The risks and effect of work related musculoskeletal pain on work performance among physiotherapists in Limpopo province

Tlangelani Bellinah Hobyani

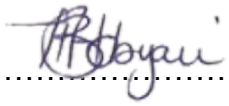
A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Physiotherapy.

WITS
UNIVERSITY

Johannesburg 2020

DECLARATION

I, Tlangelani Bellinah Hobyani declare that this Research Report is my own work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Science in Physiotherapy at the University of the Witwatersrand School of Health Sciences. This report has not been submitted before for any degree or examination purposes at this or any other University.



…….. 24/07/2020

Signature of Candidate Date

ABSTRACT

Background:

Musculoskeletal disorders are one of the major health problems facing workers today including many physiotherapists. The aim of the study was to determine the risks and effects of work related musculoskeletal pain on work performance among physiotherapists in Limpopo province.

Methods: This was a cross sectional descriptive study using self-administered questionnaires. Data was collected using an online REDCap questionnaire that was circulated among physiotherapists in Limpopo province through South African Society of Physiotherapy (SASP), Physiotherapy Association of South Africa (PASA, Limpopo Department of Health Physiotherapy Provincial Coordinator (LDOHPPC) The data was analysed using STATA version 14.1 software and summarised using descriptive statistics.

Results: A total of 106 physiotherapists accessed the online questionnaire and 59 participants accepted and completed the questionnaire giving a response rate of 55.1%. A lifetime prevalence of work related musculoskeletal pain (WRMP) in Limpopo province was 84.4% (n=50). More female 78% (n=39) participants were affected compared to males 22% (n=11). Majority of the physiotherapists with WRMP were working in public sector (n=31; 67.4%). The low back was the most commonly affected site with 47.5% (n=28) participants reporting WRMP, followed by the neck (n=25; 42.4%). Treating a larger number of patients in one day and malfunctioning of equipment (n=33; 66%) were the major risk factors contributing to WRMP. The most common coping strategies among physiotherapists was adjusting the height of the plinth or bed (n=30; 60%) and modifying the patient position or the therapist position (n=27; 54%). Majority of the physiotherapists (n=38; 76%) reported having continued to work with the discomfort, while only 34% (n=17) are considering leaving the profession.

Conclusion: The prevalence of WRMP among physiotherapists in Limpopo province was found to be high. Despite the high prevalence, physiotherapists are not considering changing their careers due to WRMP.

Key words: work related musculoskeletal pain/discomfort, physiotherapy, MSK pain

ACKNOWLEGEMENTS

I would like to extend my sincere thanks and gratitude to:

- The Lord God Almighty for the strength and wisdom to study and write this research report.

- Dr N Benjamin-Damons and Mrs. S Ravat, my supervisors for their academic support and professional guidance and supervision.

- The Limpopo Department of Health for giving me the opportunity to conduct the study in the province.

- All Limpopo physiotherapists who participated in this study.

- The South African Society of Physiotherapy (SASP), Physiotherapy Association of South Africa (PASA) and Limpopo Department of Health Provincial Physiotherapy Coordinator (LDOHPPC) for their assistance during the study.

- The Pietersburg Hospital Physiotherapy department for their support during my period of study.

- My loving husband Victor Khangala for his unwavering support, inspiration and encouragement. To my son Riamulivhuwa Khangala.
  The Hobyani and Khangala family for their continued support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADL:	Activities of daily living
HREC:	Human Research Ethics Committee
ICU:	Intensive care unit
MSK:	Musculoskeletal
UK:	United Kingdom
KZN:	Kwazulu-Natal
LDOHPPC:	Limpopo Department of Health Physiotherapy Provincial Coordinator
MSK:	Musculoskeletal
REDCAP:	Research Electronic Data Capture
SASP:	South African Society of Physiotherapy
PASA:	Physiotherapy Association of South Africa
USA:	United States of America
WHO:	World Health Organisation
WRMP:	Work-related musculoskeletal pain
WRMDs:	Work related musculoskeletal disorders

CHAPTER 1: INTRODUCTION

1.1 Background and the need

The World Health Organisation (WHO) reported that musculoskeletal (MSK) conditions affect the working age group and is directly associated with pain (Lutman *et al*., 2003). These conditions are among the most common causes of chronic pain (40%), restricted activity days (24%), and physical disability (54%) affecting 100 million people around the globe (Woolf & Pfleger, 2003). The WHO reported that MSK conditions are one of the most costly conditions globally and lead to considerable costs for the public health system (Lutman *et al*.,2003).

MSK disorders are one of the major health problems facing workers today, including many physiotherapists (Glover *et al*., 2005). Sharan and Ajeesh (2012) reported a 60% worldwide prevalence of work related pain amongst physiotherapists. The nature of physiotherapy and techniques used to treat patients exposes physiotherapists to MSK disorders (Milhem *et al*., 2015). Physiotherapists engage in a wide range of treatment techniques using their hands and body weight during administration of treatment. These techniques involve high repetitive tasks, awkward placement of joints during treatment, sustained postures and high force manual techniques that put a strain on the hands, thumb, neck and back (Milhem *et al*., 2015). These treatment techniques may expose physiotherapists to injuries.

The South African health system report by Jobson (2015) describes the public sector as under-resourced, holding an overall responsibility of the health of South Africa's population. Approximately 84% of the South African population have no medical aid and are dependent on the public health sector that in turn is hampered by a shortage of medical personnel (Jobson, 2015). Limpopo is one of the provinces with the highest shortage of health care workers and has the lowest medical aid coverage (Rural health Advocacy Project, 2015). Lack of medical scheme coverage means a high reliance on public health care. Shortage of staff put a lot of strain on physiotherapists to meet patients' demands because of high patient volume and increased workload.

1.2 Problem statement

The Department of Health South Africa (2003) describes healthcare practitioners as the most valuable asset for providing healthcare services to the community. Hospitals cannot operate well if there is a high rate of sickness among healthcare workers (Department of Health South Africa, 2003). Work related musculoskeletal pain (WRMP) might pose a threat to the health of physiotherapist's and the length of their profession. Sharan and Ajeesh (2012) discovered that WRMP among physiotherapists remain unreported. One out of six physiotherapists change their career due to WRMP (Sharan and Ajeesh, 2012). Physiotherapists may decide to change their career because they can no longer perform certain treatment techniques resulting in a loss to the profession.

There are few studies conducted on the prevalence of WRMP among physiotherapists in South Africa. Only one study conducted in KwaZulu Natal Province (KZN) focused on physiotherapists experiencing work related MSK disorders (Pillay, 2014). Other studies focused on the thumb and wrist pain (Jenkins, 2014 and Banes, *et al*., 2011). No studies have been done in the Limpopo province in South Africa to assess the prevalence rate of WRMP among physiotherapists, its effect on work and measures in place to address them.

1.3 Research question

1. What is the prevalence of WRMP among physiotherapists in Limpopo province?
2. What are the risk factors associated with WRMP among physiotherapists?
3. What are the effects of WRMP on work performance?
4. What are the coping strategies among physiotherapists with WRMP?

1.4 Aim of the study

The aim of the study was to determine the prevalence of WRMP, and its associated risk factors, coping strategies and effects on work performance among physiotherapists practicing in public and private sector in Limpopo province.

1.5 Objectives of the study

a) To determine the prevalence of WRMP in public and private sector in the Limpopo province.
b) To evaluate the risk factors that contributes to WRMP among physiotherapists.
c) To determine the coping strategies among physiotherapists with WRMP.
d) To evaluate the effect of MSK pain on work performance and measures in place to address MSK pain in the workplace.

1.6 Significance of study

The study may add to the existing body of knowledge within South Africa on the risks and extent of WRMP among physiotherapists in Limpopo. The information gained from the study may help physiotherapists in the development of specific professional guidelines about preventative measures of MSK pain and injuries in the workplace and influence the South African health sector in policy decision making. This in turn may help improve productivity at the workplace, improve service delivery and quality of care to patients by retention of staff, preventing loss to the profession and sustaining a viable workforce.

1.7 Conclusion

MSK problems are prevalent among physiotherapists. With only few studies conducted in South Africa and no studies done in the province of Limpopo, more data is needed on the prevalence and extent of WRMP among physiotherapists. The aim of this study was to report on the prevalence of WRMP and its associated risk factors, coping strategies and its effects among physiotherapists in Limpopo province. The findings from this study may help formulate preventative measures to help minimize the risk of WRMP among physiotherapists.

CHAPTER 2: LITERATURE REVIEW

Introduction

This section will analyse the studies done in different countries comparing the prevalence of WRMP among physiotherapists in public and private sector. The literature has been obtained from electronic database searching sourced from PUBMED, EBSCO, CINAHL, ClinicalKey and Access physiotherapy. It will be covering the following aspects: prevalence rate, demographic data, factors and commonly affected anatomical areas, effect on work, coping strategies and measures for WRMP. Studies published between 2000 and 2017 were included in the literature review.

2.1 Prevalence rate of WRMP among Physiotherapists

Physiotherapists who offer services on the management and prevention of MSK conditions are experiencing MSK pain themselves (Buddhadev and Kotecha, 2012). The overall physical therapy tasks are intensely related with work related musculoskeletal disorders (WRMDs) amongst physiotherapists (Grooten *et al*., 2011). Sharan and Ajeesh (2012) asserted that physiotherapists are at risk of developing MSK disorders and injuries despite being trained to manage these conditions. Their expertise and information on MSK management does not preclude them from developing MSK pain (Milhem *et al*., 2015). The statement ascertains that there is a need for fresh and modern preventative strategies.

Studies have been conducted globally to measure the degree of WRMP among physiotherapists (Gharote *et al*., 2016 Viera *et al*., 2016; Pillay, 2014; Nordin, *et al*., 2011; Alrowayeh *et al*., 2010). Most of these studies reported on a twelve-month and lifetime prevalence ranging from 48% to 96% (Viera, *et al*., 2016; Alrowayeh *et al*., 2010). Vieira, *et al*., (2016) reported the highest twelve-month prevalence of 96% amongst physiotherapists in Florida United State of America (USA), followed by Aljairan *et al.,* (2015) who reported a twelve-month prevalence rate of 91% among physiotherapists in Bahrain. A study done in South Asia reported twelve-month

prevalence rate as 71% (Nordin *et al*., 2011), while in India, the Surat district reported a prevalence of 62.73% (Preran *et al*., 2015). Alrowayeh *et al*., (2010) reported the lowest twelve-month prevalence of 48% amongst physiotherapists in Kuwait. Cromie and colleagues (2000) reported a lifetime prevalence rate of 91% among physiotherapists in Australia. High workload and shortage of staff were identified as risk factors for the prevalence of WRMDs while low workload was attributed to a lower prevalence (Nordin *et al*., 2011).

In Africa, studies done by Neveen *et al*., (2014) the reported twelve-month prevalence rate was 90.75% among physiotherapists in Egypt while Pfumojena (2015), reported a lifetime prevalence of 86,1% among physiotherapists in Zimbabwe respectively. Nkatha *et al.,* (2010) reported a twelve-month prevalence rate of 68.3% among physiotherapists in Zambia, while Adegoke *et al*., (2008) reported a twelve-month prevalence rate of 91.3% among physiotherapists in Nigeria. In a study done by Igombo *et al.,* (2003) the reported a twelve-month prevalence rate was 56% among physiotherapists in Zimbabwe. The difference between these studies conducted in Africa is that Igumbo *et al.,* (2003) only focused on the low back while the other studies included other areas of the body. Table 2.1 present a summary of the prevalence rate of WRMP (from high to lower prevalence rate):

Table 2.1: The prevalence of WRMP globally

Author	Area	Prevalence Type	Prevalence rate
Vieira, *et al*., (2016)	Florida United State of America (USA)	12 month	96%
Aljairan *et al*., (2015)	Bahrain	12 month	91%
Adegoke *et al*., (2008)	Nigeria	12 month	91.3%
Cromie *et al*., (2000)	Australia	Lifetime	91%
Neveen *et al*., (2014)	Egypt	12 month	90.75%
Pfumojena (2015)	Zimbabwe	Lifetime	86,1%
Pillay (2014)	South Africa, KZN	Lifetime	86%
Nordin *et al*., (2011)	South Asia	12 month	71%
Nkatha *et al*., (2010)	Zambia	12 month	68.3%
Jenkins (2014)	South Africa	Lifetime	65.3%.
Preran *et al*., (2015).	India, the Surat district	12 month	62.73%
Banes *et al*., 2011,	South Africa, Bloemfontein	Lifetime	62.5%
Igombo *et al*., (2003)	Zimbabwe	12 month	56%
Alrowayeh, *et al*., (2010)	Kuwait	12 month	48%

In South Africa three studies could be sourced on WRMDs among physiothrapists (Pillay 2014; Jenkins 2014 and Banes, *et al*., 2011). The study done in KwaZulu Natal (KZN) reported a lifetime prevalence rate of WRMDs among physiotherapists at 86% (Pillay, 2014). Jenkins (2014) reported a lifetime prevalence of 65.3% in South Africa, while Banes, *et al*., 2011 reported a lifetime prevalence of 62.5% in Bloemfontein. Jenkins (2014) investigated the prevalence of work-related thumb pain among South African physiotherapists treating MSK conditions using manual therapy, while Banes, *et al*., 2011 evaluated the wrist and the thumb. Pillay (2014) included other body parts as well in her study. Limpopo province might reflect differently from the results obtained in KZN due to varying demographic characteristics, geographical location, the practice setting and the status of the profession between the two provinces. KZN, an urban and coastal area attracts more physiotherapists while Limpopo might attract fewer physiotherapists as it is an in-land area.

2.2 The Demographic Data of WRMP amongst Physiotherapists

Bharadva stated that MSK pain among physiotherapists start as early as undergraduate level (Bharadva *et al*., 2014). The majority of studies reported that the greatest incidences of WRMP among physiotherapists happen within the first five years following graduation, during student internship and affects junior and newly qualified physiotherapists (Muruganantham *et al*., 2015; Prerana *et al*., 2015; Pillay, 2014). Sharan and Ajeesh (2012) also stated that WRMP affect young physiotherapists below the age of 35. A possible reason could be that newly qualified physiotherapists have not mastered the skills of the treatment techniques. Newly trained physiotherapists are also involved in clinical rotations posing a risk of injuries (Sharan and Ajeesh, 2012). Older physiotherapists may have already discontinued practicing due to pain.

On the other hand, the reported lifetime prevalence of WRMDs among physiotherapists with postgraduate specialisations were also high, like those without postgraduate qualifications despite having qualified with their area of special interest (Gharote *et al*., 2016). Most of the physiotherapists do not have the requisite experience necessary for management of patients despite having recently qualified with the knowledge of how to reduce the risk of developing WRMP (Viera *et al*., 2016).

