to correspond to different areas of the body (Todd 2010; MacEachern 2008) bringing about therapeutic effects (Saha 2008).
- Sports massage incorporates the use of varied massage techniques such as petrissage, effleurage, trigger point or cross friction techniques and deep tissue body work and is very popular among sportsmen and women (Jooste *et al.* 2013). It allows for improved physical performance (Gould 2004) and is relaxing with holistic benefits (Jooste and Khumalo 2012) during and after participation in an aerobic sports event (Nesti 2004).

2.2.1.2 Beauty and aesthetics

The Beauty and aesthetics sector has gained popularity globally (Campbell 2012). Beauty and aesthetics comprise facial therapy, electrical therapy, manicures and pedicures, hair removal techniques and the application of makeup, all of which are treatments commonly offered at most salons and spas (Mbutho 2013). Whilst performing treatments, based on observation (Alojado *et al.* 2015), the therapist adopts a hunched-over posture, tilted head or incorrect sitting ergonomics as well as repeated body twisting and flexion to reach for tools resulting in strain. These awkward body positions and monotonous activities may lead to altered biomechanics and muscle imbalances as well as wear and tear (Cole *et al*. 2005). These activities result in injury to the MSK system structures (Punnet and Wegman 2004). WRMDs may be considered to have a mechanical aetiological component due to occupational activities that may cause injury to the MSK system (Kumar *et al*. 2013).

2.2.1.2.1 Facial therapy:

In the modern salon and spa, facial therapy has become a very popular treatment amongst both men and women (Strausfogel 2010). It is the most common skin treatment performed by beauty therapists today (Foulston *et al*. 2007). Facial therapy involves treatments such as facial peels, masks and massage, exfoliation and extraction, the application of steam and products for moisturising (Sunnydale 2010) as well as electrical therapy for the skin (Gerson 2001).

2.2.1.2.2 Electrical therapy:

Electrical therapy is being used extensively in the health and beauty industry (Campbell 2012) because of its ability to allow skincare products to infiltrate the skin thereby achieving desired results (Hiscock *et al*. 2007). Electrical therapy treatments commonly used include galvanism, microcurrents, high frequency and vacuum suction (Rammanhor 2015). There are various types of electrical equipment with functions ranging from reduction of signs of ageing and scars, treatment of skin conditions such as acne vulgaris, hair removal and treatment of the skin before and after surgery (Campbell 2012). These activities involve repetitive movements of the upper limb as well as the concurrent support of the electrical equipment by the therapist. Information that is available suggests that therapists who perform physical activities using their hands are at a higher risk for developing work related injuries (Jang *et al.* 2006).

2.2.1.2.3 Manicures and pedicures:

Manicures and pedicures are treatments applied to the hands and feet such as nail filing, shaping, buffing, clipping, polishing, cuticle care, massage and the application of products to exfoliate, moisturise, hydrate and nourish the skin and nail (Newman 2007; Nordmann 2001). Manicure and pedicure treatments typically range from between 30 to 60 minutes per treatment. Therapists perform manicures and pedicures in seated positions without the use of a backrest, this increases the risk of slouching. Pedicurists commonly sit on the floor or on a stool that's below their popliteal height (Alojado *et al.* 2015). Incorrect seating ergonomics leads to incorrect sitting postures and therefore may lead to the occurrence of MSK disorders (Baharampour *et al.* 2013). Some of their movements are rapid and repetitive (e.g. foot scrubs/filing) or minute and precise (e.g. nail treatments). Minute precise movements require focus and sustained postures which may lead to pain and stiffness (Alojado *et al.* 2015). Performing visually demanding activities where the point of treatment is relatively fixed may increase the risk for WRMDs affecting multiple sites (Harris-Roberts *et al.* 2011).

2.2.1.2.4 Hair removal techniques:

Hair removal has gained popularity in modern times in both males and females (Foulston *et al.* 2007). There are a variety of reasons for the removal of unwanted hair for an aesthetically pleasing appearance to build confidence in social settings (Saha 2008), or in the sporting world where the removal of hair makes it easier to care for potential wounds which may arise or for ease and comfort when wearing spandex. The two methods by which hair can be removed are depilation (hair removal at the skin surface level) and epilation (hair removal at the level below the skins surface) (Kennedy 2011). Depilation can be achieved by the process of threading, shaving and the use of depilatory preparations. (Kennedy 2011; Culp *et al.* 2010). Epilation is the process of tweezing, waxing (Cressy 2003), sugaring (Kennedy 2011), electrolysis (Saha 2008) and laser hair removal (Kennedy 2011). Incorrect technique, poor posture along with repetitive use of the hand and wrist may lead to stress and strain on the therapist.

2.2.1.2.5 The application of makeup:

Makeup involves the use of cosmetics such as concealer, foundation, powder, blusher, eye shadow, mascara and lipstick. The application of artificial eyelashes can also be used to enhance one's features (Cressy 2003). The chief goal of makeup application is to highlight the client's most attractive features and minimise least attractive features with the use of various cosmetic techniques and products (Culp *et al.* 2010). Makeup application requires concentration and skill in order to create a desired look (Nordmann 2001), the adoption of non-neutral postures may predispose to the development of WRMDs (Adegoke *et al*. 2008).

2.2.2 Beauty therapy education in South Africa

In South Africa, beauty and aesthetics are taught at both public higher education institutions (HEI) and private HEI. The Council on Higher Education (CHE) is an autonomous constitutional organisation established in terms of the South Africa. Department of Higher Education and Training (1997) acts as the Quality Council for Higher Education in terms of the National Qualifications Framework Act (Act No. 67 of 2008). The Department of Education (DoE) was divided into the Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET) in the year 2009. These departments serve to oversee the training and education systems in South Africa.

Public HEI are registered with and accredited by the DoE and the CHE (Campbell 2012). Some private HEI are accredited by the CHE but not all. Several private institutions prefer to be accredited by professional boards and/or associations such as the South African Association of Health and Skincare Professionals (SAAHSP) as well as the Comite' International d'Esthetique et de Cosmetologie (CIDESCO) (Campbell 2012).

Private HEI offer health and beauty courses in massage, aesthetics and health and skin care offering a two year diploma which amounts to 240 South African Qualifications Authority (SAQA) credits (South African Qualification Authority 2013). Certain private HEI also offer admission to an optional third year of study the student may then apply to write national and/or international examinations (Campbell 2012).

Public HEI offer a somatology qualification which amounts to 360 SAQA credits and a National Qualifications Framework (NQF) Level 6 (Rammanhor 2015; Campbell 2012). These qualifications consist of a National Diploma (N. Dip) (three year full time / four year part time), Bachelor of Technology (B.Tech), Master of Technology (M.Tech) and a Doctoral Degree in Technology (D.Tech) (Campbell 2012; South African Qualification Authority 2013; Rammanhor 2015). International qualifications can then be accomplished through numerous international councils or committees (Vosloo 2009).

2.2.3 Beauty therapy regulation

Workplace regulations should attain a safe, secure, healthy and hygienic working environment and owners should ensure adequate environmental conditions, maintenance of the equipment and the workplace (Cressy 2003). According to the South African Department of Labour (1993), the employer is obligated to ensure that the workplace is free of harmful materials, substances or equipment that may cause injury or disease. In work settings where this is not possible, the employer must inform employees of these hazards. Safety, precautionary and protective measures must be established by communication and co-operation between employers and employees. Several key gaps exist with regards to guidelines and regulations in beauty establishments (Rammanhor 2015). It is essential for environmental health workers and strategy planners to update programmes and guidelines to minimise and control occupational health risks in service establishments such as spas (Barn and Chen 2011). Legislation exists to govern occupations, however, there are no specific guidelines, regulations and practices governing the practice of beauty therapy in South Africa (Rammanhor 2015).

2.3 Work-related musculoskeletal disorders (WRMDs)

WRMDs are caused or aggravated by work (National Research Council and Institute of Medicine 2001; Kuorinka *et al.* 1995; Mathews 2006; Salik and Ozcan 2004). They form a major component of occupational diseases (Kang *et al.* 2014) and result not only in pain and discomfort for the individual, but also decreased productivity and performance, chronic absenteeism and early retirement (New Zealand. Department of Labour 2007). They are a foremost reason for disability in the work place and result in a burden on the health care system and the economy (International Labour Organisation 2013; Morris 2006; Manga 2000). WRMDs were described as the most common work-related problem in Great Britain and contributed to at least one-third of all occupational injuries in the USA (Seo and Blair 2003) with a variety of risk factors associated with its development (David *et al.* 2008).

2.3.1 Theoretical framework for WRMDs

In order to guide this study the theoretical framework (the Bone and Joint Decade model) developed by the Bone and Joint Decade 2000-2010 Task Force for Neck Pain and its Associated Disorders (Côté *et al.* 2008) was selected. This model was chosen as it is comprehensive, simple, allows a detailed view of potential factors that can affect an individual developing WRMDs and the authors recommend its use to guide forthcoming aetiological studies (Côté *et al.* 2008). Although it was originally developed for understanding neck pain in the work place (Côté *et al.* 2008), it has been used by Long *et al.* (2012) when investigating WRMDs in healthcare professionals. Causal diagrammatic models are valuable tools in supporting or refuting theoretical pathways for the development of WRMDs pain (Greenland and Brumback 2002). This theoretical framework, as seen in Figure 2.1, highlights both inherent variables as well as workplace related variables that can lead to work-related neck pain and functional deficits.

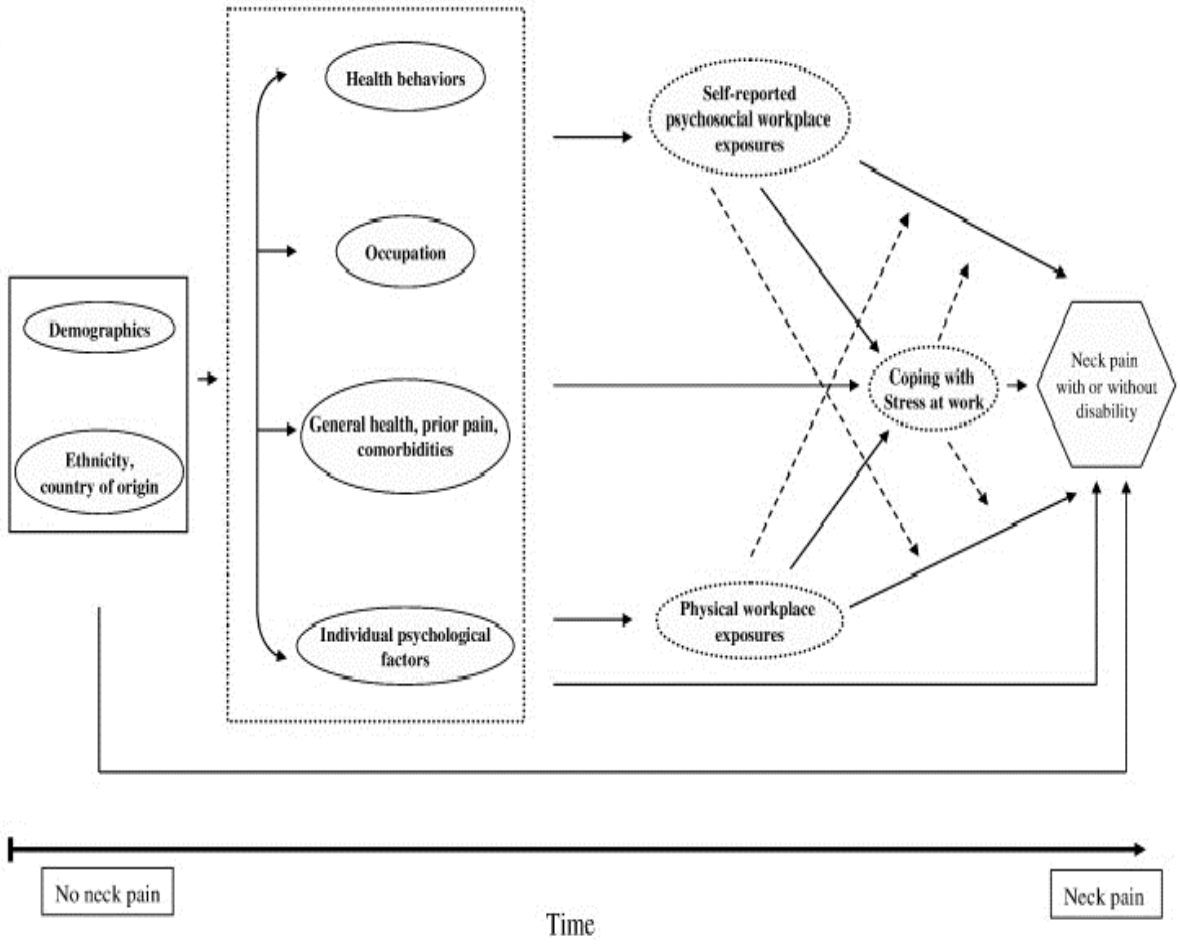

Figure 2.1: Theoretical framework for the development of neck pain in workers (Côté *et al.* 2008)

Inherent risk factors are classified as primary and secondary. The primary risk factors include socio-demographic characteristics such as age, gender, ethnicity and country of origin. These risk factors may precede entry to the workplace and may have an effect on the secondary risk factors such as health behaviour (e.g. exercise/smoking); occupation (e.g. job title); general health, prior pain and comorbidities (e.g. history of MSK disorders/concomitant disease); and individual psychological factors (e.g. mood disorders). Secondary risk factors are developmental and have the propensity for interaction with the primary factors.

The next stage in the model shows occupational exposure which is subdivided into psychosocial (e.g. low supervisor support) and physical workplace risk factors (e.g. repetitive tasks). The model then illustrates how these factors work together to result in coping with stress at the workplace.

2.4 Epidemiology of WRMDs in beauty therapists

2.4.1 Incidence and prevalence of WRMDs

WRMDs have been recognised as common problems contributing to pain and disability (Chaman *et al.* 2015; Leal *et al.* 2014; National Research Council and Institute of Medicine 2001). A number of self-reported surveys on WRMDs in Great Britain have been undertaken by the Health and Safety Executive (2014) in manual intensive occupational groups during the period 2013/14, the incidence of back disorders, upper limb disorders and lower limb disorders were estimated to be 69 000, 82 000 and 33 000 respectively. WRMDs commonly may affect various body sites (Sembajwe *et al.* 2013; Kumar *et al.* 2013; Okojie and Isah 2001) and have been described as components of an occupational epidemic (International Labour Organisation 2013).

When reviewing the literature only one study investigating WRMDs in beauty therapists was found. This was a cross sectional survey based study involving the distribution of a self-administered questionnaire to Greek cosmetologists (N=106) (Tsigonia *et al.* 2009). The purpose of the study was to determine WRMDs in cosmetologists (beauty therapists) and the aim was to determine the prevalence, risk factors and consequences of WRMDs. The results of this study were comparable to other labour intensive occupations involving the healthcare and industrial sectors where workers are exposed to various risk factors. This showed that the nature of work of the cosmetologists is one which predisposes the therapist to the development of WRMDs.

Due to the lack of similar studies to compare these findings, studies investigating populations that performed similar techniques to beauty therapists were sought and tabulated in Table 2.1.

Table 2.1 Studies investigating WRMDs in beauty therapists and occupations utilising similar techniques to beauty therapists

Author	Country, Number of participants and Population	Prevalence of WRMDs & most affected body sites	Exposures/ Aggravating factors
Cromie *et al.* 2000	Australia N=536 Physical therapists	•Lifetime 91% •1 year in at least 1 body site (82.8%) • Low back pain (48%), neck and upper back pain (12.2%) and thumb (11%)	•Younger age •Mobilisation techniques •Workload, awkward, static postures •Bending and twisting
West and Gardener 2001	Australia N=119 Physiotherapists	•Career prevalence 55% •1 year 40% •Prevalence in multi-sites (68%) • Low back (35%), hand (25%) and neck (24%)	• Monotonous/ static positions for prolonged periods •Working when injured •Mobilisations, manipulations and repetitive tasks
Okojie and Isah 2001	Nigeria N=174 Beauticians	•Prevalence in various sites was 87.4%	•Prolonged hours at work
Glover *et al.* 2005	United Kingdom N=2593 Physiotherapists, physiotherapy assistant and students	•Career prevalence 68% •1 year 58% • Low back pain (37.2%), neck (25.7%), upper back (18.4%) and thumbs (17.8%)	•Monotonous tasks and working postures •Overworking, bending/twisting with awkward postures •Working when injured
Matthews 2006	South Africa N=108 Chiropractors	•Lifetime 73.15% (wrist and/or hand pain) •Wrist pain 56.48% and hand pain 54.63%	•Younger age •Female gender •Hand/wrist overuse injuries
Jang *et al.* 2006	Taiwan N=161 Massage practitioner	•1 year 71.4% •Fingers/thumb (50.3%), shoulder (31.7%), wrist (28.6%), neck (25.5%), arm/elbow (23.6%), forearm (20.5%) and back (19.3%)	•Increased working duration •Prolonged exposure to risk factors •Repetitive and forceful movements •Awkward postures
Dasappa 2007	South Africa N=124 Nurses	•Prevalence of current WRMDs pain was 59.7%	•Lifting, bending and standing
Campo *et al.* 2008	USA N=882 Physical therapists	•1 year 28% (in any body region)	•Kneeling, squatting, awkward postures, static posture, repetition and working with trunk bent or twisted
Albert *et al.* 2008	Canada N=502 Massage therapists	•Current prevalence (30-50%) • Wrist & thumb (83.3%), neck (66.5%), low back (65.3%) and shoulders (62.2%)	•Massage techniques, exposure to high cumulative loads, non-neutral posture for prolonged periods
Tsigonia *et al.* 2009	Greece N=106 Cosmetologists	•1 year prevalence rates: neck (58%), low back (53%), hand and wrist (53%) and knee (28%)	•Sitting or standing for prolonged periods, operating vibrating hand tools
Alrowayeh *et al.* 2010	Kuwait N=212 Physical therapists	• 1 year 47.6% •Low back (32%), neck (21%), shoulder (13%), knee, hand/ wrist (11%), ankle/foot (6%), elbow (4%) and hip/thigh (3%)	• Female gender • Younger age • High workload • Manual therapy techniques
Tinubu *et al.* 2010	South-west Nigeria N=128 Nurses	•Career prevalence 84.4% •1 year 78% •Point prevalence 66.1% •Low back (44.1%), neck (28%) and knees (22.4%)	•Increased number of years in practice •Monotonous work postures •Lifting and transferring patients •Overworking (treating a large number of patients in a day)

Freimann *et al.* 2013	Estonia N=221 Nurses	•1 year 84% •Current prevalence 69% •Prevalence of multisite pain was 60%	•Repeated use of the upper limb •Heavy lifting •Working under pressure •Psychosocial risk factors
Grobler 2013	United Kingdom N=206 Assembly line workers	•5 year 29% • Upper limbs (48%), lower limbs (26%) and neck and back (26%)	•Younger age •Repetitive activities
Kumar *et al*. 2013	India N=536 Dentists	•1 year 100% •Neck (75.7%), hand & wrist (73.1%), low back (72%) and shoulder (69.4%)	•Awkward and sustained postures •Lack of physical activity stress
Sembajwe *et al.* 2013	USA N=1572 Patient care workers	•Prevalence in >3 body sites (27%) & prevalence of low back pain (52.8%)	•Increased workload, low supervisor support, bending, stooping & repositioning patients
Leal *et al.* 2014	Brazil N=41 Physical therapists	•Current prevalence of overall WRMDs was 85.4%. •C-spine 62.9%	•Increased frequency of cervical flexion movements & posture & trunk flexion

From the above studies it can be seen that manual intensive occupations are exposed to potential risks at the workplace that may lead to the development of WRMDs. These studies found that lifetime prevalence of WRMDs was between 55% and 91%. Additionally, period prevalence varied significantly between 28% and 100%, which demonstrates that a range of possible risk factors could be contributing to the occurrence of WRMDs. Point prevalence also varied considerably from 30% to 85.4%, indicating a high prevalence of WRMDs in labour intensive occupations.

The common exposures were repetitive movements, prolonged standing/seated positions and awkward postures. Consideration of these variables is relevant to beauty therapists as they may contribute to their predisposition of WRMDs. The most common region affected by WRMDs was the low back. Low back pain is a global common economic problem (Dagenais *et al.* 2008). Africa has been found to have a high prevalence of low back pain in manual labour activities (Woolf and Pfleger 2003). There is a paucity of literature investigating beauty therapists, therefore, conclusions may be drawn from collective studies regarding common exposures found in the above occupations. These studies will be further elaborated on in the next section

2.4.2 Risk factors for WRMDs in beauty therapists

2.4.2.1 Risk factors inherent to the worker

2.4.2.1.1 Socio-demographic factors:

Age: Increasing age affects muscle strength, muscle mass and bone density decreases, cartilage thins and ligaments lose their elasticity. Functional capabilities decline regardless of having medical conditions or MSK disorders (Welch *et al.* 2008). However, studies have shown an association between advanced age and increased prevalence of WRMDs in manual intensive occupations (Bejia *et al.* 2005: Rugelj 2003). Physically demanding work with less resistance to strain caused by the work and biomechanical age-related changes are thought be responsible (Plouvier *et al.* 2011; Bejia *et al.* 2005). In advanced age, workers who have been working in the same occupation for a lengthy duration are most likely exposed to continual occupational risks factors and this may lead to the occurrence of WRMDs (Tinubu *et al.* 2010; Jang *et al.* 2006). Conversely, several studies (Grobler 2013; Glover 2005; Cromie *et al*. 2000; West and Gardener 2001) have found WRMDs to occur in the younger working populations, the novice skills and low knowledge in the formative years of their career are often given as reasons for injuries in this group (Salik and Ozcan 2004).

Gender: Bisiachhi and Huber (2006) found that the anatomical distribution of occupational MSK injury may vary with gender. When comparing gender in chiropractic students in the USA (n=120), neck pain was more prevalent in males (11%) and low back pain in females (19%). This contrasts with Alrowayeh *et al*. (2010) who found both neck pain (17.9%) and low back pain (22.6%) to be strongly associated with the female gender in physical therapists in Kuwait (N=212). The relationship between the occurrence of WRMDs and the female gender has been documented in the literature (Baek *et al.* 2015; Leal *et al.* 2014; Nordin *et al.* 2011; Salik and Ozcan 2004). It has been suggested that females are more likely to report information regarding health, education and societal issues than men (Lemos *et al.* 2013; Yao *et al.* 2012), thus resulting in a high prevalence in this gender.

Strazdins and Bammer (2004) suggested that women were not more vulnerable than men to occupational overuse or repetitive work and that there was no evidence that their pain perception or sensitivity was higher than men. Instead they found that the relationship between females and an increased risk of developing WRMDs was

because of the diverse demands encountered at both the workplace and home, which negatively affected their time for exercise or relaxation.

In general, males are stronger and have more body strength than their female counterparts, differences in muscle morphology and sex hormones may predispose males to greater muscular strength and decreased pain sensitivity (Wiesenfeld-Hallin 2005). Yet other studies have reported no gender differences when WRMDs were investigated in dental practitioners (Muralidharan *et al.* 2013) and factory workers (Coury *et al.* 2002).

Dependents: Research has shown that individuals who have family members which they are responsible for may be at risk of experiencing physical and psychological health problems (Umberson and Montez 2010). In a survey based study regarding community wellness, work, family and associated impacts, a relationship between poor mental health and taking care of dependents was found especially for those with special needs (Earle and Heymann (2011). On the contrary, the ability of the worker to be have the emotional and physical support of a family member has been shown to have a positive effect on health (Tsouna-Hadjis *et al.* 2000).

Education: Research has shown an association between education and health in both developed and developing regions (Baker *et al.* 2011). In an informal settlement population of India, Pingle and Pandit (2006) showed an association between the occurrence of rheumatic MSK disorders and education. There was a higher prevalence of MSK disorders in uneducated participants (N=119; 31.1%) as opposed to participants with a formal degree of education (N=84; 5.9%). Investigations comparing educated and uneducated adults found that schooling significantly develops meta-cognitive skills such as deductive reasoning and the degree of intelligence (Medhi *et al.* 2013; Blair *et al.* 2005). Noticeable differences in health behaviour such as the processing of health information and the ability to make more informed decisions regarding health have been observed in individuals who have obtained even minimal levels of education when compared to individuals without formal education in underdeveloped areas (de Walque *et al.* 2005).

Cole *et al.* (2005) found that respondents (N=155) who had some formal tertiary education were more likely to report WRMDs exposure (60%-62%) than those with high school education or less (33%). Higher education may lead to awareness of the relationship between their occupation and experiencing WRMDs and thus being more likely to attribute WRMDs to work-related activities (Chaman *et al.* 2015; Cole *et al*.

2005). People with higher education levels were more likely to accurately report injuries (Mirowsky and Ross 2003), as well as understand and integrate education in the form of self-management regimes (such as a healthy balanced diet, lifestyle modification and exercise) to decrease the risk of WRMDs and increase their physical and mental well-being (Albert *et al.* 2008). Having a formal education enhances cognitive skills in decision making which can inform health and lifestyle choices (Baker *et al.* 2011).

Ethnicity: Ethnicity comprises racial, cultural, social and psychological characteristics all of which pertain to ones identification to a particular group (Edwards *et al.* 2001). Ethnicity has the ability to influence health beliefs and behaviours with regards to pain, perceptions, healthcare, illness and disease (Callister 2003), and may thus be a risk factor for musculoskeletal pain (Vargus-Prada *et al.* 2013; Campbell and Edwards 2012; Palmer *et al.* 2008; Portenoy *et al.* 2004; Green *et al.* 2003). One such example is perceived pain, which varies between cultures and impacts on reporting of MSK pain (Dagenais and Haldeman 2012), and may influence a respondent's answering of a questionnaire related to WRMDs.

There has been an extensive growth in literature regarding differences across ethnic groups. The mechanisms causing ethnic differences in pain response are multifactorial and multifaceted and when assessed may also be influenced by other variables (e.g. gender and age) (Campbell and Edwards 2012). A hypothetical model suggested by Pincus *et al.* (2006) proposed that exposure to a combination of individual health beliefs as well as cultural health beliefs might lead to the development of attitudes and behaviour in coping with the pain which may then result in morbidity and chronicity.

2.4.2.1.2 Anthropometry (Height / Weight / BMI): Body Mass Index (BMI) is a tool used to calculate risk for chronic diseases. The weight and height of an individual is measured in order to determine the amount of body fat present (World Health Organization 2011; Bickley and Szilagyi 2003). Obesity (high BMI) has developed into a worldwide epidemic having a major impact on morbidity. Several theories exist proposing the link between increased weight, obesity and MSK symptoms (Viester *et al.* 2013), one such theory involves mechanical burdens resulting from overload on the MSK system (e.g. joints, soft tissue structures and bones) (Wearing *et al.* 2006). This is comparable to Wai *et al.* (2008) who proposed that increased weight places strain on the spinal components resulting in biomechanical changes, wear and tear and premature degeneration.

Many studies have shown an association between obesity and MSK disorders (Nilsen *et al.* 2011; Shiri *et al.* 2010; Felson 2009; Wearing *et al.* 2006; Kouyoumdjian *et al.* 2002). Bejia *et al.* (2005) found that an increased BMI was associated with lower back pain in nurses. In a recent study involving working populations in the Netherlands, Viester *et al.* (2013) found increased weight and a high BMI was moderately associated with MSK disorders in multiple sites over a one year period. When comparing individuals with normal weight to those with a high BMI, obese workers had a higher risk for MSK disorders as well as decreased recovery from symptoms. Although MSK disorders are multifactorial, being overweight and obese may be variables that interact and potentiate the effects of other risk factors (Wearing *et al.* 2006).

2.4.2.1.3 General health and medical history:

Previous trauma, injury and surgery: Any acute or repetitive trauma directed to the kinematic chain may result in injury and this may lead to compensations in other regions of the body. These biomechanical changes directly affect the MSK system leading to abnormal stress and strain exerted on the joints of the body. One such example is aberrations to the lower kinematic chain with the resultant compensation by the lumber spine leading to MSK pain and discomfort (Stoxen 2008). Factors that may contribute to the development of a subsequent injury or re-injury is having a history of a previous trauma (Steffen *et al.* 2008; Arnason *et al.* 2004), exposure to risk factors that lead to a compromised MSK system (e.g. joint instability / ligament laxity) (Steffen *et al.* 2008) and continuous exposure to risk factors implicated in the initial injury (Schneider *et al.* 2000). Therefore, chronic joint instability, scar tissue development and biomechanical changes are also indicated as potential risk factors to the development of injury and perpetuation of re-injury (Arnason *et al.* 2004). WRMDs affecting the lower extremity in manual therapists such as physiotherapists and healthcare professionals such as nurses have been consistently shown to be due to previous injury to the lower limb kinematics (Seymour 2002; Stoxen 2008). In a military setting, previous injury involving the hamstring has been linked to proprioceptive deficits which is correlated with future risk of re-injury in both the hamstring and the low back (Parr *et al.* 2015). Therefore, appropriate treatment and rehabilitation in any injury is imperative in order to prevent re-injury and chronicity (Schmitt *et al.* 2012).

Surgery has been shown to cause stress to the body lowering the immune system. The mechanisms for this are not known, however, the surgery and the medication used during surgery, such as anaesthesia, have strong effects on the body and the immune

system, which may increase risk of infection (Desborough 2000). During surgery, trauma and inflammation arise and nociceptors and inflammatory mediators (cytokines, bradykinin and prostaglandins) are activated leading to increased pain sensitivity perception. The central nervous system also becomes highly sensitised because of ongoing nociceptive stimuli altering the stimulus-response relationship, this is known as central sensitisation (Sandkühler 2009). The process of central sensitisation is suggested to be an important factor in the development of persistent or chronic pain (Reddi and Curran 2014). Therefore, the effects of surgery can be seen in any region of the body.

Exercise: Physical activity increases functional capability of the structures of the MSK system and is thought to be a factor protective for high manual labour (Dagenais and Haldeman 2012; Bell and Burnett 2009; Morris 2006), yet the literature is inconclusive. A French study found that male workers who took part in physical activities, were at a reduced risk of developing neck pain (Cassou *et al.* 2002), this is in contrast to Brandt *et al.* (2004), Luime *et al.* (2004) and Power *et al.* (2001) who found no association between MSK pain and activity levels. High loading activities and the accumulation of loads have been shown to be predictive of MSK pain, especially for women, where it was noted that high intensity physical activity seemed to predispose females to higher likelihood of MSK disorders affecting the low back (Heneweer *et al.* 2011). Carrying out exercises incorrectly may lead to MSK injuries, therefore it was suggested that complex high load or high intensity exercises be taught by a qualified therapist to alleviate MSK pain (Sargant and Bachman 2010). In addition, as physical activity intensifies the risk for developing MSK pain increases (Haskell *et al.* 2007).

Sleep: Sleep is a very important variable in determining the well-being and health of an individual. However, sleep is often overlooked in most studies (Aghayev *et al.* 2010). Sleep is necessary to help the body recover and rejuvenate from everyday stress and strain. Sleep disruptions may affect the consequence of disease (Simpson and Dinges 2007) in both physical and mental health (Hamilton *et al.* 2007). Canivet *et al.* (2008) found that exposure to mechanical loads, manual intensive occupations and sleep disturbances were associated with the development of chronic MSK pain.

Individuals who present with sleep difficulties associated with pain have considerably more MSK pain in comparison with healthy individuals (Aghayev *et al.* 2010). The lack of sleep has been found to be associated with depression, shift work, high job demand, work environment, work-related stress and lack of job control (Lim *et al.* 2014). Sleep

disruptions have been shown to be associated with migraines in adolescents (Gupta *et al.* 2008). Alterations in sleep patterns have also been shown to increase the frequency of headaches (Ødegard et *al.* 2010).

Cigarette smoking: The pathogenesis of cigarette smoking is multifaceted and it has harmful effects on the MSK system such as the loss of bone mineral density and increased risk of fractures (Abate *et al.* 2013). Nicotine increases calcium ion concentrations which results in muscular contraction, consequently resulting in pain and fatigue (Goesling *et al.* 2012). Negative effects have been observed in tendons (Abate *et al.* 2013). In an American population (N=1134), history of smoking was associated with cluster headaches with 51% of the respondents reporting the onset of the headache whilst smoking (Rozen and Fishman 2012).

In Spain (N=361), 29% of medical students who smoked suffered from migraine headaches, with smoking increasing the severity of their headaches (71%) (Lopez-Mesonero *et al.* 2009). Smoking has been suggested to be a risk factor predisposing to low back pain among smokers (current and ex-smokers) (Vindigni *et al.* 2005). Smoking is not only known to exacerbate chronic back pain, but also MSK pain in the upper limbs, lower limbs and neck (D'Silva *et al.* 2014).

Alcohol consumption: Alcohol has been shown to be an immunosuppressant in both humans (Nelson and Kolls 2002) and rodents, particularly mice (Jonsson *et al.* 2007), and when taken excessively it is a risk factor for several chronic conditions and diseases such as alcoholic fatty liver disease and alcoholic hepatitis (Shield *et al.* 2013). Alcohol consumption has also been found to be a risk factor for MSK disorders in nurses (Smith *et al.* 2005), yet in a systematic literature review conducted by Leboeuf-Yde (2000) there was no confirmatory association found between alcohol consumption and low back pain.

