University of Ghana http://ugspace.ug.edu.gh

SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNNIVERSITY OF GHANA

WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG PHYSIOTHERAPISTS IN GHANA: PREVALENCE, PERCEIVED CAUSES AND COPING STRATEGIES

BY

EMMANUEL BART PLANGE

(10599724)

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE MASTER OF PUBLIC HEALTH DEGREE

APRIL, 2019

University of Ghana http://ugspace.ug.edu.gh

DECLARATION

I, Emmanuel Bart Plange, hereby declare that, except for the references of other people's work which has been duly acknowledged, this work is my original research and that this dissertation, either in whole or part has not been presented for the award of any degree in this university or any other one.

....

EMMANUEL BART PLANGE **DATE**

(MPH STUDENT)

....

DR. JOHN ARKO-MENSAH **DATE**

(SUPERVISOR)

University of Ghana http://ugspace.ug.edu.gh

DEDICATION

This dissertation is dedicated to the Almighty God who has given me good health and has seen me through this stage of my education. Also to my late grandmother; Madam Hannah Afaaley Commey, my lovely wife; Linda Abena Plange and my children; Princess Naa Afaaley Plange and Emmanuel Bart Plange Jnr.

University of Ghana http://ugspace.ug.edu.gh

ACKNOWLEDGEMENT

Glory be to the Almighty God for seeing me through this stage of my education successfully. I am most grateful to my supervisor Dr. John Arko-Mensah for his immense contributions to this dissertation, I say God richly bless you for all the support and input into this work.

I am also grateful to all the academic and non-academic staff of School of Public Health, for their diverse contributions during my MPH program. My sincere appreciation goes to Mr. Samuel Nii Aryee Lartey for assisting in data collections. Also to the various heads of Physiotherapy departments for allowing me to conduct the study in their facilities.

Thanks to the Ghana Physiotherapy Association for giving me nominal data on registered physiotherapists in the country. My deepest appreciation goes to all Physiotherapists in the five regions of Ghana who took part in the study.

University of Ghana http://ugspace.ug.edu.gh

ABSTRACT

Background: Physiotherapy is a professionally demanding job, and physiotherapists are prone to develop musculoskeletal disorders. Musculoskeletal disorders are inflammatory and degenerative conditions affecting muscles, tendons, ligaments, cartilages, nerves and peripheral blood vessels, and are associated with exposure to risk factors at the work place. Physical risk factors including performing high repetitive movements, maintaining awkward postures while working or sustaining static work postures are associated with physiotherapy. There is therefore a need to investigate the prevalence and perceived causes of WRMSDs among physiotherapists in Ghana in order to put in adequate measures to reduce its development.

Objective: The aim of the study was to determine the prevalence and perceived causes of WRMSDs among physiotherapists in Ghana and the coping strategies they adopt.

Methods: A questionnaire-based cross-sectional survey was conducted in nine (9) facilities in five regions in Ghana (Greater Accra, Ashanti, Western, Central and Eastern regions) with majority of physiotherapist. A four-part questionnaire comprised of demographic data, experience of musculoskeletal disorders, perceived contributing factors and coping strategies was distributed to 102 physiotherapists. Anthropometric indices (age, sex, weight and height) were obtained.

Data collected was entered in to STATA version 15. Means, standard deviations, frequencies and percentages were calculated. The association between WRMSDs and demographic characteristics (such as age, sex, marital status, number of years of work-

University of Ghana http://ugspace.ug.edu.gh

experience, level of education) and BMI were analyzed using chi square or Fisher's exact test.

Results: The prevalence of Work related musculoskeletal disorders was 76.5% prevalence of WRMSDs with the most common affected the body site being the lower back (69.6%), the upper back (38.2%) and the neck (22.6%). The least affected part of the body was the elbow/ forearm (1.0%). Respondents' perceived causes of WRMSDs were performing repetitive movements and workload in a given day (58.8%).

Coping strategies adopted by majority of physiotherapists included change of posture to prevent WRMSDs. There was an association between age and WRMSDs and also between work experience and WRMSDs.

Conclusion: Prevalence of WRMSDs was high amongst Physiotherapists in Ghana, as such, the ministry of health, Ghana health service, and the Ghana Physiotherapy Association must put in measures (such as reducing workload on the physiotherapist, making workstation ergonomically friendly etc.) to help prevent or reduce its development.