Grooten *et al*. (2011) reported that WRMDs affect mostly females (54%). This was further supported by Nordin *et al*., (2011) who reported 73% prevalence of WRMDs among female physiotherapists. Grooten *et al*., (2011) assessed the prevalence of WRMDs among female physiotherapists who have more than 15 years of work experience, whereas the other studies included both males and females with only one year work experience. Adegoke *et al*., (2008) also reported a high prevalence in females (100% in females, and 86% in males), even though most of the participants in his study were males. The ratio of female (n=46) to male (n=69) in this study was 1:1.5 (Adegoke *et al*., 2008). The possible reason for high prevalence in females could be that females undergo a lot of physiological changes resulting in postural changes and weakening of MSK system (e.g. maternal physiological changes) which could predispose them to MSK pain (Nordin *et al*., 2011).

High prevalence of WRMP was reported amongst physiotherapists working in public hospitals (Gharote *et al*., 2016; Pillay, 2014; Nordin *et al*., 2011). A high prevalence of WRMP in public hospitals was attributed to shortage of staff and high clinical workload (Nordin *et al*., 2011). This is relevant to South Africa as there is a shortage of health care workers who are under pressure to provide services to a larger population (84%) who are dependent on public health sector for quality health care services (Rural Health Advocacy Project, 2015; Jobson, 2015).

2.3 Factors Contributing to WRMP

Work related MSK disorders are prevalent among physiotherapists, and the incidences are dependent on practice setting and the area of specialty (Vieira *et al*., 2016). Czupryna *et al*., (2014) concluded that there is a cause and effect relationship between physiotherapy techniques and the prevalence of discomfort. This working group spends most of their time engaging in repetitive activities and static positions for long periods regardless of their job (Collins *et al*., 2010). The occurrence of musculoskeletal pain is related to several work related precursors such as: high exposure to awkward postures; manual application of force to joints or muscles and mobilisation of a joint or individual (de Cassia Pereira *et al*., 2016). These risk factors are reversible in acute overloading but become progressive symptoms for the start of a more serious condition (Luttman *et al*., 2003).

Physiotherapists are thus vulnerable to MSK pain when performing treatment techniques. This is because the scope of physiotherapy practice varies per clinical discipline of clinical speciality therefore altering the risk factors for injury (Vieira *et al*., 2016; Czupryna *et al*., (2014). Each clinical area and treatment technique requires varied expertise and that causes different biomechanical demands on the physiotherapists' MSK system predisposing the therapist to MSK injuries (Vieira *et al*., 2016; Czupryna *et al*., 2014; Bernstein, 1998). Some risk factors most commonly alleged by health professionals as likely to reduce their ability to carry on working have been identified and grouped into four broad areas and 17 job-related risk

factors (Cromie et al., 2000; Bork *et al*., 1996). These are listed in Table 2.2. Pfumojena (2015) identified additional risk factors involving malfunction of equipment and availability of assistive devices that could contribute to WRMP among physiotherapists in her study done in Zimbabwe. The risk factors are summarised in the table below (Cromie et al., 2000; Bork *et al*., 1996):

Table 2.2: Job related risk factors

Groups of risks factors	**Description**	**Job-related risk factors**
Activities	Six risk factors pertaining to specific activities	- Execution of manual orthopaedic procedures - Lifting and transferring of patients, - Supporting patients during gait training - Moving and carrying heavy materials or equipment - Working with disoriented patients - Unexpected movements and falling by patient
Position/posture	Four risk factors concerning working posture and movements by physiotherapist	- Working in awkward or cramped positions - Working in the same posture for prolonged time. - Bending or rotating in an awkward manner - Reaching or working away from your body
Workload issues	Four risk factors relating to the frequency or repetitive treatment and time management matters such as scheduling and rest breaks	- Performing repetitive task - Treating a large number of patients in one day - Working scheduling (overtime, irregular shifts, length of workday) - Not enough rest breaks during the day
Personal work factors	Three risk factors pertaining to work in association with physical work capacity, health status, and knowledge of the physiotherapist	- Working at or closer to your physical limits - Working with an injury - Inadequate training in injury prevention

Passier and Mcphail (2011) revealed that occupational postures and activities, lifting, patient related issues and repetitive jobs are alleged to be main risk factors in physically demanding clinical roles. However, Knardal (2017) reported that WRMP does not only depend on physical and physiological factors, but that psychosocial factor such as job demands and pressure also play an important role as contributing factors. This is supported by Grooten *et al*., (2011) who concluded that general as well as particular physical therapy jobs and psychosocial work related exposures are associated with WRMDs.

The main risk factors for WRMP among physiotherapists are repetitive tasks, increased number of patients, lack of proper rest between treatments, performing manual techniques, reaching away from body, twisting, bending, patient lifting and transfers and working at physical limit (Bae and Min, 2016; Pillay, 2014; Narendrasinh and Mulla, 2013). Frequent standing and walking were also found to be contributing to MSK pain (Aljairan *et al*., 2015).

Nordin *et al*., (2010) reported that the most commonly used physical activities contributing to WRMDs are manual therapy, lifting and transferring of patients. Nkatha *et al*., (2010) and Pillay (2014) also alluded that manual therapy, lifting and transferring patients were found to be major risk factors for WRMDs among physiotherapists.

Physiotherapists who regularly perform manual therapy such as soft tissue mobilisation, manipulations and massage are more at risk of developing wrist, hand and thumb pain than those who do not perform these techniques (Nordin *et al*., 2010; Cromie *et al*., 2000; Bork *et al*., 1996) This is supported by Barnes *et al*. (2011) and Jenkins (2014) who state that physiotherapists regularly using manual therapy techniques reported high WRMD of the wrist, hand and thumb. Repetitive movements of the thumbs and hands and increased workload or failure to stabilise the joints of the hands when administering manual therapy techniques were associated to be the risk factors (Jenkins, 2014; Barnes *et al*., 2011;). Frequent repetitive movements result in fatigue and overloading of muscular structures (Luttman *et al*., 2003).

In contrast to these findings, Narendrasinh and Mulla (2013) established that physical activities such as assisting patients during gait activities was a minor risk factor. Similarly, Adegoke *et al*., (2008) discovered that working with disorientated or restless patients and reaching or working far from the body were minor risk factors.

Workload issues such as the cumulative strain from productivity demands in the workplace is the most important cause of the injuries and discomforts (Viera *et al*., 2016). Adegoke *et al*., (2008); discovered that handling a bigger number of patients per day was the major workload risk factor for the development of WRMP. This

notion is supported by various other authors (Preranan *et al*., 2015; Pfumojena, 2015; Pillay, 2014; Nkatha *et al*., 2010) who found that treating big number of patients and doing the same task were the major risk factors for WRMDs. Pillay (2014) and Narendrasinh and Mulla (2013) also found that not having enough rest breaks between treatments is a major risk factor for WRMDs.

Physiotherapists adopt different working postures in different clinical settings in order to treat their patients (Bernstein, 1998). Postural risk factors may be due to failure to apply the principles of ergonomics in daily routines and the length of time at which the body is placed in these positions (Czupryna *et al*., 2014). If a non-physiological body position is maintained frequently for a long time, the distribution of compressive and stretching forces in the joints surrounding tissues changes resulting in slow overload which leads to development of WRMD (Czupryna *et al*., 2014). It was found that postural risk factors such as working close to physical limit, bending or rotating the back in an awkward manner, working in confined positions and in the same postures for prolonged times were the major postural contributing factors to WRMP (Balakrishanan *et al*., 2016; Preranan *et al*., 2015; Pillay, 2014; Adegoke *et al*., 2008). Ashfaq *et al*., (2010) found that adopting constant and uncomfortable postures was also a risk factor.

The major personal risk factor contributing to WRMDs was working near or close to physical limit (Pillay, 2014) while physiotherapists who continue to work when injured or hurt were at risk of chronic WRMDs (Muruganantham *et al*., 2015). Insufficient training on preventing injuries was found to be minor risk factor for WRMDs (Pillay, 2014; Narendrasinh and Mulla, 2013).

In studies done by Narendrasinh and Mulla (2013); Nordin et al., (2011) physiotherapists with body mass Index (BMI) over 25 reported high prevalence of WRMP. In contrast to these findings, Adegoke et al., (2008) reported a high prevalence rate among physiotherapists with low BMI. Being overweight is associated with low physical activity while low BMI was associated with poor muscle strength which predisposes to WRMP. Lack of physical strength and endurance is alleged to be a key factor to MSK injuries (Rugelj, 2003). Those who are obese may

not be physically active, such that they may be more susceptible to WRMDs (Atia et al., 2015)

2.4 Commonly Affected Anatomical Areas

According to WHO, work related musculoskeletal disorders may affect different body regions such as the low back, fingers, hand, wrist, arms, elbows, shoulders and neck (Luttman *et al*., 2003). Cromie *et al*., (2000) and colleagues share the same findings, that work-related postural risk factors, administering manual therapy techniques, and workload issues were related to symptoms in the wrists, thumbs, hands, neck, upper and lower back.

A high rate of low back pain was reported among physiotherapists (Bae and Min, 2016; Vieira *et al*., 2015; Pillay, 2014; Nordin *el at.,* 2010; Igumbor *et al*., 2003). Lower back pain among physiotherapists was discovered to be associated with patient care activities (Nordin *el at.,* 2010), resulting from lifting and transferring of patients (Bae and Min, 2016). Although the study done by Igumbor *et al*., (2008) only focused on low back pain while the other studies focused on the whole body, low back was still reported to be the main commonly affected body part. Low back pain amongst physiotherapists could be also be a result of physiotherapists adopting a standing position and relying on their upper limbs to treat patients and during lifting and transferring of patients (Bae and Min, 2016).

Barnes *et al*., (2011) and Grooten *et al*., (2011) found that the hand, wrist and the thumb were affected by repetitive use during mobilization, manipulation and massage while Gharote *et al*., (2016) found these areas were affected by incorrect position and posture while treating neurological patients. Gharote et al (2016) and Collins et al (2010) established that repetitive shoulder, wrist and elbow movement was found to be affected during chest physiotherapy. While Muruganantham *et al*., (2015) found that knee pain was affected by prolonged working position. In addition, Neveen *et al*., (2014) in their study established that upper limb WRMDs was related to lifting load, regularly; applying force with hand and working with hand above shoulder level, while lower limb WRMDs were related to standing for longer periods and working in a squatting or kneeling position.

2.5 Effect of MSK Pain on Work Performance

WRMDs result in physiotherapists factoring their symptoms into clinical decision making thus altering their treatment schedules and avoiding or adapting techniques (Atia *et al*., 2015). The consequences of WRMDs include interference with work, worsening of symptoms, limited patient contact and changing area of work or speciality within the profession, or exiting the physiotherapy career altogether (Cromie *et al*., 2000).

In Igumbo *et al*., (2003) study, physiotherapists reported that severity of symptoms prevented them from working. This was also established by Phongamwong and Deema (2015) that multi-site MSK pain was related to reduce work capacity. Quamane-mhlanga, (2014) discovered that continuing to work when injured has a negative impact on service delivery by interfering with the ability to carry out duties among hospital workers. Aljairan *et al*. (2015) further supported reduced work capacity by establishing that low back pain among physiotherapists affected provision of services.

Absenteeism

Quamane-Mhlanga (2014) discovered that WRMP was greatly associated with time lost at work due to absence in the hospital. The epidemiology and economic significances of pain is costly to the health system and to those affected. It costs more than the annual cost of managing heart disease and cancer (Henschke *et al*., 2015). Absenteeism from work affects productivity indirectly leading to loss of income to the employer (Henschke *et al*., 2015). It has negative impact on service delivery. Being absent from work without anyone substituting would mean that the work would not be done or more workload for the physiotherapists on duty (Quamane-Mhlanga, 2014). Vierra *et al*., (2016) asserts that most missed workdays were due to ankle or feet pain and wrist, hand and finger pain.

Pillay (2014) mentioned that of 86% of physiotherapists who reported the injuries 61% continued to work with the discomfort. Atia *et al*., (2016) reported that 75.4% of their participants sought treatment and 59.4% took prescribed medication. Contrary to this, Pfumojena (2015) reported that 73.6% of their participants did not consult a doctor but 80.6% self-medicated for WRMDs. Igumbo *et al*., (2003) report that 13% of the physiotherapists included in their study indicated that they could not perform their normal activities of daily living (ADL) while 28% had officially reported their discomfort to the relevant authority in their workplace. This is a lot higher than the Pillay study (2014), where only 1.5% of participants had lodged an employee's compensation claim. Atia *et al*., (2016) reported that only 29% of the participants took sick leave. This increases their risk for further damage and ultimately some form of disability.

Muruganantham *et al*., (2015) reported that majority (90.32%) of the physiotherapists did not leave the profession as a result of WRMDs. Whereas Cromie *et al., (2002)* states that one in six physiotherapists consider a career change as a result of WRMDs. This was asserted by Sharan and Ajeesh (2012) and Prenan *et al*., (2015) who discovered that fewer physiotherapists exit the profession as a result of WRMDs.

In contrast to the other studies Alrowayeh *et al*., (2010) concluded that work duties were not affected by WRMDs, reporting that no physiotherapists limited patient contact nor changed their work habits or area of practice. This finding supports the studies conducted by Adegoke *et al*., (2008) and Pfumojena (2015) who reported that no physiotherapists considered exiting the profession or retiring early as a result of WRMDs. Furthermore, countries like Kuwait, with policies, early intervention and preventative measures reported that majority of their therapists did not leave the profession (Alrowayeh *et al*., 2010), as this helped to minimize work related injuries.

2.6 Coping strategies among physiotherapists

Different coping strategies have been adopted among physiotherapists with WRMDs. These coping strategies were grouped into responses that are intended at minimising the effects of stress on the body and responses designed to avoid future exposure (Cromie *et al*., 2000). Coping strategies aimed at reducing stress on the body include self-protective behaviours, preventative strategies and reactive strategies while coping strategies were designed to avoid future exposure including "leaving and moving" (Cromie *et al*., 2000).

Self-protective behaviours include outsourcing strategies which shifts all or part of a therapist's workload to a colleague thereby reducing the load (Cromie *et al*., 2000). It also included getting assistance when handling or transferring a heavy patient. Other strategies included allocating physiotherapist assistants to execute physically demanding tasks or use of hoist with transfers of patients (Cromie *et al*., 2000).

Preventative strategies are aimed at changing the technique or the environment to evade putting stress on the therapist's body (Cromie *et al*., 2000). These preventative coping strategies include modifying a therapist's or patient's position or adjusting height of the bed, introducing breaks and changing posture, as well as warm-up and stretching before performing a treatment in order to prevent or decrease the risk of injury (Cromie *et al*., 2000). Referral to a colleague also greatly reduces the strain but ensures the patient outcomes are still maximised. These constitute a more proactive, physiotherapy-friendly approach where the patient still benefits. Muruganantham *et al*., (2015) discovered that the most commonly adopted coping strategy was postural correction. This strategy may result in temporary relief but cause strain elsewhere.

Reactive strategies are those developed by therapists in response to a discomfort or a perceived risk of injury (Cromie *et al*., 2000). These coping strategies encompass activities that help in avoiding exacerbating factors such as stress and overuse injuries. It includes using different part of the body to apply manual technique, for example using the elbow to apply ischaemic compressions instead of the thumb. Other strategies include substituting manual techniques with electrotherapy or

exercise, selecting mechanisms that will not worsen the discomfort and discontinue a treatment if that aggravates the discomfort (Cromie *et al*., 2000). The latter may be to the detriment of the patient.