Interestingly, Skillgate *et al.* (2009) found moderate alcohol consumption as having a protective effect against neck or back pain in female workers. This could be due to the relaxing effects of moderate alcohol consumption (Park *et al.* 2015). Respondents answering self-reported questionnaires are known to underestimate alcohol consumption (Selin 2006). In a study comparing two Australian population survey's respondents who consumed alcohol less frequently and those who never drank underestimated their consumption (43%) more than those who did drink alcohol (22%) (Livingstone and Callinan 2015). According to Kesteloot (2004) there is currently no consensus in the literature on the effects of various alcoholic beverages on health.

2.4.2.1.4 Individual psychological factors:

Stress, depression and mental exhaustion: Stress is an important factor to consider as it leads to changes in the central nervous system, such as increased muscle activity and tension resulting in hypersensitivity and pain (Bongers *et al.* 2006; Bongers *et al.* 2002). Extreme fatigue, emotional distress, frustration and inability to balance work and life are indicators of work stress (Devereux *et al.* 2004).

Stress along with increased work load and demand, lack of control, lack of co-worker support and lack of supervisor support may adversely affect the individual and contribute to WRMDs (Karasek *et al.* 1998). According to Heneweer *et al.* (2010), there is evidence that suggests that psychological factors (such as stress, depression) are associated with occurrences of MSK pain and its related disability levels (Heneweer *et al.* 2010; Hoogendoorn *et al.* 2000). This may be linked to anxiety and fear about a past injury or anxiety due to the perception of damage to the lower back or apprehension about possible re-injury (Morris 2006).

Depression is a mental illness which may affect daily life and work negatively. It affects ones confidence, ability, concentration, relationships and it may contribute to the development and progression of MSK pain and disability (Phyomaung *et al.* 2014). In Japan, female nursing students suffering from depression were close to two times more likely to have low back pain, although the cause of this was not established (Smith 2005). Depression was reported by physiotherapists as a complaint that contributed to stress-related illness that they felt were attributed to their work (West and Gardener 2001). In emergency medical workers there was an association between those who suffered from depression (25%) and presence of low back pain (Vlok 2005).

Stress, depression, anxiety and distress are risk factors that may lead to chronicity of MSK disorders leading to pain and disability (Bogduk 2006). Carroll *et al.* (2004) label depression as a positive indicator and predictor of low back pain and disability. Kirkaldy-Willis and Burton (1992) stated that low back pain may be mechanical and psychogenic in origin, where the primary onset of low back pain may be a mechanical or a physical problem and later psychological changes may occur secondarily and contribute to the pain as described earlier. This subjective pain and emotional element (such as stress, depression and anxiety) has been found to further increase pain and discomfort (Middleton and Pollard 2005; Kirkaldy-Willis and Burton 1992).

Mental exhaustion, also known as burnout is characterised by chronic stress and feelings of frustration which may lead to emotional and physical exhaustion (Maslach *et al.* 2001). These symptoms may then lead to functional deficits both professionally and personally. Mental exhaustion or burnout has been shown to affect general health as well as psychological health, leading to the adoption of negative health habits and feelings of being unable to cope with stressors of daily work and life (Shirom *et al.* 2005, Burke and Richardsen 2000). This is supported by Glise *et al.* (2010) who showed that with an increase in the degree of stress-related exhaustion, depression and anxiety rate increases and general health status and work performance decreases (Glise *et al.* 2010). Evidence exists suggesting associations between work-related psychosocial risk factors and burnout (Borritz *et al.* 2005) therefore workers reporting high burnout rates have been shown to have decreased productivity at work, absenteeism and premature retirement (Ahola *et al.* 2008) as well as MSK pain and disability (Christensen and Knardahl 2010).

2.4.2.2 Work-related/occupational risk factors

2.4.2.2.1 Psychosocial risk factors:

Job satisfaction: Psychosocial risk factors that may affect the individual's capacity to deal with demands of their working environment need to be addressed (Kompier 2003). In South Africa, a low job satisfaction has been found in healthcare workers (Blaauw 2013), organisational (e.g. workload) and individual factors (e.g. personality traits) have been found to influence its occurrence (Lu *et al.* 2012). Thus, motivation at work was found to be a positive determinant of job satisfaction and work-related stress was found to be a negative determinant (Li *et al.* 2014). Demotivation at work may then contribute to stress and burnout (Chung and Kowalski 2012) which affects job performance (Blaauw 2013). Cortisol is a hormone released in response to stress, chronic exposure to stress elicits a prolonged stress response which may lead to cortisol dysfunction resulting in MSK pain and inflammation (Hannibal and Bishop 2014). Low job satisfaction and occupational stress along with increased biomechanical demands have a greater influence on MSK pain and disability (Davis and Heaney 2000). Job dissatisfaction may lead to increased risk of MSK disorders and chronicity (van den Heuvel *et al.* 2004).

Job demand: Increased job demands involve time constraints, intense workload, working under pressure and working fast. Perceptions of increased job demand and intensified workload as well as physical stress were linked to WRMDs in a systematic review of literature in the workplace (Morris 2006). Similar to this, high workload was suggested to be associated with an increased prevalence of low back pain in younger physical therapists (N=212; 26%) whereas the lower prevalence rate in older therapists (5%) appeared to be due to decreased workload as they moved out of direct patient care (Alrowayeh *et al.* 2010). Occupational stress along with increased biomechanical demands have a greater influence on MSK pain and disability (Davis and Heaney 2000). Increased workload was associated with WRMDs being reported in more than three regions in patient care workers (Sembajwe *et al.* 2013).

Job control: This refers to the amount of influence workers have over the way tasks can be carried out. Having little or no control over the job, monotonous work and low job satisfaction has also been noted to increase WRMDs in healthcare workers (Sembajwe *et al.* 2013). Low task variation or monotonous tasks were identified as risk factors in the development of WRMDs in qualified physiotherapists, physiotherapy students and assistants (Glover *et al.* 2005). Exposure to physical risk factors in the working environment and the way in which work is done may place the worker at risk for developing WRMDs (Bugajska *et al.* 2013). So with no control over rest breaks, work pace and techniques at work, stress levels are increased and strain occurs because muscles do not have enough time to rest (Lacey *et al*. 2007; Bongers *et al.* 2006).

Manager/supervisor/co-worker support: Employers or those in superior positions (e.g. management / supervision) may show a disinclination to listen to or address work problems, this lack of support may lead to stress to the employee. Managerial support has been found to have beneficial effects on employees in that it improves job satisfaction and productivity (Wallace *et al.* 2009). Low co-worker support was found to be more likely to increase the physical load on cosmetologists leading to an increased prevalence of low back and hand/wrist complaints as well as absenteeism and care seeking. These findings were also supported by other studies in dentists, and other working populations (Sembajwe *et al.* 2015; van den Heuvel *et al.* 2005; Hoogendoorn *et al.* 2000).

Shortage of co-workers: High employee turnover, poor performance appraisal, staff leave, absenteeism or a limited number of employees have a negative impacts on the remaining workers resulting in additional workload, working overtime to meet demands and working under pressure to compensate for the shortage of staff (Mathis and Jackson 2007). This in turn leads to absenteeism, high stress levels and low ambition (Mabindisa 2014).

2.4.2.2.2 Physical workplace exposures:

The nature of the work done by the beauty therapist may result in injury.

Mechanical and manual massage therapy: Mechanical massage involves the use of vibratory and/or gyratory equipment whereby the beauty therapist must simultaneously support the weight of the vibrating and rotating machine whilst maintaining their body posture. Physical workload and awkward sustained postures have been implicated in the development WRMDs in manual therapists (Leal *et al.* 2014; Pereira 2009).

Massage therapy is an exhaustive manual activity that places significant strain on the therapist that performs the massage (Rupert and Ebete 2004). This has been documented to result in decreased effectiveness and efficiency of the delivery of the massage to clients as well as increased risk of re-injury to the therapist, resulting in increased absence from work, increased negative impact on the therapist's work and social interactions as well as their health and financial well-being (Cromie *et al.* 2001; Jang *et al.* 2006). The Bureau of Labor Statistics (2016) found that therapists performing manual massage are exposed to numerous repetitive and exhaustive work-related injuries due to the physically challenging nature of performing massage techniques and are therefore susceptible to carpal tunnel syndrome and low back pain.

Beauty and aesthetics:

Facial therapy: Little has been reported about the impact of facial therapy and its effect on the beauty therapists, however, in professions such as dentistry (n=536) where the professional is required to maintain a forward head posture as well as work in static postures for prolonged periods show a high prevalence of WRMDs affecting the neck (75.7%), hand and wrist (73.1%), lower back (72%) and shoulder (69.4%) over a 12 month period (Kumar *et al*. 2013).

Manicures and pedicures: Certain hazards exist in the health and beauty industry, therefore, there is a legal obligation to provide a safe and hygienic environment (Nordmann 2001). Most of the guidelines in place are to protect the health and the safety of the client (Gerson 2001), however the therapist is at risk for WRMDs due to repetitive techniques and poor posture when performing manicures and pedicure (Alojado 2015). A recent study by Park *et al.* (2014) comparing nail technicians and office workers showed the shoulders and the neck region were common areas for WRMDs. These outcomes were comparable to a study by Harris-Roberts *et al.* (2011) who suggested that the risk for WRMDs increased when carrying out work that was visually demanding. Wrist position during repetitive movements of a job task can also lead to wrist injury (Chen *et al.* 2010). This can be seen in activities such as manicure and pedicure treatments performed by beauty therapists.

Hair removal techniques: These involve repetitive movements of the upper limb as well as grasping on hair removal instruments or devices. Holding devices incorrectly or tightly clutching objects frequently may lead to overuse of the flexor tendons, fatigue and inflammation then follows leading to median nerve compression, pain and numbness (carpel tunnel syndrome), as seen in dentistry (Ahmed *et al.* 2014). Beauty therapists perform tasks involving rapid supination and repetitive vigorous movements and may use vibratory tools for hair removal. These activities may lead to overuse, which places undue strain on the MSK system of the practitioner (Rambabu and Suneetha 2014; Alrowayeh *et al.* 2010).

Makeup application: Tasks that call for the therapist to grasp or hold objects for prolonged periods as well as repetitive wrist movements are found to be risks for WRMDs (Jang *et al.* 2006) as well as bending over or in a hunched position (Alojado *et al.* 2015), flexed neck or tilted neck as well as sustained posture (Adegoke *et al.* 2008) are all factors that increase susceptibility for WRMDs (Alojado *et al.* 2015). These body positions and techniques may often be seen in beauty therapists when performing makeup related tasks. Musculoskeletal pain can be seen as a significant occupational health problem for professions involving precise hand and wrist techniques and the maintenance of static postures (Szeto *et al.* 2009; Stomberg *et al*. 2010).

Number of hours in contact with clients: Excessive patient contact time has been positively associated with a greater risk for the development of WRMDs among physiotherapists (West and Gardener 2001). The association between the numbers of

hours worked per day and WRMDs is unclear in the literature (Pereira 2009). There was a high prevalence of injury in physiotherapists who had high patient contact hours (41-50 hours per week) (Holder *et al.* 1999). Glover *et al.* (2005) and West and Gardner (2001) found decreasing patient contact hours as an important preventative strategy used by physiotherapists in response to work related injury. In the USA, a national occupational survey was conducted to evaluate the impact of long working hours and overtime on occupational injuries and it was found that working for at least 12 hours per day and at least 60 hours per week were associated with an increased risk of injury (Dembe 2009. Attar (2014) found in Saudi Arabian nurses that working for longer than 10 hours per day as a determinant for psychological and physical stress.

In professions such as nursing (n=128), treating a large number of patients per day was associated with a prevalence of low back (44.1%), neck (28%) and knee pain (22.4%). In chiropractic students, the practice of chiropractic specific techniques for over 21 hours per week were 22 times more risky for low back pain (Fyfe 2006). In massage therapists increased patient contact hours impacted significantly on the prevalence of WRMDs in massage therapists and it was suggested that strategies to decrease patient contact time should be implemented to reduce stress and fatigue. These strategies were the allowance of time for rest or breaks and reduction of scheduling of clients and recognition of factors which reduce work productivity such as fatigue (Jang *et al.* 2006). Having little or no influence on when rest or breaks can be taken has been found to predict upper limb disorders in computer users (Juul-Kristensen *et al.* 2004).

Workplace modification: The workplace environment (lighting, temperature, space) and ability to modify the workplace station (furniture, equipment) is very important in prevention and reduction of WRMDs (Cromie *et al.* 2000). Height adjustable work surfaces are important to prevent bending (prolonged or repetitive) or elevation of the upper limbs to reach if the surface is too high for the therapist. According to postural analysis, working surfaces that are too high lead to elevation of the shoulders with the elbows and wrists in an awkward position to also allow for compensation of increased height and working surfaces that are too low leads to increased bending and twisting of the back to accommodate for the lack of height. These awkward positions and compensations may result in WRMDs (Jang *et al.* 2006).

Incorrect table height in massage therapists was cited as a factor that contributed to WRMDs (Jang *et al.* 2006) among physiotherapists. The plinth height was also

reported as a factor which predisposed to MSK injury (Glover *et al.* 2005). However, among chiropractors, Mior and Diakow (1987) found incorrect table height to be associated with unspecified back pain, conversely, Tim (1996) found that chiropractors (90%) did not attribute their unspecified back pain to the height of their tables.

In a study on workplace interventions in the general population Arnetz *et al.* (2003) found that interventions such as ergonomic improvements and workplace modifications significantly reduced days off from work and the probability of return to work was increased 50% higher in the intervention group as compared to the reference group.

2.5. Summary

Musculoskeletal disorder has been cited in the literature as the most common cause of severe chronic pain and disability worldwide (Brooks 2006; Woolf and Pfleger 2003). At the workplace beauty therapists are vulnerable to sustaining MSK disorders because of their work tasks performed at work (Tsigonia *et al.* 2009). In addition to this, the demanding and popular nature of the beauty (Campbell 2012) and hotel spa industry (Akinboade and Braimoh 2010) places the beauty therapist in a position where a variety of treatments have to be performed to meet the need of the client. However this may jeopardise their individual health and well-being resulting in WRMDs.

Work-related musculoskeletal disorders are highly prevalent especially in labour intensive occupations (Baek *et al.* 2015) and they account for the majority of occupational diseases globally (Kumar et al 2013). WRMDs are multifactorial, therefore many factors may contribute to its development whether at leisure or work setting (Nyantumbu *et al.* 2011). In this study, risk factors inherent to the beauty therapist and those relating to the workplace were described. The risk factors inherent to the worker were sociodemographic factors, general health, medical history and individual psychological risk factors. Extrinsic risk factors are those relating to the workplace such as physical risk and psychosocial risk factors. These were described to show interactions between variables. WRMDs have a significant impact on manual intensive occupations therefore being able to identify associations or interactions between risk factors may assist in the development of effective strategies and guidelines to prevent and manage WRMDs in hotel spa therapists.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter details the research methodology and statistical analyses utilised in this study.

3.2 Study design and approval

This research utilised a quantitative paradigm and a cross sectional epidemiological survey design. Survey based research allows for the collection of data from a large diverse target population, the descriptive information that is generated can then undergo statistical analysis allowing for an understanding of the relationships between variables (Mitchell and Jolly 2012).

This study was approved by the Durban University of Technology, Faculty of Health Sciences, Research and Higher Degrees Committee (RHDC) and the Institutional Research and Ethics Committee (IREC) (Appendix A) prior to the collection of data.

3.3 Setting and population

This research was conducted in the eThekwini municipality utilising beauty therapists that worked within the hotel spa industry.

3.4 Sampling

3.4.1 Sampling strategy: Hotel spa

The Federated Hospitality Association of South Africa (FEDHASA), South African Tourism Service Association (SATSA), South African Spa Association (SASA) and the South African Association of Health and Skincare Professionals (SAAHSP) were contacted to obtain a list of all registered spas and members to determine the population, as this list was not comprehensive the internet was searched, using the

following key terms: hotel; spa; eThekwini; to identify additional spas. The resultant list was checked against the yellow pages phone book, creating a comprehensive list from which the spas could be sampled.

A total of 35 spas were identified within the eThekwini municipality. The researcher then made telephonic contact with each hotel spa owner where the following inclusion and exclusion criteria were applied.

Inclusion criteria:

1. The Spa must be either owned by the hotel or affiliated with a hotel
2. The hotel/spa owner must read and sign a Letter of Information and Consent (LOIC) and give permission for research to be conducted at their spa (Appendix B).
3. The spa was required to offer the following minimum treatments: facial treatments, manicures and pedicures and massage therapy.

Exclusion criteria:

1. Dental and medical spas, cruise ship spas, club spas and mineral spring spas.

Following the telephonic discussion with the spa management, ten spas declined participation resulting in 25 spas allowing access to their beauty therapists. The hotel spas meeting the inclusion criteria were asked for the number of beauty therapists working in the spa.

3.4.2. Beauty therapists

Through telephonic contact it was found that there were approximately 261 beauty therapists working in the hotel spas that met the study criteria in the eThekwini municipality. From this, those who would partake in the expert group and pilot testing would be required to be excluded leaving a total of 254 participants being eligible to participate. A minimum of a 70% (n=178) response rate was required for generalisability.

In order for the beauty therapist to participate the following inclusion and exclusion criteria were applied.

Inclusion criteria:

1. Participants were required to read and sign the LOIC (Appendix C).
2. Participants were required to be working as beauty therapists for at least one year.

Exclusion criteria:

1. Participants who took part in the expert group and pilot study.

3.5 Measurement tool

3.5.1 Development of the questionnaire

A literature search was conducted using search terms such as “beauty therapist”, “cosmetologist”, “beautician”, “spa therapist”, “work-related musculoskeletal disorders”, “occupational overuse syndrome” and “repetitive strain injury”. In addition to this, studies by Tsigonia *et al.* (2009); Raad (2012); Matthews (2006), Hilderbrandt *et al.* (2001) and Kuorinka *et al.* (1987) were reviewed to obtain a suitable questionnaire.

Tsigonia *et al.* (2009) was the only study that had investigated work-related MSK pain in cosmetologists and provided a suitable questionnaire for use in this study. However, following several attempts to contact the authors with little success it was decided that a modified questionnaire would need to be complied for use in this study. Table 3.1 highlights the authors and their works which informed the development of the present questionnaire.

Table 3.1 Research utilised to guide questionnaire development

Variables	Question number	Literature utilised
Socio-demographic: Age Gender Ethnicity Number of dependents Education level	 1.1 - 1.2 1.3 1.4 1.7 1.8 - 1.11	Tsigonia *et al.* (2009); Matthews (2006); Hilderbrandt *et al.* (2001)
Anthropometry:	1.5 - 1.6	Tsigonia *et al.* (2009)
General health & past medical history: Overall health Medical conditions Current medication Ill health (last 6 months) Previous trauma, injury & surgery	 1.12 1.17 1.18 1.19 1.20 - 1.21	Tsigonia *et al.* 2009; Raad 2012
Health behaviour: Exercise Sleep Cigarette smoking Alcohol consumption Individual psychological factors Stress Mental exhaustion Depression	 2.1 2.2 2.3 2.4 1.13 1.15 1.16	Tsigonia *et al.* (2009); Raad (2012)
Psychosocial risk factors: Enjoyment of work Opportunity to develop new skills Lack of decision control Co-worker & managerial support job demand feelings of work overload & frustration	 3.8.13 3.8.14 3.8.15 3.8.16 - 3.8.17 3.8.18 3.8.19 - 3.8.20	Tsigonia *et al.* (2009); Raad (2012)
Work-related/occupational risk factors: Work characteristics of the beauty therapist Treatments performed by beauty therapist Occupational exposures Lifetime prevalence of WRMD pain	 3.1 - 3.6 3.7.1 - 3.7.12 3.8.1 - 3.8.12 3.9	Raad (2012); Tsigonia *et al.* (2009); Matthews (2006)
Impact of WRMDs	4.1 - 4.10	Hildebrandt *et al.* (2001)
Current and past pain (point & period prevalence)	5.1 - 5.10	Kuorinka *et al.* (1987)

3.5.2 Validation of the questionnaire for use in this study

In order for the questionnaire to be utilised successfully in research the questionnaire was validated. Validity refers to the accuracy and dependability of instruments, information, statistics and results in research, so that a particular tool utilised in upcoming research investigations can ensure accuracy (Bernard 2013). In this study, this was done through the use of an expert group and pilot study.

Following approval from the IREC to conduct the validation of the questionnaire an expert group meeting was organised to assess the questionnaire for face and content validity. Face validity refers to the 'face value' of the questionnaire, it is a subjective decision of whether the research tool appears to be valid and unambiguous on the surface (Bernard 2013; Hicks 2004). In order to attain face validity the expert group members had to agree that the questionnaire would measure what it set out to measure i.e. the aim and objectives of the study. Content validity involves the assessment of the content specific to the questionnaire. This form of validity relies on the knowledge of individuals who are familiar with the concept and constructs being investigated in the research (Bernard 2013). In order for the expert group to decide that the questionnaire met content validity they would need to agree that the questions are effective and suitable to the aim and objectives of the study.

The expert group had to consist of at least six to eight members following minimum following criteria:

- The researcher
- The research supervisor/s
- At least two beauty therapists with a recognised qualification and at least one years' experience working in the hotel spa industry
- At least one person who has had experience in survey research
- At least one person who has had experience in quantitative research methodologies
- A masters student who has conducted or is presently conducting survey research

Eight people representing at least one of the above criteria presented for the expert group. Members were welcomed and given verbal instructions as to the role of the

expert group. They were also informed that the expert group discussion would be adequately recorded. Members were informed that their names would not accompany any report in the dissertation maintaining confidentiality. They were also requested not to divulge any discussion that would take place in the expert group to people outside of the expert group.

Each member was required to read and sign the LOIC (Appendix C), a copy of the pre-expert group questionnaire (Appendix D) and to sign a confidentiality statement (Appendix E). Once all members agreed to the terms of the expert group, the researcher then explained that members should think critically about the issues encompassing each research question (Salant and Dillman 1994), that they should then analytically consider the significance of the questions and make recommendations for each question to inform the development of the questionnaire.

Each question was then discussed; modifications, suggestions and recommendations were recorded. Group consensus was required to modify each question. Following the expert group meeting discussion the questionnaire was modified to produce the pre-piloted questionnaire (Appendix G).

Before the questionnaire could be administered to the beauty therapists it required pilot testing. Pilot testing is a trial run of the research conducted on members of the research population to determine the viability of the research measurement tool (Trochim 2000). The aim of the pilot study was to determine if the research population could relate to the questionnaire and if there were any oversights or discrepancies evident in the questionnaire (Brancato *et al.* 2006). Five qualified beauty therapists from a local hotel spa were requested to be involved in the pilot testing of the questionnaire. They were required to complete the LOIC (Appendix H), the pre-pilot questionnaire (Appendix G) and a pilot testing evaluation form (Appendix I). They were instructed to make any necessary changes to the questionnaire as they answered it. The recommended changes, mostly editorial (Appendix J), were then made to the questionnaire to produce the research study questionnaire (Appendix K) used for data collection in this study.

3.5.3 Final Questionnaire

The research study questionnaire (Appendix K) consisted of question in the following categories:

- Socio-demographic
- Anthropometric
- Individual psychological
- General health and medical history
- Work-related / occupational risk factors
- Area of MSK pain, severity of MSK pain and whether a health care practitioner had been consulted for the pain

3.6 Research procedure:

Once permission was obtained from the spa owner or management to conduct the study at their spa (Appendix B), a suitable time was arranged for the researcher to visit the spas and inform the beauty therapists of the study and request their participation. The beauty therapists were informed that participation was voluntary and that their participation would be confidential. Those wanting to participate were given a LOIC (Appendix L) and the research study questionnaire (Appendix K) to complete. The researcher was present to address any questions or queries that arose; depending on the availability of the beauty therapist, the researcher would either wait while the questionnaire was being completed or arrange a date or time to collect the questionnaires.

The researcher instructed participants not to place their names and other identifiers on the questionnaires. Separate ballot boxes were used to store the LOIC (Appendix L) (Ballot box A) and the questionnaires (Appendix K) (Ballot box B) to ensure confidentiality. The boxes were only opened once the researcher had collected the minimum required number of questionnaires to allow for confidentiality to be maintained.

3.7 Data synthesis and analysis

Once the ballot boxes were opened the questionnaires were checked for completeness (n=178). The only question which required data synthesis was that of height and weight to make body mass index. This was done by a statistician (Singh 2016).

The data was then extracted, coded and captured in MS Excel format (2010) and imported into IBM Statistical Package for the Social Sciences (SPSS) version 24 for analysis. Descriptive and inferential statistics were utilised to analyse the data. Descriptive statistics such as mean, standard deviation, median and mode where necessary. The association between risk factors and WRMDs was assessed using bivariate analysis to test association and causality. Chi squared or Fischer's exact test were used for categorical variables, while independent student's t-tests were used for numerical data. If the data was not normally distributed Mann-Whitney U test was utilised. Odd's ratio were calculated to determine the risk of the exposure where possible (Singh 2016).

3.8 Ethical considerations

Participation in this study was voluntary. Participants were informed of the study both verbally and through the LOIC (Appendix L). Participants were also informed that they were free to withdraw at any time should they so wish, ensuring participant autonomy. All participants meeting the study criteria were invited to participate in line with ethical principle of justice. Justice ensures an impartial selection of participants (Emmanuel *et al.* 2000). In this study there was no discrimination utilised in sample selection based on race, gender or age. In line with non-maleficence participants were requested not to place their name of any other identifier on the questionnaires which were then coded, and the use of separate ballot boxes ensured participant confidentiality.

The data obtained from the study were accessed by the researcher, the research supervisor and the co-supervisor only. During the study the research questionnaires and LOIC were kept in a locked safe. On completion of the study the research data (Excel spreadsheet, LOIC and the questionnaires) will be stored safely in the DUT Chiropractic department for five years, thereafter, all data will be disposed of by means of shredding.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the results of data analysis, which is reported under the objectives of the study.

4.2 Response rate

The population of beauty therapists who were eligible to participate in this study from the hotel spas which agreed to participate in the eThekwini municipality was 254, of which 178 completed the questionnaire, resulting in a 70% response rate. Beauty therapists who did not meet the inclusion criteria were excluded. Reasons for non-participation were a lack of interest and time to complete the questionnaire. Others took the questionnaire but failed to return it to the researcher, resulting in non-inclusion. Of the questionnaires that were returned, all were included as there were none that were incomplete.

4.3 Objective 1: To determine the lifetime, point and period prevalence of self-reported WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

The respondents in this study reported high lifetime, period and point prevalence of WRMDs pain that, in their opinion, was related to their work as beauty therapists, as can be seen in Figure 4.1. There were no missing responses.

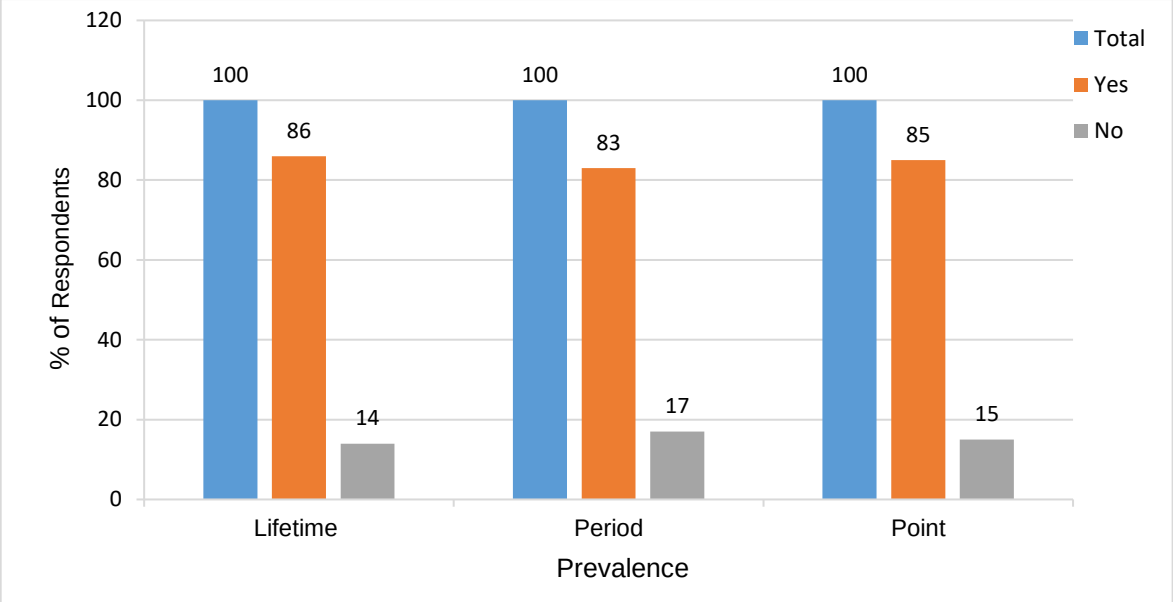

Figure 4.1. The lifetime, period and point prevalence of self-reported WRMDs by the participants

The respondents reported WRMDs in all areas of the body with the most affected area being the low back followed by the neck, then the hand and wrist as seen in Table 4.1.

Table 4.1. The number of respondents who experienced period and point prevalence of self-reported WRMDs per body region (n=178)

Region	Point		Period	
	n	%	n	%
Head	79	44.4	93	52.2
Neck	116	65.2	118	66.3
Upper back	110	61.8	105	59.0
Shoulder	93	52.2	83	46.6
Elbow	51	28.7	49	27.5
Low back	131	73.6	124	69.7
Hand/Wrist	112	62.9	114	64.0
Hip/Thigh	34	19.1	42	23.6
Knee	53	29.8	58	32.6
Foot/Ankle	69	38.8	80	44.9

When asked about the intensity of their pain per body region, it was mostly rated as mild to moderate with the exception of low back pain and hand and wrist pain which were more often reported as severe, as seen in Table 4.2.

Table 4.2. Pain rating per body region (n=178)

Region	Total	Mild		Moderate		Severe	
		n	%	n	%	n	%
Head	78	40	51.3	30	38.5	8	10.3
Neck	119	40	33.6	41	34.5	38	31.9
Upper back	91	25	27.5	41	45.1	25	27.5
Shoulder	112	30	26.8	46	41.1	36	32.1
Elbow	51	21	41.2	19	37.3	11	21.6
Low back	112	29	25.9	38	33.9	45	40.2
Hand/Wrist	130	19	14.6	41	31.5	70	53.8
Hip/Thigh	34	17	50	9	26.5	8	23.5
Knee	54	27	50	17	31.5	10	18.5
Foot/Ankle	69	35	50.7	20	29	14	20.3

The health care providers visited for either past or current WRMDs pain per body region, as reported by the respondents, are listed in Table 4.3, in descending order of most frequented. General practitioners were the health care practitioner most commonly sought for assistance for WRMDs.

Table 4.3: The number of participants who consulted health care providers for their self-reported WRMDs per body region

Healthcare provider	Total	Head	Neck	Shoulder	Upper back	Elbow	Wrist/ Hand	Low back	Hip/ Thigh	Knee	Foot/ ankle
	N	n	n	n	n	n	n	n	n	n	n
General Practitioner	174	24	31	6	17	3	19	60	2	7	5
Pharmacist	88	8	12	7	19	4	14	18	0	4	2
Physiotherapist	71	11	8	10	6	3	18	13	2	0	0
Chiropractor	68	9	18	10	10	0	3	14	0	2	2
Massage therapist	34	1	3	6	4	2	11	2	2	0	3
Specialist: e.g. Neurologist	15	1	1	0	2	0	6	0	4	1	0
Biokineticist	5	0	0	0	0	0	2	2	1	0	0

4.4 Objective 2: To determine the socio-demographic, anthropometric, individual psychological, general health and medical history and work-related/occupational risk factors for WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

4.4.1 Socio-demographic characteristics

4.4.1.1 Age

The mean age of the respondents was 27.74 (± SD 4.83), with a range from 19 to 47 years of age. Two participants failed to answer this question. Age was significantly (p=0.005, CI 0.87 - 4.84, independent sample t test) associated with WRMDs with those who experienced point WRMDs being older (n=147, mean 28.12, ± SD 4.99) than those who did not report current WRMDs (n=29, mean 25.76, ± SD3.40).

4.4.1.2 Gender

The respondents were female dominant as seen in Figure 4.2, with three respondents failing to answer this question. The majority of the respondents, irrespective of gender, reported suffering current WRMD pain (p=0.364; Fisher's exact test).