University of Ghana http://ugspace.ug.edu.gh

TABLE OF CONTENT

CONTENT **PAGE**

DECLARATION i

ACKNOWLEDGEMENT iii

ABSTRACT iv

TABLE OF CONTENT vi

LIST OF TABLES ix

LIST OF FIGURES x

LIST OF ABBREVIATIONS xi

DEFINITION OF TERMS xii

CHAPTER ONE 1

1.0 INTRODUCTION 1

1.1 Background 1

1.2 Problem Statement 2

1.3 Conceptual framework 4

1.4 Justification 6

1.5 Research Questions 7

1.6 Objectives 8

CHAPTER TWO 9

2.0 LITERATURE REVIEW 9

2.1 Introduction 9

2.2 Risk factors associated WRMSDs 10

2.3 Pathways to developing WRMSDs 12

2.4 Prevalence and Burden of WRMSDs 13

2.5 Anatomy of Human backbone 15

2.6 Low back pain 16

2.7 Neck Pain 17

2.8 Association between Age and WRMSDs 18

2.9 Association between sex and WRMSDs 19

University of Ghana http://ugspace.ug.edu.gh

2.10 Association between Work demand and WRMSDs 19
2.11 Association between working experience and WRMSDs 20
2.12 Coping strategies to reduce WRMSDs 21
CHAPTER THREE 23
3.0 METHODS 23
3.1 Study design 23
3.2 Study location 23
3.3 Variables 25
3.4 Study population 26
3.5 Inclusion criteria 26
3.6 Exclusion criteria 26
3.7 Sampling 27
3.8 Data collection Technique 29
3.9 Anthropometric measurements 29
3.10 Quality assurance 30
3.11 Data processing and analysis 30
3.12 Ethical considerations/issues 30
3.13 Pre-test/Pilot study 31
CHAPTER FOUR 32
4.0 RESULTS 32
4.1 Demographic characteristics of participants 32
4.2 Prevalence of WRMSDs and level of pain amongst respondent 33
4.4 Perceived causes of WRMSDs 36
4.5 Strategies adopted by respondents to cope or prevent WRMSDs 37
4.6 Association between WRMSDs and demographic characteristics of respondents 38
CHAPTER FIVE 40
5.0 DISCUSSION 40
5.1 Introduction 40
5.2 Prevalence of WRMSDs amongst physiotherapists in Ghana and the body parts affected 40

University of Ghana http://ugspace.ug.edu.gh

5.3 Perceived causes of WRMSDs 41
5.4 Coping strategies adopted by Physiotherapists to reduce and (or) prevent WRMSDs 42
5.5 Association between WRMSDs and demographic characteristics of the respondents. 43
CHAPTER SIX 44
6.0 CONCLUSIONS AND RECOMMENDATIONS 44
6.1 Conclusions 44
6.2 Limitation of study 45
6.3 Recommendations 45
REFERENCES 47
APPENDICES 53
Appendix 1: Informed consent Form 53
Appendix 2: Questionnaire 56
Appendix 3: Ethical Clearance 59

University of Ghana http://ugspace.ug.edu.gh

LIST OF TABLES

Table1. Sample size stratification among the five regions 28

Table 2: Body mass index categorization 30

Table 3: Demographic characteristics of respondents 32

Table 4: Prevalence of WRMSDs amongst respondents 33

Table 5: Body Parts affected by WRMSDs 36

Table 6: Perceived causes of WRMSDs as reported by respondents 37

Table 7: Strategies adopted by respondents to cope or prevent WRMSDs 38

Table 8: Association between WRMSDs and demographic characteristics of respondents

……39

University of Ghana http://ugspace.ug.edu.gh

LIST OF FIGURES

Figure 1: Conceptual framework 6

Figure2. The three major pathways that could lead to the development of WRMSDs 12

Figure 3: Anatomy of the human backbone..... 15

Figure 4: Map of Ghana..... 24

Figure 5: Prevalence of WRMSDs amongst different age groups..... 34

Figure 6: Level of Pain or discomfort reported by respondents 35

University of Ghana http://ugspace.ug.edu.gh

LIST OF ABBREVIATIONS

BMI	Body Mass Index
CVA	Cerebrovascular Accident
KBTH	Korle bu Teaching Hospital
MSDs	Musculoskeletal Disorders
PTs	Physiotherapists
WRMSDs	Work-related Musculoskeletal Disorders