Naredishnan and Mulla (2013) found that physiotherapists apply different body part to administer manual techniques to help them cope with WRMDs while Arowayeh *et al*.,(2010) found that physiotherapists tend to treat each other. Similarly, Sharan and Ajeesh (2012) established that those affected tend to treat themselves or consult a colleague.

The least common coping strategy among physiotherapists with WRMDs was stretching and warm ups before doing manual techniques (Balakrishnan *et al.,* 2016; Adegoke *et al*., 2008). Adegoke *et al*., (2008) also discovered that the utilisation of electrotherapy as a substitute to manual therapy was a less common coping strategy. Czurupryna *et al*., (2014) discovered that none of the physiotherapists performed any preventative exercises during breaks.

2.7 Measures of WRMP among physiotherapists

The Chartered Society of Physiotherapy for the United Kingdom (UK) describes health and safety in the workplace as an issue for everyone including physiotherapists (CSP, 2011). Physiotherapists continue to work when injured by modifying patient position or therapist position, adjusting the plinth before treatment and using other body parts to perform treatment which worsens their conditions (Muruganantham *et al*., 2015; Narendrasinh and Mulla 2013). Phongamwong and Deema (2015) stated that MSK pain affecting more than one site should be of concern for the entire working population.

In a study done by Passier and Mcphail (2011) the most common reported existing strategies adopted by health professionals to assist them to carry on with physically demanding roles was preserving an appropriate level of physical fitness and conditioning. Glover *et al*., (2005) suggested reporting of workplace injuries, while

Adegoke *et al*., (2008) suggested selected treatments and a shorter physiotherapy career to manage and minimise work-related injuries amongst physiotherapists. Nordin *et al*., (2011) suggested the use of management strategies while Muruganantham *et al*., (2015) suggested on effective preventative and ergonomic strategies to help minimise work-related injuries in the physiotherapy practice. Arowayeh *et al*., (2010) emphasised the importance of WRMDs education and the availability of preventative programmes and early access to treatment to help reduce WRMDs. Luttman *et al*., (2003) proposed that an ideal balance between activity and rest and application of principles of ergonomics, avoiding accidents and injuries to help prevent MSK disorders in the workplace.

There is a need for involvement of physiotherapists in policy decision, developing of state knowledge and on-going research (Cromie *et al*., 2001). Including breaks and stretching in between work could help decrease MSK pain among physiotherapists (Sharan and Ajeesh, 2012). Phongamwong and Deema (2015) suggested that MSK pain should be assessed through occupational health services, for example; health screening, survey and ergonomics. They further added that among health professionals, the self-administered questionnaire could be used as an assessment tool to identify workers at risk of reduced work capability.

Cromie, *et al*., (2002) suggested the strategies to address the areas of postural and environmental factors within the framework of occupational health and safety legislation of physiotherapists for the Australian government. It proposes that all physiotherapists must:

- Familiarise themselves with requirements of the regulation governing occupational health and safety.
- Conduct a workplace risk assessment.
- Establish ergonomic strategies for equipment, space and environmental conditions of physiotherapy workplaces.
- Introduce work scheduling to guarantee diversity in the physical demands of work.
- Introduce training and the use of mechanical aids and equipment.
- Undergo training in principles of injury prevention and risk management.

- Conduct on-going risk assessment and control.
- Involvement of physiotherapists in policy decision, developing of state knowledge and on-going research.
- Keeping up a proper level of fitness for their job and exercising may help.

Passier and Mcphail (2011) summarized the strategies used by therapists to overcome risks related to WRMDs among physiotherapists into: organisational strategies, workload or job distribution, occupational practices, work setting and equipment, physical conditional and capacity, education and training.

Organisational strategies include:

- Providing physiotherapists with opportunities to move to lesser physically demanding clinical assignments by rotate through different clinical areas.
- Allowing them to interchange or donate their on-call and overtime.
- Retaining a viable level of staff and recruiting and filling up of existing posts.
- Suitable workloads and arranging organisation and client expectations in relative to suitable health professional workloads.
- Adequate staffing to minimize further demand of covering an absentee's workload.
- Encouraging staff to maintain healthy life styles.
- Establishing a culture of adverse events reporting and effective management of injuries.

<u>Workload or work allocation</u>

Requires physiotherapists to manage their workload by ensuring diversity in the physical loads of a job. This can be done by either introducing work schedule, performing different work tasks throughout a day or treating variety of patients with different conditions.

<u>Work Practices</u>

Includes modification of treatment techniques using manual handling skills, use of physiotherapy assistants, and avoiding work tasks.

Work Environment and Equipment

Includes the availability and provision suitable equipment and mechanical aid, and the use of suitable equipment, modification of clinical settings and administrative working areas and the application of the principles of ergonomics.

Physical condition and capacity

This includes Health professionals' maintenance of their own physical fitness and condition to undertake work tasks, annual fitness assessments and MSK screening of staff working in 'high risk' clinical areas

Education and training

Focuses on training and competencies, including existing 'manual handling' training, prevention of injury and viable work practices, alternative treatment and postures', education on treatment methods that are effective and not physically demanding regarding the use and application of equipment.

In SA the Occupational Health & Safety Act SA passed in 1993 (Act. No. 85 of 1993) provide for more protection for workers against any health risks which may arise out of the work, or the conditions in which it is carried. It also outlines on the roles and responsibilities of the employer, employees and that of the health and safety practitioners to ensure a safe and healthy workplace by developing Health and Safety Policy document (A guideline booklet for OH services, 2003). Compensation of occupational injuries and disease (COID) Act No. 130 of 1993 provides for compensation to workers who have sustained an injury on duty, or who have contracted an occupational disease.

A South African guideline booklet for OH services, (2003) outlined that a comprehensive Occupational Health service should entail:

- Promotion of healthy living and prevention of diseases and injuries
- Prevention of occupational injuries and diseases by monitoring risks in the workplace.
- Management of occupational injuries and diseases, reporting and recording occupational accidents and injuries.

- Occupational Hygiene to identify workplace risks.
- Administration that includes developing and managing information, including developing and reviewing of policies, records and reports keeping.
- On-going research.

All these guidelines and suggestions could benefit the physiotherapists to prevent and manage WRMDs if applied appropriately.

2.8 Conclusion

The literature has revealed a worldwide prevalence of WRMP among physiotherapists despite being trained to manage these conditions. Physiotherapists become vulnerable to MSK pain when performing treatment techniques. High prevalence was reported in public hospitals among physiotherapists working full time. WRMDs mostly occur within the first five years of working. The low back is the most commonly affected areas. Work related tasks such as manual therapy, lifting and transferring of patients and increased workload, and repetitive tasks have been revealed to be the major risk factors for WRMP among physiotherapists. Different coping strategies and the measures to deal with WRMP have also been revealed.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter outlines the methodology used to conduct the study. It describes the study type, participants, sample selection and size. It also explains the procedure followed in data collection and data analysis. The ethical considerations are also reflected.

3.2 Type of study

This was a quantitative, cross sectional descriptive study on the risks and effect of work related musculoskeletal pain on work performance among physiotherapists in Limpopo province. An online self-administered questionnaire was used to collect data with a research electronic data capture REDCap software (Harris *et al.,* 2009).

3.3 1 Participants

Participants consisted of all physiotherapists working in public and private settings who were registered with the HPCSA and practicing as physiotherapists in Limpopo province. There were 272 Limpopo based physiotherapists registered with the Health profession council of South Africa (HPCSA) in the year 2017.

3.3.2 Sample selection

A non-probability convenience sampling was applied in this study, where participants selected for inclusion were quicker and easy to access (Ilker *et al.,* 2016). In this study participants needed access to the internet and be willing to participate in order to complete the survey. Convenience sampling implies that the sample is unlikely to be representative of the population being studied (Ilker et al., 2016).

3.3.3 Sample size

The sample size needed for the survey was 136 from a statistical calculation using

a confidence interval of 90% and ensuring a margin error of 5% (Bartlett *et al*., 2001). The sample size was calculated using an online statistical calculator Raosoft Sample Size Calculator (http://wwwraososft.com/samplesize). The confidence interval was set at 90%, margin error at 5% and a response distribution of 50%, from a total population of 272 physiotherapists registered with the HPCSA to obtain a sample size of 136.

3.3.4 Inclusion criteria

All physiotherapists working in private and public hospitals in the Limpopo province that were registered with the HPCSA and practicing as physiotherapists were included in the study.

3.3.5 Exclusion criteria

There were no exclusions. All participants that completed the survey are still actively practicing.

3.4 Data collection tools and measurement tools used

3.4.1 Instrumentation and outcome measures

A self-administered questionnaire used in previous similar studies was adopted and used as outcome measure (Pfumojena, 2015; Pillay, 2014; Adegoke *et al*., 2008). Included in the questionnaire was the standardized Nordic MSK questionnaire (NMQ) used to evaluate work related MSK pain amongst workers (in the working population). Standardized tools have already been validated and tested for reliability (Boynton and Greenhalgh, 2004). They allow for comparison of the findings with other similar studies (Boynton and Greenhalgh, 2004). Descriptive statistics were used to compare the findings of this study with those reported in previous related studies. A standardized tool ensures accuracy of the collected data because all participants are asked precisely the same questions in an identical format and responses recorded in a uniform manner (Boynton and Greenhalgh, 2004). The NMQ has been found to be valid (Kurionka *et al*., 1987). The tool has

been used repeatedly in other previous similar studies (Pfumojena, 2015; Pillay, 2014; Adegoke *et al.,* 2008; Igombo *et al.,* 2003; Cromie *et al.,* 2000).

Shimabukuro *et al.,* (2012) obtained a Cronbach's α of 0.91 for the test-retest reliability and internal consistency for the job factor questionnaire among physiotherapists in Brazil. The self-administered questionnaire has also been found to be valid and reliable among physiotherapists in SA and Zimbabwean contexts (Pfumojena, 2015; Pillay, 2014). Content and construct validity of the questionnaire was established by Pfumojena, (2015) through a panel of experts. Pfumojena, (2015) found the tool to be reliable by establishing intra-rater reliability using a test-re-test method where participants filled in the same questionnaire twice, however the psychometric values of the tests were not documented. The questionnaire was also validated through feedback from the pilot study. Based on findings from Pfumojena (2015), Pillay (2014) and Shimabukuro *et al.,* (2012), and its repeated use in other related previous studies, it was concluded that the tool is a valid and reliable for data collection.

3.4.2 Measuring instruments

The instrument consisted of 5 sections which were composed of closed-ended and open-ended questions. Closed-ended questions required yes or no answers while the open-ended questions required the participant to offer suggestions. Section B formed part of the NMQ, and section A and C to E formed part of the self-administered questionnaire. The survey took 20 minutes to complete.

Section A: Demographic data

The demographic data section composed of closed-ended questions and collected information about the age, gender, height, weight, number of working years, postgraduate qualifications, clinical area, work status and sector.

Section B: Prevalence and area of pain

This section collected information on the anatomical areas affected by WRMP. It included information on the presence and onset of WRMP.

Section C: Measures in place to deal with work related musculoskeletal pain (WRMP)

This section consisted of closed-ended questions and collected information pertaining to the strategies used by therapists to overcome risk factors associated with WRMP such as the use of assistive devices, additional manpower and training on injury prevention.

Section D: Perceived causes and predisposing factors

The Likert scale was used to assess the risk factors. This section collected information pertaining to job related risk factors, posture/positions, workload and personal risk factors. These questions included performing manual orthopaedic techniques, lifting or transferring dependent patients, working in the same position for long periods, bending or twisting in an awkward way, performing the same task over and over, treating a large number of patients in one day, working at or near your physical limits and continuing to work when injured or hurt.

Section E: Coping strategies and perceived effect of WMSD on the work of physiotherapists

The Likert scale was used to assess the coping strategies. This section collected information pertaining to strategies aimed at reducing the effects of stress on the body and avoiding future exposure and the effect that work related MSK pain has on work such as modifying therapist or patient position, getting someone to help handle heavy patient, preventing work, limit patient contact, or leave profession.

Those who reported to be having WRMP had to complete all the sections whereas those who reported no WRMP had to complete section A, C and E.

3.5 Procedure

3.5.1 Pilot study

A pilot study was carried out by inviting six physiotherapists to complete the online REDCap questionnaire. Only 4 participants responded to the pilot study. The aim of

the pilot study was for the participants to give inputs on the use of REDCap, instructions, whether the questions are understandable and meet the study objectives, length of the questionnaires and the estimated length of time needed to complete the questionnaires. The study was piloted for face validity. Face validity was obtained through feedback from the pilot study with participants indicating that the questions are understandable and relevant with regard to assessing WRMP among physiotherapists. No changes were made to the original questionnaire from the pilot study. The results of the pilot study were excluded from the outcome of the study.

3.5.2 Main study

This was an online study conducted using a REDCap (Harris *et al.,* 2009) tool hosted by the University of the Witwatersrand. The approval to conduct the study was obtained from Limpopo department of health (Appendix I). A request was also made to South African Society of Physiotherapy Limpopo (SASP), Physiotherapy Association of South Africa (PASA) and Limpopo Department of Health physiotherapy provincial coordinator (LDOHPPC) for them to assist with circulating and advertising the survey (Appendix II, III, IV). An online link (https://redcap.core.wits.ac.za/redcap/surveys/?s=4W9AWXAH8N) to the REDCap questionnaire (Appendix IX) and the advertisement (Appendix VII) which included a link to the REDCap questionnaire was provided to SASP operational manager, PASA and LDOH-PPC for them to distribute amongst their members using their website, email, Facebook page, and WhatsApp. The researcher's Facebook and WhatsApp page also had a link to the REDCap questionnaire. The participants were issued with an online information sheet detailing the study (Appendix VIII) and an online consent (Appendix VIII).

SASP circulated the survey through their operational manager who sent emails to all members registered with their association. Members of SASP Limpopo also distributed the survey through their WhatsApp group. PASA distributed the survey by advertising on their Facebook page and website. LDOHPPC circulated the survey by sending emails to provincial coordinators for them to distribute among

physiotherapists in the province via Limpopo government emails and through WhatsApp groups. The researcher also advertised and circulated the survey using her Facebook page, email and WhatsApp. Furthermore, the researcher made phone calls and used the provincial and district meetings and coordinators to advertise the study and recruit participants. The reminder e-mails were sent after 2 weeks and thereafter at least twice every month. The data collection was carried out from November 2018 to March 2019. The total number of physiotherapists that completed the entire survey was 59 from the 106 physiotherapists that accessed the online survey. This study had a response rate of 55.6%.

3.6 Ethical considerations

Approval was received from the Human Research Ethics committee (HREC) (Medical) at the University of the Witwatersrand (Clearance certificate number: M180305, Appendix IV).

Permission to conduct the study in the province was obtained from the Limpopo department of health (LDOH) (Appendix I). Permission was also obtained from the SASP operational manager, PASA and LDOHPPC to advertise and recruit members for participation and to circulate the survey (Appendix II, III, IV). The participants were informed that participation was voluntary and they could withdraw from the study at any point without bias. Confidentiality was ensured by coding all data to maintain anonymity.