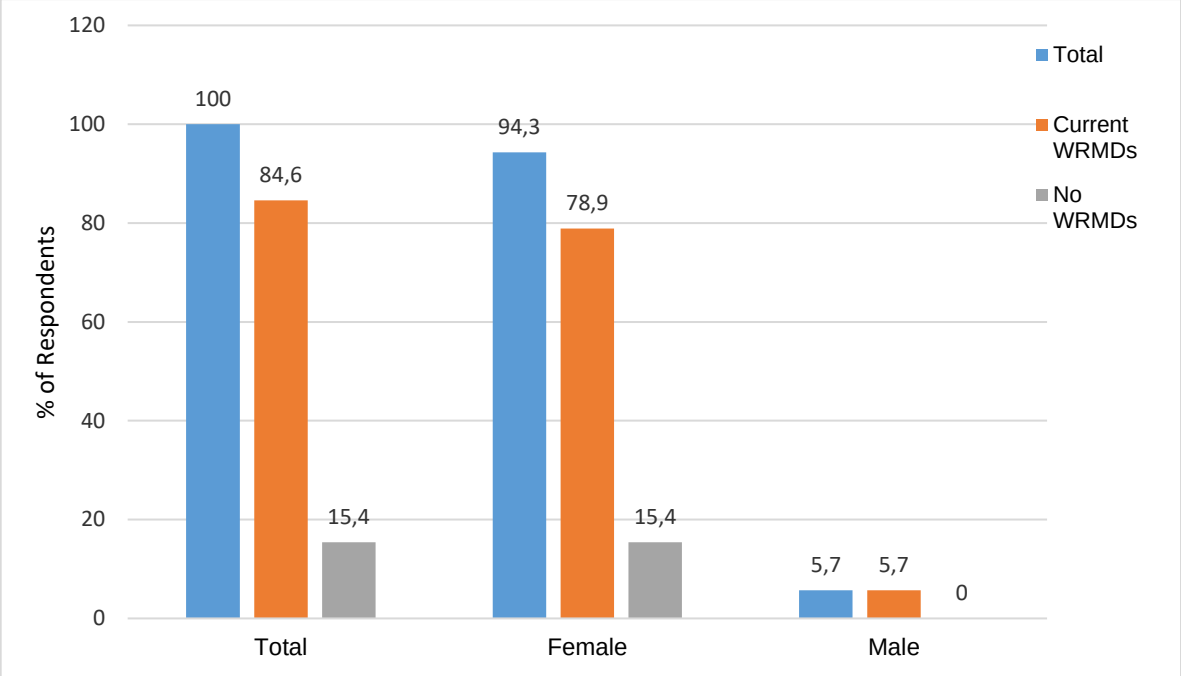

Figure 4.2: Gender distribution of the participants relative to current WRMD status

4.4.1.3 Number of dependents

The mean number of dependents per respondent was 1.66 (±SD 1.59) with a range of 0 to 10 dependents. There was no significant (p=0.081; CI -1.78- 0.10; independent student's t-test) relationship found between the number of dependents of those who were currently experiencing WRMDs (n=116; mean 1.58 ±SD1.50) and those who reported no current WRMDs (n=12; mean 2.42 ±SD2.15).

4.4.1.4 Ethnicity

The four main ethnic groups of South Africa were represented by the respondents. Trends suggest that ethnicity did not affect the prevalence of current WRMD pain, as seen in Figure 4.3. Chi squared test was invalid due to low cell counts.

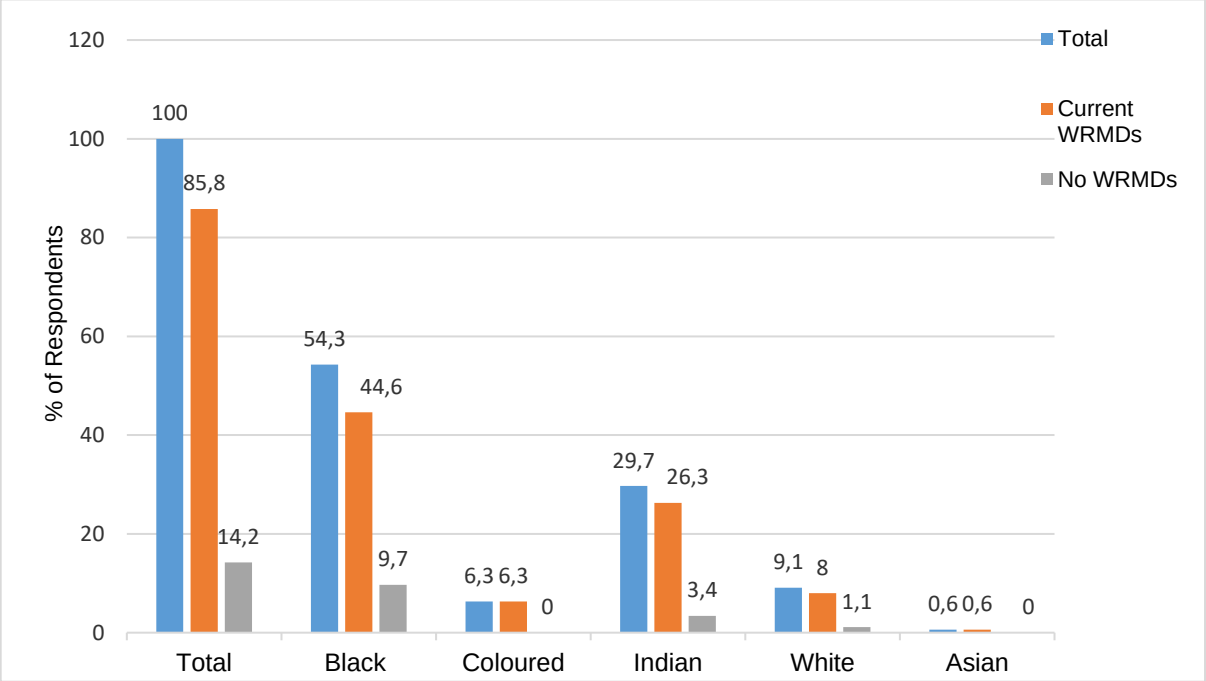

Figure 4.3: Ethnic groups relative to injury status

4.4.1.5 Education

- Highest level of school education achieved

The majority of the respondents had completed matric as seen in Table 4.4. Twelve respondents failed to answer this question. Trends suggest that highest level of school education did not influence the prevalence of current WRMD pain, as irrespective of completing matric or not, the reporting of WRMDs was high.

Table 4.4: Highest level of school education relative to injury status

Highest level of school education achieved	Total		Current WRMD pain			
			Yes		No	
	n	%	n	%	n	%
Primary school	1	0.6	1	0.6	0	0.0
High school completed matric	155	93.4	131	78.9	24	14.5
High school did not complete matric	10	6	8	4.8	2	1.2
Total	166	100	140	84.3	26	15.7

Chi squared test invalid due to low cell counts

- Post school Higher Education

More than half (n=101; 68.7%) of respondents had attended post school higher education. Thirty-one respondents failed to answer this question. Irrespective of whether the respondent had attended post school higher education there was a high rate of self-reported WRMDs. Chi squared test was invalid due to low cell counts.

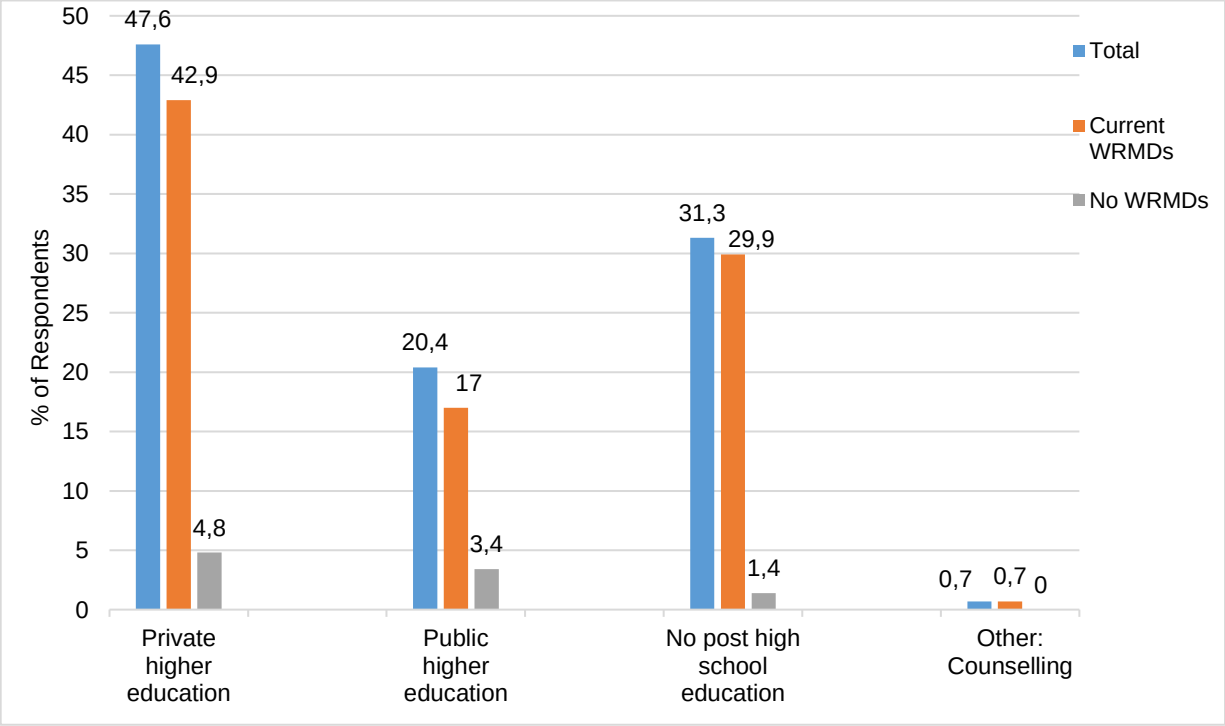

Figure 4.4: Highest level of school education achieved relative to injury status

- Beauty qualification

The majority of the respondents had obtained advanced/international diplomas followed by training certificates in order to obtain their beauty qualifications, as seen in Table 4.5. Twenty-five respondents failed to answer this question. Trends suggest that the type of beauty qualification obtained did not influence the reporting of current WRMDs. Nevertheless, the reporting of WRMD pain was high regardless of the reported qualification level.

Table 4.5: Beauty qualification achieved relative to injury status

Beauty Qualification	Total		Current WRMD pain			
			Yes		No	
	n	%	n	%	n	%
B. Tech Degree	3	2.0	2	1.3	1	0.7
National Diploma	21	13.7	17	11.1	4	2.6
Advanced / International Diploma	50	32.7	45	29.4	5	3.3
Modules	17	11.1	16	10.4	1	0.7
Training Certificate	48	31.4	39	25.5	9	5.9
National Certificate Vocational	12	7.8	10	6.5	2	1.3
No formal beauty qualification	2	1.3	2	1.3	0	0.0
Total	153	100	133	87	20	13

Chi squared test invalid due to low cell counts

- Training college / institution

The majority of respondents reported having attending a private higher education facility to obtain their beauty qualification, as seen in Figure 4.5. Forty respondents failed to answer this question.

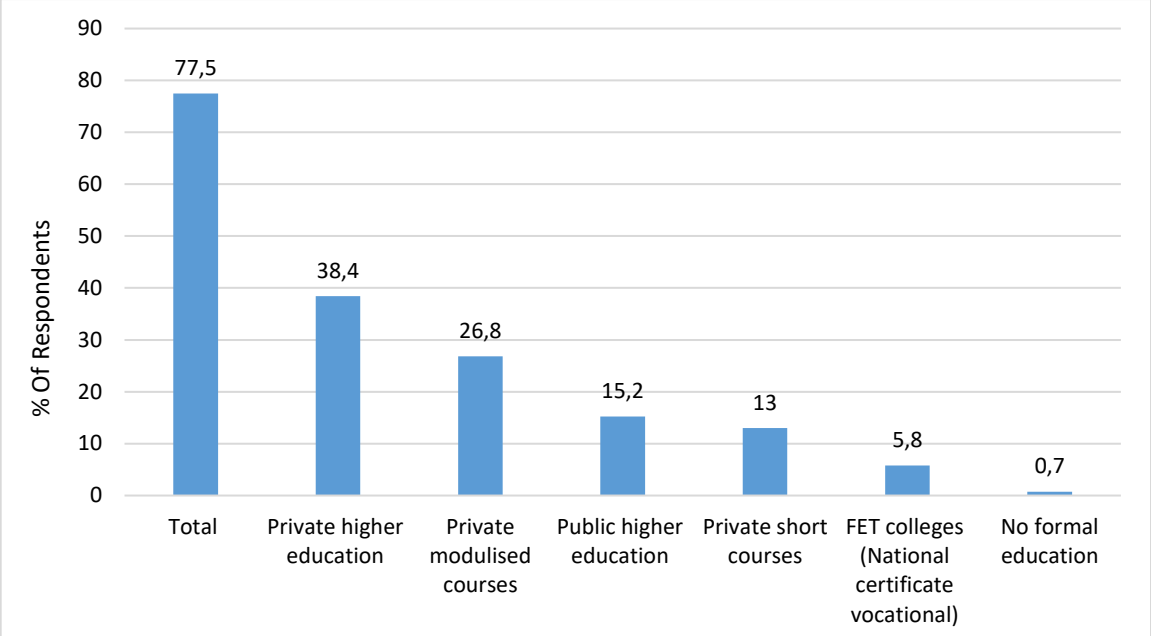

Figure 4.5: Type of training college/institution attended by respondents

4.4.2 Anthropometry

The mean height (n=138, 77.5%) and weight (n=155, 87%) of the respondents are presented in Table 4.6. No significant difference was found for height (p=0.272; independent samples t-test) or weight (p=0.994; independent sample t-test) when those who reported current WRMD pain were compared to those who did not.

Table 4.6: The mean height and weight of respondents in relation to self-reported WRMDs

	Total			Current WRMD pain					
				Yes			No		
	N	Mean	±SD	n	Mean	±SD	n	Mean	±SD
Height	138	1.567	0.11	123	1.57	0.11	15	1.54	0.11
Weight	155	72.87	18.89	134	72.87	17.64	21	72.9	25.96

When categorised according to the body mass index (BMI) many of the respondents were overweight or obese. Trends suggest that BMI did not influence the prevalence of current WRMD pain, as can be seen in Figure 4.6. Chi squared test was invalid due to low cell counts.

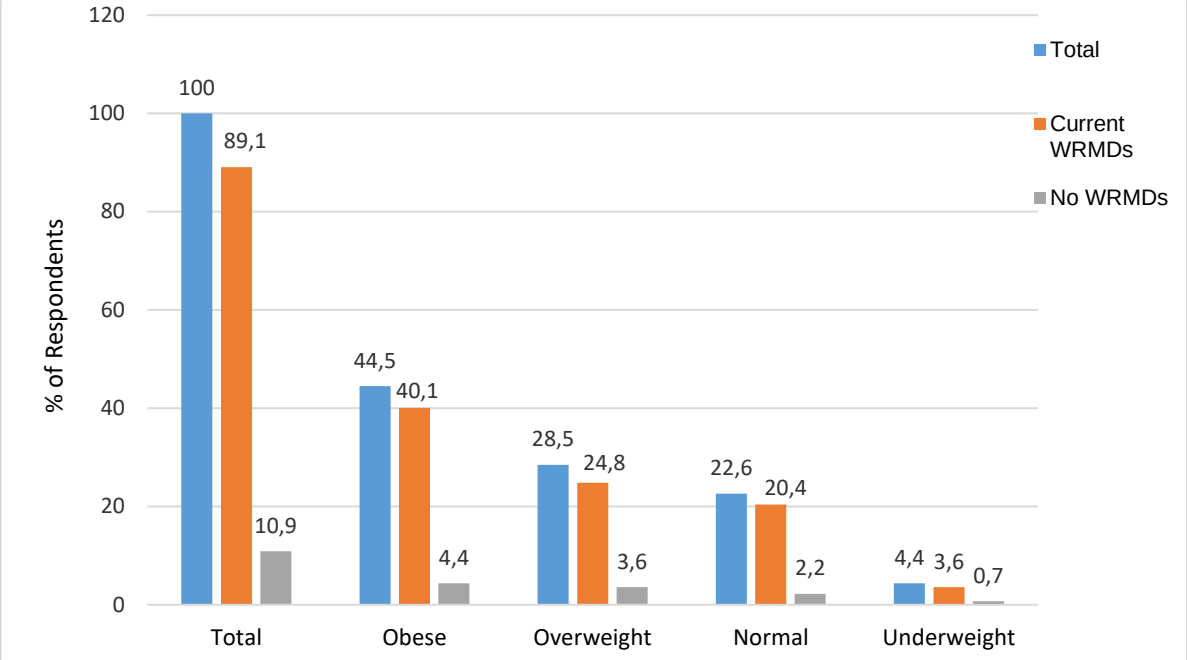

Figure 4.6: BMI categories relative to injury status

4.4.3 Individual psychological risk factors

4.4.3.1 Stress and mental exhaustion rating

The majority of the respondents reported a high level of general stress and mental exhaustion at the end of the day, seen in Table 4.7. The reporting of general stress was not related to experiencing current WRMDs pain (p=0.360; Fisher's exact test). However those who reported feeling mentally exhausted at the end of the day were 3.977 times (OR, CI 1.193-13.263) more likely to be currently experiencing WRMDs pain (p=0.032; Fisher's exact test).

Table 4.7: Stress and mental exhaustion relative to injury status

Variable		Total		Period pain			
				Yes		No	
		n	%	n	%	n	%
	High	152	86.4	131	74.4	21	11.9
	Low	24	13.6	19	10.8	5	2.8
	Total	176	100	150	85.2	26	14.7
	High	162	92.6	140	80	22	12.6
	Low	13	7.4	8	4.6	5	2.8
	Total	175	100	148	84.6	27	15.4

4.4.3.2 Depression rating

The majority of the respondents were not experiencing feelings of depression (n=130; 73.9%), there was missing data for two participants. Reporting depression was not related to experiencing current WRMD pain (p=0.474; Fisher's exact test).

4.4.4 General health and medical history

4.4.4.1 Overall health

The majority of the respondents reported their overall health to be good to excellent as seen in Table 4.8. Perceived health rating was not related to current WRMDs pain (p=0.228; Fisher's exact test). Trends suggest that overall health did not influence the prevalence of current WRMD pain.

Table 4.8: Overall health rating in relation to injury status

How would you rate your overall health?	Total		Current WRMD pain			
			Yes		No	
	n	%	n	%	n	%
Excellent	72	40.7	56	31.6	16	9
Good	91	51.4	81	45.8	10	5.6
Fair	13	7.3	13	7.3	0	0
Poor	1	0.6	1	0.6	0	0
Total	177	100	151	85.3	26	14.6

Chi squared test invalid due to low cell counts

4.4.4.2 Medical history

- Medical conditions

Only 34 respondents (19.2%) reported having a concomitant medical condition. The medical conditions suffered by the respondents are presented in Figure 4.7, with asthma (14.7%, n=5), arthritis (14.7%, n=5) and anaemia (11.8%, n=4) being the most common medical conditions reported.

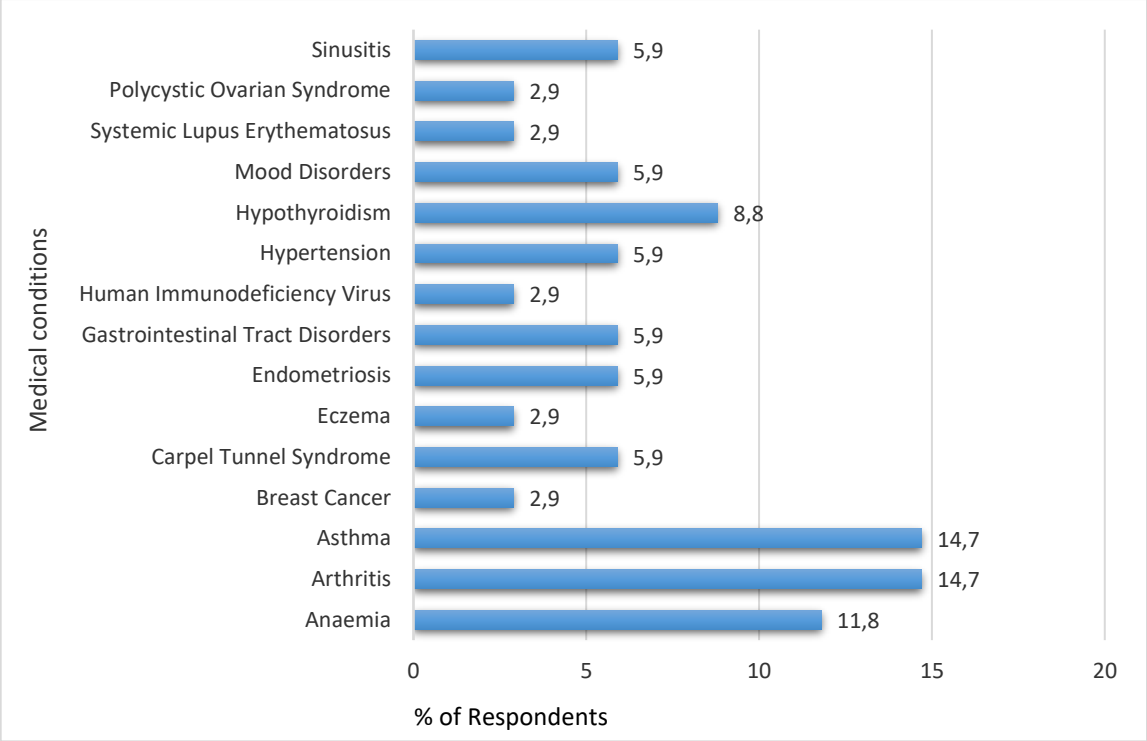

Figure 4.7: Medical conditions suffered by the respondents (n=177)

Those reporting a concomitant comorbidity, as seen in Table 4.9, were 7.33 times more at risk (OR, CI 0.96-56.08) at experiencing current WRMDs (p=0.031; Fisher's exact test).

Table 4.9: Relationship between respondents reporting a medical condition and the point prevalence of WRMDs

Medical condition	Total		Point Pain			
			Yes		No	
	n	%	n	%	n	%
Yes	34	19.2	33	18.6	1	0.6
No	143	80.8	117	66.1	26	14.7
Total	177	100	150	84.7	27	15.3

- Current medication

The majority of the respondents were not currently taking any medication (84.8%, n=151). Of those that were taking medication, oral contraceptives were the most common (25.9%, n=7) followed by Eltroxin (11.1%, n=3), inhaled corticosteroids (11.1%, n=3), iron supplements (11.1%, n=3) and anti-depressants drugs (7.4%, n=2), as seen in Figure 4.8.

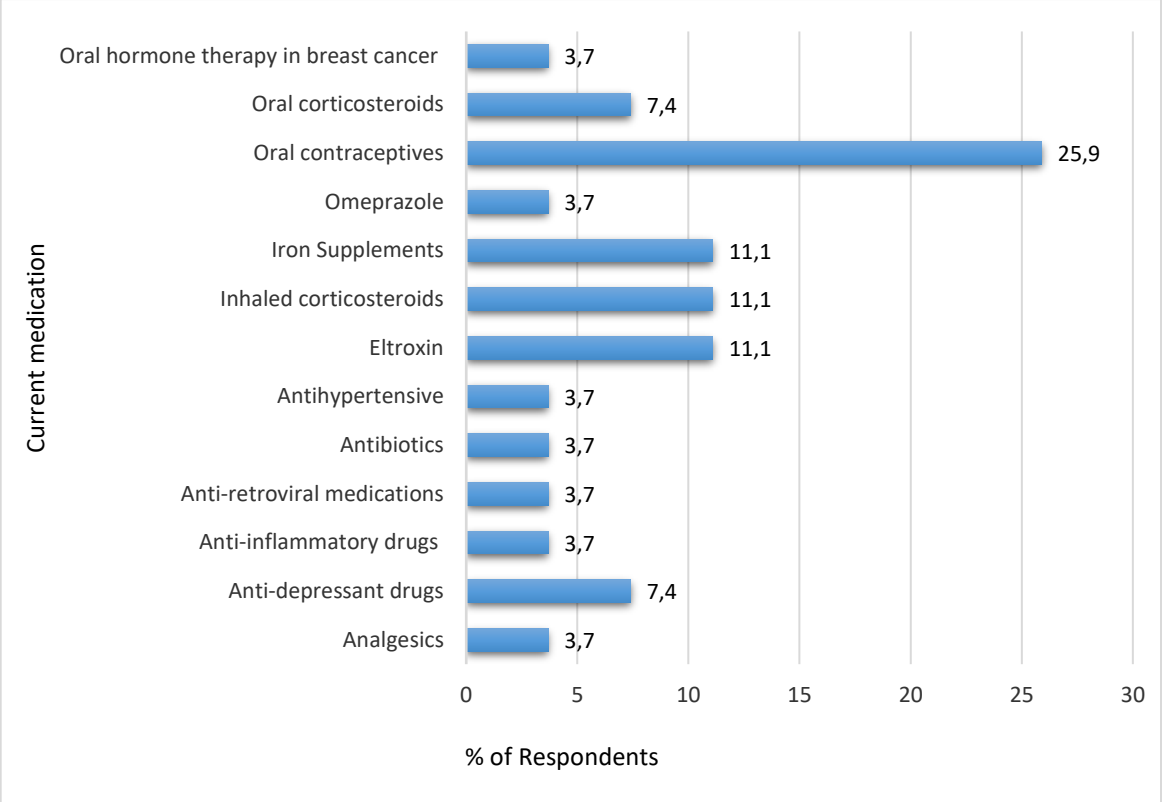

Figure 4.8: Medication currently being taken by the respondents (n=151)

No significant relationship was found between current medication use and the reporting of point WRMDs (p=0.085; Fischer's exact test), as seen in Table 4.10.

Table 4.10: Relationship between respondents reporting a current medication and the point prevalence of WRMDs

Current medication	Total		Point Pain			
			Yes		No	
	n	%	n	%	n	%
Yes	29	16.4	28	15.8	1	0.6
No	148	83.6	122	68.9	26	14.7
Total	177	100	150	84.7	27	15.3

- Ill health resulting in absenteeism

Only 10.1% (n=18) of respondents reported that they had ill health which prevented them from working in the last 6 months. The most common reasons for missed days of work were from viral/bacterial infection (61.1%, n=11), followed by MSK pain and dysfunction (11.1%, n=2) and asthmatic attack (11.1%, n=2), as seen in Figure 4.9.

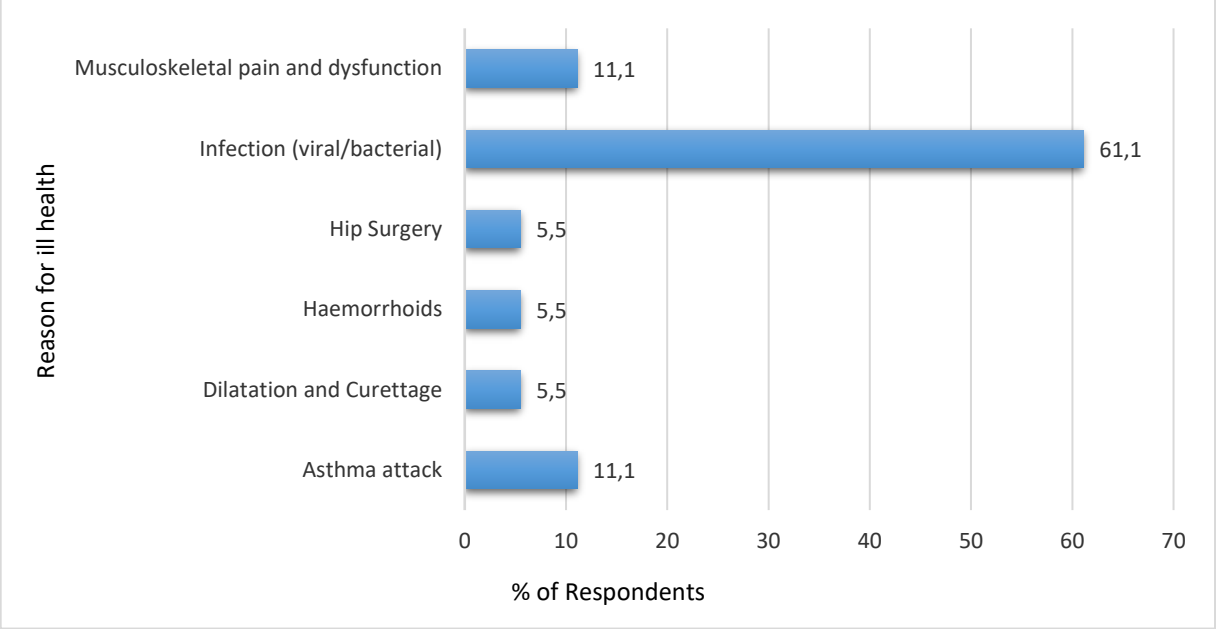

Figure 4.9: Ill health that has led to absenteeism in the last 6 months (n=160)

Table 4.11 illustrates that there was no significant relationship found between ill health in the last 6 months and the reporting of current WRMD pain (p=0.209; Fisher's exact test).

Table 4.11: Relationship between respondents reporting ill health and the point prevalence of WRMDs

Ill health	Total		Point Pain			
			Yes		No	
	n	%	N	%	n	%
Yes	23	13	22	12.4	1	0.6
No	154	87	128	72.3	26	14.7
Total	177	100	148	84.7	27	15.3

- Previous trauma to any part of their body that resulted in injury requiring medical intervention

Only 5.6% (n=10) of respondents reported having previous trauma requiring medical intervention, with the hand region being the most frequent area injured, as seen in Figure 4.10.

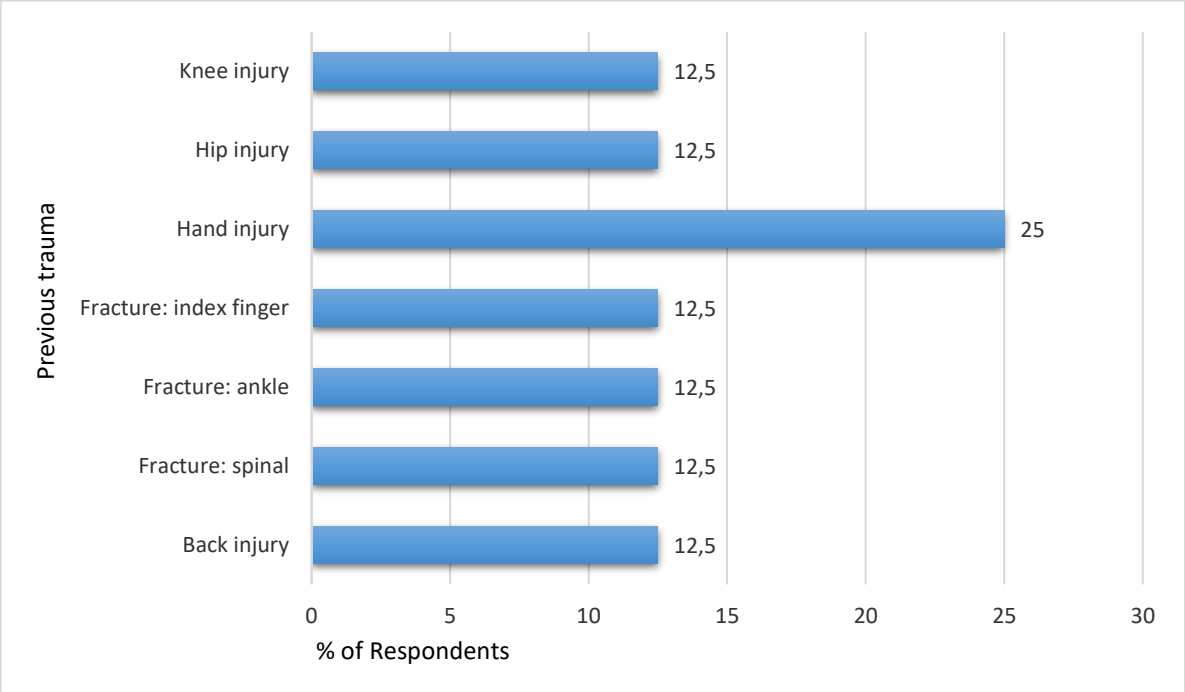

Figure 4.10: Previous trauma requiring medical intervention (n=170)

There was no significant relationship found between previous trauma and reporting of current WRMD pain (*p*=0. 364; Fisher's exact test), as seen in Table 4.12

Table 4.12: Relationship between respondents reporting previous trauma and the point prevalence of WRMDs

Previous trauma	Total		Point Pain			
			Yes		No	
	n	%	n	%	n	%
Yes	10	5.6	10	5.6	0	0
No	167	94.4	140	79.1	27	15.3
Total	177	100	150	84.7	27	15.3

- Surgical history

The majority of respondents (n=144, 80.9%) had no previous surgery. A caesarean section (41.2%, n=14) was the most common surgery reported followed by tonsillectomy (14.7%, n=5) and appendectomy (8.8%, n=3), as seen in Figure 4.11.