University of Ghana http://ugspace.ug.edu.gh

DEFINITION OF TERMS

Work-related Musculoskeletal Disorders (WRMSDs): are injuries or disorders that affect muscles, nerves, tendons, joints, cartilages, and the spinal discs, that are associated with exposure to risk factors at the work place (Bureau of labor statistics, 2005)

Physiotherapy: Is the Treatment or managements of diseases, injuries and deformities by using physical modalities such as exercise, heat, ice, electric current and massage, instead of using drugs and surgeries. It has several specializations such as Orthopaedics, paediatrics, neurorehabilitation etc.

Physiotherapist: A health care professional trained and licensed to practice Physiotherapy. Basic requirement to becoming a physiotherapist is a bachelor's degree in physiotherapy.

Body Mass Index (BMI): Weight divided by height square. **It is a measure of body's adiposity**. It is categorize in to underweight (≤18.5kg), normal weight (between18.5kg to 24.5kg), overweight (25kg to 29.9kg) and obese (≥30kg).

Prevalence: It is the total number of cases of a disease in a defined population at a given time, divided by the total number of individuals in that population. If there is no information about the population, a sample from it can be used to determine the prevalence.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Workplace injuries constitute a large proportion of injury prevalence and are very essential public health problem that affects the worker and also his or her household members in terms of finances, time consumed during treatments etc. (Smith, Wellman, Gary, et al., 2005). Musculoskeletal disorders (MSDs) are inflammatory and degenerative conditions that affect joints, muscles, tendons, ligaments, nerves and blood vessels (Punnett & Wegman, 2004a). Work-related musculoskeletal disorders (WRMSDs) are MSDs caused or exacerbated by execution of work and workstation design (European agency for safety and health at work, 2007). Globally, millions of people experience long term severe disability and pain as a result of WRMSDs (Woolf & Åkesson, 2001). Work-related musculoskeletal disorders are the commonest workplace injury and morbidity and are the major cause of absenteeism from work and presenteeism (Manjunatha, Kiran & Thankappan, 2011). According to European agency for safety and health at work (2007) several factors such as personal, organizational, technical, etc. combine to cause WRMSDs. The most prevalent WRMSDs is Low back pain (LBP) which is also the leading cause of disability among workers (Picavet & Schouten, 2003). Other examples of WRMSDs include shoulder, wrist, neck and knee pain (Deeney & O'Sullivan, 2009).

The aetiology of WRMSDs has been associated with performance of high repetitive task, awkward and/or static postures, leading to an increase physical loading on soft tissues (such as muscles, tendons, ligaments etc.) and joints which results in injuries (Tantawy et

University of Ghana http://ugspace.ug.edu.gh

al., 2017). The severity of these injuries depend on the intensity, type, frequency and duration of the physical exposure (Bernard, 1997). Body mass index (BMI) is a measure of adiposity of the body and has also been closely linked to the development of MSDs (Yang, Mathews, & Chen, 2014). People with high BMI are prone to the development more musculoskeletal pains compared to those with low BMI. Therefore, BMI is an independent variable in MSDs development (Viester, Verhagen, Oude et al., 2013).

The work of Physiotherapists involve treatment and management of patients affected by injuries, illnesses or disabilities through manual therapy, exercise, electrotherapy, advice and education. A physiotherapist's work is physically demanding and involves repetitive bending and movements, quick response to unanticipated patient's movements to prevent falls, lifting, transferring and supporting patients during treatments (Nkhata, Zyaambo, Nzala, et al., 2010). Most physiotherapy treatments involve manual therapy and soft tissue mobilization which usually demand high level force and awkward postures (Cromie, Robertson, & Best, 2001). Hence there is the need to determine the prevalence and perceived risk factors of WRMSDs amongst Ghanaian Physiotherapists for adequate measures to be put in place to reduce its occurrence.

1.2 Problem Statement

Physiotherapists are an integral part of the healthcare delivery team, as they bridge the gap between doctors and the patients, and facilitate healthcare delivery in hospital. Because of the nature of their work, healthcare workers are prone to WRMSDs and even more in physiotherapists who are often involved in heavy lifting (of patients), awkward postures and repetitive movements when working on patients, quick response to

University of Ghana http://ugspace.ug.edu.gh

unanticipated patients' movements to prevent falls and sometimes supporting patients with parts of their body during treatments.