The REDCap software eliminated the need for data entry as the responses were sent and stored electronically. The exported data to Microsoft excel was saved on the researcher's personal laptop. Both the software and laptop are password protected and only the researcher had access to using a personal password. Only the researcher and the statistician had access to the data. Data will be kept for five years after publication of the study.

3.7 Data analysis

The collected data from the online REDCap questionnaire was exported to Microsoft Excel then to STATA version 14.1 software for analysis. Data was analysed and summarized using descriptive statistics of frequencies and percentages for categorical variables. Continuous variables were summarized with mean and standard deviations (± SD) for normal distributed data and median interquartile range for non-normal distributed data (Preranan *et al*., 2015; Muruganantham *et al*., 2015; Pillay, 2014). The responses to the open-ended questionnaires were recorded then coded and grouped according to similarity. It was then presented in terms of the number of participants who mentioned a particular response, then presented in percentages. Fisher exact test was used to determine the association between pain and categorical demographic data. Logistic regression was used to determine the association (odds ratio) between pain and sector of employment (public vs private).

Table 3.1: Data analysis

Objective	Variable	Type of data	Statistical test	Data analysis
1. To determine demographic characteristics of physiotherapist with WRMP.	Age, height, weight, Number of working years. Gender, Clinical area, postgraduate qualification, Work status, Sector	Continuous Categorical	Descriptive statistics Descriptive statistics	-Mean (standard deviation) -Data was summarised using frequencies & percentages
2. To determine and compare the prevalence of WRMP in public and private sector in Limpopo province.	Pain (This is a self-reported questionnaire) (Participants were asked whether they had experienced pain, discomfort or injury in any part of the body arising from work as a physiotherapist. Those that indicated having experienced WRMP in any body part were further, requested to indicate body parts where they had experienced pain or discomfort in the last 12 months, currently and ever).	Binary variable labelled yes/no	Inferential statistics	-Frequencies & percentages was used to determine the overall prevalence regardless of the sector -Logistic regression was used to determine the association, odd ratio between pain and sector of employment (public vs private) -Fisher exact test was used to determine the association between pain and categorical demographic data. -The analysis was restricted to only participants with pain
3. To determine common anatomical areas affected by WRMP among physiotherapists.	- Dependent variable=pain -Independent variable =:Anatomical area of the body: Neck, Shoulder, Upper back, chest, Elbow, forearm, Lower back, Wrist, Hand, Thumbs, Hips, Thighs, Knees, Ankle, Feet	Categorical	Descriptive statistics	- Data was summarised using frequencies & percentages - The analysis was restricted to only participants with pain
4. To establish the factors that contributes to WRMP among physiotherapists.	Dependent variable=pain Independent variable (factors)=: Performing same task, Treating large number of patients, Not resting, Lifting and transfers, Moving/lifting objects, Bending/Twisting, OMT, Gait training, Same position, Reaching away, Sudden movement, Confused patients, Work with injury, Work at physical limit, Irregular shifts, Inadequate training on prevention, lack of assistive devices, malfunction of equipment	Quantitative data	Inferential statistics	- Data was summarised using frequencies & percentages - The analysis was restricted to only participants with pain

5. To determine the coping strategies among physiotherapists with WRMP.	Dependent variable=pain Independent variable (Coping strategies) =: -Ask for help, Modify position, Use different body part, electrotherapy, rehab, Pause and stretch, Warm up and stretch, Adjust plinth, Select techniques, Stop treatment	Categorical	Inferential statistics	- Data was summarised using frequencies & percentages - The analysis was restricted to only participants with WRMP
6. To evaluate the effect of MSK pain on work performance and the measures in place to address MSK pain.	Dependent variable=pain Independent variable (Effect, Measures) =: Effect: Prevent work, change area of work, Limit patient contact, Take leave, Leave profession. Measures: Assistive devices Additional manpower, consult, received training.	Categorical	Descriptive statistics	- Data was summarised using frequencies & percentages - The analysis was restricted to only participants with pain

3.8 CONCLUSION

The methodology, study type, participants, sample selection and size have been presented in this chapter. The procedure followed in data collection and data analysis have also been described. Ethical considerations have been reflected.

CHAPTER 4: RESULTS

4.1. Introduction

This chapter presents the results of the findings from the data collected. The findings of the study are presented with respect to the study objectives and are summarised in the form of tables.

4.2. Results of pilot study

Participants were asked to give inputs on the use of REDCap, instructions of, whether the questions are understandable and the estimated length of time needed to complete the questionnaire. The Participants found the REDCap questionnaire to be easy to use. The questions were clear and understandable and took about 15-20 minutes to complete. No concerns were raised by the participants.

4.3. Response rate of main study

The REDCap survey was accessed by 106 physiotherapists which was less than the 272 of the whole population of physiotherapists registered with the HPCSA in Limpopo province. From the population of physiotherapists registered with the HPCSA not everybody was registered with SASP, had access to PASA Facebook and not everyone had a government email resulting in the survey reaching only 106 of the entire population of physiotherapists in Limpopo province, which was less than the calculated sample size of 136. From the 106 questionnaires that were accessed by the physiotherapists, 77 (73%) were returned however 18 (17%) of the returned questionnaires were incompletely answered and therefore excluded from the main study. Only 59 (56%) of the fully completed questionnaires met the inclusion criteria and therefore qualified for data analysis, giving the response rate of 55.6%. This sample represented 21.7% (59/272) of the entire population of physiotherapists in Limpopo province.

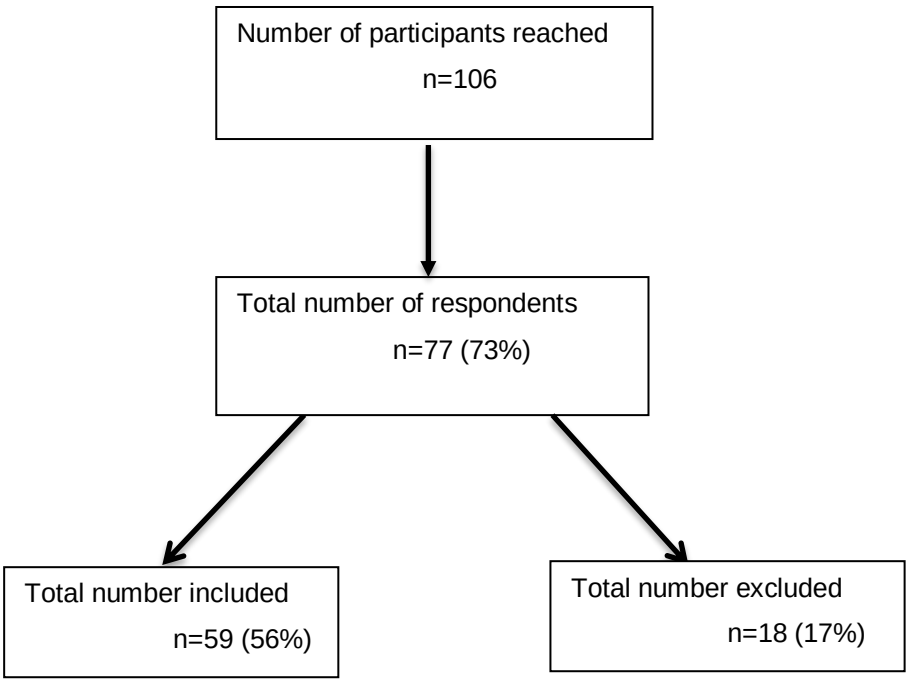


Figure 4.1: Flow diagram of participants through the study

4.4. Demographic characteristics of physiotherapists in Limpopo province

The demographic characteristics of physiotherapists in Limpopo province are presented in Table 4.1. The mean age of the participants was 32.1 (mean± SD= 6.2) years. There were more female participants (n=43; 72.9%) compared to males (n=16; 27.1%). The majority of the participants were working full time (n=55; 93.2%) and only 36 (61%) worked for the public sector. More than 22 (37.2%) of the participants have been working for more than 10 years and 26 (44.1%) participants were currently working in general hospital. Only 10 (17%) of the respondents have postgraduate qualifications.

Table 4.1: Demographic characteristics of physiotherapists in Limpopo province

CATEGORY/ CHARACTERISTIS	VARIABLE	N (%)	Mean ± SD	Median IQR
Age		59 (100)	32.1±6.2	
Height		59 (100)		1.65 (1.58-1.71)
Years of working experience	More than 20years	4 (6.8)		
	More than 10 years	22 (37.2)		
	Less than 10 years	33 (56)		
Gender	Female	43 (72.9)		
	Male	16 (27.1)		
Postgraduate qualifications		10 (17)		
Work status	Full time	55 (93.2)		
	Part-time	4 (6.8)		
Sector of employment	Public	36 (61)		
	Private	18 (30.5)		
	Both private and public	5 (8.5)		
Current clinical area	General hospital	26 (44.1)		
	ICU	3 (5.1)		
	Orthopaedics	3 (5.1)		
	Outpatient department	10 (16.9)		
	Paediatric	3 (5.1)		
	Private practice	7 (11.9)		
	Sports physiotherapy	2 (8.5)		
	Other	5 (8.5)		

4.5. The Prevalence of WRMP

Of the 59 participants, 50 (84.8%) reported a lifetime prevalence of WRMP, while 9 (15.2%) had no WRMP.

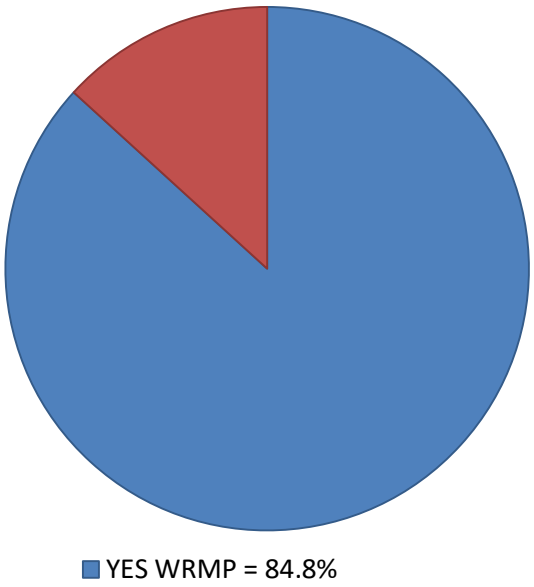


Figure 4.2: The prevalence of WRMP

4.5.1 Prevalence of WRMP according to demographic characteristics

From the 50 participants with WRMP, 31 (67.4%) are working in a public sector while 15 (32.6%) are working in a private sector (Table 4.3). Out of the 43 (72.9%) female participants, 39 (78%) reported having WRMP while 11 (22%) out of 16 (27.1%) male participants reported having WRMP. More female participants 39 (78%) reported WRMP compared to males 11 (22%), however gender was not significantly associated with WRMP (p=0.52). Most of those with WRMP were working full time 46 (92%) and had no postgraduate qualifications 42 (84%). Sector of employment as well as work status was not significantly associated with WRMP (p=1.0). Having a postgraduate qualification was not significantly associated with WRMP (p=0.64).

Table 4.2: Prevalence of WRMP according to demographic characteristics (N=59)

Characteristics data	Variable	Yes WRMP N (%)	No WRMP N (%)	p-value
Gender	Female	39 (78)	4 (44.4)	0.52
	Male	11 (22)	5 (55.6)	
Work status	Full time	46 (92)	9 (100)	1.0
	Part time	4 (8)	0	
Sector of employment	Public	31 (67.4)	5 (62.5)	1.0
	Private	15 (32.6)	3 (37.5)	
Postgraduate qualifications	Yes	8 (16)	2 (22.2)	0.64
	No	42 (84)	7 (77.8)	

* P- values less than 0.05 is considered significant.

* The P- value greater than 0.05 of comparisons of demographics in relation to prevalence of WRMP were not significant or had insufficient data overall.

4.5.2 Comparison of prevalence of WRMP between public and private sector

Majority of the physiotherapists who reported WRMP were working in a public sector 31 (67.4%) compared to 15 (32.6%) who work in a private sector (Table 4.4). The odds ratio of WRMP is 1.2 times higher for those in public than in private sector, but not significant at 5% (p=0.78).

4.5.3 First experience of WRMP

Twenty (40%) of the participants reported having experienced WRMP within the first five years after graduation, while 12 (24%) started experiencing it as physiotherapy students (Table 4.5).

Table 4.3: First experience of WRMP (N=50)

Onset of WRMP	**N (%)**
As a physiotherapy student	12 (24)
In the first five years after graduation	20 (40)
5-15 years after graduation	14 (28)
>15 years after graduation	3 (6)
Don't know	1 (2)

4.6. The Common anatomical areas affected by WRMP

Physiotherapists reported having experienced WRMPs in different body parts presented in Table 4.4. The highest lifetime prevalence was reported on the low back with 28 (47.5%) participants reporting WRMP, followed by the neck 25 (42.4%), upper back 21 (35.6%), shoulder 19 (32.2%), thumb 14 (23.7%), wrist 12 (20.3%). The lowest prevalence was reported in the hips 1 (1.7%), the ankle and forearm 3 (5.1%). The highest twelve month prevalence was reported on the upper back 20 (33.9%) followed by the neck 17 (28.8%) and the low back 17 (28.8%), while the highest point prevalence was reported on the upper back and shoulder 11 (18.6%) respectively, followed by the low back 10 (16.9%).

Table 4.4: Anatomical areas affected by WRMP (N= 50)

Anatomical area	**Lifetime prevalence**	**Twelve month prevalence**	**Point prevalence**
	N (%)	**N (%)**	**N (%)**
Low back	28 (47.5)	17 (28.8)	10 (16.9)
Neck	25 (42.4)	17 (28.8)	9 (15.3)
Upper back	21 (35.6)	20 (33.9)	11 (18.6)
Shoulder	19 (32.2)	10 (16.9)	11 (18.6)
Thumb	14 (23.7)	12 (20.3)	2 (3.4)
Wrist	12 (20.3)	5 (8.5)	2 (3.4)
Hands	9 (15.2)	5 (8.5)	2 (3.4)
Feet	7 (11.9)	5 (8.5)	5 (8.5)
Knees	5 (8.5)	2 (3.4)	0
Elbow	4 (6.9)	3 (5.1)	0
Forearm	3 (5.1)	2 (3.4)	0
Ankle	3 (5.1)	3 (5.1)	2 (3.4)
Hips	1 (1.7)	1 (1.7)	0

* Percentages of table 4.4 may not add to 100% as participants could choose more than one body area

Table 4.5 present how WRMP impacted on work and (ADL) according to anatomical areas. Only 6 (10.2%) of the participants reported that thumb pain prevented them from work, while 10 (16.9%) with low back pain were prevented from performing ADL. Physiotherapists with low back pain, neck and upper back pain had sought treatment from a physiotherapist 20 (33.9%) and the doctor 7 (11.9%).