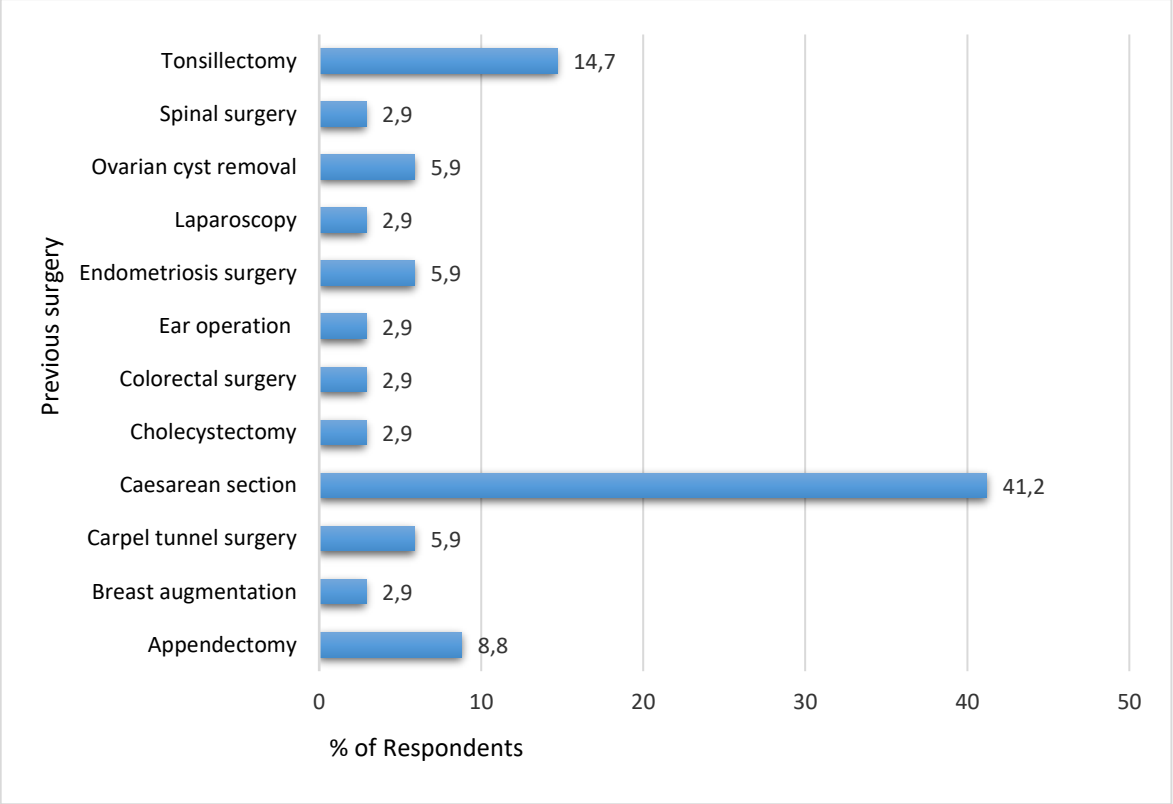

Figure 4.11: Previous surgeries reported by respondents (n=144)

Table 4.13 shows the number of respondents who were currently experiencing WRMDs related to surgical history, no significant relationships were found (p=0.454; Fisher's exact test).

Table 4.13: Relationship between respondents reporting surgical history and the point prevalence of WRMDs

Surgical history	Total		Point Pain			
			Yes		No	
	n	%	n	%	n	%
Yes	37	21	33	18.8	4	2.3
No	139	79	116	65.9	23	13.1
Total	176	100	149	84.7	27	16.3

4.4.4.3 Health behaviour (Exercise, Sleep, Cigarette smoking and Alcohol consumption)

- Exercise and sleep

The majority of the respondents did not exercise (n=113, 63.5%, N=178) as seen in Table 4.14, and of those that did exercise, they partook in an average of three exercise sessions per week (±SD 1.23) of a duration of 30 minutes (±SD 19.26), ranging for 10 to 90 minutes. Exercise participation was not found to be related to the reporting of current WRMD pain (*p*=0.279; Fisher's exact test).

More than half of the respondents felt that they did not get enough sleep (55.6%, n=95, N=178), as seen in Table 4.14. The respondents had on average 6.63 hours (±SD 1.) per night ranging from 2 to 11 hours per night The reporting of adequate sleep was not related to current WRMD pain (*p*=0.097; Fisher's exact test).

Table 4.14: Exercise and adequate sleep relative to injury status

Variable	Status	Total		Point Pain			
				Yes		No	
		n	%	n	%	n	%
	Yes	65	36.5	58	32.6	7	3.9
	No	113	63.5	93	52.2	20	11.2
	Total	178	100	151	84.8	27	15.2
	Yes	76	44.4	60	35.1	16	9.4
	No	95	55.6	84	49.1	11	6.4
	Total	171	100	144	84.2	27	15.8

When asked about their preferred sleeping position the respondents favoured sleeping on their sides (n=67, 50.8%). Trends suggest that sleeping position did not affect the reporting of current WRMD pain (Table 4.15).

Table 4.15: Respondents sleeping positions relative to current WRMD status (n=132)

Sleeping position	Total		Point pain			
			Yes		No	
	n	%	n	%	n	%
Back	32	24.2	31	23.5	1	0.8
Side	67	50.8	59	44.7	8	6.1
Stomach	33	25	26	19.7	7	5.3
Total	132	100	116	87.9	16	12.1

Chi squared test invalid due to low cell counts

- Cigarette smoking and alcohol consumption in relation to injury status

The majority of the respondents did not smoke cigarettes as seen in Table 4.16. There was missing data for five respondents. The average number of cigarettes smoked per day was 7.5 (±SD 3.31) with a range of one to 10 cigarettes smoked per day. Smoking status was not associated with the reporting of current WRMD pain (p=0.104; Fisher's exact test).

Just over half of the respondents did not drink alcohol, as seen in Table 4.16. There was missing data from two respondents. Respondents who reported alcohol intake on average consumed 1.59 unit per week (±SD 0.72) with a range from one to four units per week. A significant relationship was found between alcohol consumption and the reporting of WRMD pain. Drinking alcohol increased the risk of WRMDs by 3.42 times (OR, CI 1.30-9.00; p=0.010, Fischer's exact test).

Table 4.16 Cigarette smoking and alcohol consumption related to point pain

Variable	Status	Total		Point pain			
				Yes		No	
		n	%	n	%	n	%
	Yes	52	30.1	48	27.7	4	2.3
	No	121	69.9	99	57.2	22	12.7
	Total	173	100	147	85	26	15
	Yes	82	46.6	76	43.2	6	3.4
	No	94	53.4	74	42	20	11.4
	Total	176	100	150	85.2	26	14.8

4.4.5 Work-related/occupational risk factors

4.4.5.1 Years working as a beauty therapist

The mean number of years worked as a beauty therapist, as reported by respondents was 5.91 years (±SD 4.19), with a range from 1 to 30 years (n=176). Table 4.17 shows that those with current WRMDs had been working significantly longer as beauty therapists (p<0.001, Mann-Whitney U test) than those who reported no current WRMDs.

Table 4.17: Relationship between years worked as a therapist and point prevalence of WRMDs

Point pain	n	Mean	±SD
Yes	149	6.30	4.31
No	27	3.78	2.61

4.4.5.2 Position held at the spa

Most of the respondents were employed as junior spa therapists as seen in Figure 4.12. Trends suggest that irrespective of position held at the spa WRMD pain was experienced by the respondents. Nine respondents did not answer this question. Chi squared test was invalid due to low cell counts.

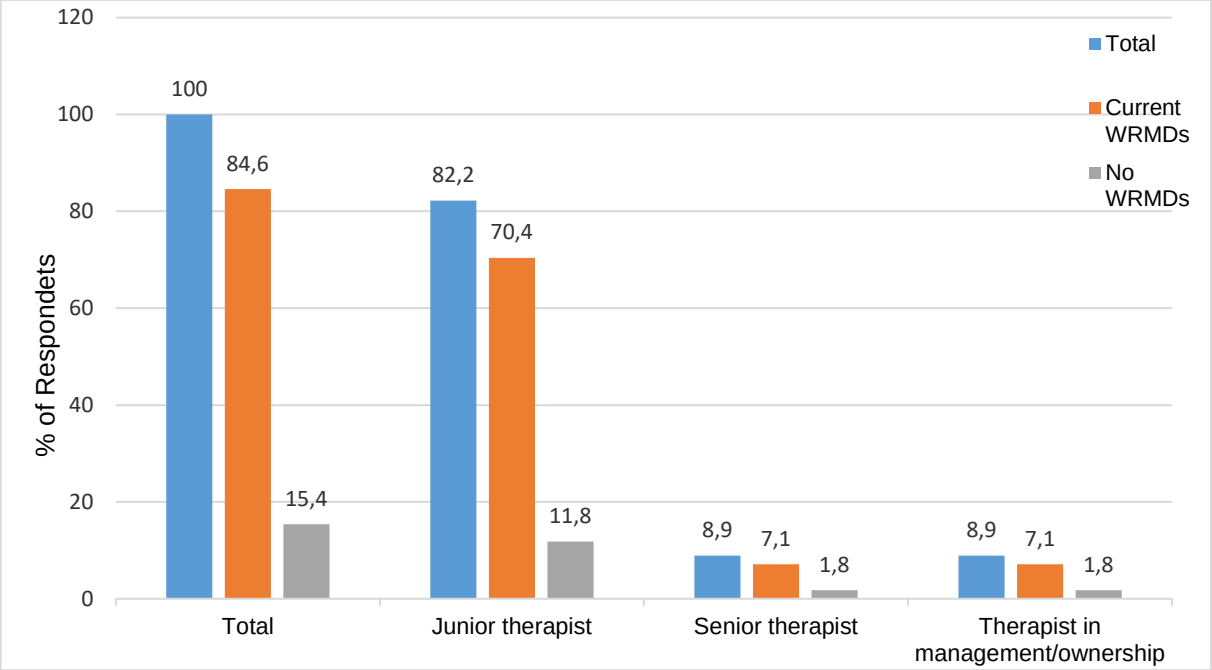

Figure 4.12: Relationship between respondents reporting their position held at the spa at which they were employed and the point prevalence of WRMD pain

4.4.5.3 Number of treatments performed per week in the spa

The mean number of treatments performed per week by the respondents was 27.89 (±SD 13.328), ranging from zero to 90 treatments per week. There was missing data from eight respondents. There was no significant relationship found between the mean number of treatments performed per week and current WRMD pain (*p*=0.430; independent student's t-test).

Table 4.18: Mean number of treatments performed per week and point prevalence of WRMDs

Point pain	N	Mean	±SD
Yes	145	28.22	12.920
No	25	25.94	15.639
Total	170	27.89	27.89

4.4.5.4 Number of hours worked per week in the spa

The respondents worked an average of 47.38 hours per week (±SD 13.36), ranging from eight to 100 hours (n=175). More than half of the respondents worked more than 45 hours per week, as seen in Figure 4.13.

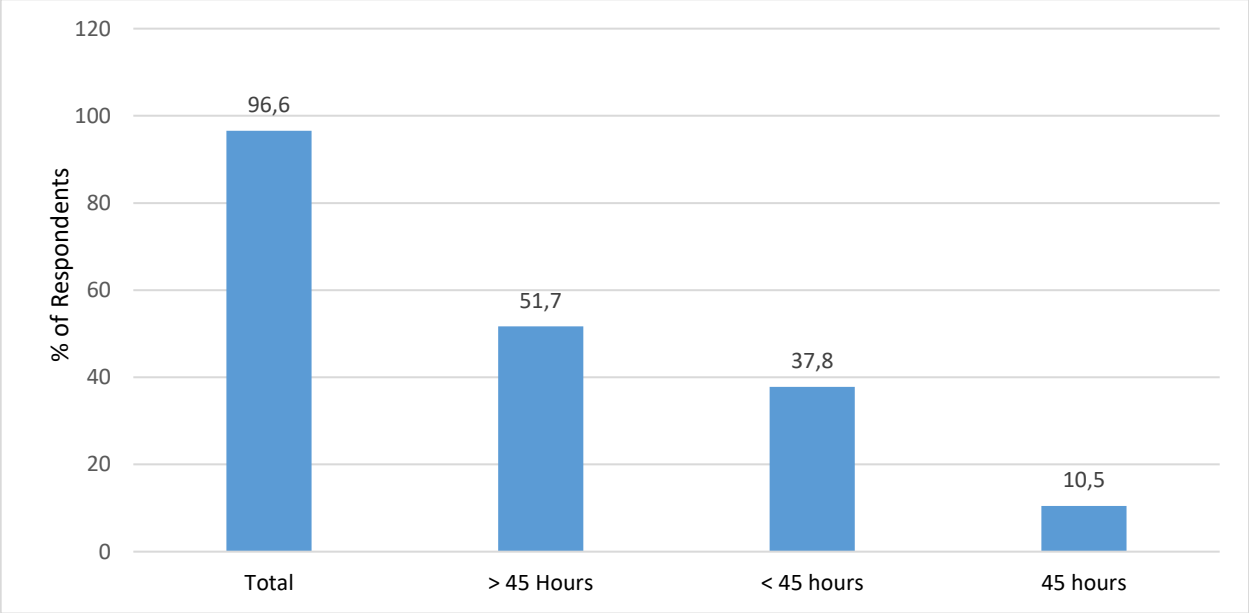

Figure 4.13: Number of hours worked per week in the spa

There was no significant relationship (p=0.137; independent student's t-test) found between mean number of hours worked per week in the spa and current pain as illustrated in Table 4.19.

Table 4.19 Mean number of hours worked per week in the spa and point prevalence of WRMDs

Point pain	n	mean	±SD
Yes	147	46.49	11.93
No	25	52.6	19.33
Total	172	47.38	13.36

4.4.5.5 Working overtime to treat private clients

The majority of the respondents did not treat private clients after hours (n=116, 66.3%). Those that consulted private clients worked an average of 5.43 (±SD 2.94) hours overtime, ranging from one to 14 hours. Table 4.20 shows the relationship between working overtime and current WRMDs, where those who worked overtime were 4.870 times (OR, CI 1.40 – 16.92) more likely to suffer with current WRMD pain (p=0.007; Fishers exact test). Three respondents failed to answer this question.

Table 4.20 Working overtime treating private clients and current pain

Treating private clients after hours	Total		Point pain			
			Yes		No	
	n	%	n	%	n	%
Yes	59	33.7	56	32	3	1.7
No	116	66.3	92	52.6	24	13.7
Total	175	100	148	84.6	27	15.4

4.4.5.6 Physical strength required at work

Only two respondents reported no physical strength required for their work. Three participants failed to answer this question. No relationship (p=0.705; Fisher's exact test) was found between current WRMD pain and rating the amount of physical strength required to perform their job as beauty therapists, showing that even those reporting low physical strength required for their work had a higher rate of WRMDs.

Table 4.21: Physical strength rating in relation to injury status

Rate the amount of physical strength your work requires	Total		Current WRMD pain			
			Yes		No	
	n	%	n	%	n	%
High	91	52	79	45.1	12	6.9
Moderate	76	43.4	63	36	13	7.4
Low	6	3.4	5	2.9	1	0.6
None	2	1.1	2	1.1	0	0
Total	175	100	149	85.1	26	14.9

4.4.5.7. Treatments performed and associated level of exertion

- Treatments performed

In order to determine the techniques that were used by beauty therapists most commonly, the columns of “often” and always” from question 3.7 were added together to determine which techniques were used “often and always” by the respondents. Table 4.22 represents these responses in descending order of utilisation. Appendix N shows the complete responses for question 3.7.

Table 4.22: Treatments performed by the respondents in descending order of utilisation

Techniques performed	**n**	**%**
Other specialised massage techniques e.g. Lomi Lomi, Shiatsu, Swedish massage	142	82.6
Manual massage (e.g. G5)	140	80.5
Pedicures	140	79.1
Manicures	137	77.8
Aromatherapy	105	61.7
Facial therapy (e.g. exfoliation, masks, peels)	87	51.4
Hair removal techniques	79	48.5
Reflexology	68	42.2
Spa treatments (e.g. body wraps)	47	29.2
Electrical therapy (e.g. micro-current, galvanism, vacuum suction)	37	23.4
Mechanical massage	30	18.2
Makeup/eyelash extensions	21	12.8

When assessing for associations between the different techniques utilised and the reporting of current WRMDs only manual massage technique showed a significant relationship to current reporting of WRMDs (p=0.043, Fischer’s exact test).

- Level of exertion

In order to determine the techniques that resulted in the most exertion, the columns of “moderate” and “heavy” from question 3.7 were added together, and presented in Table 4.23 in descending order of level of exertion. Appendix N presents the responses for all rating levels for question 3.7.

Table 4.23: Treatments requiring moderate to heavy levels of exertion

Techniques performed with level of exertion	n	%
Manual massage (e.g. G5)	153	91.7
Other specialised massage techniques (e.g. Lomi Lomi, Shiatsu, Swedish massage)	146	63.3
Pedicures	120	70.1
Manicures	112	65.5
Aromatherapy	107	66.9
Facial therapy (e.g. exfoliation, masks, peels)	86	52.7
Reflexology	86	56.2
Hair removal techniques	76	48.7
Spa treatments (e.g. body wraps)	55	37
Mechanical massage	44	31.7
Electrical therapy (e.g. micro-current, galvanism, vacuum suction)	42	30.2
Makeup/eyelash extensions	31	21.4

When level of exertion while performing the different techniques was compared with reporting of current WRMDs, the only technique associated with heavy exertion was “other specialised massage techniques” (p=0.014, Fisher’s exact test). A significant relationship was found between applying “makeup/eyelash extensions” and WRMDs where those with no WRMDs did not report feelings of heavy exertion compared to those with WRMDs, reporting feelings of heavy exertion while performing “makeup/eyelash extensions” (p=0.022, Fishers exact test).

4.4.5.8. Work characteristics and environment in relation to injury status

The participants were asked statements pertaining to their work and its environment, significant relationships, using Chi squared or Fisher’s exact test and Odds Ratio’s, were utilised to determine their relation to current reporting of WRMDs as reported below. A comprehensive table of the responses to question 3.8 can be found in Appendix O.

When asked about their perception of their working environment the following statements where significantly related to current reporting of WRMDs:

- Those who indicated working with their back in awkward positions were 5.318 (CI 2.210-12.797; $p<0.001$) times more at risk than those who did not
- Working in a hot/humid environment increased the risk by 10.305 (CI 2.344 – 45.315; $p<0.001$) times
- Picking up heavy items/move heavy loads during a work shift was associated with a 3.227 (CI 1.232 – 8.453; $p=0.019$) times higher risk of developing WRMDs
- Standing for prolonged periods was associated with a 8.810 (CI 3.444 – 22.535; $p<0.001$) times higher risk of developing WRMDs
- Those who indicated a shortage of therapists at their workplace were 6.585 (CI 1.893 – 22.908; $p<0.001$) times more likely to develop WRMDs.
- Those reporting feelings of body strain when using equipment during a treatment session were 9.852 (CI 2.756 – 35.219; $p<0.001$) times more likely to experience WRMDs
- Those reporting feelings of working under pressure for a majority of their time at work were 4.085 (CI 1.406-11.426; $p=0.005$) times at risk of developing WRMDs
- Those who reported feelings of having too much work to do were 3.868 (CI 1.384-10.813; $p=0.009$) times at risk of developing WRMDs
- Those who reported feelings of being frustrated by their job were 4.923 (CI 1.417-17.107; $p=0.007$) times at risk of developing WRMDs

The following statements were associated with reduced risk of reporting current WRMDs if participants:

- Could make modifications to their environment to reduce strain on their bodies (OR 0.332, CI 0.135-0.819; $p=0.017$)
- Felt that their co-workers were supportive to them (OR 0.163, CI 0.037-0.717; $p=0.006$)
- Felt that they had management support (OR 0.100, CI 0.023-0.440; $p<0.001$)

When asked if they enjoyed their work the majority of respondents answered “yes” (n=155, 87.6%). Interestingly, all of the respondents (12.4%, n=22) that indicated “no” also currently suffered with WRMDs, whereas only 15.3% (n=27) of respondents who answered “yes” currently suffered from WRMDs (*p*=0.028) indicating that work enjoyment may affect the presence of WRMDs.

Table 4.24 Enjoyment of work in relation to pain

I enjoy my work	Total		Current WRMDs			
			Yes		no	
	n	%	n	%	n	%
Yes	155	87.6	128	72.3	27	15.3
No	22	12.4	22	12.4	0	0
Total	177	100.0	150	84.7	27	15.3

There were no significant relationships found between the following statements and current WRMDs:

- My work involves repetitive movements of my arms/hands (*p*=0.485)
- My work environment is cold / draughty (*p*=0.512)
- I sit for prolonged periods of the day (*p*=0.345)
- I work overtime regularly at my place of employment (*p*=0.386)
- I have been taught to reduce strain on my body whilst performing treatments (*p*=0.264)
- I have the opportunity to develop new skills (*p*=0.205)
- I can decide how to carry out my job tasks (*p*=0.135)

4.5 Objective 3: The impact of WRMDs in beauty therapists

Table 4.25 shows the responses to the questions on the impact of the WRMDs suffered by the respondents. The majority of the respondents reported that their WRMDs was aggravated by their work and that their WRMDs prevented them from being productive at work. Their WRMDs also made the majority of the respondents feel anxious and the respondents were almost equally divided on the impact of WRMDs on rating of feelings of depression, ability to enjoy social activities, locus of control and their ability to partake in physical activities.

Table 4.25: The impact of WRMDs

Impact of WRMD		**Yes**		**No**	
Work related impact:	N	n	%	n	%
My pain keeps me from going to work.	150	58	38.7	92	61.3
I have been put on bed rest for my work-related pain.	153	53	34.6	100	65.4
I feel my pain is made worse by work activities.	153	119	77.8	34	22.2
I have work-related pain that prevents me from being productive at work.	153	90	58.8	63	41.2
I have previously lost my job due to my work-related pain.	152	19	12.5	133	87.5
Psycho-social impact:	N	n	%	n	%
My work-related pain prevents me from enjoying social activities (visiting family, social outings).	152	67	44.1	85	55.9
I have been unable to control or cope with the pain.	153	76	49.7	77	50.3
My pain keeps me from doing physical activities (house cleaning, shopping, and exercise).	153	76	49.7	77	50.3
My pain makes me feel depressed (sad, pessimistic, in low spirits, lethargic).	153	73	47.7	80	52.3
My pain makes me feel anxious (uptight, irritable, tense, difficulty relaxing).	153	91	59.5	62	34.8

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 Introduction

This chapter will discuss the findings of the study relative to the available literature. The response rate will be discussed followed by a discussion of each of the study objectives.

5.2 Response rate

The goal of most epidemiological research is to acquire approximations that can be generalised to the target population (Mealing *et al.* 2010). Low response rates indicate a potential for the study to be at risk of validity (Mouton 2002). In order to obtain a reasonable response rate, comprehensive data collection methods must be used (Russel *et al.* 2004). These include, but are not limited to, factors such as direct contact when delivering questionnaires (Szolnoki and Hoffman 2012), efficient follow up techniques (Russel *et al.* 2004), reminders and the length of the questionnaire (Sahlqvist 2011). In this study, a response rate of 70% (n=178) was obtained. This response rate was achieved with the assistance of spa owners or management who allowed the researcher to explain the study to the beauty therapists. The beauty therapists were then able to understand the requirements of the study and how to answer the questionnaire. Once the questionnaires were administered, the spa owners or management readily agreed to give the beauty therapists time between treatments to complete the questionnaire. The spa authorities and therapists at all the hotel spas included into the study were considerate and accommodating and this played a role in the response rate attained.

The response rate in the current study was lower than that of Tsigonia (2009) who achieved a response rate of 90% when assessing WRMDs in cosmetologists. The method used in that study was through a self-administered questionnaire. This was

similar to the current study. Time factors and participant “eagerness” to partake may have influenced responses.

Favourable response rates are those which approximate 60% (Draugalis *et al*. 2008) and approximate the total population size, to allow for generalisability of the population being studied (Copp *et al.* 2007). Therefore, it is possible that the outcomes of this study are generalisable to the total population from which the sample was drawn.

5.3 Objective 1: To determine the lifetime, point and period prevalence of self-reported WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

The prevalence of WRMDs is reported to be high especially in occupations that involve manual handling (Leal *et al.* 2014; Freimann 2013; Cromie *et al.* 2000). Similarly in this study it was found that beauty therapists had a high prevalence (> 80%) of self-reported WRMD. The period prevalence of WRMD in beauty therapists in the current study was higher than the period prevalence of physical therapists (Alrowayeh *et al.* 2010), cosmetologists (Tsigonia *et al.* 2009), nurses (Tinubu *et al.* 2008) and massage therapists (Jang *et al.* 2006) but lower than in dentists (Kumar *et al.* 2013).

The region most commonly affected was the low back, followed by the neck, hand and wrist and upper back, for those suffering current and period WRMDs. In contrast to Tsigonia *et al.* (2009), who found the neck to be the most common region in cosmetologists, followed by the low back, hand and wrist and the shoulder. However, when comparing the latter study to the current study, spinal pain and hand and wrist pain were common sites for WRMD pain in beauty therapists. The nature of the beauty therapist’s work would make these areas of susceptibility to injury.

The low back region is commonly affected by WRMDs especially in physically demanding occupations (Woolf and Pfleger 2010). Activities involving repetitive bending, lifting and twisting coupled with awkward postures may lead to stress and strain exerted on the low back and this repetitive trauma results in low back pain.

Neck pain prevalence varies across working populations and in its aetiology (Côté *et al.* 2008). In the current study neck pain was the second most prevalent region affected and was associated with moderate severity. Beauty therapists perform visually and

physically demanding tasks which places the neck in static and awkward postures for prolonged periods. This is similarly seen in manicures and pedicures (Alojado *et al.* 2015; Harris-Roberts *et al.* 2011), dentistry (Kumar et al 2013) and podiatry and chiropody (Leah and Birtles 2006) and has been associated with increased muscular strain and loading of the cervical vertebra (Tsigonia *et al.* 2009).

In traditional medicine, GP's are often the first port of call for MSK pain (Kinge *et al.* 2015; Hagen *et al.* 2000), their management involves prescribing medication, giving advice and referrals to other healthcare professionals (Williams *et al.* 2010). In the UK, approximately seven million visits to the GP were recorded for MSK pain (Savigny *et al.* 2009). Similarly, in the current study a high number of visits to the GP were reported followed by visits to pharmacists, physiotherapists and chiropractors for WRMD pain. Physiotherapists and chiropractors primarily treat MSK disorders (Foster *et al*. 2012) and are often consulted when patients seek alternative forms of healthcare (Wolsko *et al.* 2003). The high number of pharmacy visits may stem from prescription by the GP or through respondents seeking self-medication. Tsigonia *et al.* (2009) also found that pharmacists were frequently visited for WRMD pain.

Hand and wrist pain was the third most highly prevalent region and was rated as the most severely affected regions. This was comparable to the study by Tsigonia *et al.* (2009) who attributed hand and wrist pain to exposure to physical risk factors. The beauty therapy occupation requires constant monotonous or repetitive use of the upper body and extremities in order to carry out treatments. Thus the reporting of high WRMDs in the hand and wrist was consistent with other professions that use their hands in manual tasks such as massage (Albert *et al.* 2008; Jang *et al.* 2006) and physiotherapy (Alrowayeh *et al.* 2010). Pain in this region is often associated with job loss and high healthcare costs (Barr *et al.* 2004) and can result in absenteeism and decreased productivity (Bureau of Labor Statistics 2001; National research council and Institute of medicine 2001). A high level of exertion was reported using 'specialised massage techniques'. Feelings of heavy exertion was reported only in beauty therapist that had experienced WRMD pain when applying 'makeup/eyelash extensions'. Constant exposure to manually intensive repetitive tasks, particularly those where high exertion is applied, can result in hand and wrist complaints (Barr, Barbe and Clark 2004). In addition to this, perceived exertion was associated with an increased risk for low back, shoulder and knee WRMDs in cosmetologists (Tsigonia *et al.* 2009).

5.4 Objective 2: To determine selected socio-demographic, anthropometric, individual psychological factors, general health and medical history and work-related/occupational risk factors for WRMDs and their association with point prevalence of WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality

5.4.1. Socio-demographic characteristics

5.4.1.1 Age

The mean age of the respondents in this study was 27.74 years of age, which was much lower than that found by Tsigonia *et al.* (2009), where their respondents were in their late 30's. Advanced age has been cited as a risk factor for MSK pain (Plouvier *et al.* 2011; Bejia *et al.* 2005: Rugelj 2003). With increased age, physiological changes occur in the MSK system (e.g. loss of muscle mass, degenerative joint changes) (Welch *et al.* 2008), leading the individual to have resistance to strain caused by work (Plouviers *et al.* 2011). Even though the mean age of the respondents in this study was relatively young, age was still associated with the reporting of current WRMDs with those having WRMDs being closer to 30 years of age. Similarly Tsigonia *et al.* (2009) found that age was shown to be associated with knee and upper extremity WRMD pain. Besides age-related changes, frequent exposure to manual intensive activities may exceed physiological limits, leading to occupational injury (Bejia *et al.* 2005; Rugelj 2003). Younger workers have a lower need for recovery after exposure to physical and psychosocial risk factors at work (Kiss *et al*. 2008), yet in this study those younger than 30 years of age also reported WRMDs.

5.4.1.2 Gender

Beauty therapy traditionally is female dominant, as was found in this study and supported by Tsigonia *et al.* (2009). The female gender has been identified as having a higher prevalence (Leal *et al.* 2014) and increased incidence (Woznicki 2014) of MSK pain than males. Females have also been shown to report more MSK pain and discomfort in multiple body regions than males (Silva *et al.* 2016). This is attributed to gonadal hormones (e.g. oestrogen) which lowers the pain threshold and makes females more sensitive to pain (Arendt 2000). Females are also exposed to multiple

risk factors at home such as domestic responsibilities (e.g. cleaning, childcare, cooking) and at work (e.g. psychosocial and physical risk factors) and, therefore, little time to recover while balancing the demands of daily life (Lemos *et al.* 2013). Yet in this study, irrespective of gender, there was a high reporting of WRMDs.

5.4.1.3 Number of dependents

Providing care for dependents may come with moments of stress at home, that may also affect the workplace, and over time it can lead to both psychological and physical strain (Vitaliano *et al.* 2003). This in turn has the potential to produce negative effects on both the individual and workplace productivity. The mean number of dependents in this study was two, with no association being found between those who did not suffer WRMDs and those who did.

5.4.1.4 Ethnicity

South Africa has a diverse population as seen by the participants in this study. The four main race groups belonging to South Africa's varied populace were represented in this study with a predominance of Black and Indian participants. This distribution is similar to that of the residence of the eThekwini municipality which are Black (73.6%) followed by Indian (17%), White (6.5%) and Coloured (2.5%) (Lehohla 2012). Ethnicity has been shown to have a negative influence on the MSK system resulting in pain and disability (Plesh *et al.* 2011; Ryall *et al.* 2007). Different ethnic groups respond to pain differently, with minority populations displaying a higher pain sensitivity (Campbell and Edwards 2012). Ethnic minority groups such as Black Americans (Green *et al.* 2003) and South Asian and African Caribbean races in the United Kingdom (Allison *et al.* 2002) have been found to have a high prevalence of MSK pain when compared to the main population group. Exposure to individual psychological factors (e.g. stress / depression), health behaviour (e.g. exercise / smoking) and psychosocial risk factors relating to the workplace (e.g. lack of control / high demand) may be responsible for the ethnic influence seen in WRMDs (Dias 2014). However, in this study trends suggest that ethnicity did not influence WRMDs.

5.4.1.5 Education (Highest level of school education achieved; Post school higher education and Beauty qualification)

The outcomes of educational milestones achieved by the respondents have been shown in Chapter Four of this study. Formal education enhances cognitive skills fundamental to decision-making about health and lifestyle choices, it has also been found to improve higher order thinking skills which are essential for lifelong knowledge and learning (Baker *et al.* 2011). Many of the respondents were trained by the company they worked for, obtaining training certificates or module level training. Short courses in the absence of NQF registered qualifications may not be registered or accredited (SAQA 2013), resulting in a lack of standardisation. Currently, with the beauty therapy industry being un-regulated, with certain short courses time may be limited and therefore more emphasis may be placed on the treatment than injury prevention. However, trends suggest that highest level of school education achieved, post school higher education and the type of beauty qualification obtained were not associated with the WRMD pain in the current study. Similar findings were found among physiotherapists and the reporting of WRMDs (Glover *et al.* 2005)

5.4.2 Anthropometry (Height / Weight / BMI)

According to the South African Demographic and Health Survey (SADHS) (2003) the prevalence of obesity in the South African population was 27% with a higher prevalence of obesity in black women as compared to the other races. In this study the majority of respondents were black, female, overweight and/or obese. According to Micklesfield (2013) socio-cultural, environmental and behavioural factors, together with socio-economic status (SES) can contribute to the high prevalence of obesity. SES is an important variable which can affect diet and food consumption behaviour (Puoane *et al.* 2006). A high SES may allow for greater food varieties, portions and increased intake frequency whereas a low SES may lead to less variety and decreased intake frequency (Oldewage-Theron *et al.* 2010). The high prevalence of female obesity may also be influenced by ethnic belief systems regarding body image where the South African Black culture emphasizes larger body sizes (Puoane *et al.* 2005; Melnyk and Weinstein 1994).

Another possible explanation for the high reporting of ‘overweight and obesity’ in the current study could be urbanisation. It has been suggested that urbanisation contributes to obesity in urban locations (Sartorius *et al.* 2015). Many people form the

rural areas surrounding eThekwini come to find work in the urban areas and although this was not asked in this study this may be a factor that can be investigated in future research.