The three main causes of WRMSDs especially of the wrist (such as carpal tunnel syndrome) are repetitive movements, poor postures, and high force usage (Bork, Cook, Rosecrance et al., 1996). All these activities are very common in the daily work of Physiotherapists (Nkhata et al., 2010). In Zambia for example, Nkhata et al. (2010) reported 68.3% prevalence of WRMSDs amongst physiotherapists with most physiotherapists experiencing their first episode within the first five years after graduation. Higher prevalence (91.3%) was reported amongst physiotherapists in Nigeria with females having higher prevalence than their male counterparts (Adegoke, Akodu & Oyeyemi (2008). In Ghana, there is no available information on the prevalence of WRMSDs among physiotherapists. However, a study conducted by Tawiah, Oppong-Yeboah, and Bello, (2015) found 85.5% prevalence amongst mining workers of Obuasi Anglogold Ashanti (AGA).

The high prevalence of WRMSDs among Physiotherapists may make them to adopt some coping strategies to prevent or minimize development of WRMSDs. For example, a physiotherapists may reduce the number of patients treated in a day and the treatment duration of patients to minimize or mange WRMSDs. High attrition rate in physiotherapy profession has been reported (Mulcahy et al., 2010) and evidence show that WRMSDs play a major role in this regard (Campo, Weiser, Koenig, et. al., 2008). If WRMSDs amongst Physiotherapists is not addressed, it may lead to the development of chronic injuries (morbidities) which can lead to incapacitation, leading to early retirement, change of work etc. Also high prevalence of WRMSDs amongst Physiotherapists could

University of Ghana http://ugspace.ug.edu.gh

also lead to Absenteeism and Presenteeism which could adversely affect work. To prevent these adverse impacts of WRMSDs, there is a need to know the prevalence amongst Ghanaian physiotherapists and the perceived risk factors, in order to formulate adequate measures to address it.

1.3 Conceptual framework

Work-related musculoskeletal disorder is the outcome or dependent variable for this study. The prevalence of WRMSDs among physiotherapists can be influenced by several factors which include demographic characteristics (sex, age, level of education, working experience), body composition of the physiotherapist or Body Mass Index and work demands (such as workload, awkward postures, repetitive movements etc.). These factors may combine with each other to influence the prevalence of WRMSDs.

It is expected that age will influences the prevalence of WRMSDs. Also, elevating the work demand in the aged physiotherapists will even increase the prevalence of WRMSDs further. Females generally tend to report WRMSDs than their male counterparts hence high reported WRMSDs in females.

Again, as physiotherapists receive higher education and get promoted, they tend leave physically demanding tasks (such as lifting, transferring patients etc.) to their juniors, leading to the reduction in the prevalence. The working experience of the physiotherapists correlates with experience in coping and preventing WRMSDs. So, Prevalence of WRMSDs is expected to be lower in the experienced physiotherapists as compared to the less experienced ones.

University of Ghana http://ugspace.ug.edu.gh

Body composition (BMI ≥ 25kg/m²) has been closely linked with musculoskeletal disorders development.

When the risk factors to the development of WRMSDs are not addressed, it will lead to high levels of WRMSDs which can cause chronic health complications leading to absenteeism, Presenteeism, early retirements, change of jobs etc. In severe situation it can lead to disability or death.