Table 4.5: Effect of WRMP on physiotherapists per anatomical area (N= 50)

Anatomical area	Prevented from work	Prevented from ADL	Treatment from physiotherapist	Treatment from doctor
	N (%)	N (%)	N (%)	N (%)
Low back	4 (6.87)	10 (16.95)	9 (15.25)	3 (5.08)
Neck	3 (5.08)	6 (10.17)	6 (10.17)	2 (3.39)
Upper back	3 (5.08)	4 (6.78)	5 (8.47)	2 (3.39)
Shoulder	4 (6.78)	3 (5.08)	1 (1.69)	2 (3.39)
Thumb	6 (10.17	4 (6.78)	3 (5.08)	0
Wrist	1 (1.69)	2 (3.39)	1 (1.69)	1 (1.69)
Hands	0	1 (1.69)	0	1 (1.69)
Feet	0	1 (1.69)	0	0
Knees	2 (3.39)	1 (1.69)	2 (3.39)	1 (1.69)
Elbow	2 (3.39)	1 (1.69)	1 (1.69)	0
Forearm	0	0	0	0
Ankle	2 (3.39)	2 (3.39)	2 (3.39)	0
Hips	1 (1.69)	0	1 (1.69)	0

* Percentages of table 4.5 may not add to 100% as participants could choose more than one body area

4.7. Risk factors contributing to WRMP

Table 4.7 presents the risk factors contributing to WRMP. The major risk factor regarded by physiotherapists to be contributing to WRMP was treating a larger number of patients in one day and malfunctioning of equipment 33 (66%), followed by lack of assistive devices and equipment 30 (60%), lifting or transferring dependant patients and continuing to work when injured 28 (56%). Work scheduling 35 (70%), training on injury prevention 29 (58%) and working with confused/ agitated patients 23 (46%) were considered to be minor risk factors.

Table 4.6: risk factors contributing to WRMP (N=50)

	Risk factor	**Major N (%)**	**Moderate N (%)**	**Minor N (%)**
1.	Treating a large number of patients in one day	33 (66)	8 (16)	9 (18)
2.	Malfunctioning of equipment (unadjustable beds)	33 (66)	3 (6)	14 (28)
3.	Lack of assistive devices and equipment	30 (60)	4 (8)	16 (32)
4.	Lifting or transferring dependant patients	28 (56)	14 (28)	8 (16)
5.	Continuing to work when injured	28 (56)	14 (28)	8 (16)
6.	Working in the same position for prolonged periods	27 (54)	17 (34)	6 (12)
7.	Bending or twisting your back in awkward way	25 (50)	12 (24)	13 (26)
8.	Performing manual orthopaedic techniques	24 (48)	15 (30)	11 (22)
9.	Working in awkward of cramped positions	23 (46)	13 (26)	14 (28)
10.	Carrying, lifting or moving heavy materials or equipment	22 (44)	13 (26)	15 (30)
11.	Not enough rest breaks during the day	19 (38)	16 (32)	15 (30)
12.	Working at or near physical limit	17 (34)	14 (28)	19 (38)
13.	Performing the same task over and over	16 (32)	25 (50)	9 (18)
14.	Working with confused or agitated patients	16 (32)	11 (22)	23 (46)
15.	Reaching or working away from your body	14 (28)	20 (40)	16 (32)
16.	Unanticipated sudden fall from patients	14 (28)	16 (32)	20 (40)
17.	Assisting patient during gait training activities	12 (24)	18 (36)	20 (40)
18.	Inadequate training on injury prevention	9 (18)	12 (24)	29 (58)
19.	Work scheduling	8 (16)	7 (14)	35 (70)

4.8. Coping strategies among physiotherapists

The coping strategies used by physiotherapists to reduce the effects of stress on the body and to avoid future exposure are presented in Table 4.8. The table presents the coping strategies used by both physiotherapists who are affected by WRMP and those who are not affected. Thirty (60%) physiotherapists indicated that they always adjust the height of the plinth or bed, while 27 (54%) modified the patient position or their position in order to cope with strain caused by work. Majority of the physiotherapists 35 (70%) indicated that they never warm up nor stretch before

performing manual techniques while 32 (64%) indicated that they sometimes get someone to assist them handle a heavy patient and use electrotherapy instead of manual techniques.

Table 4.7: Coping strategies among physiotherapists (N=59)

	Coping strategies	**Always N (%)**	**Sometimes N (%)**	**Never N (%)**
1.	I adjust plinth/bed height	30 (60)	12 (24)	8 (16)
2.	I modify patient position/my position	27 (54)	23 (46)	
3.	I use a different part of my body to administer techniques	23 (46)	26 (52)	1 (2)
4.	I select techniques that will not aggravate my discomfort	22 (44)	25 (50)	3 (6)
5.	I get someone else to help me handle a heavy patient	14 (28)	32 (64)	4 (8)
6.	I stop a treatment if it causes or aggravates my discomfort	9 (18)	25 (50)	16 (32)
7.	I pause regularly so I can stretch and change posture	8 (16)	32 (64)	10 (20)
8.	I use rehabilitation technicians to perform physically stressed tasks	6 (12)	17 (34)	27 (54)
9.	I use electrotherapy instead of manual therapy	5 (10)	32 (64)	13 (26)
10.	I warm up and stretch before performing manual techniques	3 (6)	12 (24)	35 (70)

4.9. Effect of MSK pain on work performance

Table 4.9 presents the effects of MSK pain work performance/ action taken by physiotherapists affected by WRMP. Despite having suffered WRMP, majority of the physiotherapists 38 (76%) continued to work with the discomfort, while only 19 (38%) limited patient contact. No physiotherapist had lodged a worker's compensation claim, while only 1 (2%) had officially reported the injury. Only 17 (34%) are considering leaving the profession.

Table 4.8: Effects of MSK pain on work performance (N=50)

Action taken	**N (%)**
Continued working with discomfort	38 (76)
Limited patient contact time	19 (38)
Considering leaving the profession	17 (34)
Taken sick leave	13 (26)
Seen a doctor	9 (15.3)
Changed area of work	2 (4)
Officially reported the disorder	1 (2)
Lodged a worker's compensation claim	0

* Percentages in Table 4.9 may not equal to 100% as some physiotherapists may have taken more than one action

4.10 Measures in place to address WRMP

Table 4.10 presents the available strategies used by physiotherapists to enable them to continue to work in their physical demanding roles. The table included physiotherapists with and without WRMP. Thirty-four (57.6%) of physiotherapists indicated that they had training on injury prevention, 26 (44.1%) had physiotherapy assistant and 22 (37.3%) had physiotherapy assistive devices.

Table 4.9: Measures in place to address WRMP (N=59)

Measures	**Yes N (%)**	**No N (%)**
Training on injury prevention	34 (57.6)	25 (42.4)
Physiotherapy assistive devices (e.g. adjustable bed/plinth, sliding board, etc.)	22 (37.3)	37 (62.7)
Physiotherapy assistant	26 (44.1)	33 (55.9)

* Percentages in Table 4.10 may not equal to 100% as some physiotherapists may have more than one measure.

4.11 Conclusion

The results of the study have been presented and summarized in this chapter. Based on the findings of this study, the rate of WRMP among physiotherapists in Limpopo has been found to be high. The next chapter focuses on the discussion of the findings.

CHAPTER 5: DISCUSSION

5.1. Introduction

This chapter summarizes the discussion of the findings presented in chapter four. It relates these findings to previous relevant studies. The aim of this study was to determine the prevalence and type of WRMP, the coping strategies and effects of WRMP on work performance among physiotherapists practicing in public and private sector in Limpopo province. The results are discussed in relation to the study objectives.

5.2 Response rate of the study

The response rate of the study was 55.6%. This lies within the ranges of other previous studies varying from 6.7% to 86.3% (Muruganantham *et al*., 2015; Pfumojena, 2015; Pillay, 2014; Nkhata *et al*., 2010; Nordin *et al*., 2010). The variation in response rate could be attributed to the different methodology used for data collection. Studies which conducted online surveys (Viera *et al*., 2016; Muruganantham *et al*., 2015; Passier and Mcphail, 2011) had low (6.7%, 34.3%) response rates compared to those who posted the questionnaires with pre-stamped envelopes (Pfumojena, 2015 (56.4%); Pillay, 2014 (31%); Grooten *et al*., 2011 (64.5%); Adegoke *et al*., 2008 (58.1%) and those who manually distributed the questionnaires (Neveen *et al*., 2014 (100%); Nordin *et al*., 2011 (77%); Nkatha *et al*., 2010 (86.3%). In a similar local study by Pillay (2014) the response rate was 31%. Pillay distributed her questionnaires using pre-stamped envelopes.

Most online studies had a low response rate (Viera *et al*., 2016; Muruganantham *et al*., 2015; Buddhadev and Kotecha, 2012; Passier and Mcphail, 2011). Muruganantham *et al*., (2015) conducted an online survey and had the lowest response rate of 6.7%. Buddhadev and Kotecha (2012) collected their data over a period of two weeks while Passier and Mcphail (2011) collected their data over a period of three weeks had a response rate of 85% and 34.3% respectively. Viera *et al*., 2016 also conducted an online study but a response rate could not be determined because the number of participants exposed to the study was not known.

In contrast to these studies, Buddhadev and Kotecha (2012) had the highest online response rate.

Viera *et al*., (2016) and Passier and Mcphail (2011), attributed the low response rate to advertising and collecting the data online. The disadvantage of online studies is that not everyone could be reached due to limited access to the internet. The survey was distributed through the physiotherapy society and associations, and Limpopo provincial coordinators which might have made it impossible to reach all physiotherapists in the province. Not all physiotherapists are members of, or familiar with, these organisations and not all physiotherapists have access to the government email. Physiotherapists in this province could be less inclined to participate in research as they have long working days, providing possible reasons for the low response rate.

5.3 Prevalence of WRMP

The results show that more physiotherapists (84.4%) in Limpopo province are suffering from WRMP in their lifetime. This high prevalence is similar to findings in a local study done in KZN by Pillay (2014) who reported 86% prevalence of WRMDs among physiotherapists. The similarities in the findings between the two provinces may be due to both provinces being hampered by increased patient volume, demographic characteristics (both studies had more physiotherapists working full time, in a public sector, more female participants), and the status of physiotherapy profession (more patient care physiotherapists than academics).

This finding is consistent with reports from other African studies (Viera, et al., 2016 (96%); Pfumojena 2015 (86.1%); Aljairan et al., 2015 (91%); Neveen *et al.,* 2014 (90.7%); Pillay 2014 (86%); and globally (Nordin *et al.,* 2011 (71%)) with high prevalence rates. The high prevalence rate in this study could be attributed to a shortage of staff and high clinical workload. More physiotherapists in Limpopo province reported treating large number of patients a day as a major risk factor to WRMP, thus supporting increased workload. This agrees with the findings on the

Rural Health Advocacy Project (2015) that majority of the population in SA depend on the public sector for health care services thus increasing the workload on an already understaffed sector resulting in physiotherapists treating large number of patients a day. This asserts the findings by Nordin *et al*., (2011) that high workload and shortage of staff were attributed to be a risk factor for the prevalence of work related musculoskeletal disorders.

5.4. Demographic characteristics of physiotherapists with WRMP

Majority of the physiotherapists in this study who reported WRMP were working in a public sector (67.4%) The possible reason could be that more participants who took part in study are working in a public sector. Most of the physiotherapists working in public sector may be limited in terms of work habits, for example it may not be possible for them to limit patient contact and don't have protective measures and policies specific to physiotherapy when it comes to patient care, for example lifting and transferring of patients and lifting hoists making them more vulnerable to WRMP (Alrowayeh, *et al*., 2010). In this study, the sector of employment as well as work status was not significantly associated with WRMP (p=1.0).

Female physiotherapists showed a higher prevalence of WRMP compared to males. Similar to other findings globally where more females reported WRMP compared to their male counterparts (Nordin *et al*., 2011, Grooten, *et al*., 2011, Adegoke, *et al*. 2008). These results are similar to the findings of Nordin, *et al*., (2011) and Adegoke *et al*., (2008) who discovered that 73% and 100%, respectively, of females were affected, as compared to males. The increased rate of WRMP among female participants could be related to the fact that there are more practicing female physiotherapists. Females undergoing physiological changes in their lives, for example pregnancy, affects the low back, leading to changes in spinal posture and weakening of joint structures, thus increasing their risk for MSK injuries (Nordin *et al*., 2011). This agrees with the findings by Alrowayeh *et al*., (2010) who reported that 39% of female participants reported their low back pain to be associated with pregnancy. Alrowayeh *et al*., (2010) also discovered that females had smaller body

mass index which increases the risk WRMDs when handling and treating large patients. Gender was found to not be significantly associated with WRMP (p=0.52).

Majority of physiotherapists reported having experienced WRMP within the first five years of working. This could be due to the fact that most young physiotherapists are required to run the department independently without enough supervision or assistance. These findings are in support of the statement by Viera *et al*., (2016) that newly graduate physiotherapists don't have essential professional experience of patient management; however they are not different from those with specialised postgraduate qualifications (Gharote *et al*., 2016). This means that despite furthering their studies to gain more knowledge on managing and preventing MSK problems, physiotherapists are still unable to apply the knowledge gained on themselves. Having a postgraduate qualification was found not to be significantly associated with WRMP (p=0.64). Furthermore, junior physiotherapists are ashamed or scared to ask for help or don't ask for help (Nkatha *et al*., 2010). As physiotherapists progresses in the profession they tend to move away from patient care to managerial positions which are less physically demanding and develop ways to reduce strain on their bodies (Milhem *et al*., 2016). Sharan and Ajeesh (2012) stated that newly trained physiotherapists are also involved in clinical rotations. This poses a risk to injuries, however majority of participants (both junior and older physiotherapists) in this study reported to be working in general hospital, meaning they were rotating in different clinical areas, hence the high prevalence to WRMP.

5.5. Anatomical areas affected by WRMP

A large number of participants in this study complained of pain in more than one anatomical area. With most reporting a high prevalence (47.5%) of low back pain. This finding is in agreement with other studies (Bae and Min, 2016; Vieira, *et al*., 2016; Pfumojena, 2015; Alrowayeh *et al*., 2010; Nordin *el at.,* 2010; Adegoke *et al*., 2008; Igumbor *et al*., 2003) The high report of low back pain could be attributed to physiotherapy related tasks (such as lifting and transferring dependent patients) and working posture. Bae and Min (2016) and Igumbo *et al*., (2003) discovered that low

back pain resulted from lifting and transferring of patients. Lifting heavy objects result in acute overloading of soft tissues by exerting weight which surpasses the physical ability of the tissue producing muscle or ligament injury (Luttman *et al*., 2003).

Czupryna *et al*., (2014) discovered that WRMDs in the lumbar spine was greater the longer the spine was maintained in unergonomic positions of excessive lateral flexion and rotation in the lumbar spine. Prolonged periods of awkward and static standing postures can strain the muscles of the low back resulting in pain (Bharadva *et al*., 2014). In comparison to these findings Alrowayeh *et al*., (2010), discovered that 39% of females reported their low back pain to be associated with pregnancy, while the study by Pillay (2014) differed in that their findings established the neck rather than the low back to be the most commonly affected area.