Many theories exist to explain the association between an increased BMI, MSK pain and disability, such as biomechanical aberrations from high mechanical demand (Viester *et al.* 2013) and metabolic disturbances which may increase the risk of cardiovascular disease, diabetes and hypertension (Head 2015). However, in the current study BMI was not related to WRMDs in beauty therapists. WRMD pain experienced by beauty therapists could be attributed to emotional changes or psychological symptoms that occur in response to the presence of occupational stress. These occupational psychological stressors were manifested as mental exhaustion, feelings of anxiety and frustration. All of which were found in the current study to be associated in the occurrence of WRMD pain. This is consistent with Roland (2014) who found these emotional symptoms to be related to MSK pain in Mauritian nurses.

5.4.3 Individual psychological risk factors (Stress, Mental exhaustion and Depression)

Stress has been found to negatively affect various systems of the body leading to symptoms such as MSK disorders, panic attacks, stomach pain and palpitations (Bongers *et al.* 2006), affecting ones mood leading to depression and mental exhaustion (Glise *et al.* 2010). Stress has also been identified as a perpetuating and exacerbating factor in the development of WRMDs in various occupations such as nursing (Freimann *et al.* 2013) and dentistry (Pandis *et al.* 2007). In the current study, there was no association found between general stress and WRMDs in beauty therapists, however, trends show that the majority of respondents had reported high perception of exposure to stress at the end of their working day. In addition to objectively dealing with daily stress, perceived stress may also place an individual at risk for developing psychological problems such as depression or anxiety (Schneiderman *et al.* 2005; Tennant 2001). Therefore, stress may be seen as a reaction to the demand and pressures placed upon the therapist and their perceived ability to cope. Chronic stress may then lead to depression (Alkadhi 2013).

Depression has been shown to be associated with the development and progression of MSK pain and disability (Heneweer *et al.* 2010; Hoogendoorn *et al.* 2000). This could

be due to biological connection where the neurological pathways involving neurotransmitters (norepinephrine and serotonin) are shared between pain and depression. Impaired regulation of the neurotransmitters is associated with depression and pain (Trivedi 2004). Individuals with depression report mostly somatic symptoms (e.g. back pain, joint pain) which could make diagnosis of depression difficult. In turn chronic pain may lead to depressive symptoms this can then make pain hard to treat (Bair *et al.* 2003). However in the current study the reporting of depression was not associated with WRMDs.

Mental exhaustion may occur as a result of persistent and prolonged exposure to stress thereby lowering the immune system which negatively impacts general health and the MSK system (Glise *et al.* 2010, Shirom *et al.* 2005). Interestingly in this study, no significant relationship was found between stress, depression and WRMDs yet those who reported mental exhaustion were four times more likely to suffer WRMDs. A possible explanation for this is that the therapists had accommodated to perceived stress to a point where they reached mental exhaustion and burnout; this could be associated with their perceived inability to cope with stress at work. This is consistent with Glise *et al.* (2010), Shirom *et al.* (2005) and Burke and Richardsen (2000) where stress and mental exhaustion were shown to negatively influence general health.

5.4.4. General health and medical history

5.4.4.1 Overall health

According to the World Health Organization (WHO). Health is defined as “a state of complete physical, mental and social well-being and not purely the absence of disease or infirmity” (WHO 2006). General health status can impact MSK disorders (Murad *et al.* 2013). Likewise, the degree and nature of MSK injuries and disability affecting individuals varies and can result in additional negative effects on their general health (Alexander *et al.* 2007; Cromie *et al.* 2002). Self-reported general health is important as it shows the individuals awareness and beliefs of their health (Murad *et al.* 2013). Perceived health may be a subjective indicator of general health status (Bowling 2005) and a valid measure associated with functional capabilities, morbidity and mortality (Chamberlain *et al.* 2013; Shields 2008). In the current study, trends suggested that perceived health status did not influence WRMDs. The majority of the respondents, even those with WRMDs, reported having good to excellent health. This could indicate

that the respondents perceived their health and wellness to be adequate in the presence of potential risk factors and pain associated with WRMDs.

5.4.4.2 Medical history

Medical history is an account of all variables which affects general health status. Comorbidity has been shown to negatively influence general health and health service cost and complicates management of conditions (Valderas 2009). In the current study the reporting of concomitant comorbidities was associated with a seven times higher risk of developing WRMDs. A possible explanation for this could be that having a concomitant medical condition could affect the beauty therapist's ability to cope with demands as well as add to biomechanical strain when carrying out work related tasks. The use of current medication and the reporting of ill health, previous trauma requiring medical intervention and surgical history were not associated with WRMDs occurrence.

5.4.4.3 Health behaviour (Exercise, Sleep, Cigarette and Alcohol consumption)

Exercise has protective effects on the development of WRMDs by providing health benefits such as cardiovascular health and physical fitness (Dagenais and Haldeman 2012). In South Africa it was found that half of the population did not partake in physical activity, with obese females exercising less than obese males (SADHS 2003). In this study, two thirds of the respondents did not exercise and 73% were overweight. A lack of exercise negatively affects an individual by leading to reduced MSK fitness increasing the risk of developing MSK disorders as well as negatively impacting the general health status by increasing the risk and complications of chronic conditions (Warburton *et al.* 2006). Interestingly no significant relationship was found between exercise and WRMDs in this study.

Sleep is an important factor in the process of healing, repair and regeneration (Robles *et al.* 2014). Stress can lead to inadequate or disturbed sleep thus having an impact on both physical and mental health (Aghayev *et al.* 2010; Simpson and Dinges 2007). Inadequate sleep has been shown to be associated with work-related stress, depression (Lim *et al.* 2014) and MSK pain (Aghayev *et al.* 2010). However the current study shows no association between sleep and WRMD pain (Table 4.12).

Literature suggests cigarette smoking as a contributing factor in the development and perpetuation of MSK pain (D'Silva *et al.* 2014; Korhonen *et al.* 2003) as cigarette smoking has been reported to have harmful effects on the MSK system as it includes but is not limited to decreased bone density and muscle mass and poor tendon healing (Goesling *et al.* 2012). However, cigarette smoking was not found to be a factor in the development of WRMDs in this study. Trends suggest that the majority of respondents did not smoke cigarettes. In South Africa, there is a lower prevalence of smoking in the Black ethnic groups as compared to the other ethnic groups, this has been suggested to be due to cultural behaviour which prohibit cigarette smoking (Saloojee 2006). Legislation also controls tobacco marketing which may be protective against smoking (Peer *et al.* 2009). This could explain the high number of non-smokers.

Consumption of alcohol in moderation may be beneficial as it decreases the incidence of dementia-related illnesses, cardiovascular and metabolic disorders whereas heavy alcohol consumption negatively effects the cardiovascular, neuro-musculoskeletal, hepatic and gastrointestinal system (Bergman *et al.* 2013). The majority of respondents in this study did not drink alcohol, but those that did were 3.42 times more likely to report WRMDs. Similarly in nurses, alcohol consumption was associated with MSK disorders (Smith *et al.* 2005). Excessive alcohol consumption may compromise the MSK system, decreasing its ability to protect against repetitive strain injuries (Bergman *et al.* 2013).

5.4.5 Work-related / occupational risk factors

5.4.5.1 Years worked as a beauty therapist

In the current study, those who had experienced WRMDs had worked as a beauty therapist for a prolonged duration. Continual exposure to occupational risk factors for a prolonged duration has been found to lead to the development of WRMDs (Jang *et al.* 2006). It should be noted that in this study, age was associated with the occurrence of WRMDs in beauty therapists. The association between age and duration of employment may lead to an inability to deal with demands of work, thus, increasing the possibility of the occurrence of WRMDs. This is supported by the findings of Tinubu *et al.* (2010) and Tsigonia *et al.* (2009) who found that older age groups with increased duration of employment were more at risk for developing WRMDs.

5.4.5.2 Position held at the spa

In this study, the majority of respondents were junior spa therapists, with only 17.8% being in senior therapist or management positions. Chen *et al.* (2005) found that in the construction industry those involved in management positions were more affected by the effects of perceived stress which led to WRMDs as opposed to the manual workers who were more affected by exposure to physical risk factors (prolonged standing, repetitive work). This can be equated to the beauty industry where various positions held at the spa may lead to the exposure of different risk factors. Similar results were found in physiotherapists (Atia *et al.* 2015; Glover *et al.* 2005; Holder *et al.* 1999). A hierarchy exists in any organisation or industry. Therefore, a chain of command is present in order to carry on functions pertaining to the business (Nikiforakis *et al.* 2014). Senior workers have the power to delegate tasks to junior workers and may have a choice of the type of tasks they perform (Vafaï 2002). Yet in this study, irrespective of the position held at the spa, the reporting of WRDM was high, possibly due to the high demands of the industry.

5.4.5.3 Number of treatments performed per week in the spa

Performing an excessive amount of treatments per week may predispose therapists to the development of overuse syndromes which may lead to an increased risk of WRMDs (West and Gardner 2001). Jang *et al.* (2006) found that massage therapists spent more than four hours per day treating clients increasing the prevalence of WRMDs affecting the fingers and thumb. This was similar to Tsigonia *et al.* (2006) who advocate performing a high number of physical tasks increased WRMDs affecting the hand and wrist. Respondents reported performing up to 90 treatments per week, this reflects the demanding nature of the industry. However, the number of treatments was not found to be significant when related to current WRMDs.

5.4.5.4. Number of hours worked per week in the spa

Working long hours may lead to increased exposure to occupational hazards. It may also result in decreased time available for exercise, preparation of healthy meals, recovery/rest or sleep time and engaging in social activities (van der Hulst 2003). The respondents, on average, worked more than the normal working time as recommended by the South Africa. Department of Labour (2002). Working for an excessive number

of hours per day has been shown to lead to fatigue and decreased work productivity (Jang *et al.* 2006) as well as increased risk for occupational injuries (Dembe 2009).

In manual intensive occupations, working long hours has been shown to be associated with an increased prevalence of WRMDs (Fyfe 2006). Long hours at work also leads to a disruption of social and family relationships, which may contribute to stress related symptoms (Trinkoff *et al.* 2008). However, in the current study, no statistical significance was found between hours worked in the spa and WRMDs.

5.4.5.5. Working overtime to treat private clients

Working overtime may lead to reduced recovery which may affect general health negatively, it may also affect stress and anxiety levels (Taris *et al.* 2011), therefore, enhancing negative health behaviour such as increased cigarette smoking and alcohol consumption (Siegrist and Rödel 2006). In the current study, working overtime significantly increased the risk of developing WRMDs by almost five times. This is consistent with literature which implicates working overtime as a strong predictor for the development of WRMD injury (Periera 2009; Dembe 2009; Fyfe 2006; Okojie and Isah 2001).

5.4.5.6. Physical strength required at work

Work-related tasks which are physically demanding have been shown to be associated with WRMDs amongst manual therapists (Passier and McPhail 2011; Glover *et al.* 2005; Squadroni and Barbini 2005; West and Gardner 2001). The majority of respondents (95.4%) reported using moderate to high strength to perform their work related tasks, further supporting the intensity of the beauty therapy occupation. Yet rating the strength required was not associated with WRMDs as irrespective of whether their rating was high, moderate or low, the respondents experienced WRMDs.

5.4.5.7. Treatments performed and associated level of exertion

Treatments most commonly performed by beauty therapists were specialised massage techniques, manual massage, pedicures and manicures. The use of varying degrees of exertion during work activities was not significantly associated with WRMD pain. Irrespective of the degrees of exertion used, respondents still reported having experiencing WRMD pain. However, performing manual massage as well as

specialised massage techniques with moderate to heavy levels of exertion were significantly associated with the presence of MSK pain. There was also an association between level of exertion whilst performing pedicures, manicures and makeup/eyelash extensions. This concurs with literature which shows an increase in the likelihood of developing WRMDs in the presence of tasks which require repetitive actions, awkward and static postures, precision and grasping of objects and increased visual demand (Adegoke *et al.* 2008; Alojado *et al.* 2015; Park *et al.* 2014; Harris-Roberts *et al.* 2011, Chen *et al.* 2010; Stomberg *et al.* 2010).

5.4.5.8. Work characteristics and environment in relation to injury status

The environment in which the beauty therapist works was reported by Tsigonia *et al.* (2009) to play a role in the development of WRMDs. Beauty therapists in particular experience WRMDs more frequently because of exposure to physical risk factors and environment at work (Tsigonia *et al.* 2009; Okojie and Isah 2001). Hot/humid working environments lead to decreased productivity as heat may lead to fatigue, excessive sweating and dehydration. Working in a hot/humid environments was found to be a factor associated with an increased risk of developing WRMDs (Korhonen *et al.* 2003).

Slouching or forward flexion of the trunk leads to eccentric loading of the extensor muscles of the back. When this position is sustained, strain occurs leading to muscular fatigue and the development of myofascial pain syndromes (Valachi and Valachi 2003). In the current study, working in awkward positions was associated with an increased risk of developing WRMDs. This is supported by Tinubu *et al.* (2010); Albert *et al.* (2008); Campo *et al.* (2008); Jang *et al.* (2006); West and Gardener (2001); Cromie *et al.* (2000); Glover *et al.* (2005). When using electrical equipment, the therapists has to maintain their posture whilst supporting and guiding the equipment to carry out tasks. This can lead to biomechanical strain if performed with incorrect posture. Vibration has also been shown to lead to injury to the soft tissue structures of the body. Feelings of strain while carrying out tasks can aggravate WRMDs in the current study. This was supported by Rambabu and Suneetha (2014) Kumar *et al.* (2013); Bihari *et al.* (2013); Tsigonia *et al.* (2009). Manual handling involves picking up, moving, pushing/pulling or carrying an object. Incorrect manual handling such as carrying loads at a distance from the body and lifting loads without bending knees have been shown to strain the low back. In this study, activities such as picking up or moving heavy loads during a shift has led to the development of WRMDs. This is supported by Freimann (2013); Tinubu *et al.* (2010); Dasappa (2007). Prolonged standing has been

shown to lead to muscular fatigue and decreased blood supply to overloaded muscles involved in maintenance of upright posture leading to low back pain and can predispose to conditions of the lower extremity (e.g. varicose veins) (Messing *et al.* 2005; McCulloch 2002).

Feelings of working under pressure for a majority of their time, feelings of having too much work to do, feelings of being frustrated by their job and a shortage of therapists all contribute to work-related stress. Chronic stress exposures lead to increased cortisol levels predisposing to the development of WRMDs and mental disorders such as depression (Hannibal and Bishop 2014).

In the current study it was found that beauty therapists reported certain occupational characteristics were less at risk of reporting WRMDs. These are discussed below.

Being able to make modifications to the treatment room to reduce strain on their bodies was found to be preventative against the development of WRMDs amongst beauty therapists. There have been studies showing that being unable to modify the workstation has led to WRMDs among labour intensive occupations such as physiotherapy (Glover *et al.* 2005), chiropractic (Lorme and Naqvi 2007) and massage therapy (Jang *et al.* 2006). Poor workstation design leads to awkward postures as the body tries to compensate to meet the demand of the task at hand (Afshari *et al.* 2014). Lorme and Naqvi (2003) found, in chiropractors, that having a higher table height induced less strain for tasks involving cervical activities but this was found to be impractical for thoracic and lumbar spine activities. Low table heights may induce low back strain. Therefore, the height of the workstation should be adjusted relevant to the task performed and the individual requirements of the therapists to reduce strain.

The findings of co-worker and managerial support were consistent with Tsigonia *et al.* (2009) who found that in Greek cosmetologists, reporting low co-worker support had increased WRMD complaints affecting the hand and wrist and low back. This is supported by other manual intensive occupation studies on support and WRMDs (Sembajwe *et al.* 2015; van den Heuvel *et al.* 2005; Hoogendoorn *et al.* 2000). Having no support at work may affect the individual's ability to cope with job demands, therefore contributing to stress (Kompier *et al.* 2008) and the chance of developing WRMDs.

In the current study, it was found that enjoyment of work was associated with current WRMDs. Enjoyment of work relates to satisfaction at work which is the degree of pleasure or happiness experienced at work (Gupta *et al.* 2014). Job dissatisfaction has been shown to be a risk factor for MSK pain and disability (van den Heuvel *et al.* 2004).

In the current study, it was found that certain work-related characteristics were not associated with current WRMDs. These are discussed below.

My work involves repetitive movements of my arms/hands: Numerous studies have shown repetitive movements of the upper limb to be a risk factor for WRMDs (Jang *et al.* 2006; Matthews 2006; Cole *et al.* 2005). Interestingly, in the current study this was not found to be significantly related to current WMRDs although an association was expected since repetitive movements are the most common physical exposure reported by cosmetologists in the beauty industry (Tsigionia *et al.* 2009) and is also commonly experienced by other occupations similar to beauty therapy (Grobler 2013; Freimann 2013; Desai *et al.* 2012; Campo *et al.* 2008).

My work environment is cold / draughty: Cold and draughty work environments not only affect general health (Mäkinen and Hassi 2009) but have also been shown to be a contributing environmental risk factor for WRMDs (Pienimäki 2002). Cold working conditions combined with repetitive work tasks have been shown to lead to increased strain and muscle fatigue (Oksa *et al.* 2002). However cold / draughty environments were not associated with WRMDs in the present study possibly due to a large percentage of respondents having reported that their environment was not cold / draughty.

I sit for prolonged periods of the day: Prolonged sitting has been found to negatively affect the MSK system as it induces static loading and can also hamper circulation. Prolonged sitting may also lead to slouching, awkward and/or sustained postures which have been cited in the occurrence of WRMDs (Desai *et al.* 2012; Tsigonia *et al.* 2009).

I work overtime regularly at my place of employment: Working overtime has been implicated as a hazard which may lead to occupational injuries (Dembe 2009; Jang *et al.* 2006). Working overtime regularly at the therapists' place of employment was not found to be associated with WRMDs in the present study however those who had

reported treating private clients outside of the workplace to earn extra income was more at risk for developing WRMDs.

I have been taught to reduce strain on my body whilst performing treatments: Registered massage therapists in Canada indicated that they had received proper education on posture and self-management, despite this they had still experienced a high prevalence of WRMDs (Albert *et al.* 2008). Similarly, registered physiotherapists in the UK reported that they did not view insufficient education as a factor contributing to their WRMDs, however, they continued to be injured during work activities, particularly in their years as newly qualified physiotherapists (Glover *et al.* 2005). This is consistent with West and Gardener (2001), Cromie *et al.* (2000) who identified healthcare workers who continued to be injured particularly in their formative years of practice, even though they were well educated on injury prevention.

I have the opportunity to develop new skills: In order to keep up with current knowledge and trends, new skills have to be learnt to continue working efficiently (Teare 2011).

I can decide how to carry out my job tasks: Job control or decision latitude refers to the freedom of decision making and control over work. Being able to decide how job tasks are carried out at work was positively related to general health and wellness (Häusser *et al.* 2010). Lack of control or decision latitude in the presence of job demand has been shown to predispose workers to job strain and stress (Schmidt and Diestel 2011) and, therefore, leads to a reduction in job satisfaction (Verrier and Harvey 2010). Job satisfaction in turn has been shown to contribute to the development WRMDs (van den Heuval *et al.* 2004).

5.5 Objective 3: To determine the impact of WRMDs in beauty therapists

In the current study, WRMDs have been shown to have an occupational, psychosocial and societal impact in beauty therapists. These are discussed below.

Occupational impact: One of the consequences of WRMDs in beauty therapists is their association with absenteeism from work. Absenteeism leads to decreased productivity and increased economic cost because of the high levels of associated pain and disability associated with WRMDs (Ghaffari *et al.* 2006). Interestingly, in the current study a high percentage of beauty therapists had reported that their pain did not keep them from going to work. This was similar to a recent study on dentists in Kwa-Zulu

Natal who had reported that most of the respondents continued going to work even though they had experienced WRMD pain. It was suggested that working in private practice could be the reason for the decreased absenteeism rate as absenteeism affects income (Moodley and Naidoo 2015). The same could be possible for beauty therapists working within the private sector (hotel spas). Another possibility is that beauty therapists' pain was tolerable.

Other studies on physical and occupational therapists have also showed continued work despite pain or injury (Darragh *et al.* 2009; Campo *et al.* 2008). Possible explanations for this could be placing the client's needs above their own (Campo and Darragh 2010) or therapists may self-diagnose and self-treat (Bork *et al.* 1996). These may place the therapist at risk for job loss and affect the longevity of their career (Campo and Darragh 2010). Another consequence of WRMDs on work is job loss. The impact of job loss is considerable as it leads to loss of income (Cha and Morgan 2010) psychological and physical distress, it affects family life and social interaction (Brand 2015). In the current study, most of the respondents did not report having previously lost their job because of the WRMD pain. This could be due to them having modified their techniques to decrease symptoms to allow them to stay in their job although treatment modification was not found to prevent aggravation of WRMD pain (Campo and Darragh 2010). The majority of beauty therapists reported that their pain was aggravated by work. This is supported by studies showing the association between labour intensive occupations and WRMDs (Yasobant and Rajkumar 2015; Leal *et al.* 2014; Tinubu *et al.* 2013; Tsigonia *et al.* 2009) this leads to decreased productivity and performance, chronic absenteeism and early retirement (New Zealand. Department of Labour 2007).

Psychosocial impact: Feelings of anxiety and depression may result in chronicity of MSK disorders leading to pain and disability (Bogduk 2006). Poor locus of control refers to being unable to control pain. This subjective pain and emotional element (depression and anxiety) may further increase pain and discomfort (Middleton and Pollard 2005). There has been substantial evidence showing that exposure to psychosocial risk factors have a strong influence on the MSK system amongst working populations (Kompier and van den Beek 2008; Simon *et al.* 2008; Lacey *et al.* 2007). In the current study, lack of co-worker and managerial support, enjoyment of work, constantly working under pressure and having too much work to do were significantly associated with occurrence of WRMDs in beauty therapists.

The aforementioned risk factors may lead to increased stress levels. Stress may negatively impact the body leading to symptoms such as muscle tension, reduced muscle relaxation and MSK pain and headaches (Roland 2014; Raj 2006). This is supported by Eatough *et al.* (2012) who found that with increased psychosocial stressors comes an increase in strain, which then contributes to the occurrence of WRMDs in multiple sites. Strain may play a facilitating role between psychosocial stressors and WRMDs. When an individual is exposed to psychosocial stress at work, autonomic changes occur (e.g. muscular tension), strain experienced may predispose the individual to WRMDs (Kim *et al.* 2010; Krantz *et al.* 2004). Therefore, the presence of psychosocial stress and strain whilst carrying out physical work-related tasks as well as exposure to physical risk factors may contribute to WRMD pain and discomfort (Kim *et al.* 2013; Eatough *et al.* 2012). This is consistent with literature which shows psychosocial variables as an important contributor to the multifactorial nature of WRMDs (Sembajwe *et al.* 2013; Alrowayeh *et al.* 2010; Kompier and van den Beek 2008; Hagberg *et al.* 2007).

Societal effects: WRMDs adversely affect society, they are the major cause of disability among working populations and reduces quality of life and has a negative impact on individual and to society (Aptel *et al.* 2002). WRMDs directly affects socialising with family and friends and may lead to an inability to enjoy physical and social activities. Social life is affected when work-related pain, fatigue or exhaustion leads to reluctance to partake in social interaction (Campo and Darragh 2010). WRMDs related to reduced quality of life has shown to be associated with an inability to adequately care for oneself and others (e.g. house cleaning, cooking, taking care of the family) (Alnaser 2007). When quality of life is reduced, pain and disability may hamper activities of daily living (Campo and Darragh 2010). WRMDs impact productivity at work, therefore, is seen as economic burdens to organisations as well as financial burdens to the individual. Beauty therapists may also work shifts depending on the demand of the industry and, therefore may have to work after hours and on weekends. Shift work and working overtime have been found to disrupt family and social life as they conflict with child care and family interaction and these can contribute to stress (Caruso *et al.* 2004), working long hours has been linked to an increased risk of developing MSK injuries at work in nurses (Trinkoff *et al.* 2006).

CHAPTER SIX

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

6.1 Conclusion

The results of this study showed that there was a high lifetime, period and point prevalence of WRMDs in beauty therapists working within the hotel spa industry in the eThekwini municipality of Kwa-Zulu Natal. The body regions most commonly affected were the low back, neck and hand/wrist. The intensity of pain per body region, for both the low back and the hand/wrist were rated as severe but the hand/wrist was reported to be the most severely affected region. Healthcare providers most commonly visited were predominantly GP's, followed by pharmacists, physiotherapists and chiropractors.

The risk factors found to be associated with current reporting of WRMDs included sociodemographic, psychological, general health and medical history and work-related/occupational factors. Thus, both primary, secondary and occupational exposures were found to influence the reporting of WRMDs indicating that when addressing complex issues like WRMDs all facets of the individual and the work environment need to be addressed. An individual who presents to work may already be predisposed to developing WRMDs, then while at work, their ability to cope with work places further stress and strain predisposing them to the development of WRMDs. The consequence of WRMDs in beauty therapists is that it negatively impacts work and social life which will then affect the productivity of the hotel spa and the family environment.

6.2 Limitations

The questionnaire was only administered in English as it was noted that beauty therapy courses are taught in English, therefore, it was expected that the beauty therapist would be English literate. This may not necessarily have been the first language for

some beauty therapists and may have influenced the understanding of the questionnaire when answered (Levin 2006).

The questionnaire was lengthy in order to gain comprehensive information regarding beauty therapists and their work environment. A more concise, detailed and user-friendly questionnaire may have produced a better response.

The validity of the results of the current study rests on the candour of the beauty therapists, untruthful reporting of behaviour or activities, and over exaggeration may have influenced the results of the study**.**

The questionnaire was only delivered to those beauty therapists who worked at spas either owned by or affiliated with hotels within the eThekwini municipality, and thus may not be generalisable to a broader population of beauty therapists working in spas.

6.3 Recommendations

6.3.1 Recommendations for future research

This study was designed as a cross sectional epidemiological study, future studies should use a longitudinal cohort design to further establish risk factors for WRMDs.

Similar studies on beauty therapists who work outside of the hotel spa industry (e.g. dental and medical spas, club spas) should be undertaken to determine if these therapists are also affected by WRMDs. Comparing different beauty therapy settings may yield information that could be valuable in developing strategies for the management of WRMDs in beauty therapists.

This study evaluated all regions of the MSK system, the most commonly affected regions should be further investigated in order to develop ergonomic strategies and safe workplace environments to reduce the impact of WRMDs.

6.3.2 Recommendations for the hotel spa beauty therapy industry

Based on the conclusions of this study, it is recommended that preventative programs and practice guidelines along with governmental regulation be developed for beauty therapists in South Africa.

Recommendations to the spa employers include:

- Health risk assessments to identify the risk of developing occupational overuse and repetitive strain injury
- The spa workstation (equipment, furniture) should be able to be adjusted or modified to suit the ergonomic need of the beauty therapist
- Development of intervention strategies that prevent monotonous, repetitive task being performed throughout the day and allow for job rotation and adequate rest breaks should be implemented
- Devising a system where health and wellness programs are promoted among beauty therapists
- Continued professional development for beauty therapists to update and enhance knowledge and skills.

Recommendations to the educational institutions and professional associations include:

- Specialised programs to prevent and mitigate WRMDs among students and members
- Intervention and health promotion services in the prevention and mitigation of WRMDs especially among students and newly qualified beauty therapists.
- Improving awareness of WRMDs in beauty therapists
- Beauty therapy education facilities should include lifestyle, ergonomic, environmental and occupational health strategies to reduce WRMDs prevalence rates and improve longevity of a beauty therapist’s career.

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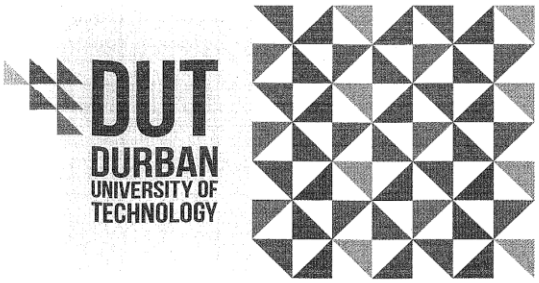
Appendix A: Institutional Research Ethics Committee Provisional Approval



Institutional Research Ethics Committee
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www.dut.ac.za

7 August 2015

IREC Reference Number: **REC 76/15**

Mrs J Jacquire
53 Engelbrecht Road
Austerville
Durban
4052

Dear Mrs Jacquire

The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry in the eThekwini municipality

I am pleased to inform you that Provisional Approval has been granted to your proposal REC 76/15 subject to:

- Piloting of the data collection tool and
- Obtaining and submitting the necessary gatekeeper permission/s to the IREC.

Full approval is subject to meeting the above conditions.

The Proposal has been allocated the following Ethical Clearance number **IREC 075/15**. Please use this number in all communication with this office.

Approval has been granted for a period of two years, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Please note that you may continue with validity testing and piloting of the data collection tool. Research on the proposed project may not proceed until IREC reviews and approves the final document. If there are no changes to the data collection tool, kindly notify the IREC in writing.

Appendix B: Letter of permission to spa owners/management

Dear Sir/Madam

RE: Permission to administer a survey to the beauty therapists working in the hotel spa.

I am a student at the Durban University of Technology registered for a Master's Degree of Technology in Chiropractic. My research is titled: The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry in the eThekwini municipality. My supervisors are Dr Laura O'Connor (M. Tech Chiropractic) and Mrs. Dorinda Borg (M. Higher Education).

Brief Introduction and Purpose of the Study:

The purpose of my study is to determine the prevalence, risk factors and impact of work related musculoskeletal pain in beauty therapists. Currently there is paucity of literature describing these types of injuries in this population. By investigating work-related musculoskeletal complaints in beauty therapists, we will be able to provide knowledge and potential risk factors associated with work-related musculoskeletal pain. This information could then aid educational institutions and professional associations in appropriately training their members to prevent work-related musculoskeletal pain and discomfort.

I would like permission to conduct my study at your spa. There will be no cost incurred to you should you agree to partake in my study. I will make myself available at a time that suites you and/or the beauty therapists working in the spa to meet with them directly to ask for their participation in the research. Their participation will be voluntary and refusal to participate will not result in adverse consequences to either the company or the employee. The questionnaire will take approximately 10 minutes to complete and can be completed at a time to ensure there is no disruption to the spa business.

Should the beauty therapist wish to partake their participation will be confidential, the information obtained from them will be confidential and will be coded and pooled with that of other beauty therapists participating. This will ensure confidentiality and anonymity to your spa. Should you allow me to conduct my research at you spa, your spa name will not appear in any of the data collected and analysed, therefore your individual data will not be identifiable to you.

Procedures:

Once permission has been obtained from the spa owner to conduct the study, a suitable time will be arranged for the researcher to visit the spas and inform the beauty therapists of the study and request their participation. Those wanting to participate will be given a Letter of Information and Informed consent and the questionnaire to be complete. The researcher will be present to address any questions or queries that may arise; the researcher will either wait while the questionnaire is being completed or arrange a date or time to collect the questionnaires. Participant's names and other identifiers will not be placed on the questionnaires. Separate ballot boxes will be used to store the Letter of Information and Informed Consent and the questionnaires to ensure confidentiality.

Confidentiality:

All information (company name as well as the individual employee's names) is confidential and the results will be used for research purposes only. Therefore the spas chosen to participate in the study will remain anonymous and confidential. Please do not hesitate to ask any questions on any aspect of this study.
Your company's approval for access to your employees would be of importance in allowing for this process to be completed and feedback sent to you / your company.

Risks/Discomfort and Cost:
There are no risks/discomfort or cost involved from your company or employee as a result of your collective participation in the study.

Benefits:
Your full co-operation in participating will allow an increase in the expanding knowledge of work related musculoskeletal pain specifically in the beauty profession and thus making future treatment of patients suffering from musculoskeletal pain and discomfort more effective

Persons to contact with problems or questions:
Should you have any questions that you may want answered by an independent source, you can contact my supervisors on the above number. If you are not satisfied with any aspect of this study, feel free to forward any concerns to the Durban University of Technology Research and Ethics Committee.

Please complete below:

I agree / do not agree to allow Mrs J. Jacquire to conduct her research at

……spa.

_____	_____	_____
Full Name	Signature	Date

Yours sincerely,

Mrs J. Jacquire
B. Tech: Chiropractic

Dr L. O'Connor
M. Tech: Chiropractic

Mrs. Borg
M. Ed: Higher Education

Appendix C: Letter of information and informed consent (Expert group)

LETTER OF INFORMATION

Dear Sir/Madam

Thank you for expressing interest in my research.

Title of the Research Study: The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry in the eThekwini municipality

Researcher: Jolene Jacquire (B. Tech: Chiropractic)

Supervisor: Dr. Laura O'Connor (M.Tech: Chiropractic)

Co-supervisor: Mrs. Dorinda Borg (M.Ed.: Higher Education)

Brief Introduction and Purpose of the Study: The spa industry is a popular, thriving and competitive industry, however with every occupation there are factors which can potentially place the worker at risk for injury. These injuries are referred to as work-related musculoskeletal disorders, and beauty therapists may be subject to such injuries due to the nature of their work. The purpose of the study is to determine if beauty therapists are suffering with work related musculoskeletal disorders, to determine the risk of such injury. This information could then aid educational institutions and professional associations in appropriately training their members to prevent work-related musculoskeletal pain and discomfort.