This study found that other commonly affected anatomical areas included the neck 25 (42.4%), upper back 21 (35.6%), shoulder 19 (32.2%), thumb 14 (23.7%), wrist 12 (20.3%). These findings are in consistent with the studies done by Adegoke and colleagues (2008) and Alrowayeh *et al*., (2010). The high prevalence of WRMP in the upper limb could be related to manual therapy techniques such as soft tissue mobilisation, manipulations and massage performed during treatment of patients. Barnes *et al*., (2011) and Jenkins (2014) discovered that physiotherapists who regularly use manual therapy techniques as a form of treatment reported high WRMD of the wrist, hand and thumb. Chest physiotherapy techniques (such as percussions and vibrations) and incorrect posture of the upper limb when treating neurological patients have also been linked to pain in the upper limb (Gharote *et al*., 2016; Collins *et al*., 2010). Neveen *et al*., (2014) found that lifting load and applying regular force with the hand was associated with upper limb WRMDs. Due to the application of repetitive and high force movements, these physiotherapy techniques exposes the upper limb to the risk factors associated with MSK as well as neurovascular disorders (Bork *et al*., 1996) and thus puts therapists at risk of developing acute and cumulative trauma disorders (Luttman *et al*., 2003; Cromie *et al*., 2000). Only 33.9% of physiotherapists with low back pain, neck and upper back pain had sought treatment from a physiotherapist while 11.9% sought treatment from a doctor.

5.6. Risk factors contributing to WRMP

The major risk factors reported by physiotherapists were treating a larger number of patients in one day as well as malfunctioning equipment (66%). These findings agree with other studies done in Africa (Pfumojena, 2015, Nkhata *et al*., 2010 and Adegoke *et al*., 2008). In these studies, staff shortages were implicated as the reason physiotherapists treat a large number of patients daily. A shortage of staff in Limpopo province (Rural Health Advocacy Project, 2015) is a very likely reason for increased workload because there are not enough physiotherapists to assist with patient care or to provide health care services on a day to day basis. Treating large numbers of patients, a day is classified as a workload factor (Cromie *et al*., 2000; Bork *et al*., 1996). These risk factors cause cumulative loads to the joints thus increasing the risk of MSK disorders (Neveen *et al*., 2014).

Malfunctioning equipment such as non-adjustable plinths or hospital beds result in therapists having to work in awkward and poor ergonomic postures, causing strain on the body. High exposure to awkward postures results in acute overloading of the joints leading to WRMP (de Cassia Pereira *et al*., 2016). Another risk factor was lack of assistive devices and equipment (60%). Lack of assistive devices means that physiotherapists will have to perform transfers of patients manually, increasing the risk of low back pain.

Work scheduling was considered to be minor risk factor. This may be because most of the participants consider themselves as having control over their work schedule. The majority of participants were not involved in irregular shifts and did not report working overtime. Working with confused or agitated patients and inadequate training in injury prevention were considered to be minor risk factors. This agrees with the findings by Adegoke *et al*., (2008) who stated that working with confused or agitated patients were a low risk for developing injuries. Findings by Pillay (2014) and Narendrasinh and Mulla (2013) on inadequate training in injury prevention were found to be minor risk factor for WRMDs. This is supported by Milhem and

colleagues., (2015) as well as Sharan and Ajeesh (2012) that being experts and trained to manage MSK conditions do not make them immune to WRMP.

5.7 Coping strategies

In this study the most commonly used coping strategies used by physiotherapists to reduce the effects of stress on the body were preventive. These strategies shift all or part of a therapist's workload to another person thereby reducing the load. Most of the participants (60%) indicated that they altered the technique or the environment by always adjusting the height of the plinth or bed and (54%) modifying the patient position or their position, as described by Nkhata *et al*., (2010). Modifying the technique or environment helps them cope with strain caused by work. Most of the participants also reported having sought treatment from a colleague. This concurs with findings by Sharan and Ajeesh (2012) and Arowayeh *et al*., (2010) who stated that physiotherapists tend to treat each other.

In this study, most of the participants (70%) never warm up nor stretch before performing manual techniques in order to prevent or reduce the risk of injury. This is similar to the findings by Czurupryna *et al*., (2014) and Adegoke *et al*., (2008). Balakrishnan *et al*., (2016) found that they sometimes warm up and stretch before performing manual techniques. These findings indicate that although physiotherapists are trained on prevention of MSK injuries, they do not perform any preventative measures to help minimise injuries on themselves.

This study established that the majority of participants (64%), indicated that they sometimes apply self-protective behaviours by requesting assistance with handling a heavy patient and using electrotherapy instead of manual techniques as a reactive strategy in response to a discomfort or an injury. This is similar to findings by Balakrishnan *et al*., (2016), however, Adegoke *et al*., (2008) discovered that the use of electrotherapy instead of manual therapy was the least popular coping strategy.

5.8. Effect of WRMP and measures to address WRMP

WRMDs did not have major effects on work performance. This is confirmed by the findings that despite having suffered WRMP, majority of the physiotherapists (76%) in this study continued to work with the discomfort. Only 10.2% of the participants reported that thumb pain prevented them from work, while 16.9% reported that low back pain prevented them from performing ADL. This is in support with the findings by Pillay (2014) who reported 61% of the participants with WRMDs continued to work with the discomfort. Physiotherapists continued to work with the discomfort, but they altered the treatment technique or the environment by adjusting the height of the plinth or bed and by modifying the patient position or their position and by avoiding certain techniques. The findings that only 38% of the physiotherapists limited patient contact and 26% took leave further support the fact that MSK had little effect on physiotherapists from performing their duties. Majority of the physiotherapist reported to be working in a general hospital, which allows them to rotate between clinical areas that are less stressful.

Physiotherapists may choose to continue working because they consider their profession as an important part of patient care or they feel compelled by the Hippocratic Oath to provide the necessary care. Continuing to work with MSK disorders are seldom life-threatening however, it may impair their quality of life (Bae and Min, 2015). Working with an injury may lead to chronic pain and increase the risk of future poor health (Quamane-Mhlanga, 2014). This poses a threat to the health of physiotherapists and the length of their profession. Although work performance was not compromised, the quality of patient care received is not known as physiotherapists indicated that they continued to work with injuries by altering treatment technique or the environment and avoiding certain treatment techniques.

This finding is in contrast with the studies by Phongamwong and Deema (2015) and Igumbo *et al*., (2003) who stated that WRMDs prevented physiotherapists from working. In this study, only 4% changed their area of work as a result of a musculoskeletal injury. No physiotherapists had lodged a worker's compensation claim and only two percent of the physiotherapists had officially reported the injury.

This supports the statement by Sharan and Ajeesh (2012) that WRMP among physiotherapists remain unreported. Few (34%) physiotherapists are considering leaving the profession. Prenan, *et al*., (2015) also discovered that fewer physiotherapists leave the profession due to WRMDs. Similarly, Muruganantham and colleagues, (2015) reported that 90.3% of the physiotherapists did not leave the profession. Remaining in the profession may be a personal choice (to be in the medical field) or due to financial reasons (as the only source of income).

In this study 57.6% of physiotherapists indicated that they had training on injury prevention. This shows that despite being trained on injury prevention and principles of ergonomics physiotherapists are unable to adequately protect themselves from sustaining MSK injuries. Furthermore, only 44.1% had physiotherapy assistants and few (37.3%) had physiotherapy assistive devices. A lack of assistive devices such as lifting hoists could be a reason for the high prevalence as the physiotherapists will have to perform certain activities by themselves. They thus depend on their bodies, for example, when lifting and transferring dependant patients. Alrowayeh *et al*., 2010 attributed the low prevalence of injury to the high number of physiotherapists available to assist with varied work as well as the availability of policies and protective measures followed by physiotherapists when lifting or handling patients and using equipment which might reduce the risk of injury. Effective measures to address WRMP will help minimise the risks of injury and aid the physiotherapist's ability to carry out their tasks. In addition, availability of policies on organisational strategies, staffing and equipping physiotherapy departments and providing ergonomically safe environments.

5.9 CONCLUSION

This study revealed a high prevalence of WRMP among physiotherapists in Limpopo province, which is supported by global research on the topic. Those working in the public sector were more affected. Treating a large number of patients and lack of assistive devices were the major contributing risk factors of WRMP, with the lower back being the most commonly affected area. Despite having suffered WRMP, physiotherapists did not limit patient contact however, they continued to work with

the discomfort. Majority of the physiotherapists are not considering changing their careers due to WRMP.

CHAPTER 6: RECOMMENDATIONS, LIMITATIONS AND CONCLUSION

6.1 Introduction

This chapter presents the recommendations, limitations and conclusion of this study whose aim was to determine the prevalence and type of WRMP, the coping strategies and effects of WRMP on work performance among physiotherapists practicing in public and private sector in Limpopo province.

6.2. Recommendations

As a result of this study, the following recommendations are made to help reduce and address WRMP.

Shortage of staff has been implicated as the reason physiotherapists treat a large number of patients daily. Treating large number of patients a day has been identified as a major risk factor (66%) to WRMP. Maintaining appropriate and adequate staffing levels and ensuring existing positions are recruited and filled may provide manageable workload. It may help improve productivity by ensuring that there are enough physiotherapists to provide health care services to patients on a daily basis. Staff should also be encouraged to manage their workload by allowing them to rotate through different clinical areas, performing different work tasks throughout a day or treating variety of patients with different conditions. Working in pairs might reduce the strain on the body especially when handling dependant patients. Reinstating and supporting appointment of physiotherapy assistants and technicians may offer some form of relief.

Another identified risk factor contributing to WRMP was malfunction of equipment (60%) such as non-adjustable plinths or hospital beds. Provision and availability of functional, suitable and adjustable equipment and assistive devices such as adjustable plinths/beds and lifting/transferring hoists may help to minimise the risk of injuries. Adjustable treatment plinth may be useful and beneficial to reduce the amount of time spent in awkward postures thereby improving therapists' posture. Physiotherapists still need to maintain proper application of principles of ergonomics when handling patients and ensure that they do not assume harmful posture.

Providing physiotherapists with assistive devices such as lifting and transferring hoist means that physiotherapists will not depend on themselves to lift and transfer patients, thereby lowering the risks of back injuries.

As part of the Occupational Health & Safety Act SA (2003), physiotherapists need to be educated on prevention of injuries and developing a culture that facilitates reporting and recording of occupational injuries and accidents. Proper reporting and recording will enable effective management of WRMDs. More awareness is needed on wellness promotion. Annual assessment of employees by the occupational health and safety personnel should include screening of WRMDs.

Education and training on manual handling, injury prevention and sustainable work practices, including training regarding the use and application of equipment. Training should be incorporated in continuing professional education. Exercise may offer a way for physiotherapists to reduce the rate and severity of WRMDs, therefore staff should be encouraged to maintain good general health and fitness.

6.3 Future research:

Research with larger sample sizes is recommended, to identify the measures available and its effectiveness to address work related musculoskeletal pain. Although work performance was not compromised the level/ quality of patient care will need further investigation as physiotherapists indicated that they avoided certain treatment techniques. Further studies are needed to identify why physiotherapists remain in their profession despite having suffered WRMP.

Investigations of preventative strategies will be useful in ensuring that physiotherapists avoid being injured. Strategies on self-management as well as improved patient management will also benefit the profession greatly.

Investigations into how equipment is selected for the area of expertise will be helpful as it may be used to inform physiotherapists on how to choose equipment that will prevent injury to themselves.

Investigations aimed at understanding the primary area of expertise will inform us on which physiotherapists are at a higher risk of developing a MSK injury, for example neurological rehabilitation that requires a lot of lifting versus a manual therapist that uses their hands to mobilise joints.

6.4 Strength and limitations

The study relied on self-reported data that required recall of events during their practice and the physiotherapists may have not been able to remember the incidences of WRMP or may have exaggerated their symptoms. Physiotherapists depend on self-reports in their daily work and thus help reduce the bias.

The study had a low response rate, which could be attributed to collecting data online. Because of the low response rate, some of the analysis (comparison and associations) were limited and the study was mainly restricted to descriptive analysis. The response rate in this study represented 21.7% of the entire population of physiotherapists in Limpopo province, making it difficult to generalize the results. Another study with a large sample size is therefore recommended for comparison and associations and to evaluate the psychosocial aspects of WRMP which was not covered in this study. Because only practicing physiotherapists were included, those who stopped practicing did not participate which will skew/bias the results. Some of the strength of this study is that it formed the basis for WRMP among physiotherapists in Limpopo province, including both private and public employed physiotherapists working in different environment from rural to urban areas. It also included newly qualified/ community service and older physiotherapists.

6.5 Conclusion

This study has revealed a high lifetime prevalence of WRMP among physiotherapists in Limpopo province despite being trained to manage these conditions. Majority of the physiotherapists affected were working in public sector than private sector and started experiencing pain within the five years of working. More female physiotherapists are affected compared males. Physiotherapists become vulnerable to WRMP while performing their work duties/ patient treatment. Treating large

number of patients and malfunctioning equipment were the major risk factors for WRMP. Physiotherapists continued working with the discomfort and are not considering leaving the profession because of WRMP.

This study has provided new data on the prevalence, the risks and effect of WRMP among physiotherapists in the Limpopo region. The findings in this study suggest that there is a need for adequate preventative measures to minimize WRMP among physiotherapists. Maintaining adequate staffing levels and providing physiotherapists with the appropriate equipment and assistive devices may assist physiotherapists to work effectively and efficiently. Continued education on the role of ergonomics and awareness on WRMP may assist lower the risks of WRMP. Further research is recommended on the quality of treatment received by patients from physiotherapists who continued to work with injuries/discomfort and on the effectiveness of the measures available to address WRMP.

REFERENCES

Adegoke BOA, Akodu AK, Oyeyemi, AL. 2008. Work related musculoskeletal disorders among Nigerian physiotherapists. *BMC Musculoskeletal Disorders* 9:112.

Aljairan DN, Al Maeeli HK, Al Fadhel AR, Al Saeedi ES, Rajab SE. 2015. Prevalence of work-related musculoskeletal disorders amongst physiotherapists in the kingdom of Bahrain, *WCPT Congress Physiotherapy* 101

Alrowayeh HN, Alshatti TA, Aljadi SH, Fares M, Alshamire MM, Alwazan SS. 2010. Prevalence, characteristics, and impacts of work-related musculoskeletal disorders: A survey among physiotherapists in the State of Kuwait. *BMC Musculoskeletal Disorders* 11:116.

Ashfaq M, Kanwal S, Tariq A. 2010. Prevalence of Work-related Musculoskeletal Disorders among Physiotherapists working in Rawalpindi/Islamabad. *JRCRS* 2(1):6-11

Atia D.T, Abdelazeim F.H, Radwan H. 2015. Impact of Work-Related Musculoskeletal Disorders on Egyptian Pediatric Physiotherapists: One-Year Follow-Up Study. *Trends In Applied Sciences Research* 10(3):175-182

Bae Y and Min KS. 2016. Associations between work-related musculoskeletal disorders, quality of life, and workplace stress in physiotherapists. *Industrial Health* I54:347–353.

Balakrishnan R, Asyikin N, Moh B. 2016. Prevalence of work related musculoskeletal disorders among Physiotherapists in Sabah : A cross-sectional study. *International Journal of Physical Education, Sports and Health* 3(1):336–343

Barnes R, Lolyn HJ, Moolman C, Roux Z, Schabort DJ, Yzel ME, Raubenhamer J.

2011. The lifetime prevalence of work-related thumb pain among physiotherapist in Bloemfontein. *Occupational Health Southern Africa.* July/august: 16-22

Bartlett JE, Kotrlik JW, Higgins CC. 2001. Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning and Performance* 19:1

Bernstein, R.C.1998. Working postures in qualified physiotherapists. A research report submitted to the Faculty of Health Sciences, University of Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Science in Physiotherapy

Bharadva NA, Verma MR, Kantharia SL, 2014. Are physiotherapy student at risk of musculoskeletal pain? A study on physiotherapy students of government physiotherapy college, New Civil Hospital, Surat. *International Journal of Interdisciplinary And Multidisciplinary Studies* 1:157-163

Boynton P.M, Greenhalgh T. 2004. Hands-on guide to questionnaire research Selecting, designing, and developing your questionnaire. *BMJ* 328:1312–5

Bork T.M, Cook J.C, Rosecrance K, Engelhardt K.A, Thomason M.J, Wauford I.J, Worley R.K. 1996. Work-Related Musculoskeletal Disorders Among Physiotherapists. *Physical Therapy* 76:827–835

Buddhadev NP, Kotecha IS, 2012. Work Related Musculoskeletal Disorders, A survey of physiotherapists in Saurashtra Region. *National Journal of Medical Research* 2:179- 181

Collins RM, Janse Van Rensburg DC, Patricios JS, 2010. Common work related musculoskeletal strains and Injuries. *South African Journal Family Practice* 53(3):240- 246

Cromie, J.E., Robertson, V.J. & Best, M.O. 2000. Work-related musculoskeletal disorders in physiotherapists: prevalence, severity, risks, and responses. *Physical Therapy* 80:336–351.

Cromie, J.E., Robertson, V.J. & Best, M.O., 2002. Occupational health in physiotherapy: General health and reproductive outcomes. *Australian Journal of Physiotherapy 48: 287-294*

Czupryana K, Nowotyn-Czupryana O, Nowotyn J. 2014. Ergonomic determinants of back pain in physiotherapists Involved in paediatric neurorehabilitation. *Orthopaedic Traumatology Rehabilitation* 16(4):407-418

de Cassia Pereira Fernandes R, da Silva Pataro SM, de Carvalho RB, Burdorf A. 2016. The concurrence of musculoskeletal pain and associated work-related factors, a cross sectional study. *BMC Public Health* 16:628

Department of Health South Africa. 2003. Occupational Health Services for health care workers in the national health service of South Africa. A Guideline booklet for Occupational Health Services.

Gharote G, Piwal P, Yeole U, Adakkite R, Gawali P. 2016. Prevalence of common work related musculoskeletal pain in physiotherapy practitioners in India. *European Journal of Pharmaceutical and Medical Research, ejpmr*. 3(5):398-402.

Glover W, Mcgregor A, Sullivan C, Hague J. 2005. Work Related musculoskeletal disorders affecting members of the Chartered Society of Physiotherapy. *Journal of Physiotherapy*. 91:138-147

Grooten WJA, Wernstedt P and Campo M. 2010. Work-related musculoskeletal disorders in female Swedish physiotherapists with more than 15 years of job experience : Prevalence and associations with work exposures. *Physiotherapy Theory and Practice*. 27(3):213-222

Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N and Conde JG. 2009. Research Electronic Data Capture (REDCap) a metadata-Driven Methodology and

Workflow Process for Providing Translational Research Information Support, *J Biomed Inform,* 42(2):377-381

Henschke N. Kamper S.J, Maher C.G. 2017. The Epidemiology and Economic Consequences of Pain. *Mayo Clinic Proceedings*, 90(1):139–147

Igumbor EU, Useh U ,Madzivire DM. 2003. an epidemiological study of work-related low back pain among physiotherapists in Zimbabwe. *SA Journal of Physiotherapy*. 59:3

Ilker E, Sulaiman A M, Rukayya S A. 2016. Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics.* 5(1):1-4

Jenkins H, Myezwa H. 2013. Work-related thumb disorders in South African physiotherapists treating musculoskeletal conditions using manual therapy techniques. *South African Journal of Physiotherapy* 71(1)249-255

Jobson M. 2015. Structure of the health system in South Africa. *Khulumani Support Group*. http://www.khulumani.net/ [Accessed: 11/06/2017]

Knardahl S. 2017. Is musculoskeletal pain associated with work engagement ? *Scandinavian Journal of Pain*, 15:58–59

Kurionka I, Jonsson B, Kilbom A, Vinterberg H, Biering-Sørensen F, Andersson G, Jørgensen K. 1987. Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms: Institute Of Occupational Health, Department of Physiology 18(3):233-7

Luttman A, Griefthan B, Caffier G. 2003. Preventing Work-related musculoskeletal disorders in the workplace. *Protecting workers health series no* 5. http:www.who.int/occupational_health/publications/en/oehmsd3.pdf. [Accessed: 10/03/ 2017]

Milhem M, Kalichman L, Ezra D, Alperovitch-Najenson D. 2016. Work related musculoskeletal disorders among Physiotherapists: A comprehensive narrative review. *International Journal of Occupational Medicine and Environmental Health.* 29(5):735-747

Muruganantham, BB, Nayak B, Dave D, Kotia P. 2015. Work-related musculoskeletal disorders among Indian. *WCPT Congress Physiotherapy* 101:1059–1060.

Narendrasinh, JU, Mulla A. 2013. Prevalence and risk factors of work related Injuries among Physiotherapists in Indian Population. *International Journal of Science & Research(IJSR)* 4:14

Neveen A, Raoof A, Sayyad MEL, Desoky E.L, Farag Y. 2014. Work-related musculoskeletal disorders among Egyptian physiotherapists. *Faculty of Physical Therapy. Cairo University* 19:1

Nkhata L, Zyaambo C, Nzala S, Siziya S. 2010. Work-related Musculoskeletal Disorders: prevalence, contributing factors and coping strategies among Physiotherapy personnel in Lusaka, Kitwe and Ndola districts, Zambia. *Medical Journal of Zambia*. 37(4):262-267

Nordin NAM, Leonard JH, Thye NC. 2011. Work-related musculoskeletal disorders among physiotherapists in public hospitals-a Southeast Asian picture. *Journal of Clinics.* 66:373-378

Passier L, Mcphail S. 2011. Work-related musculoskeletal disorders among physiotherapists in physically demanding roles: A qualitative analysis of risk factors and strategies for prevention. *BMC Musculoskeletal Disorders* 12:24

Pfumojena CC, 2015. The prevalence and nature of work related musculoskeletal disorders amongst physiotherapists in Zimbabwe. A research report submitted to the Faculty of Health Sciences, University of Witwatersrand, in partial fulfilment of

the requirements for the degree of Master of Science in Physiotherapy

Pillay HC, 2014. A study to determine the type, prevalence, risk factors and coping strategies of physiotherapists experiencing work related neuro-musculoskeletal disorders in Kwazulu-Natal, A research report submitted to the Faculty of Health Sciences, University of Kwazulu-Natal, in partial fulfilment of the requirements for the degree of Master of Science in Physiotherapy

Phongamwong C, Deema H. 2015. The impact of multi-site musculoskeletal pain on work ability among health care provides. *Journal of Occupational Medicine And Toxicology*. BMC 10:21

Prerana S, Saravanan M, Krunal L, Krishna R, Ruchi V. 2017. Prevalence, risk factors and coping strategies to work related musculoskeletal disorders reported by physiotherapists in surat district, India. *International Journal of Occupational Safety and Health* 101:eS1238–eS1642

Qhomane-Mhlanga T. 2014. The impact of musculoskeletal disorders on absenteeism in hospital workers in the Mangaung Metropolitan District. A field study submitted to the UFS Business School in the Faculty of Economic and Management Sciences in partial fulfilment of the requirements for the degree Master in Business administration at the University of Free State, Bloemfoeintein

Raosoft Sample Size Calculator. (http://www.raosoft.com/samplesize). [Accessed: 07/07/2017]

Rugelj D. 2003. Low back pain and other work-related musculoskeletal problems among physiotherapists. *Applied Ergonomics*, 34:635–639

Rural health advocacy project. 2015. Rural health fact sheet. http://www.rhap.org.za/wp- content/uploads/2015/09/RHAP-Rural-Health-Fact-Sheet-2015-web.pdf. [Accessed: 08/06/2017]

Sharan D, Ajeesh PS. 2012. Injury prevention in physiotherapists-a scientific review *IOS Press* 41:1855-1859.

Shimabukuro V.G.P, Alexandre N.M.C, Coluci M.Z.O, Rosecrance J.C, Gallani M.C.J.B .2012. Validity and Reliability of a Job Factors Questionnaire Related to the Work Tasks of Physical Therapists. *International Journal of Occupational Safety and Ergonomics*, 18(1):15-26

Vieira ER, Svoboda S, Belniak A, Brunt D, Prix CR, Roberts L, da Costa BR. 2016. Work-related musculoskeletal disorders among physiotherapists: an online survey. *An International, Multidisciplinary Journal.* 38(6):552–557.

Woolf AD, Pfleger B. 2003. Burden of musculoskeletal conditions. *Bulletin of The World Health Organization.* 81(9):646-656

APPENDIX I: APPROVAL LETTER FROM LDOH

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH

Enquiries: Stander SS (015 293 6650) Ref: LP_2018_

Hobyani TB
University of Witwatersrand
Human Research Ethics Committee

Greetings,

RE: The prevalence of Work related Musculoskeletal Pain among Physiotherapists in Limpopo Province

The above matter refers.

1. Permission to conduct the above mentioned study is hereby granted.
2. Kindly be informed that:-
   - Research must be loaded on the NHRD site (http://nhrd.hst.org.za) by the researcher.
   - Further arrangement should be made with the targeted institutions, after consultation with the District Executive Manager.
   - In the course of your study there should be no action that disrupts the services, or incur any cost on the Department.
   - After completion of the study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   - The above approval is valid for a 3 year period.
   - If the proposal has been amended, a new approval should be sought from the Department of Health.
   - Kindly note, that the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated.

Head of Department

20/06/2018
Date

Private Bag X9302 Polokwane
Fidel Castro Ruz House, 18 College Street. Polokwane 0700. Tel: 015 293 6000/12. Fax: 015 293 6211.
Website: http/www.limpopo.gov.za

The heartland of Southern Africa – Development is about people!

APPENDIX II: APPROVAL LETTER FROM SASP

SOUTH AFRICAN SOCIETY OF PHYSIOTHERAPY
106 – 154 NPO
Vat No: 4390268409

PO Box 752378, Gardenview, Jhb, 2047
Unit 4, Parade on Kloof Office Park, 1 The Parade,
Bedfordview, 2007

Tel: +27 11 615 3170 www.saphysio.co.za
Fax: 086 559 8237 info@saphysio.co.za

HUMAN RESEARCH ETHICS COMMITTEE
UNIVERSITY OF THE WITWATERSRAND

18 June 2018

RE: REQUEST FOR STUDY – Protocol No. M180305 – Ms Tlangelani Bellinah Hobyani

To whom it may concern,

We hereby confirm receipt of the request from Ms. Tlangelani Bellinah Hobyani to conduct a study on the Prevalence of Work Related Musculoskeletal Pain among Physiotherapists in the Limpopo Province, Protocol No: M180305.

We approve the study to be sent out by our Head Office to the members of the South African Society of Physiotherapy, subject to Ms. Hobyani receiving the final clearance certificate from the HREC Secretariat for this study.

Sincerely,

Vanessa Bosheff
National Operations Manager
The South African Society of Physiotherapy
opsmanager@saphysio.co.za

Member and co-founder of World Confederation for Physical Therapy

AFRICA REGION World Confederation for Physical Therapy

APPENDIX III: APPROVAL LETTER FROM PASA

PHYSIOTHERAPY ASSOCIATION OF SOUTH AFRICA
344 Sedibeng Section
Tembisa,Gauteng,1632
Telephone: 083-280 7273
Email: physiotherapyasa@gmail.com
enquiries.pasa@gmail.com
Web: physiotherapyasa.weebly.com

28 Prince Street
Ivy Park
Polokwane
0699
19 June 2018

Dear Ms. Hobyani T.B.

Re: The Prevalence of Work Related Musculoskeletal Pain among Physiotherapists in Limpopo Province

This letters serves to indicate that permission is hereby granted to the above-mentioned researcher to proceed with the advertisement of the intended study as requested. The onus rests with the researcher to ensure proper advertising and recruitment of participants is conducted ethically.

The Physiotherapy Association of South Africa wishes you well in this important research undertaking and looks forward to you receiving feeding of the findings from your study.

Sincerely

Muziwakhe Tshabalala

PASA: Treasurer

Research Support and Co-ordinator

APPENDIX IV: APPROVAL LETTER FROM LDOHPPC

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF HEALTH AND SOCIAL DEVELOPMENT

Private Bagx2466
Mokopane
0600
26 January 2018

Ms TB Hobyani
28 Prince Street
Ivy Park
Polokwane 0699

Dear Ms TB Hobyani

Re: Permission Letter For Assistance With Research Project

In response to your letter of request for assistance with the research project on; "The Prevalence Of Work Related Musculoskeletal Pain Among Physiotherapists In Limpopo Province"

I hereby confirm that this office will assist with emailing out the invitations and data collection tool link to all District Coordinators who will in turn circulate to all physiotherapists.

I trust that this is in order.

Date: 29/01/2018

Physiotherapy Provincial coordinator (Acting)
Zoe Nanavat Letsoalo
082 660 4547 (Cell)
015 483 4219 (Office)

APPENDIX V: APPROVAL LETTER FROM SCHOOL OF HEALTH SCIENCES

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

04 January 2019
Person No: 670405
PAG

Miss TB Hobyani
28 Prince Street
Ivy Park Extention 20
Polokwane
0699
South Africa

Dear Miss Tlangelani Hobyani

Master of Science in Physiotherapy: Approval of Title

We have pleasure in advising that your proposal entitled has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

APPENDIX VI: ETHICAL CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Ms Tlangelani Bellinah Hobyani

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M180305

NAME: (Principal Investigator)	Ms Tlangelani Bellinah Hobyani
DEPARTMENT:	Physiotherapy Limpopo Department of Health and Social Development The South African Society of Physiotherapy (SASP) The Physiotherapy Association of South Africa (PASA)
PROJECT TITLE:	The Prevalence of Work Related Musculoskeletal Pain among Physiotherapists in Limpopo Province
DATE CONSIDERED:	06/04/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Mrs N. Benjamin and Mrs S. Ravat
APPROVED BY:	Professor CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	08/08/2018

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in **March** and will therefore be due in the month of **March** each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date 08/08/2018

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX VII: ADVERTISING POSTER

Are you a physiotherapist working in Limpopo province?

Where? In Public hospital or Private Practice or hospital.

You are invited to participate in a study on the risks and effects of work-related musculoskeletal pain among physiotherapists in Limpopo province.