Outline of the Procedures:

In order to participate you must be working as a beauty therapist for at least one year. Should you meet the study criteria and want to participate please can you date and sign the consent section below before answering the questionnaire. The questionnaire should take approximately 10 minutes to answer. Please answer each question as honestly as possible. Please refrain from placing either your name and/or staff number on the questionnaire. This will allow your response to the questionnaire to remain anonymous as the questionnaire cannot be linked to the informed consent form or you personally. Please answer all questions. Once you have completed the questionnaire, place the questionnaire and the consent form in the individually marked boxes. This further assures you that your name cannot be linked to the information that you provide.

Risks or Discomforts to the Participant: There will be no risks or discomfort to you should you chose to participate. The information obtained will not be shared with your

employer, all responses will be coded to protect confidentiality and will be discuss as a whole rather than for individual responses.

Benefits: By participating you will allow an increase in the knowledge of work related musculoskeletal pain specifically to the beauty profession.

Reason/s why the Participant May Be Withdrawn from the Study: Should you decide that you would like to with draw from the study after agreeing to participate you are free to do so, without negative repercussions.

Remuneration: There will be no remuneration for your participation.

Costs of the Study: There will be no costs to you should you agree to participate.

Confidentiality: All completed questionnaires will be confidential. Only the researcher and the research supervisors will have access to the questionnaires. The information will be coded to maintain confidentiality and will not be shared with your employer. The results of the study will be made available in the Durban University of Technology library in the form of a dissertation. Your employer will only receive the information regarding this study after all the data has collectively been analysed, meaning that your individual data will not be available to them.

Research-related Injury: There will be no research related injury as a result of your participation.

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

Please contact the researcher (0827382118), my supervisor (031 373 2923) or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the Prof Moyo on 031 373 2382 or sibusisom@dut.ac.za.

Yours sincerely,

Jolene Jacquire

CONSENT

Statement of Agreement to Participate in the Research Study:

I hereby confirm that I have been informed by the researcher, Jolene Jacquire, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: **REC 76/15**,

• 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**	**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	**Date**	**Signature**

(if applicable)

Appendix D: Pre-expert group questionnaire

QUESTIONNAIRE

Please take a few minutes to fill out this survey. I welcome your feedback and your answers will be kept confidential and you will remain anonymous once the questionnaire is returned. Thank you for your participation.

1. General Information

Age :_____years		Height:_____ meters		Weight:_____ kgs	
Gender	Male			Female	
Race (for statistical purposes)	White	Black	Coloured	Indian	Other (Specify):
Number of children					
	No formal education	Primary school	High school	Matriculated	Tertiary education	NQF
	Other (Specify)			Beauty therapy qualification (Specify)	

2. General Health / Perceived health

Please tick the appropriate box

2.1 How would you rate your health generally?	Excellent	Good	Fair	Poor
2.2 How would you rate your stress levels generally?	Very High	High	Moderate	Low
2.3 Rate the amount of physical strength your work requires	Very High	High	Moderate	Low
2.4 Rate your mental exhaustion at the end of the day	Very High	High	Moderate	Low
2.5 Are you on any medication for stress?	Yes		No	
2.6Do you suffer from depression?	Yes		No	
2.7 Are you on any medication for depression?	Yes		No	
2.8 Are you on any medication for pain?	Yes		No	
2.9 Have you been diagnosed with any health conditions?	Yes		No	
2.9..1 If yes please specify (if no proceed to question 2.10				
2.10 Has any health complaints caused you to be absent from work in the last 6 months?	Yes		No	
2.10.1 If yes please specify (if no proceed to question 2.11)				
2.11. Have you had any previous surgeries?	Yes		No	
2.12.1 If yes please specify (if no proceed to question 2.13)				
2.13 Have you had any accidents or injuries?	Yes		No	
1.13.1 If yes please specify (if no please proceed to question 2.14)				

2.14. Tick the statement that best describes your Drinking- Smoking status:		
2.14.1) □ I am a Non-smoker	□ I am a Current smoker, I smoke…….cigarettes per day. And have been smoking for…….years.	□ I am an Ex-smoker I was smoking for……..months/years.
2.14.2) □ I do not drink alcohol	□ I drink……...units per week (1 unit = 1 340ml beer/1x200ml glass of wine/ 1 tot of spirits)	

3. Work characteristics, Physical and Psychosocial load

3.1) How many years have you been a beauty therapist?		
3.2) Number of treatments performed per week in the spa		
3.3) Number of hours worked per week in the spa?		
3.4) Do you work after hours to treat private clients?	Yes	No
3.5) If yes please specify (if no please proceed to question 3.6)		

3.6) Please indicate the following treatments you perform at your workplace and the level of exertion associated with each treatment performed. (More than one answer is possible)

Treatment	Performed:		Please tick your level of exertion for each of the treatments you perform:			
			Light	Moderate	Heavy	Very heavy
	Yes	No				
Mechanical massage (G5)						
Manual massage (lymph drainage, deep tissue						
Other specialised massage techniques (Lomi Lomi, Shiatsu, Swedish massage)						
Pedicures						
Manicures						
Makeup/eyelash extensions						
Facial Therapy (exfoliation, masks, peels)						
Electrical therapy (micro-current, galvanism, vacuum suction)						
Spa treatments (body wraps)						

Hair removal techniques (threading, waxing, sugaring)						
Reflexology						
Aromatherapy						

3.7) Please tick the appropriate box below:

Does your work involve repetitive movements of your arms or hands?	Yes	No
Do you work with your back in awkward positions?	Yes	No
Is your work environment cold or draughty?	Yes	No
Is your work environment hot and humid?	Yes	No
Do you pick up heavy items or move heavy loads during your shift?	Yes	No
Do you stand for prolonged periods during the day?	Yes	No
Do you sit for prolonged periods of the day?	Yes	No
Do you work overtime regularly?	Yes	No
Is there a shortage of therapists at your workplace?	Yes	No
Are you able to make modifications to your treatment room to reduce strain on your body (e.g. chair or table height)?	Yes	No
Do you enjoy your work?	Yes	No
Do you have the opportunity to develop new skills	Yes	No
Can you decide how to carry out your tasks yourself?	Yes	No
Do you feel like your co-workers are supportive toward you?	Yes	No
Do you feel like management is supportive toward you?	Yes	No
Do you feel you are working under pressure most of the time?	Yes	No
Do you feel like you have too much work to do?	Yes	No
Do you feel frustrated by your job?	Yes	No

4. Musculoskeletal complaints

4.1) Have you ever experienced pain that in your opinion is related to your work as a beauty therapist?

Yes / No

Region of pain or discomfort	Currently Experiencing pain		Pain within the in the last 12 months		The pain has led me to visit a doctor in the last 12 months	The pain has led me to be absent from work in the last 12 months
	Yes	Rate the pain on a scale of 0-10, 0 being no pain and 10 being the worst pain you have experienced	Yes	Rate the pain on a scale of 0-10, 0 being no pain and 10 being the worst pain you have experienced		
Neck						
Upper back						
Mid back						
Low back						
Shoulder						
Elbow						

Hand/Wrist						
Hip/Thigh						
Knees						
Foot/Ankle						

If yes please proceed to question 4.2. If no thank you for partaking in this research project.

4.2) Please indicate the area of your body in which you have experienced pain, that in your opinion is directly related to your work as a beauty therapist. Indicate if you are currently experiencing the pain and whether you have had pain in this region in the last 12 months only. Only tick those which are applicable.

4.3) From the above table which pain is/was the most painful? Please state:

_____

4.4) For the pain indicated above please answer the following questions:

My pain keeps me from going to work	Yes	No
I have been put on bed rest for my work-related pain.	Yes	No
I feel my pain is made worst by work activities.	Yes	No
I have work-related pain that prevents me from being productive at work.	Yes	No
I have previously lost my job due to my work-related pain.	Yes	No
My work-related pain prevents me from enjoying social activities (visiting family, social outings).	Yes	No
I have been unable to control or cope with the pain.	Yes	No
My pain keeps me from doing physical activities (house cleaning, shopping, exercise).	Yes	No
My pain makes me feel depressed (down in the dumps, sad, in low spirits, pessimistic, lethargic).	Yes	No
My pain makes me feel anxious (uptight, tense irritable, difficulty in relaxing /concentrating).	Yes	No

4.3.1) For any work related musculoskeletal pain have you ever received treatment? If yes, please tick the appropriate options below. More than one answer is possible.							Yes	No
Public hospital	Private hospital	Clinic	Pharmacy	Physio-therapy	Chiropractic	Traditional healer	Orthopedic surgeon	Neurologist
Other (Specify)								

Appendix E: Confidentiality statement and code of conduct (Expert 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 AND CODE OF CONDUCT: EXPERT GROUP

1. All information contained in the research documents and any information discussed during the focus group meeting must be kept private and confidential. This is especially binding to any information that may identify any of the participants in the focus group.
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 dissertation/thesis and/or journal publication, which will in no way identify any of the participants involved in this focus group.
4. The returned questionnaires will be coded and kept anonymous in the research process.
5. The focus group may be either voice or video recorded, as a transcript of the proceedings will need to be made. The data will stored securely under password protection.
6. All data generated from this focus group (including the recording) will be kept for 15 years in a secure location at Durban University of Technology and thereafter will be destroyed.

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

Please print in block letters:

Name	Surname	Sign

Researcher's Name:
_____Signature:_____

Supervisor's Name:
_____Signature:_____

Appendix F: Corrections from the Expert group

Focus group recommended changes	Student/supervisor response	Question/page number where change has to be made
Add ‘date of birth’	Added	Page 1.
Change race to ethnicity and arrange alphabetically	Done	Page 1; Question 1.5
Number each question in general information	Done	Page 1; Section 1
Change number of children to number of dependents	Done	Page 1; Question 1.6
Add ‘High school completed matric’	Added	Page 1.
Add ‘High school did not completed matric’	Added	Page 1.
Add ‘Post high school education’	Added	Page 1.
Add ‘Beauty qualification obtained’	Added	Page 1.
Remove ‘Are you on any medications for stress’	Removed	Page 1; Question 2.5
Change wording of ‘Do you suffer from depression?’ to ‘Do you feel depressed?’	Changed	Page 1; Question 2.6
Remove ‘Are you on any medications for depression’	Removed	Page 1; Question 2.7
Remove ‘Are you on any medications for pain’	Removed	Page 1; Question 2.8
Add ‘Are you currently on any medications	Add	Page 1.

Change the format from question 2.10 to question 2.13, Add a separate option for 'If yes specify'	Changed Added	Page 2, Question 2.10-2.13
Add in questions on exercise and sleep	Added	Page 2
Change the statements to questions	Done	Page 2; Question 2.14
Add 'What position do you hold at the spa in which you are employed?'	Done	Page 2
Change the format of question 3.6. Add a rating for techniques performed	Done	Page 2; Question 3.6
Change the questions to statements and add a 'not applicable' option	Done	Page 3; Question 3.7
Change the format of question 4.2	Done	Page 4; Question 4.2
Change rating scale to 'mild, moderate ,severe'	Done	Page 4; Question 4.2
Merge Table 4.3.1 with Table 4.2	Done	Page 5

Appendix G: Pre-pilot questionnaire

QUESTIONNAIRE

Thank you for agreeing to partake in my research project. Please answer each question openly and honestly by placing an X next to the correct answer, or when necessary provide detail. I welcome your feedback and your answers will be kept confidential and you will remain anonymous once the questionnaire is returned.

1. Please mark an X indicating your choice where applicable. Some questions are open-ended and will entail a more detailed answer								
1. Date of Birth (DD/MM/YY)								
2. Age	years		Female			Black		
5. Height	meters		Male			Coloured		
6. Weight	kgs	7. Number of dependents				Indian		
8. Highest level of school education achieved		9. Post school Higher Education				White		
No formal schooling		None						
Primary school		Private higher education (e.g. Camelot etc.)						
High school completed matric		Public higher education (e.g. University of Technology)						
High school did not complete matric								
Other specify:								
10. State your beauty qualification (e.g. national diploma/bachelor's/master's degree/training certificates/module):								
11. State the name of the training college/institution from where you obtain your beauty qualification?								
12. How would you rate your overall health?	Excellent	Good		Fair		Poor		
13. How would you rate your stress levels generally?	High	Moderate		Low		None		
14. Rate the amount of physical strength your work requires	High	Moderate		Low		None		
15. Rate your mental exhaustion at the end of the day	High	Moderate		Low		None		
16. Do you feel depressed?	Yes	No						
17. Do you have any medical conditions?	Yes	No	If yes specify:					
18. Are you currently on any medication?	Yes	No	If yes specify:					

19. Has any ill health caused you to be absent from work in the last 6 months?	Yes	No	If yes specify:
20. Have you had any trauma to any part of your body that resulted in an injury requiring medical intervention?	Yes	No	If yes specify:
21. Have you had any previous surgery?	Yes	No	If yes please specify in the table below:

State the type of surgery e.g. appendix or low back surgery and the year in which it took place e.g. 2002

2.Please mark an X indicating the statement that best describes your lifestyle, where necessary provide more detailed:

			How many times do you exercise per week?		per week
			How long do you exercise per session?		minutes
			On average, how many hours do you sleep per night?		per night
			What is your predominant sleeping position?		
			Back	Side	Stomach
2.3 Do you smoke cigarettes?	Yes	No	Approximately how many cigarettes do you smoke per day?		per day
			How many units of alcohol do you drink per week? 1 unit = 1 glass of wine (125ml) / 1 tot of spirit (25ml) / 1 can of beer (340ml)		
			Less than 3 units	4-6 units	
			7-10 units	10+ units	

3.Please answer the questions below relating to your work:

3.1 How many years have you been a therapist?	years	
3.2 What position do you hold at the spa in which you are employed?		
3.3 Number of treatments performed per week in the spa	per week	
3.4 Number of hours worked per week in the spa?	per week	
3.5 Do you work after hours to treat private clients?	Yes	No
3.6 If yes, specify the number of overtime hours worked per week (if no please proceed to question 3.7):		

3.7 Please mark an X to indicate the following treatments you perform at your workplace and the level of exertion associated with each treatment performed (More than one answer is possible).									
	Performed:					**Please tick your level of exertion while preforming the treatment:**			
	Never	Rarely	Occasionally	Often	Always	None	Mild	Moderate	Heavy
1.Mechanical massage (G5)									
2.Manual massage (lymph drainage, deep tissue									
3.Other specialised massage techniques (Lomi Lomi, Shiatsu, Swedish massage)									
4.Pedicures									
5.Manicures									
6.Makeup/eyelash extensions									
7.Facial Therapy (exfoliation, masks, peels)									
8.Electrical therapy (micro-current, galvanism, vacuum suction									
9.Spa treatments (body wraps)									
10.Hair removal techniques (threading, waxing, sugaring)									
11.Reflexology									
12.Aromatherapy									

3.8 Please mark an X indicating the statement that best describes your choice where applicable (N/A = not applicable)			
1. My work involves repetitive movements of my arms / hands?	Yes	No	N/A
2. I work with my back in awkward positions?	Yes	No	N/A
3. My work environment is cold / draughty?	Yes	No	N/A
4. My work environment is hot / humid?	Yes	No	N/A
5. I pick up heavy items / move heavy loads during your shift?	Yes	No	N/A
6. I stand for prolonged periods during the day?	Yes	No	N/A
7. I sit for prolonged periods of the day?	Yes	No	N/A
8. I work overtime regularly at my place of employment?	Yes	No	N/A
9. There is a shortage of therapists at my workplace?	Yes	No	N/A
10. I am able to make modifications to my treatment room to reduce strain on my body (e.g. chair or table height)?	Yes	No	N/A
11. I feel strain on my body when using equipment during a treatment session	Yes	No	N/A
12. I have been taught to reduce strain on my body whilst performing treatments	Yes	No	N/A
13. I enjoy my work?	Yes	No	N/A
14. I have the opportunity to develop new skills? (training/modules/refresher courses)	Yes	No	N/A
15. I can decide how to carry out my job tasks?	Yes	No	N/A
16. I feel like my co-workers are supportive toward me?	Yes	No	N/A
17. I feel like management is supportive toward me?	Yes	No	N/A
18. I feel like I work under pressure most of the time?	Yes	No	N/A
19. I feel like I have too much work to do?	Yes	No	N/A
20. I feel frustrated by my job?	Yes	No	N/A
3.9 Have you ever experienced musculoskeletal pain that in your opinion is related to your work as a therapist? If yes proceed to question 4, if no thank you for participating.		Yes	No

5. Relating to your work related musculoskeletal pain please mark an X indicating the statement that best describes your choice where applicable		
1.My pain keeps me from going to work	Yes	No
2. I have been put on bed rest for my work-related pain.	Yes	No
3. I feel my pain is made worst by work activities.	Yes	No
4. I have work-related pain that prevents me from being productive at work.	Yes	No
5. I have previously lost my job due to my work-related pain.	Yes	No
6. My work-related pain prevents me from enjoying social activities (visiting family, social outings).	Yes	No
7. I have been unable to control or cope with the pain.	Yes	No
8. My pain keeps me from doing physical activities (house cleaning, shopping, and exercise).	Yes	No
9. My pain makes me feel depressed (sad, pessimistic, in low spirits, lethargic).	Yes	No
10. My pain makes me feel anxious (uptight, irritable, tense, difficulty relaxing)	Yes	No
4. Please answer each of the following questions below by placing an X in the appropriate box.		

4. Please answer each of the following questions by placing an X in the appropriate box.																	
	Are you currently experiencing pain or discomfort in:		Is the pain or discomfort:			Have you consulted a health care professional for this problem?			Have you had pain or discomfort in the same area during the last 12 months?		Was the pain:			Did you consulted a health care professional for this problem?		If yes specify who you consulted (e.g. chiropractor, GP, pharmacist, physiotherapist)?
	Yes	No	Mild	Moderate	Severe	Yes	No		Yes	No	Mild	Moderate	Severe	Yes	No	
Example:	**X**			**X**		**X**		**Neurologist**	**X**				**X**	**X**		**Physiotherapist**
1.Head																
2.Neck																
3.Upper back																
4.Mid back																
5.Lower back																
6.Chest																
7.Abdomen																
8.Shoulder																
9.Arm																
10.Elbow																
11.Forearm																
12.Hand/Wrist																
13.Hip/Thigh																
14.Knees/Calf																
15.Foot/Ankle																

Appendix H: Letter of information and informed consent (Pilot study)

LETTER OF INFORMATION

Dear Sir/Madam

Thank you for expressing interest in my research.

Title of the Research Study: The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry in the eThekwini municipality

Researcher: Jolene Jacquire (B. Tech: Chiropractic)

Supervisor: Dr. Laura O'Connor (M.Tech: Chiropractic)

Co-supervisor: Mrs. Dorinda Borg (M.Ed.: Higher Education)

Brief Introduction and Purpose of the Study: The spa industry is a popular, thriving and competitive industry, however with every occupation there are factors which can potentially place the worker at risk for injury. These injuries are referred to as work-related musculoskeletal disorders, and beauty therapists may be subject to such injuries due to the nature of their work. The purpose of the study is to determine if therapists are suffering with work related musculoskeletal disorders, to determine the risk of such injury. This information could then aid educational institutions and professional associations in appropriately training their members to prevent work-related musculoskeletal pain and discomfort.

Outline of the Procedures: In order to participate you will be required to be working as a beauty therapist for at least one year. Should you meet the study criteria and want to participate please can you date and sign the consent section below before answering the questionnaire. The questionnaire should take approximately 10 minutes to answer. Please answer each question as honestly as possible. Please refrain from placing either your name and/or staff number on the questionnaire. This will allow your response to the questionnaire to remain anonymous as the questionnaire cannot be linked to the informed consent form or you personally. Please answer all questions. Once you have completed the questionnaire, place the questionnaire and the consent form in the individually marked boxes. This further assures you that your name cannot be linked to the information that you provide.

Risks or Discomforts to the Participant: There will be no risks or discomfort to you should you chose to participate. The information obtained will not be shared with your employer, all responses will be coded to protect confidentiality and will be discuss as a whole rather than for individual responses.

Benefits: By participating you will allow an increase in the knowledge of work related musculoskeletal pain specifically to the beauty profession.

Reason/s why the Participant May Be Withdrawn from the Study: Should you decide that you would like to with draw from the study after agreeing to participate you are free to do so, without negative repercussions.

Remuneration: There will be no remuneration for your participation.

Costs of the Study: There will be no costs to you should you agree to participate.

Confidentiality: All completed questionnaires will be confidential. Only the researcher and the research supervisors will have access to the questionnaires. The information will be coded to maintain confidentiality and will not be shared with your employer. The results of the study will be made available in the Durban University of Technology library in the form of a dissertation. Your employer will only receive the information regarding this study after all the data has collectively been analysed, meaning that your individual data will not be available to them.

Research-related Injury: There will be no research related injury as a result of your participation.

Persons to Contact in the Event of Any Problems or Queries: Please contact the researcher (0827382118), my supervisor (031 373 2923) or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the Prof Moyo on 031 373 2382 or sibusisom@dut.ac.za.

Yours sincerely,

Jolene Jacquire

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Jolene Jacquire, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: REC 76/15,
- 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**	**Signature**
_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (if applicable)	**Date**	**Signature**

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

Appendix I: Pilot study evaluation sheet

Pilot Study Questionnaire Evaluation Sheet

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

- 1.1 Extremely interesting ☐
- 1.2 Interesting ☐
- 1.3 Average ☐
- 1.4 Boring ☐
- 1.5 Very boring ☐

2 Do you think the topics raised in this questionnaire were adequately covered?

- 2.1 Yes ☐
- 2.2 No ☐

3 What is your opinion about the Letter of Information?
(Please tick 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 tick 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 tick the appropriate box)

- 6.1 The meaning of **all questions** is absolutely clear ☐
- 6.2 The meaning of **most** questions is clear ☐
- 6.3 There is too much chiropractic/ medical jargon ☐
- 6.4 The questions will not be understood by lay persons ☐
- 6.5 The questionnaire needs to be revised because it is unclear ☐

If you had any difficulty answering any question/s, please write the number/s of the question/s in the space below with a suggestion on how the question/s can be improved?

_____
_____
_____

Appendix J: Corrections from the Pilot study

Pilot study recommended changes	Student/supervisor response	Question/page number where change has to be made
Change the format of question 1.1 - 1.9	Done	Page 1; Question 1.1 - 1.9
Change question 4 (Appendix F continued) from landscape to portrait and add it as question 5 to the final questionnaire	Question 4 became question 5 in the final questionnaire (Appendix J)	Appendix J
Correct editorial errors	Done	Appendix J
Modify the Letter of Information and Consent (Appendix G) so that it is shorter for final questionnaire	Done	Letter of Information and Consent (Appendix K)

Appendix K: Research study questionnaire

1. Please mark an X indicating your choice where applicable. Some questions are open-ended and will entail a more detailed answer						
1.Date of Birth (DD/MM/YY)		2. Age		3. Gender	Female	Male
4.Ethnicity	Black	Coloured	Indian	White	Other specify	
5. Height	metres		6. Weight	kgs		
7. Number of dependents						
8. Highest level of school education achieved	Primary school	High school completed matric	High school did not complete matric			
9. Post school Higher Education	None	Private higher education (e.g. Camelot etc.)	Public higher education (e.g. University of Technology)	Other specify		
10. State your beauty qualification (e.g. national diploma/bachelor's/master's degree/training certificates/module):						
11. State the name of the training college/institution from where you obtained your beauty qualification?						
12. How would you rate your overall health?	Excellent	Good	Fair	Poor		
13. How would you rate your stress levels generally?	High	Moderate	Low	None		
14. Rate the amount of physical strength your work requires	High	Moderate	Low	None		
15. Rate your mental exhaustion at the end of the day	High	Moderate	Low	None		
16. Do you feel depressed?	Yes	No				
17. Do you have any medical conditions?	Yes	No	If yes specify:			
18. Are you currently on any medication?	Yes	No	If yes specify:			
19. Has any ill health caused you to be absent from work in the last 6 months?	Yes	No	If yes specify:			
20. Have you had any trauma to any part of your body that resulted in an injury requiring medical intervention?	Yes	No	If yes specify:			
21. Have you had any previous surgery?	Yes	No	If yes please specify in the table below:			
State the type of surgery e.g. appendix or low back surgery and the year in which it took place e.g. 2002						

2.Please mark an X indicating the statement that best describes your lifestyle, where necessary provide more detailed:

2.1 Do you exercise?	Yes	No	How many times do you exercise per week?	per week
			How long do you exercise per session?	minutes
			On average, how many hours do you sleep per night?	per night
			What is your predominant sleeping position?	
			Back / Side / Stomach	
2.3 Do you smoke cigarettes?	Yes	No	Approximately how many cigarettes do you smoke per day?	per day
			How many units of alcohol do you drink per week? 1 unit = 1 glass of wine (125ml) / 1 tot of spirit (25ml) / 1 can of beer (340ml)	
			Less than 3 units / 4-6 units	
			7-10 units / 10+ units	

3.Please answer the questions below relating to your work:		
3.1 How many years have you been a therapist?	years	
3.2 What position do you hold at the spa in which you are employed?		
3.3 Number of treatments performed per week in the spa	per week	
3.4 Number of hours worked per week in the spa?	per week	
3.5 Do you work after hours to treat private clients?	Yes	No
3.6 If yes, specify the number of overtime hours worked per week (if no please proceed to question 3.7):	hours worked over time	

3.7 Please mark an X to indicate the following treatments you perform at your workplace and the level of exertion associated with each treatment performed (More than one answer is possible).

	Performed:					**Please tick your level of exertion while preforming the treatment:**			
	Never	Rarely	Occasionally	Often	Always	None	Mild	Moderate	Heavy
1.Mechanical massage (G5)									
2.Manual massage (lymph drainage, deep tissue)									
3.Other specialised massage techniques (Lomi Lomi, Shiatsu, Swedish massage)									
4.Pedicures									
5.Manicures									
6.Makeup/eyelash extensions									
7.Facial Therapy (exfoliation, masks, peels)									
8.Electrical therapy (micro-current, galvanism, vacuum suction)									
9.Spa treatments (body wraps)									
10.Hair removal techniques (threading, waxing, sugaring)									
11.Reflexology									
12.Aromatherapy									

3.8 Please mark an X indicating the statement that best describes your choice where applicable (N/A = not applicable)			
1. My work involves repetitive movements of my arms / hands	Yes	No	N/A
2. I work with my back in awkward positions	Yes	No	N/A
3. My work environment is cold / draughty	Yes	No	N/A
4. My work environment is hot / humid	Yes	No	N/A
5. I pick up heavy items / move heavy loads during your shift?	Yes	No	N/A
6. I stand for prolonged periods during the day	Yes	No	N/A
7. I sit for prolonged periods of the day	Yes	No	N/A
8. I work overtime regularly at my place of employment	Yes	No	N/A
9. There is a shortage of therapists at my workplace	Yes	No	N/A
10. I am able to make modifications to my treatment room to reduce strain on my body (e.g. chair or table height)	Yes	No	N/A
11. I feel strain on my body when using equipment during a treatment session	Yes	No	N/A
12. I have been taught to reduce strain on my body whilst performing treatments	Yes	No	N/A
13. I enjoy my work	Yes	No	N/A
14. I have the opportunity to develop new skills (training/modules/refresher courses)	Yes	No	N/A
15. I can decide how to carry out my job tasks	Yes	No	N/A
16. I feel like my co-workers are supportive toward me	Yes	No	N/A
17. I feel like management is supportive toward me	Yes	No	N/A
18. I feel like I work under pressure most of the time	Yes	No	N/A
19. I feel like I have too much work to do	Yes	No	N/A
20. I feel frustrated by my job	Yes	No	N/A
3.9 Have you ever experienced musculoskeletal pain that in your opinion is related to your work as a therapist? If yes proceed to question 4, if no thank you for participating.		Yes	No

4. Relating to your work related musculoskeletal pain please mark an X indicating the statement that best describes your choice where applicable		
1.My pain keeps me from going to work	Yes	No
2. I have been put on bed rest for my work-related pain.	Yes	No
3. I feel my pain is made worst by work activities.	Yes	No
4. I have work-related pain that prevents me from being productive at work.	Yes	No
5. I have previously lost my job due to my work-related pain.	Yes	No
6. My work-related pain prevents me from enjoying social activities (visiting family, social outings).	Yes	No
7. I have been unable to control or cope with the pain.	Yes	No
8. My pain keeps me from doing physical activities (house cleaning, shopping, and exercise).	Yes	No
9. My pain makes me feel depressed (sad, pessimistic, in low spirits, lethargic).	Yes	No
10. My pain makes me feel anxious (uptight, irritable, tense, difficulty relaxing)	Yes	No

5. The following table refers to current and past pain which you have experienced within the last 12 months, which you feel has been related to your work. Please answer each question by marking an X in the appropriate box.

		Current Pain			Past pain experienced (within the last 12 months)		
		Are you currently experiencing pain or discomfort in:	**Is your pain:**	**Have you ever consulted a chiropractor, GP, physiotherapist, pharmacist or any other health care professional for your current pain?**	**Have you had pain or discomfort in the past 12 months**	**Was your pain:**	**Have you ever consulted a chiropractor, GP, physiotherapist, pharmacist or any other health care professional for your past pain?**
	Head	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Neck	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Shoulders	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Upper Back	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Elbows	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Wrist/ Hands	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Low Back	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Hips/ Thighs	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Knees	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify
	Ankles/ Feet	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify	☐ Yes ☐ No	☐ Mild ☐ Moderate ☐ Severe	☐ Yes ☐ No If yes specify

Thank you for participating.

Appendix L: Letter of information and informed consent (Research study)

LETTER OF INFORMATION

Dear Sir/Madam

Thank you for expressing interest in my research.

Title of the Research Study: The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry in the eThekwini municipality

Researcher: Jolene Jacquire (B. Tech: Chiropractic)

Supervisor: Dr. Laura O'Connor (M.Tech: Chiropractic)

Co-supervisor: Mrs. Dorinda Borg (M.Ed.: Higher Education)

Brief Introduction and Purpose of the Study: The spa industry is a popular, thriving and competitive industry, however with every occupation there are factors which can potentially place the worker at risk for injury. These injuries are referred to as work-related musculoskeletal disorders, and beauty therapists may be subject to such injuries due to the nature of their work. The purpose of the study is to determine if therapists are suffering with work related musculoskeletal disorders, to determine the risk of such injury. This information could then aid educational institutions and professional associations in appropriately training their members to prevent work-related musculoskeletal pain and discomfort.

Outline of the Procedures: In order to participate you will be required to be working as a beauty therapist for at least one year. Should you meet the study criteria and want to participate please can you date and sign the consent section below before answering the questionnaire. The questionnaire should take approximately 10 minutes to answer. Please answer each question as honestly as possible. Please refrain from placing either your name and/or staff number on the questionnaire. This will allow your response to the questionnaire to remain anonymous as the questionnaire cannot be linked to the informed consent form or you personally. Please answer all questions. Once you have completed the questionnaire, place the questionnaire and the consent form in the individually marked boxes. This further assures you that your name cannot be linked to the information that you provide.

Risks or Discomforts to the Participant: There will be no risks or discomfort to you should you chose to participate. The information obtained will not be shared with your employer, all responses will be coded to protect confidentiality and will be discuss as a whole rather than for individual responses.

Benefits: By participating you will allow an increase in the knowledge of work related musculoskeletal pain specifically to the beauty profession.

Reason/s why the Participant May Be Withdrawn from the Study: Should you decide that you would like to with draw from the study after agreeing to participate you are free to do so, without negative repercussions.

Remuneration: There will be no remuneration for your participation.

Costs of the Study: There will be no costs to you should you agree to participate.

Confidentiality: All completed questionnaires will be confidential. Only the researcher and the research supervisors will have access to the questionnaires. The information will be coded to maintain confidentiality and will not be shared with your employer. The results of the study will be made available in the Durban University of Technology library in the form of a dissertation. Your employer will only receive the information regarding this study after all the data has collectively been analysed, meaning that your individual data will not be available to them.

Research-related Injury: There will be no research related injury as a result of your participation.

Persons to Contact in the Event of Any Problems or Queries: Please contact the researcher (0827382118), my supervisor (031 373 2923) or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the Prof Moyo on 031 373 2382 or sibusisom@dut.ac.za.

Yours sincerely,

Jolene Jacquire

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Jolene Jacquire, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: REC 76/15,
- 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**	**Signature**
_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (if applicable)	**Date**	**Signature**

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

Appendix M: Institutional Research Ethics Committee Full 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

1 October 2015

IREC Reference Number: **REC 76/15**

Mrs J Jacquire
53 Engelbrecht Road
Austerville
Durban
4052

Dear Mrs Jacquire

The epidemiology of work-related musculoskeletal disorders in beauty therapists working within the hotel spa industry 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. Kindly ensure that participants used for the pilot study are not part of the main study.

In addition, the IREC acknowledges receipt of your gatekeeper permission letters.

Please note that FULL APPROVAL is granted to your research proposal. You may proceed with data collection.