What is expected? You will need 15 to 20 minutes to fill in an online questionnaire. To participate:

You may open the survey in your web browser by clicking the link below: The Risks and effects of Work Related Musculoskeletal Pain Among Physiotherapists in Limpopo Province

If the link above does not work, try copying the link below into your web browser: https://redcap.core.wits.ac.za/redcap/surveys/?s=4W9AWXAH8N

For more information kindly contact: Tlangelani Hobyani

Email: tlangihobs@gmail.com

Alternatively visit the Physiotherapy Association of South Africa (PASA) Facebook page and follow the link to the questionnaire, or contact South African Society of Physiotherapy (SASP) or Limpopo department of health physiotherapy provincial coordinator (LDOH-PPC).

APPENDIX VIII: INFORMATION DOCUMENT

INFORMATION DOCUMENT

Study title: The Risks and effect of Work Related Musculoskeletal Pain among Physiotherapists in Limpopo Province

Dear participant

Introduction:

My name is Tlangelani Hobyani. I am a physiotherapist, and currently a postgraduate student at the University of the Witwatersrand. I am doing research on the risks and effect of work related musculoskeletal pain among physiotherapists in the Limpopo Province.

Musculoskeletal disorders are one of the major health problems facing workers today including many physiotherapists. The nature of physiotherapy and the techniques used to treat patients exposes the physiotherapists to musculoskeletal disorders. Professionalism is undermined by the injured physiotherapists seeking informal treatment from colleagues rather than reporting injury to their managers, thereby keep work-related injury a hidden mystery. Therefore it is necessary that research be conducted on the prevalence of work related musculoskeletal pain among physiotherapists, since no studies have been conducted in the Limpopo province.

I am inviting you to take part in this research study.

What is involved in the study: If you agree to participate in the study, you will be required to fill in the questionnaires regarding your work and possible musculoskeletal pain. This will take approximately 20-30 minutes.

Risks: There are no risks involved in this study.

Benefits: There are no direct benefits of the study. The information gained from the study may add to the existing body of knowledge within South Africa on the prevalence and extent of work-related musculoskeletal pain among physiotherapists. The results of this study will be communicated to the University of Witwatersrand, Limpopo department of health, South African society of physiotherapy (SASP) Limpopo, Physiotherapy Association of South Africa (PASA) and Limpopo

department of health physiotherapy provincial coordinator (LDOH-PPC). The study will be made available by publication.

Participation is voluntary. Refusal to participate will involve no penalty. You are free to withdraw participation from the study at any time without discrimination.

Confidentiality: The results will be confidential. Your name and personal information will not be used in the course of the study. Codes will be used to enhance anonymity and confidentiality.

Contact details of researcher/s – For further information and questions, the researcher can be reached at tlangihobs@gmail.com or 0796586902.

Contact details of HREC administrator and chair – Information and questions on ethical considerations and approval and for reporting of complaints / problems can be obtained from the chairperson of the human research ethics committee (Medical) University of the Witwatersrand: Prof Clem Penny: E-mail: Clement.Penny@wits.ac.za or the administrative officer Mr Rhulani Mkansi: E-mail: Rhulani.mkansi@wits.ac.za or Tel: 011 717 2700/2656

Thank you for your participation in this research study.

APPENDIX IX: QUESTIONNAIRE

Confidential

The Risks and Effect of Work Related Musculoskeletal Pain Among Physiotherapists in Limpopo Province

Information Document
Study title: The Risks and Effect of Work Related Musculoskeletal Pain Among Physiotherapists in Limpopo Province
Dear participant

Introduction:
My name is Tlangelani Hobyani. I am a physiotherapist, and currently a postgraduate student at the University of the Witwatersrand. I am doing research on the risks and effect of work related musculoskeletal pain among physiotherapists in the Limpopo Province.
Musculoskeletal disorders are one of the major health problems facing workers today including many physiotherapists. The nature of physiotherapy and the techniques used to treat patients exposes the physiotherapists to musculoskeletal disorders. Professionalism is undermined by the injured physiotherapists seeking informal treatment from colleagues rather than reporting injury to their managers, thereby keep work-related injury a hidden mystery. Therefore it is necessary that research be conducted on the prevalence of work related musculoskeletal pain among physiotherapists, since no studies have been conducted in the Limpopo province.

I am inviting you to take part in this research study.

What is involved in the study: If you agree to participate in the study, you will be required to fill in the questionnaires regarding your work and possible musculoskeletal pain. This will take approximately 20 to 30 minutes.

Risks: There are no risks involved in this study.

Benefits: There are no direct benefits of the study. The information gained from the study may add to the existing body of knowledge within South Africa on the prevalence and extent of work-related musculoskeletal pain among physiotherapists. The results of this study will be communicated to the University of Witwatersrand, Limpopo department of health (DOH), South African Society of Physiotherapy (SASP) Limpopo, Physiotherapy Association of South Africa (PASA) and Limpopo department of health physiotherapy provincial coordinator (LDOH-PPC). The study will be made available by publication.

Participation is voluntary. Refusal to participate will involve no penalty. You are free to withdraw participation from the study at any time without discrimination.

Confidentiality: The results will be confidential. Your name and personal information will not be used in the course of the study. Codes will be used to enhance anonymity and confidentiality.

Contact details of researcher/s - For further information and questions, the researcher can be reached at tlangihobs@gmail.com or 0796586902.

Contact details of HREC (Medical) administrator and chair - Information and questions on ethical considerations and approval and for reporting of complaints / problems can be obtained from the chairperson of the human research ethics committee (Medical) University of the Witwatersrand: Prof Clem Penny, Email: Clement.Penny@wits.ac.za or the admnistrative officer Mr Rhulani Mkansi, E-mail: Rhulani.mkansi@wits.ac.za or Tel: 011 717 2700/2656.

Thank-you for your participation in this research study.

I agree to participate in the research study.	◯ Yes ◯ No
Age in years.	_____
Height(cm)	_____
Weight (kg)	_____

Gender	◯ Female ◯ Male ◯ Other
How long have you been working as a physiotherapist? (Months/Years)	_____
School of Physiotherapy where Qualification Obtained	_____
Postgraduate Qualifications	_____
work Status in the last 12 months	◯ Full time ◯ Part-time ◯ Sessional/Casual ◯ Locum ◯ Other (please explain)
Please describe other work status	_____
In What Town/City Do You Currently Practice	_____
Where Do You Work?	◯ Private Sector ◯ Public Sector ◯ Both Private and Public ◯ Academia ◯ Other

Please indicate how long, in years, you have worked in the following areas, in your total working experience.
General hospital refers to a job where you rotate through different clinical areas eg: Medical, Surgical, Outpatients, ICU etc

	1-5 years	5-10 years	11-15 years	16-20 years	>20 years	Not applicable
General hospital	○	○	○	○	○	○
Cardio-thoracic unit	○	○	○	○	○	○
Peadiatrics	○	○	○	○	○	○
Orthpaedics	○	○	○	○	○	○
Sports physiotheray	○	○	○	○	○	○
Spinal unit	○	○	○	○	○	○
Neurology	○	○	○	○	○	○
Rehabilitation unit	○	○	○	○	○	○
Old-Age home	○	○	○	○	○	○
Community health/Outreach projetc	○	○	○	○	○	○
Out-patient department	○	○	○	○	○	○
Other	○	○	○	○	○	○

Other (please specify) _____

Please specify the clinical area in which you currently work.

○ General hospital
○ Orthopaedics
○ Sports physiotherapy
○ Cardio-thoracic unit
○ Paediatric
○ Community health/outreach
○ Private practice
○ Rehabilitation unit
○ Old age home
○ Spinal unit
○ Outpatient department
○ other
(General hospital refers to a job where you rotate through different clinical areas e.g Medical, Surgical, ICU, Outpatient etc.)

Other (please specify) _____

Do you suffer from any of the following conditions?

☐ Chronic musculoskeletal conditions
☐ Rheumatoid Arthritis
☐ Systemic Lupus Erythematosus
☐ Pregnancy related MSK pain
☐ Other

Other (please specify) _____

Have you ever experienced pain, discomfort or injury in any part of your body arising from your work as a physiotherapist?

○ Yes
○ No

SECTION B

Please tick the boxes that describe your work related pain/discomfort.
Please do not include any pain/discomfort/Injury you acquired outside of your work as a physiotherapist.

	Have you ever had any symptoms ever?	Do you have any symptoms currently?	Have you had any symptoms at all in the last 12 months?	Have these symptoms prevented you from working?	Have these symptoms prevented you from doing normal ADL or leisure activities?
Neck	☐	☐	☐	☐	☐
Shoulder	☐	☐	☐	☐	☐
Upper back	☐	☐	☐	☐	☐
Chest	☐	☐	☐	☐	☐
Elbow	☐	☐	☐	☐	☐
Forearm	☐	☐	☐	☐	☐
Wrist	☐	☐	☐	☐	☐
Hands	☐	☐	☐	☐	☐
Thumbs	☐	☐	☐	☐	☐
Lower back	☐	☐	☐	☐	☐
Hips	☐	☐	☐	☐	☐
Thighs	☐	☐	☐	☐	☐
Knees	☐	☐	☐	☐	☐
Ankle	☐	☐	☐	☐	☐
Feet	☐	☐	☐	☐	☐

Indicate what treatment (if any) you sought.

	Have you had treatment from the doctor?	Have you had treatment from a physiotherapist?	Have you had any other treatment?	No treatment.
Neck	☐	☐	☐	☐
Shoulder	☐	☐	☐	☐
Upper back	☐	☐	☐	☐
Chest	☐	☐	☐	☐
Elbow	☐	☐	☐	☐
Forearm	☐	☐	☐	☐
Wrist	☐	☐	☐	☐
Hands	☐	☐	☐	☐

Thumbs	☐	☐	☐	☐
Lower back	☐	☐	☐	☐
Hips	☐	☐	☐	☐
Thighs	☐	☐	☐	☐
Knees	☐	☐	☐	☐
Ankle	☐	☐	☐	☐
Feet	☐	☐	☐	☐

Please specify other treatment.

_____

When did you first experience this work-related pain or discomfort?

- ◯ As a physiotherapist student
- ◯ In the first 5 years after graduation
- ◯ 5-15 years after graduation
- ◯ >15 years after graduation
- ◯ Don't know

In what type of setting did the injury occur?

- ◯ Private Hospital-In patient
- ◯ Private Practice-out-patient
- ◯ Public Hospital -in patient
- ◯ Public Hospital-out-patient
- ◯ Old Age Home
- ◯ Rehabilitation Centre

(please tick the appropriate)

Was the onset:

- ◯ Gradual
- ◯ Sudden
- ◯ As a result of Accident

(please tick the appropriate)

As a result of this work-related pain or discomfort , which of the following have you done?

- ☐ Officially reported the disorder
- ☐ Lodged a worker's compensation claim
- ☐ Taken sick leave
- ☐ Continued working with discomfort
- ☐ Seen a doctor
- ☐ Other

Other (please specify)

_____

Have you changed the area/ specialty in which you practice as a result of work-related pain/discomfort/injury?

- ◯ Yes
- ◯ No

If the answer is yes, what did you change from and to what?

_____

Did you lose time from work as result of work-related pain/injury?

- ◯ Yes
- ◯ No

How much time/approximate hours/days?

_____

Since your injury, have the symptoms been exacerbated by clinical practice?

- ◯ Yes
- ◯ No

Have you limited your patient contact time as a result of the injury,pain or discomfort?	◯ Yes ◯ No
Are you considering changing jobs because of this injury or risk of another injury?	◯ Yes ◯ No

Section C

Have you had training in ways that alter your environment or reduce strain on your body?	◯ Yes ◯ No
Are there physiotherapy assistive devices available to help you?	◯ Yes ◯ No
Is there a physiotherapy assistant or an individual available to help?	◯ Yes ◯ No
Which of the following do you use to reduce the strain on your body when working?	☐ Adjustable Bed/Plinth ☐ Sliding board ☐ Wheelie stool ☐ Patient lifting belt ☐ Splint ☐ Other ☐ None of these
Other (please specify)	_____

Section C

Have you had training in ways that alter your environment or reduce strain on your body?	◯ Yes ◯ No
Are there physiotherapy assistive devices available to help you?	◯ Yes ◯ No
Is there a physiotherapy assistant or an individual available to help?	◯ Yes ◯ No
Which of the following do you use to reduce the strain on your body when working?	☐ Adjustable Bed/Plinth ☐ Sliding board ☐ Wheelie stool ☐ Patient lifting belt ☐ Splint ☐ Other ☐ None of these
Other (please specify)	_____

Section D

The list describes factors that could contribute to work-related pain, discomfort or injury. In your opinion, how have the following factors contributed to your work related pain, discomfort or injury? please tick the appropriate.
Please do not include any pain/discomfort/Injury acquired outside your work as a physiotherapist.

	Major (1)	Moderate (2)	Minor (3)
Performing the same task over and over	○	○	○
Treating a large number of patients in one day	○	○	○
Not enough rest breaks during the day	○	○	○
Performing manual orthopaedic techniques	○	○	○
Working in awkward or cramped positions	○	○	○
working in the same position for long periods	○	○	○
Bending or twisting your back in an awkward way	○	○	○
Reaching or working away from your body	○	○	○
Unanticipated sudden movement or falls of patient	○	○	○
Assisting patient during gait activities	○	○	○
Lifting or transferring dependent patients	○	○	○
Working with confused or agitated patients	○	○	○
Carrying, lifting or moving heavy materials	○	○	○
Working at or near your physical limit	○	○	○
Continuing to work when injured	○	○	○
Work scheduling: (overtime, irregular shifts, length)	○	○	○
Inadequate training on injury prevention	○	○	○

Lack of assistive devices and equipments e.g hoist	○	○	○
Malfunction of equipment e.g unadjustable beds	○	○	○

Section E

The response to the following statements should reflect what you actually do in practice rather than what you would like to do or think you should do. Please tick the appropriate.

	Always (1)	Sometimes (2)	Never (2)
I get someone else to help me handle a heavy patient	○	○	○
I modify patient position/ my position	○	○	○
I use a different part of my body to administer techniques	○	○	○
I use electrotherapy instead of manual therapy	○	○	○
I pause regularly so I can stretch and change posture	○	○	○
I warm up and stretch before performing manual techniques	○	○	○
I adjust plinth/bed height	○	○	○
I select techniques that will not aggravate my discomfort	○	○	○
I use rehabilitation technicians to perform physically stressful tasks	○	○	○
I stop a treatment if it causes or aggravates my discomfort	○	○	○

Do you contemplate leaving the physiotherapy profession as a result of work-related musculoskeletal pain, discomfort or injury?

○ Yes
○ No

Are there any other reasons (besides pain) why you would contemplate leaving the physiotherapy profession?

☐ Other health reasons
☐ Retirement
☐ Personal/ Family reasons
☐ Don't like physio
☐ Financial reasons
☐ Career change/development
☐ Other

Do you have any suggestions to help reduce work-related musculoskeletal pain among physiotherapists?

_____

Have you any comment?

_____

END OF SURVEY

Thank you for your participation in this study.