Yours Sincerely,

[redacted]

Professor J K Adam
Chairperson: IREC

DUT DURBAN UNIVERSITY OF TECHNOLOGY
2015 -10- 01
INSITUTUTIONAL RESEARCH ETHICS COMMITTEE
P O BOX 1334 DURBAN 4000 SOUTH AFRICA

Appendix N: Treatments performed and associated level of exertion

Question 3.7

Technique used:	Total		Never		Rarely		Occasionally		Often		Always	
	n	%	n	%	n	%	n	%	n	%	n	%
1.Mechanical massage	164	92.1	112	68.3	13	7.9	9	5.5	15	9.1	15	9.1
2.Manual massage	174	97.8	7	4	13	7.5	14	8	49	28.2	91	52.3
3.Other specialised massage techniques	172	96.6	18	10.5	5	2.9	7	4.1	45	26.2	97	56.4
4.Pedicures	177	99.4	10	5.6	12	6.8	15	8.5	53	29.9	87	49.2
5.Manicures	176	98.9	10	5.7	12	6.8	17	9.7	53	30.1	84	47.7
6.Makeup/eyelash extensions	164	92.1	88	53.7	24	14.6	31	18.9	10	6.1	11	6.7
7.Facial therapy	169	94.9	25	14.8	19	11.2	38	22.5	44	26	43	25.4
8.Electrical therapy	158	88.8	99	62.7	10	6.3	12	7.6	22	13.9	15	9.5
9.Spa treatments	161	90.4	66	41	22	13.7	26	16.1	29	18	18	11.2
10.Hair removal	163	91.6	42	25.8	18	11	24	14.7	41	25.2	38	23.3
11.Reflexology	161	90.4	49	30.4	19	11.8	25	15.5	40	24.8	28	17.4
12.Aromatherapy	170	95.5	25	14.7	19	11.2	21	12.4	49	28.8	56	32.9

Exertion level whilst performing techniques:	Total		None		Mild		Moderate		Heavy	
	n	%	n	%	n	%	n	%	n	%
1.Mechanical massage	139	78.1	86	61.9	9	6.5	13	9.4	31	22.3
2.Manual massage	167	93.8	3	1.8	11	6.6	38	22.8	115	68.9
3.Other specialised massage techniques	160	89.9	9	5.6	5	3.1	51	31.9	95	59.4
4.Pedicures	171	96.1	11	6.4	40	23.4	56	32.7	64	37.4
5.Manicures	171	96.1	19	11.1	40	23.4	50	29.2	62	36.3
6.Makeup/eyelash extensions	145	81.5	76	52.4	38	26.2	23	15.9	8	5.5
7.Facial therapy	163	91.6	25	15.3	52	31.9	61	37.4	25	15.3
8.Electrical therapy	139	78.1	84	60.4	13	9.4	14	10.1	28	20.1
9.Spa treatments	149	83.7	60	40.3	34	22.8	36	24.2	19	12.8
10.Hair removal	156	87.6	44	28.2	36	23.1	46	29.5	30	19.2
11.Reflexology	153	86.0	43	28.1	24	15.7	43	28.1	43	28.1
12.Aromatherapy	160	89.9	22	13.8	31	19.4	53	33.1	54	33.8

Appendix O: Work characteristics and environment in relation to injury status

Question 3.8

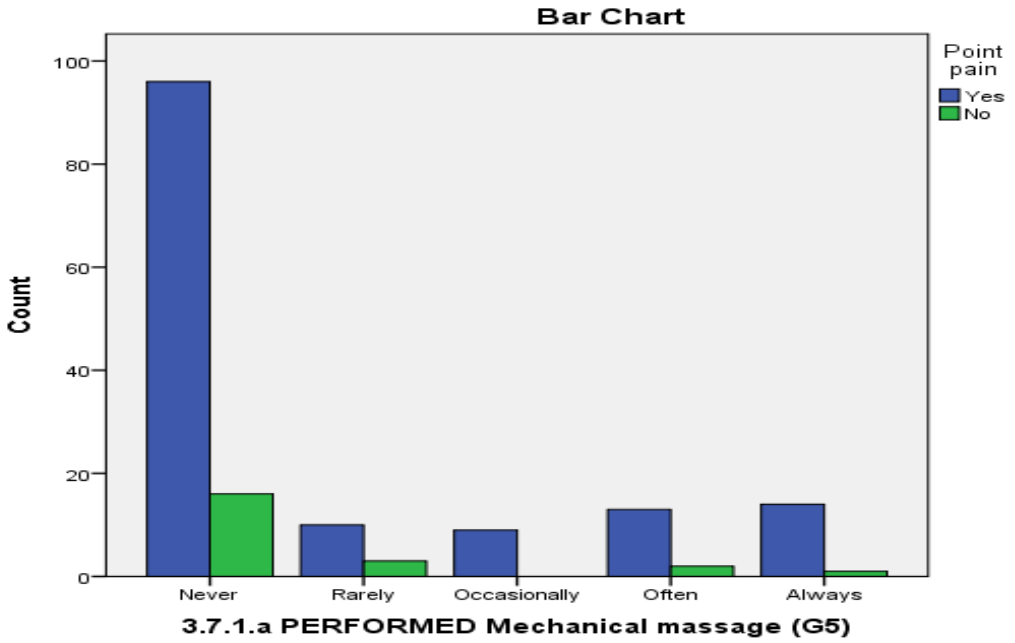
Statement		Status	Total		Point pain				P value
					Yes		No		
			n	%	n	%	n	%	
		Yes	174	97.8	148	83.1	26	14.6	
		No	4	2.2	3	1.7	1	0.6	
		Total	178	100.0	151	84.8	27	15.2	
		Yes	123	71.1	113	65.3	10	5.8	
		No	50	28.9	34	19.7	16	9.2	
		Total	173	100.0	147	85	26	15	
		Yes	65	38.0	57	33.3	8	4.7	
		No	106	62.0	88	51.5	18	10.5	
		Total	171	100.0	145	84.8	26	15.2	
		Yes	71	41.5	69	40.4	2	1.2	
		No	100	58.5	77	45	23	13.5	
		Total	171	100.0	146	85.4	25	14.7	
		Yes	77	44.0	71	40.6	6	3.4	
		No	98	56.0	77	44	21	12	
		Total	175	100.0	148	84.6	27	15.4	
		Yes	118	67.8	111	63.8	7	4.0	
		No	56	32.2	36	20.7	20	11.5	
		Total	174	100.0	147	84.5	27	15.5	
		Yes	51	29.5	46	26.6	5	2.9	
		No	122	70.5	102	59	20	11.6	
		Total	173	100.0	148	85.5	25	14.5	
		Yes	80	46.0	71	40.8	9	5.2	
		No	94	54.0	78	44.8	16	9.2	
		Total	174	100.0	149	85.6	25	14.4	
		Yes	70	40.9	67	39.2	3	1.8	
		No	101	59.1	78	45.6	23	13.5	
		Total	171	100.0	145	84.8	26	15.3	
		Yes	77	45.3	60	35.3	17	10	
		No	93	54.7	85	50	8	4.7	
		Total	170	100.0	145	85.3	25	14.7	

	treatment room to reduce strain on my body								
		Yes	73	53.3	70	51.1	3	2.2	
		No	64	46.7	45	32.8	19	13.9	
		Total	137	100.0	115	83.9	22	16.1	
		Yes	101	58.7	84	48.8	17	9.9	
		No	71	41.3	64	37.2	7	4.1	
		Total	172	100.0	148	86	24	14	
		Yes	155	87.6	128	72.3	27	15.3	
		No	22	12.4	22	12.4	0	0	
		Total	177	100.0	150	84.7	27	15.3	
		Yes	137	78.3	113	64.6	24	13.7	
		No	38	21.7	35	20	3	1.7	
		Total	175	100.0	148	84.6	27	15.4	
		Yes	106	59.6	86	48.3	20	11.2	
		No	72	40.4	65	36.5	7	3.9	
		Total	178	100.0	151	84.8	27	15.1	
		Yes	125	71.0	100	56.8	25	14.2	
		No	51	29.0	49	27.8	2	1.1	
		Total	176	100.0	149	84.6	27	15.3	
		Yes	104	61.5	79	46.7	25	14.8	
		No	65	38.5	63	37.3	2	1.2	
		Total	169	100.0	142	84	27	16	
		Yes	76	44.7	71	41.8	5	2.9	
		No	94	55.3	73	42.9	21	12.4	
		Total	170	100.0	144	84.7	26	15.3	
		Yes	75	43.6	70	40.7	5	2.9	
		No	97	56.4	76	44.2	21	12.2	
		Total	172	100.0	146	84.9	26	15.1	
		Yes	59	33.9	56	32.2	3	1.7	
		No	115	66.1	91	52.3	24	13.8	
		Total	174	100.0	147	84.5	27	15.5	

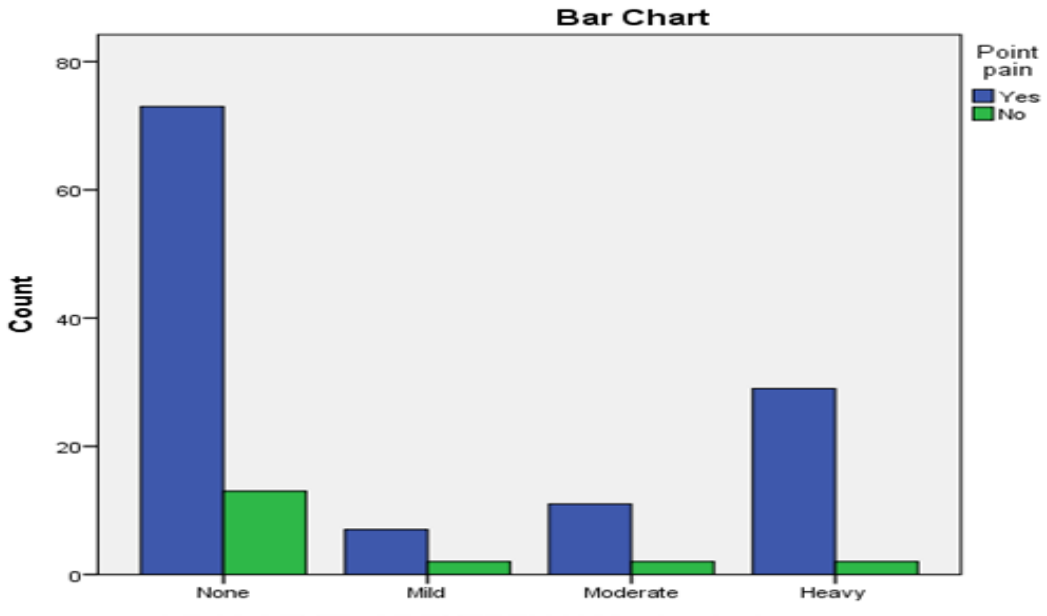
Statement	Risk (OR)	CI	Risk RR	CI	P value
My work involves repetitive movements of my arms/hands	1.897	0.190 - 18.949	1.134	0.642-2.004	0.485
I work with my back in awkward positions	5.318	2.210-12.797	1.351	1.109-1.646	<0.001
My work environment is cold / draughty	1.457	0.594-3.574	1.056	0.932-1.197	0.512
My work environment is hot/humid	10.305	2.344 – 45.315	1.262	1.126-1.415	<0.001
I pick up heavy items/move heavy loads during my shift	3.227	1.232 – 8.453	1.174	1.039-1.326	0.019
I stand for prolonged periods during	8.810	3.444 – 22.535	1.463	1.198-1.788	<0.001
I sit for prolonged periods of the day	1.804	0.638-5.104	1.079	0.957-1.216	0.345
I work overtime regularly at my place of employment	1.618	0.673-3.892	1.070	0.948-1.206	0.386
There is a shortage of therapists at my workplace	6.585	1.893 – 22.908	1.239	1.103-1.393	<0.001
I am able to make modification to my treatment room to reduce strain on my body	0.332	0.135-0.819	2.567	1.172-5.622	0.017
I feel strain on my body when using equipment during a treatment session	9.852	2.756 – 35.219	1.364	1.155-1.610	<0.001
I have been taught to reduce strain on my body whilst performing treatments	0.540	0.211-1.381	0.923	0.821-1.037	0.264
I enjoy my work *nil answers for no			0.826	0.768-0.888	0.028
I have the opportunity to develop new skills	0.404	0.115-1.421	2.219	0.706-6.974	0.205
I can decide how to carry out my job tasks	0.463	0.185-1.161	1.941	0.866-4.349	0.135
I feel like my co-workers are supportive toward me	0.163	0.037-0.717	5.100	1.254-20.743	0.006
I feel like management is supportive toward me	0.100	0.023-0.440	7.813	1.914-31.889	<0.001
I feel like I work under pressure most of the time	4.085	1.406-11.426	1.203	1.063-1.361	0.005
I feel like i have too much work to do	3.868	1.384-10.813	1.191	1.056-1.344	0.009
I feel frustrated by my job	4.923	1.417-17.107	1.199	1.074-1.340	0.007

Appendix P: Bar graphs illustrating treatments performed and associated level of exertion

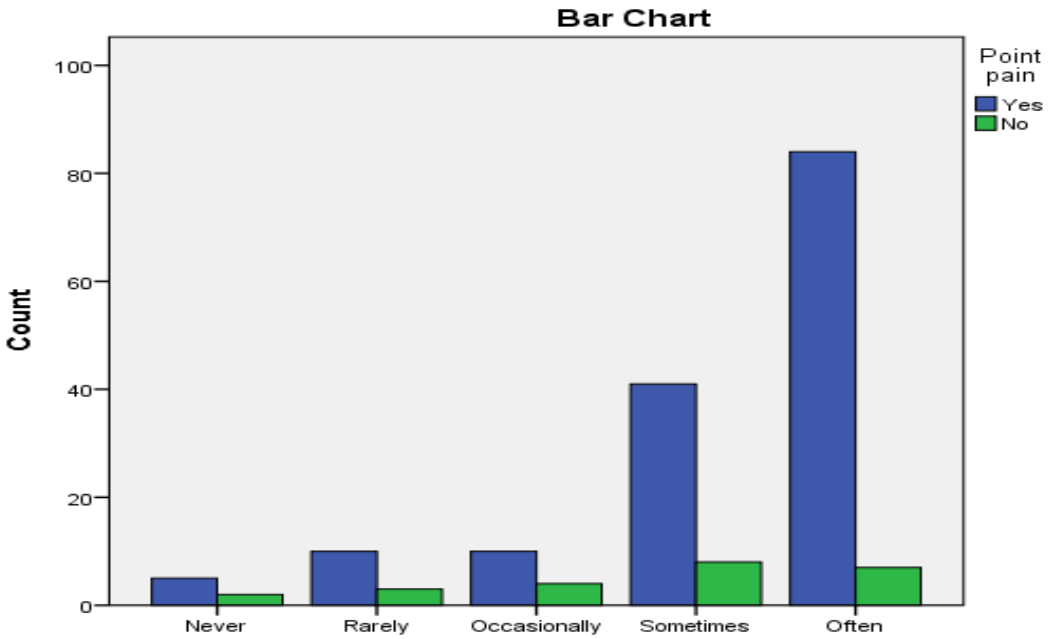
Question 3.7



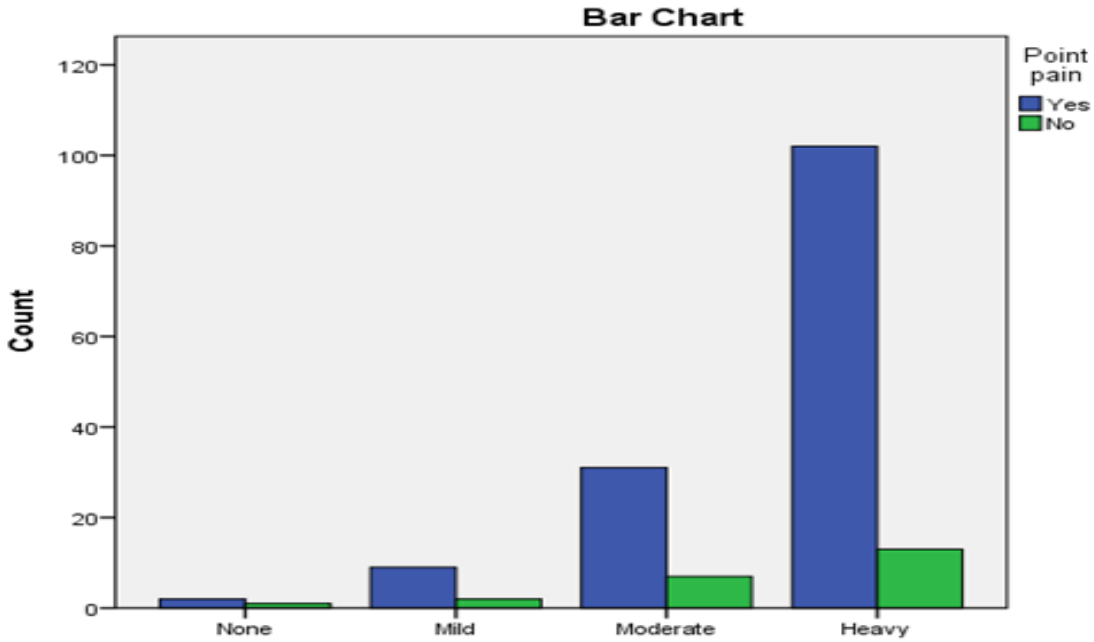
3.7.1.a PERFORMED Mechanical massage (G5)



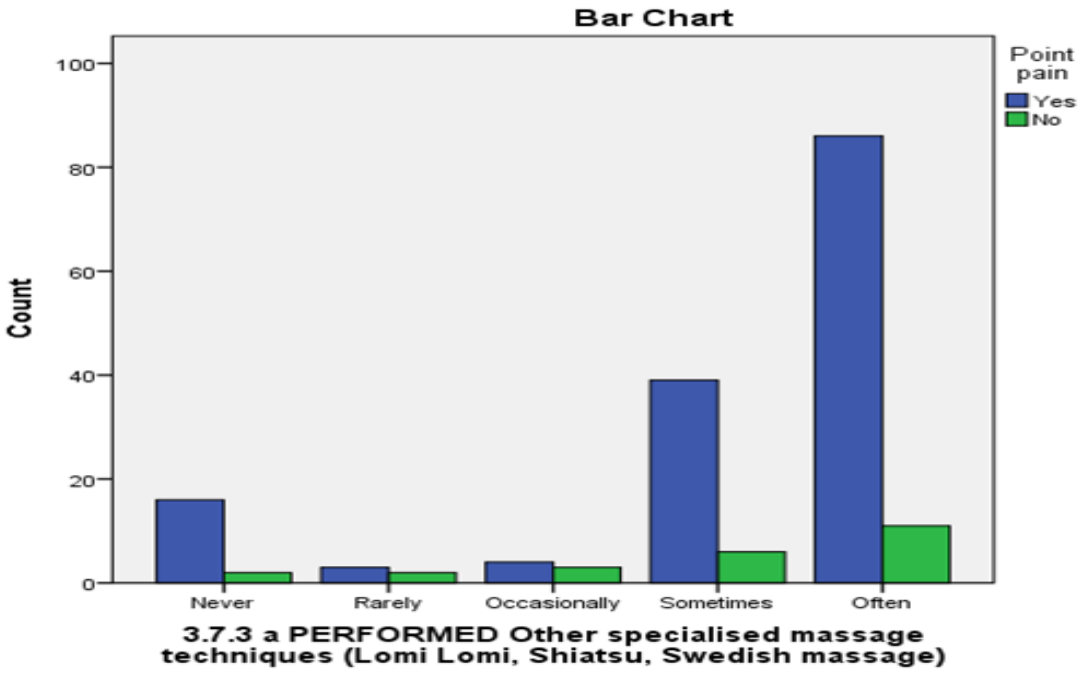
3.7.1 b LEVEL OF EXERTION Mechanical massage



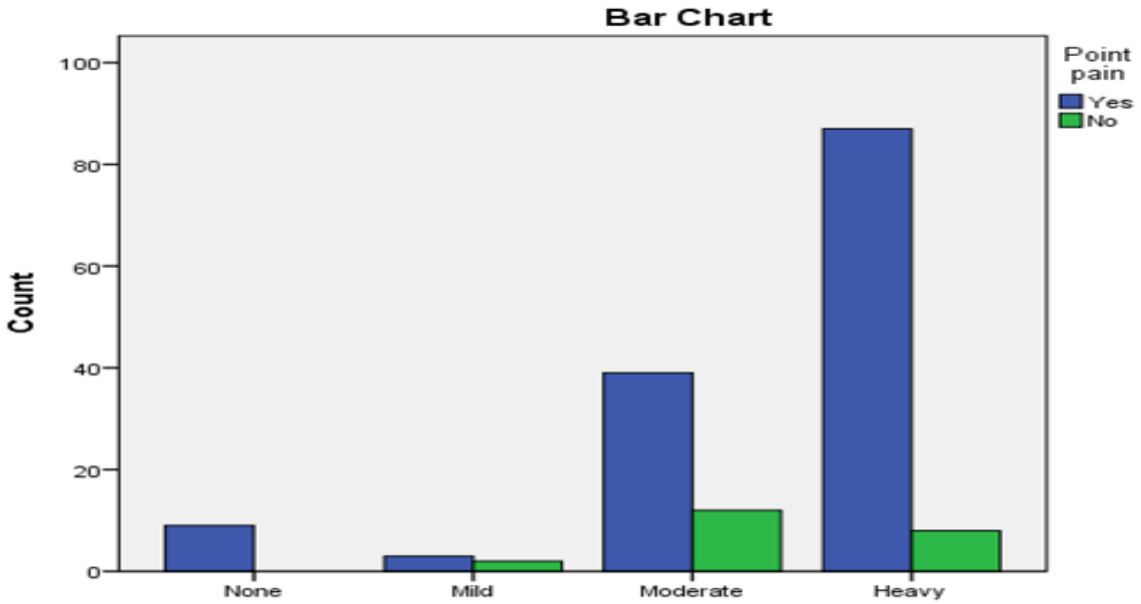
3.7.2 a PERFORMED Manual massage (lymph drainage, deep tissue)



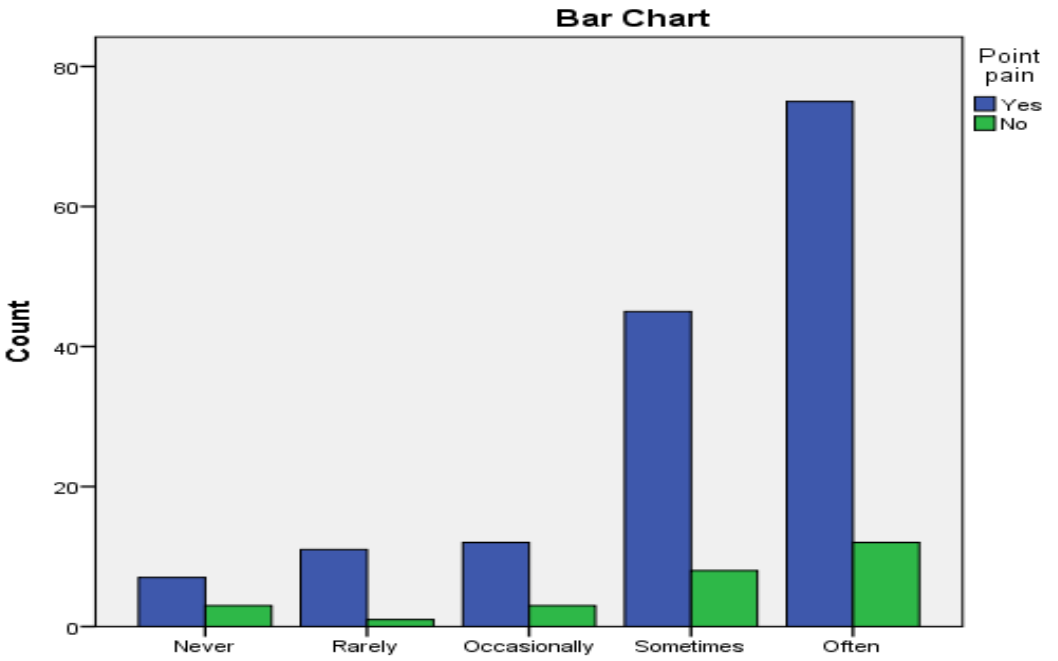
3.7.2.b LEVEL OF EXERTION Manual massage (lymph drainage, deep tissue)



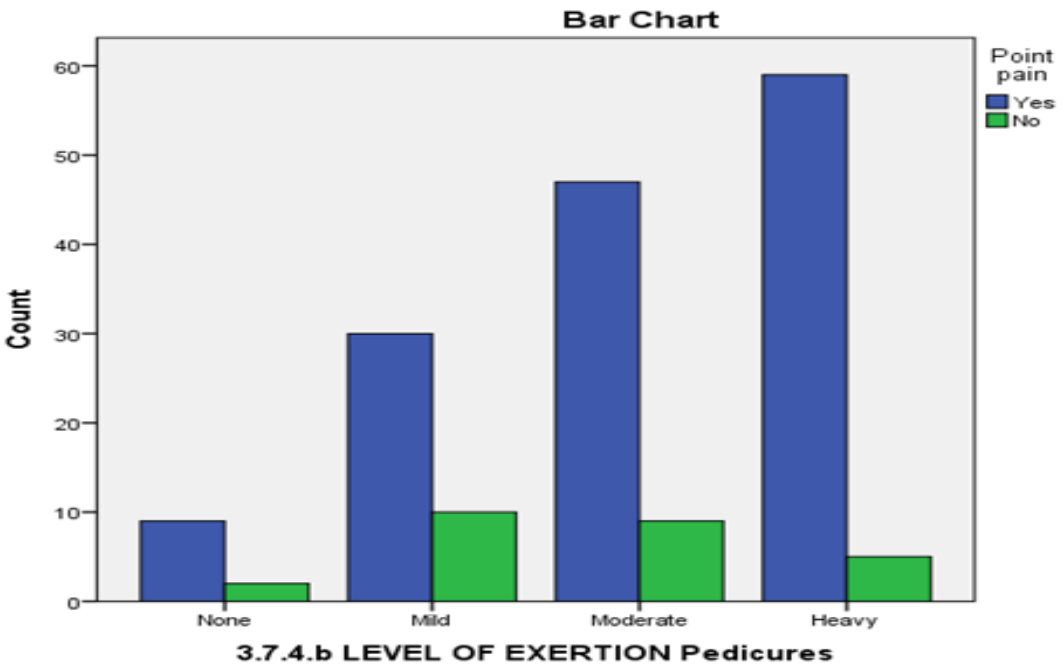
3.7.3 a PERFORMED Other specialised massage techniques (Lomi Lomi, Shiatsu, Swedish massage)



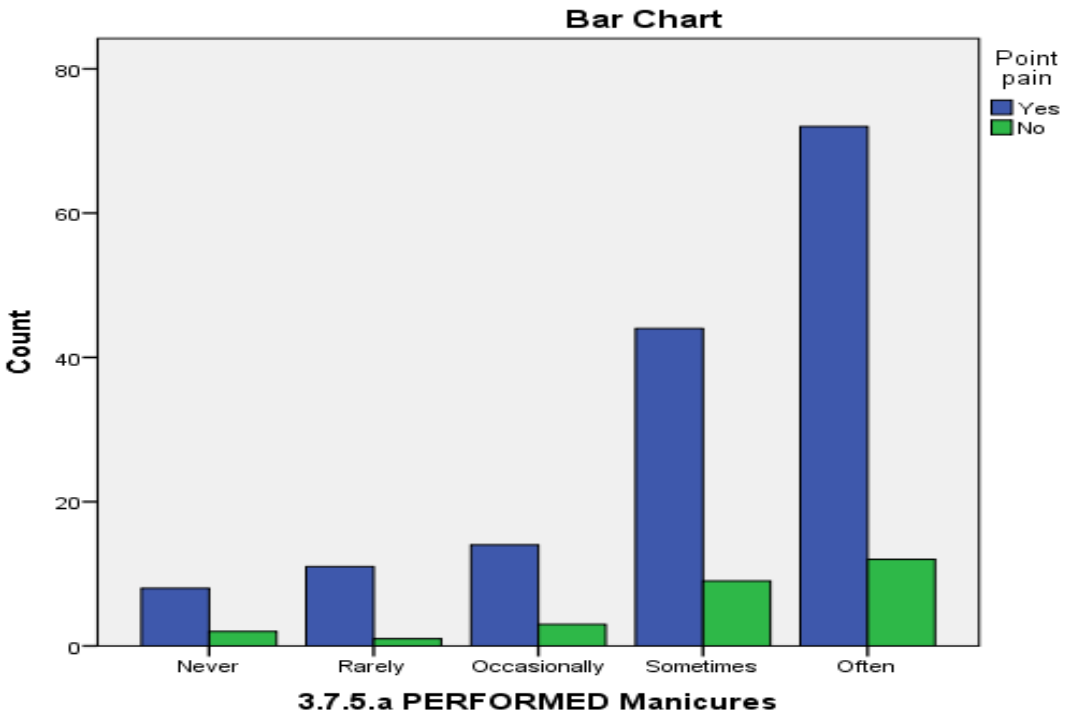
3.7.3.b LEVEL OF EXERTION Other specialised massage techniques (Lomi Lomi, Shiatsu, Swedish massage)



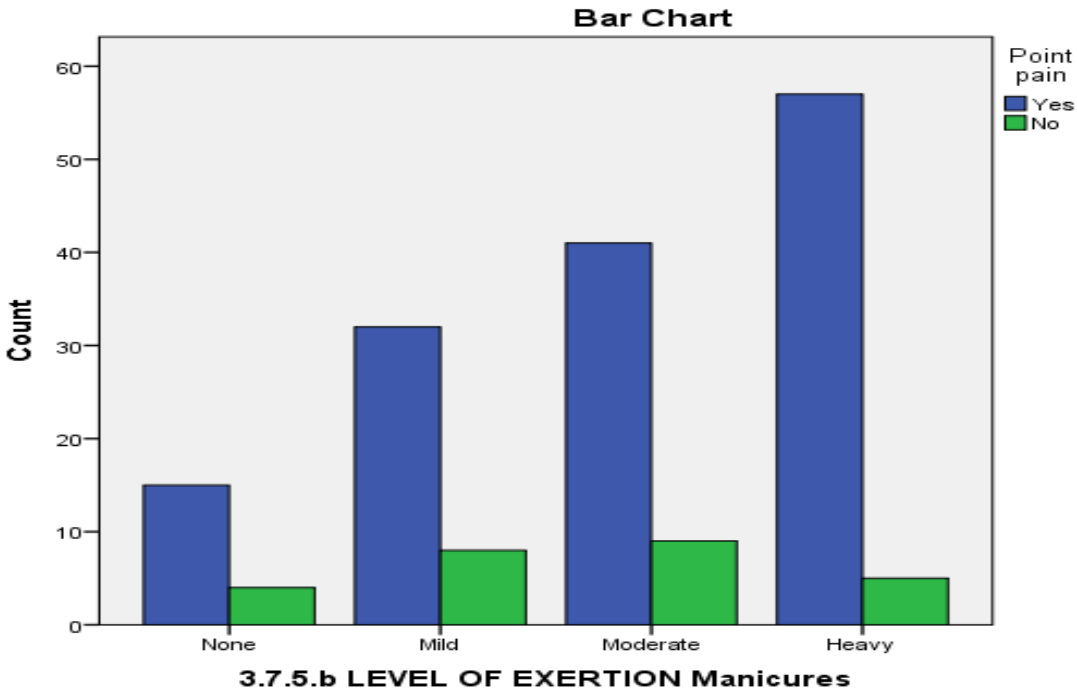
3.7.4 a PERFORMED 4.Pedicures



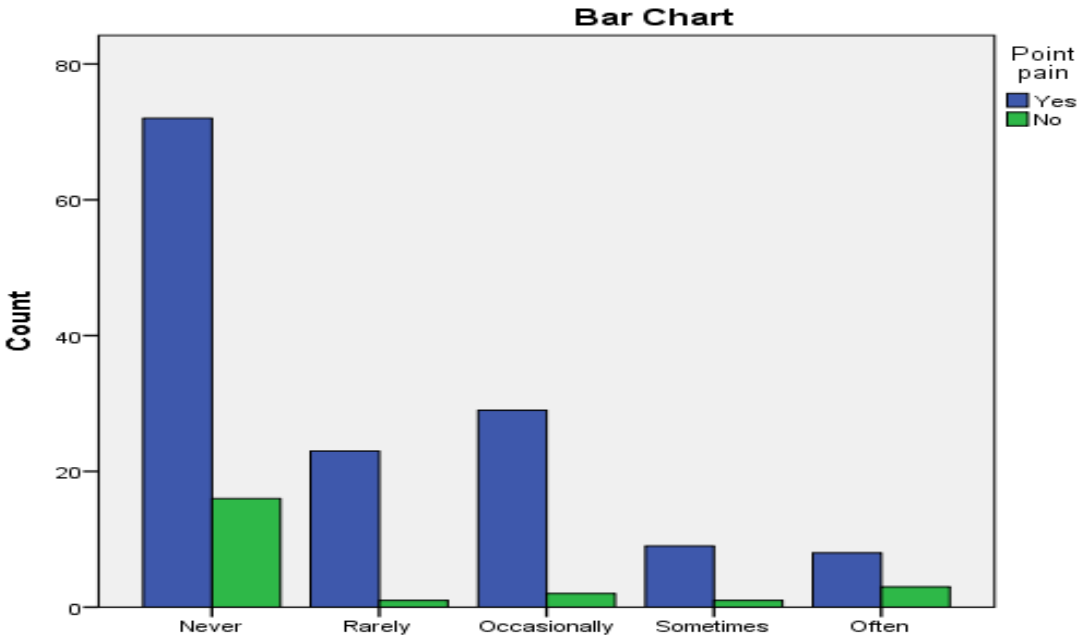
3.7.4.b LEVEL OF EXERTION Pedicures



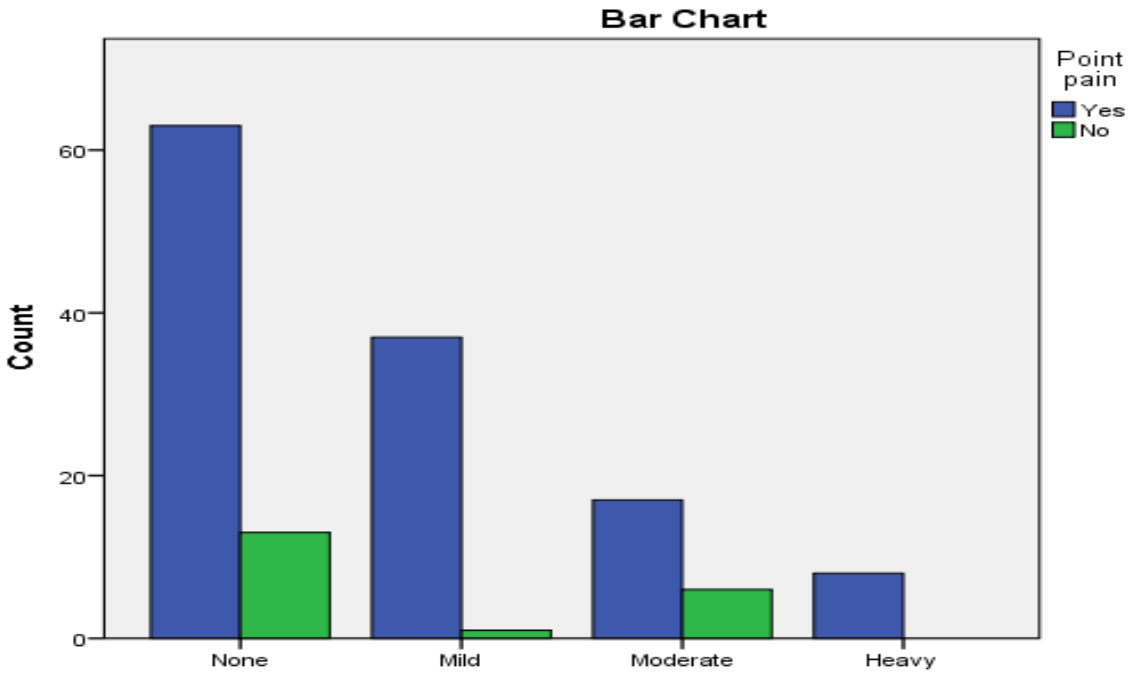
3.7.5.a PERFORMED Manicures



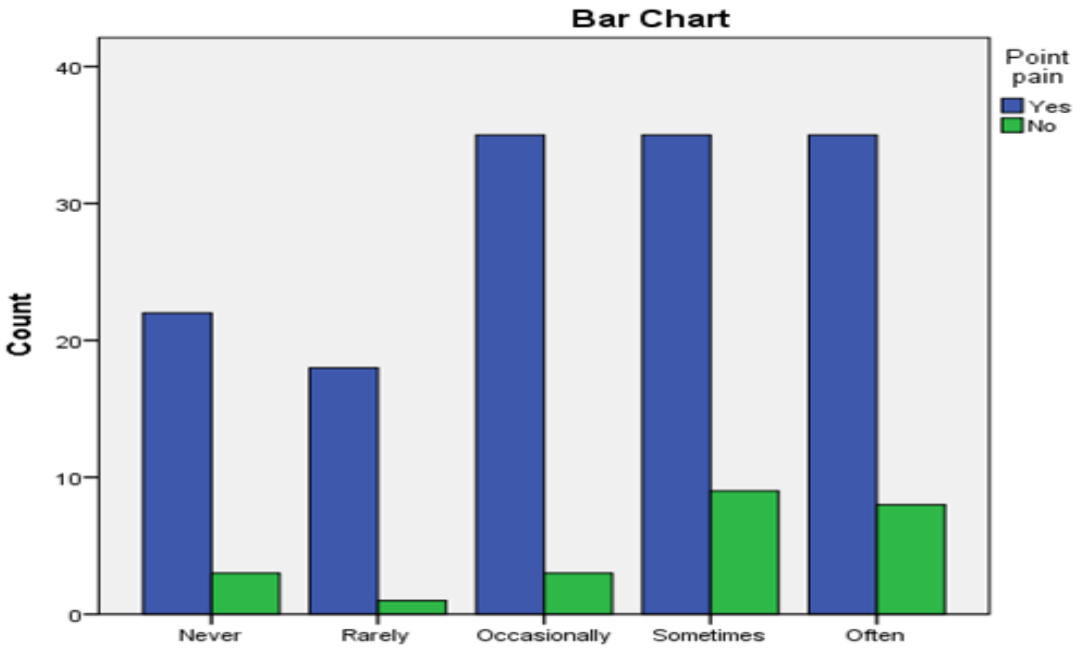
3.7.5.b LEVEL OF EXERTION Manicures



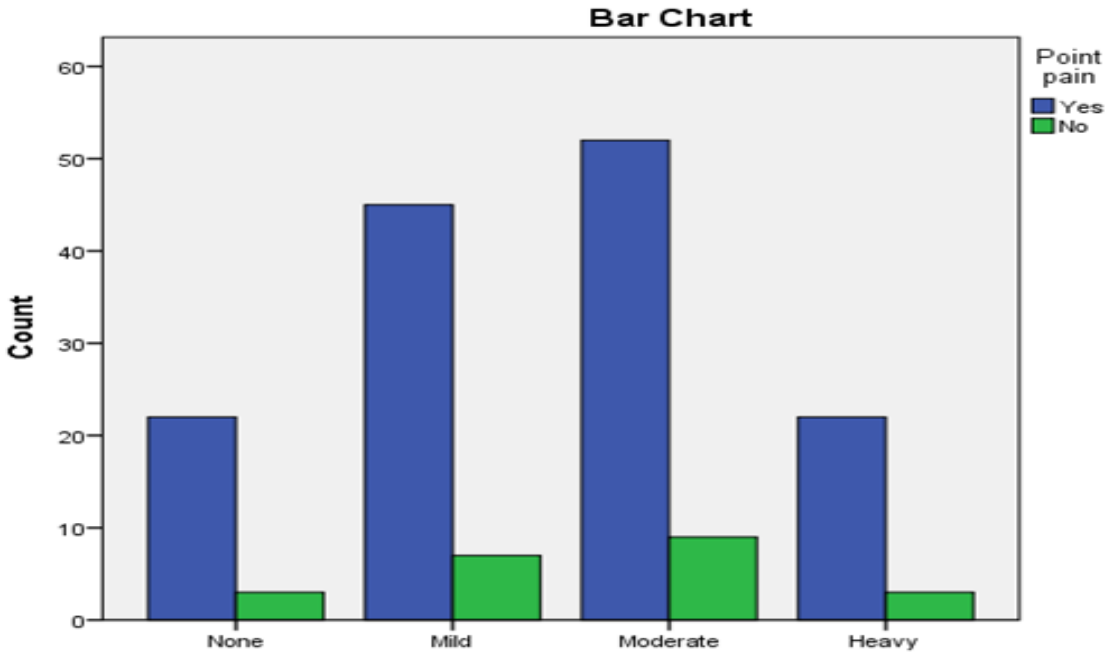
3.7.6.a PERFORMED Make-up/eyelash extensions



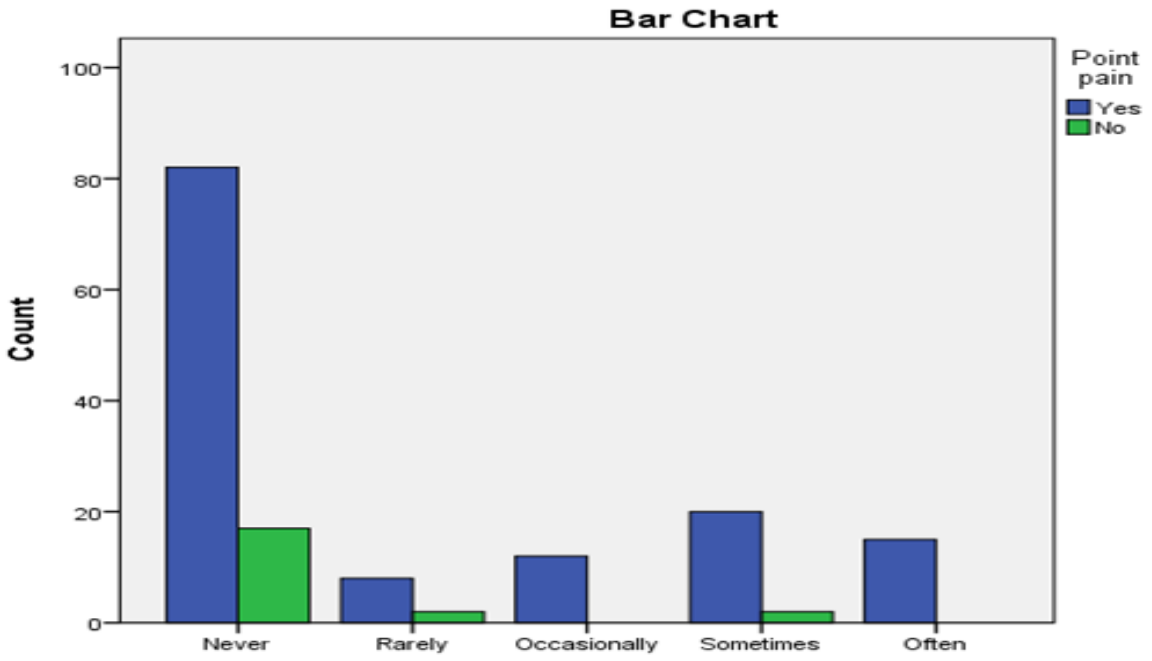
3.7.6.b LEVEL OF EXERTION Make-up/eyelash extensions



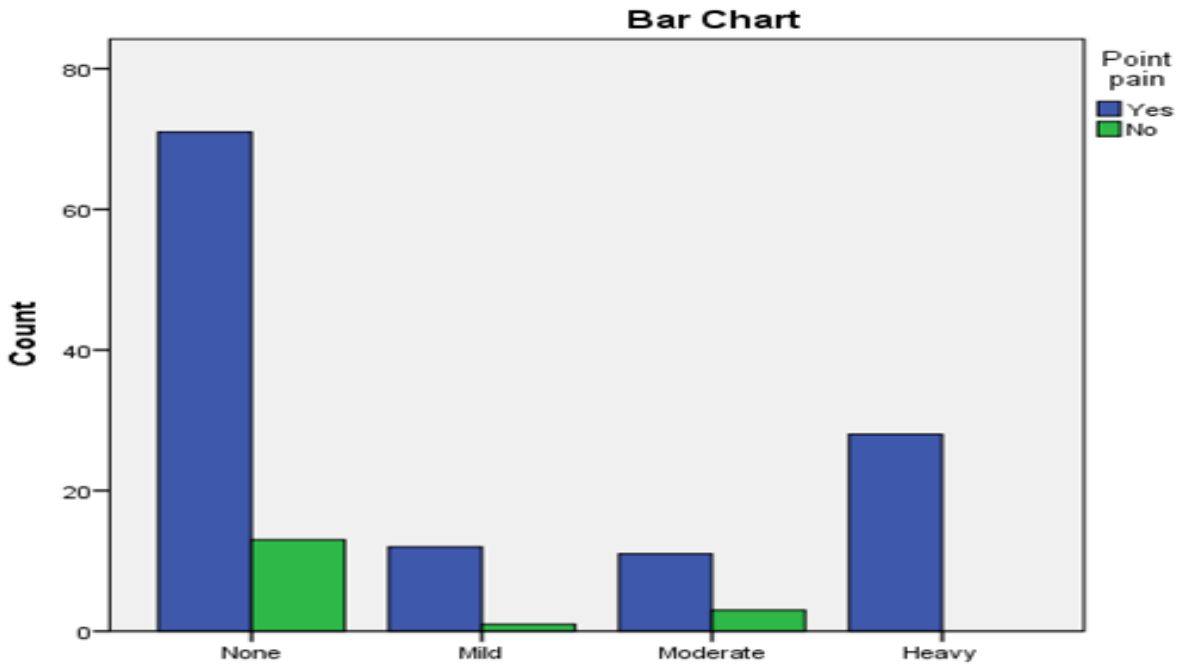
3.7.7 a PERFORMED Facial Therapy (exfoliation, masks, peels)



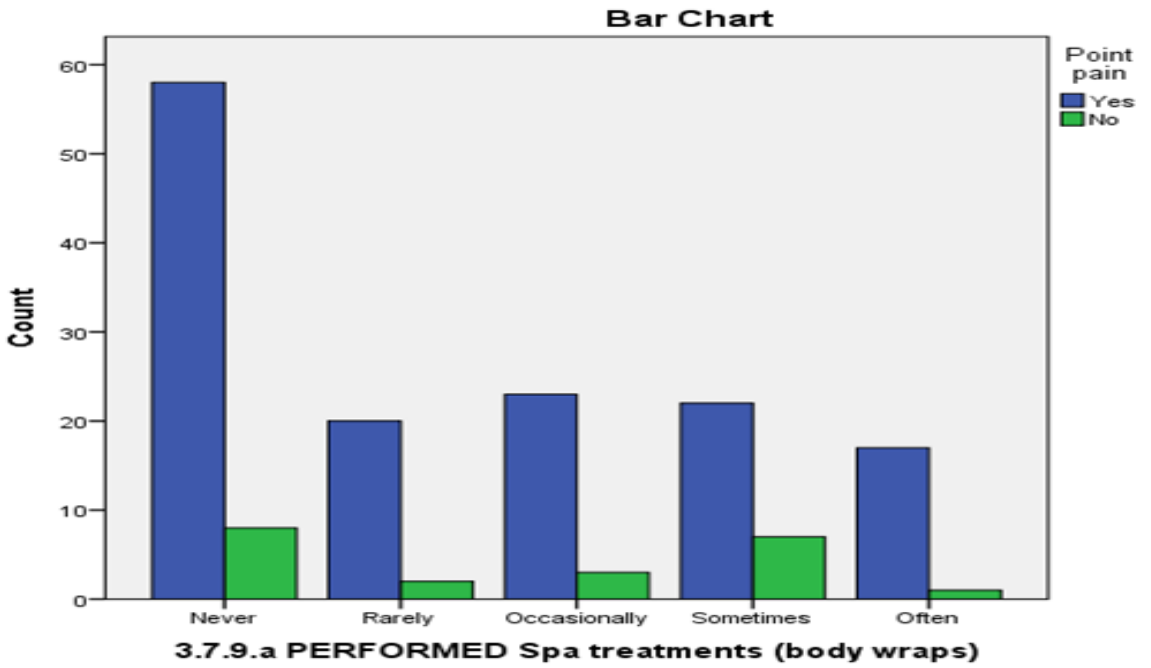
3.7.7.b LEVEL OF ACTIVITY Facial Therapy (exfoliation, masks, peels)



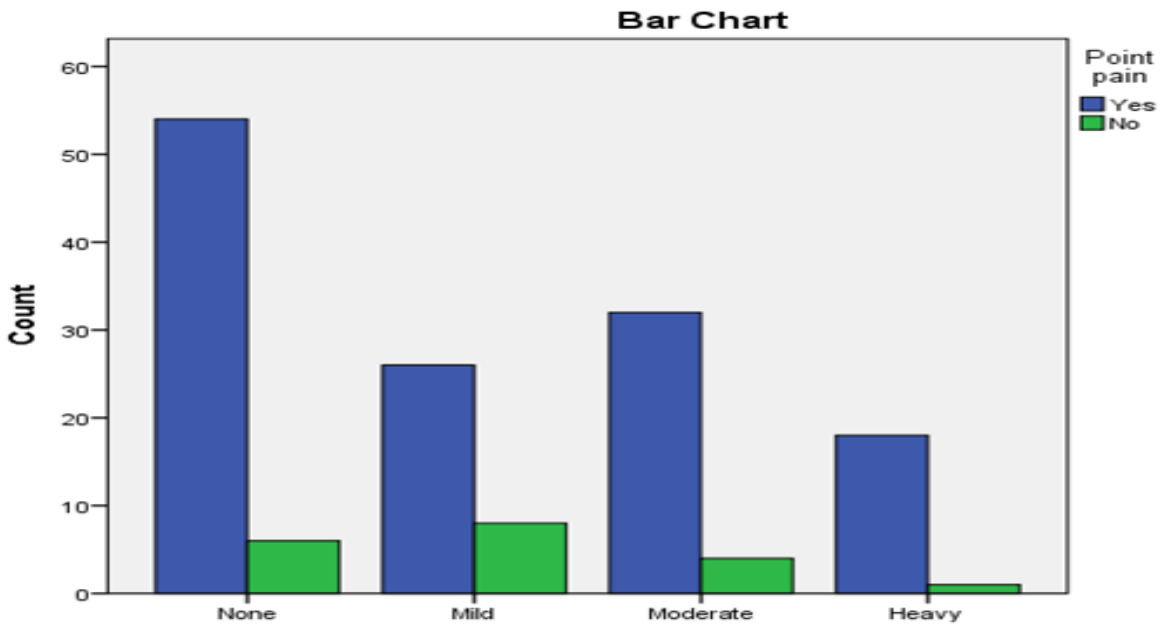
3.7.8. a PERFORMED Electrical therapy (micro-current, galvanism, vacuum suction)



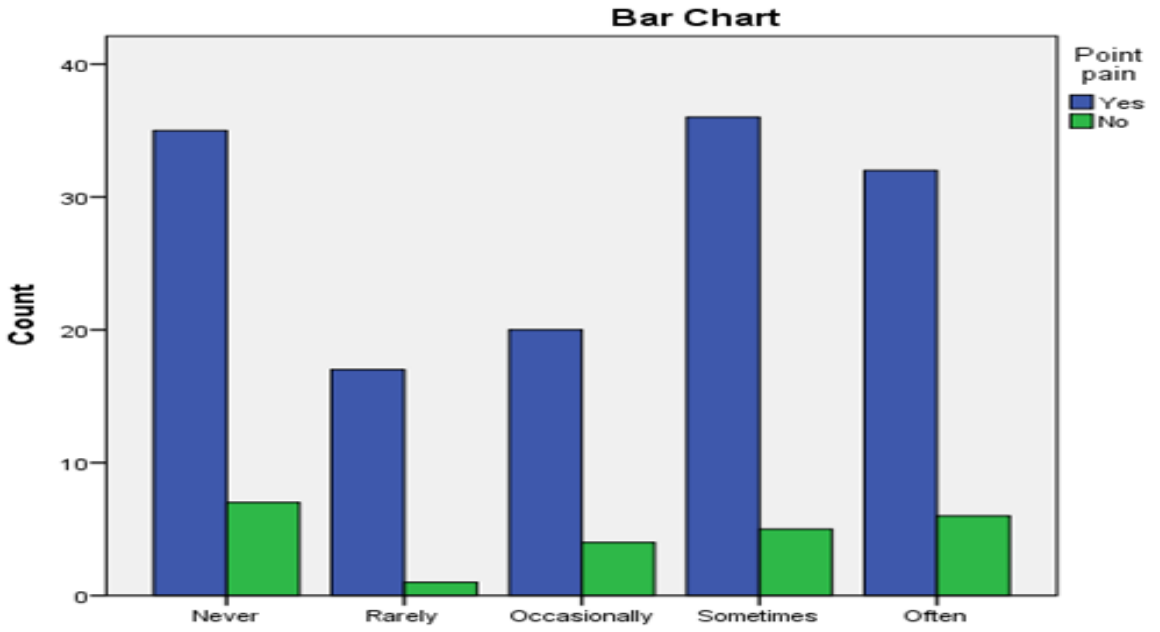
3.7.8.b LEVEL OF EXERTION Electrical therapy (micro-current, galvanism, vacuum suction)



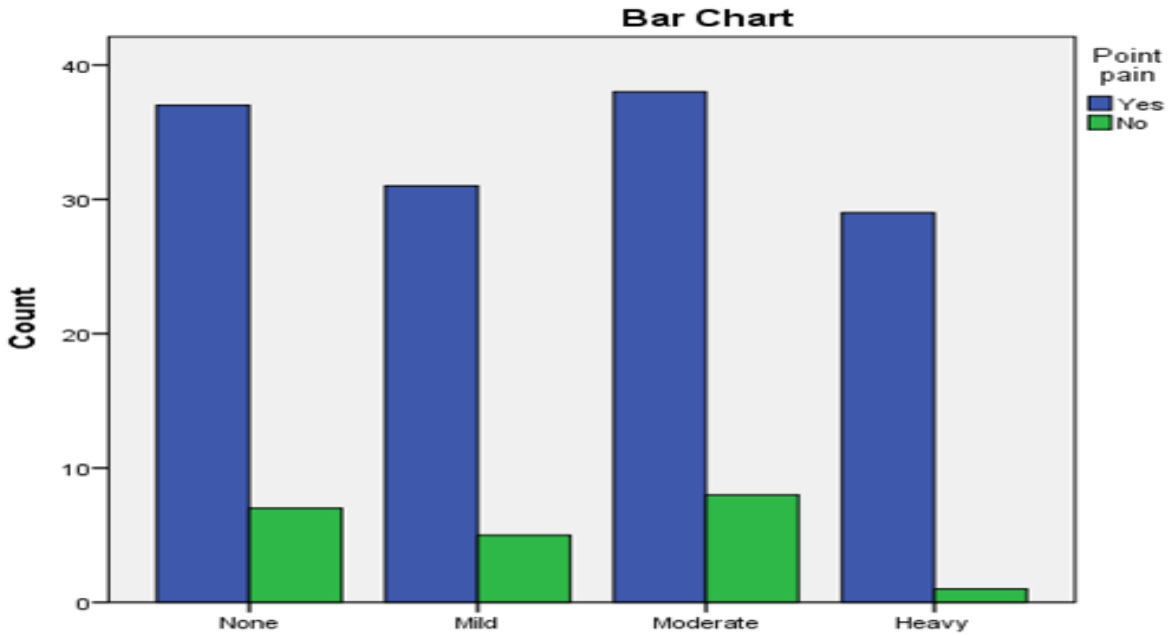
3.7.9.a PERFORMED Spa treatments (body wraps)



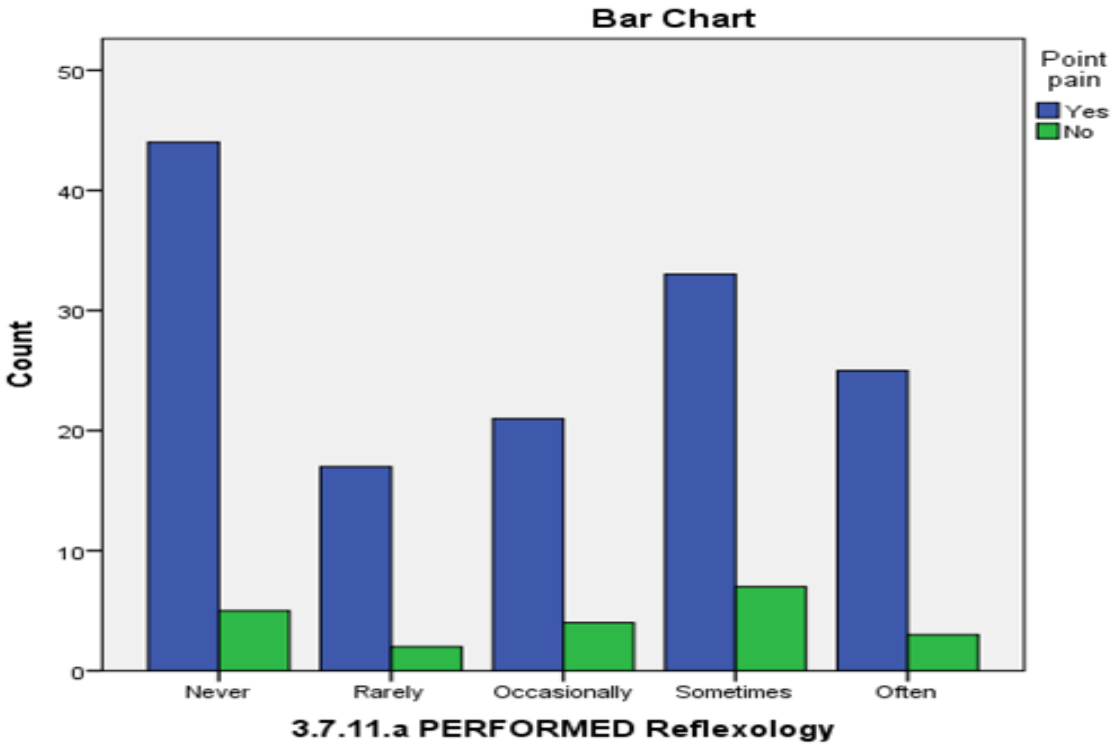
3.7.9.b LEVEL OF EXERTION Spa treatments (body wraps)



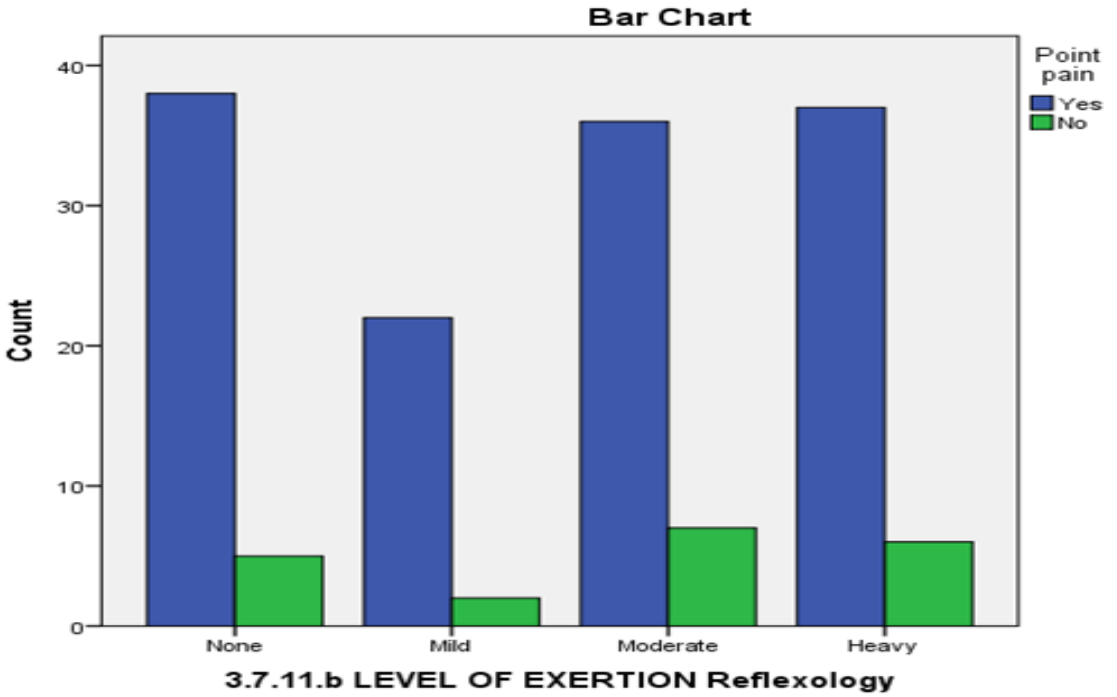
3.7.10.a PERFORMED Hair removal techniques (threading, waxing, sugaring)



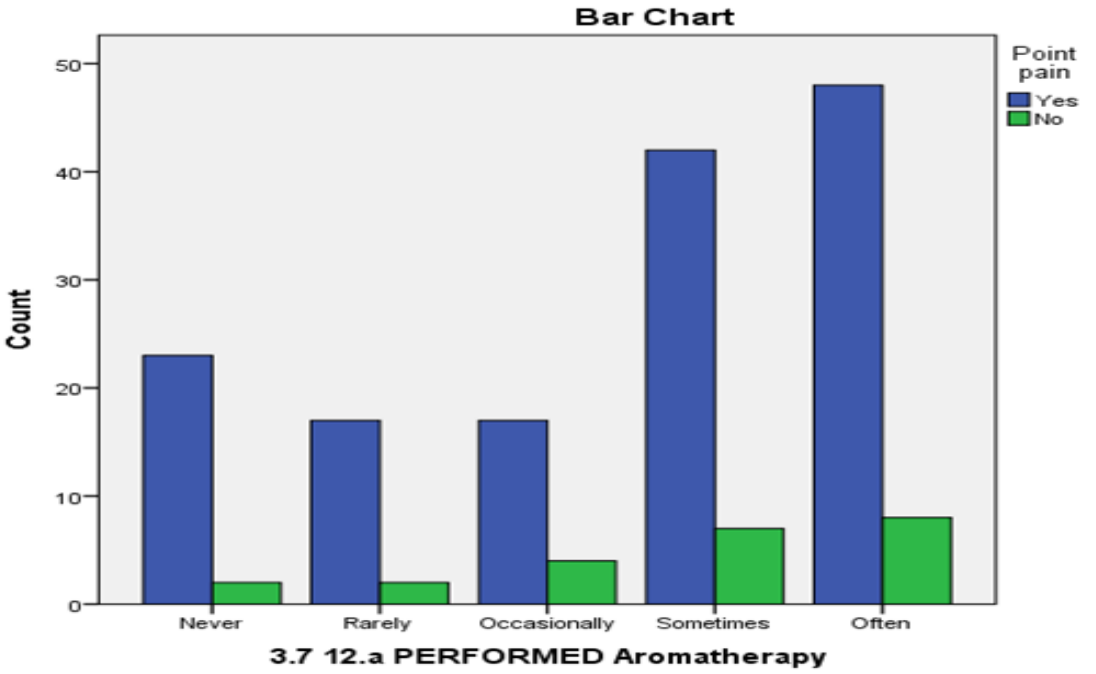
3.7.10. b LEVEL OF EXERTION Hair removal techniques (threading, waxing, sugaring)



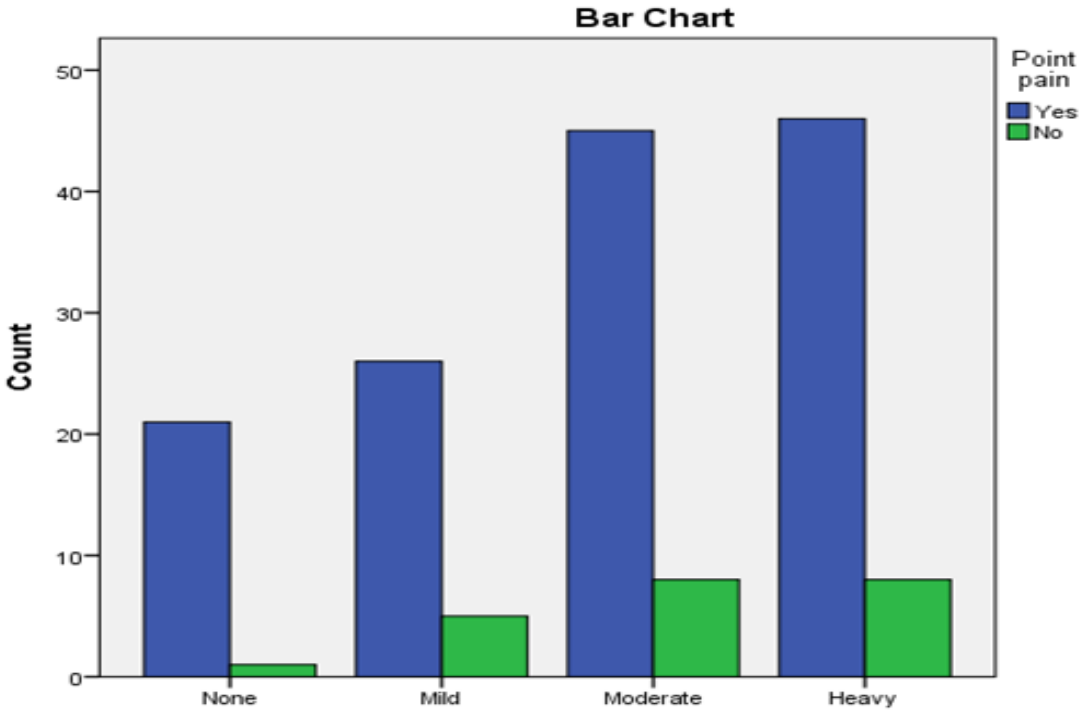
3.7.11.a PERFORMED Reflexology



3.7.11.b LEVEL OF EXERTION Reflexology



3.7 12.a PERFORMED Aromatherapy



3.7.12.b LEVEL OF EXERTION Aromatherapy