University of Ghana http://ugspace.ug.edu.gh

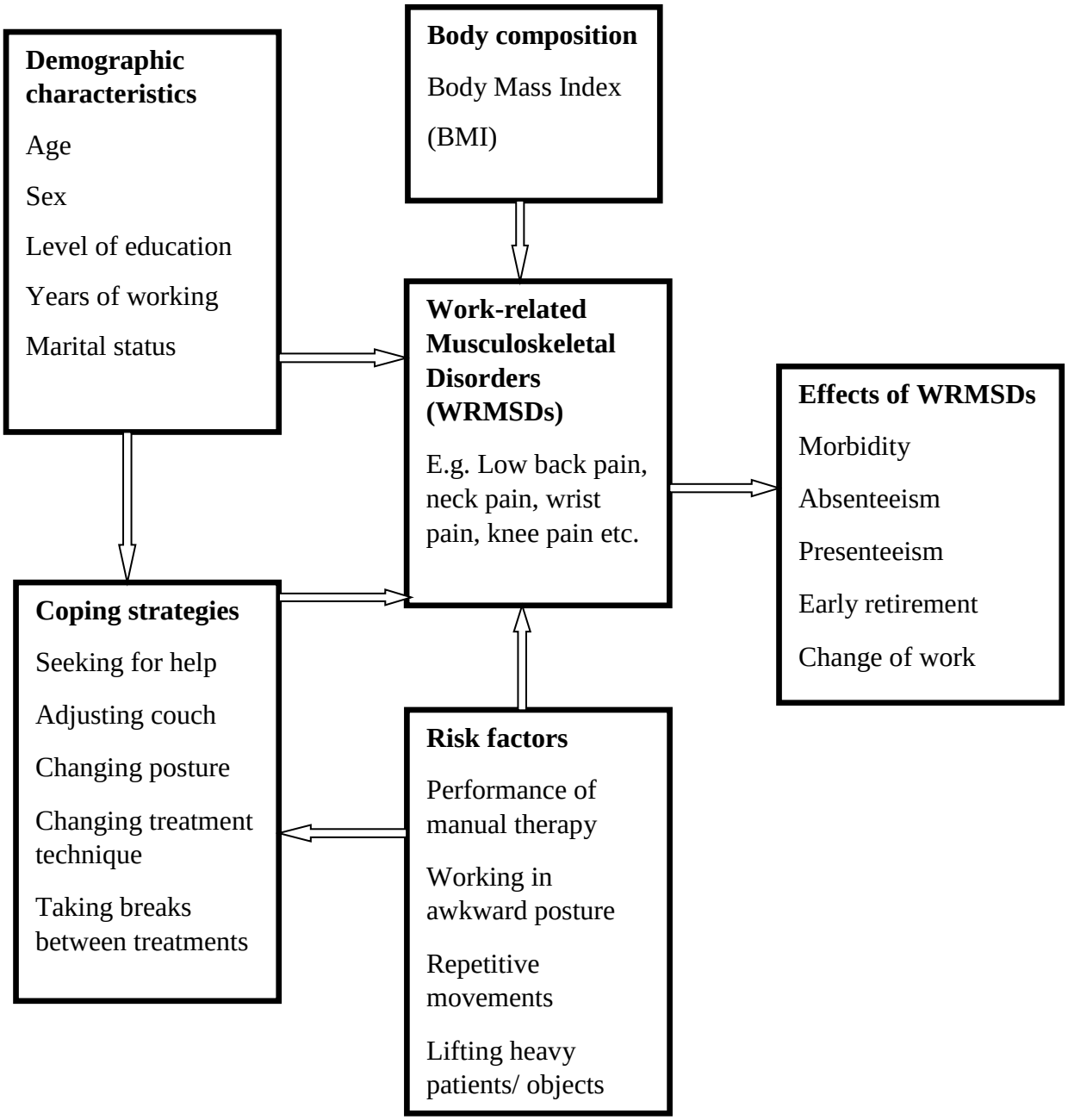

Figure 1: Conceptual framework

1.4 Justification

Physiotherapists play a vital role in the healthcare system. They help in the treatment and management of several medical conditions such as cerebrovascular accident (CVA), cerebral palsy, arthritis, musculoskeletal pain etc., which reduces the quality of life (QoL)

University of Ghana http://ugspace.ug.edu.gh

of patients. Physiotherapy treatment demands a lot of manual therapy and physical involvements such as transferring patients from wheel chair to couch, repetitive movements, bending etc. All these activities have been found to be important determinants of WRMSDs (Cromie et al., 2001) and hence high reported prevalence of WRMSDs amongst Physiotherapist (Adegoke et al., 2008, Nkhata et al., 2010). The high prevalence of WRMSDs may lead to physiotherapists adopting coping strategies that can affect their patients. They may modify their treatment by reducing its intensity and duration, select modalities that will not exacerbate their pain but may not be most beneficial to the patients etc. All these will go a long way to affect the recovery of the patients because they may not get the best of treatment required for their conditions. There is however, no information on WRMSDs among Ghanaian Physiotherapists. Hence the need to explore the prevalence and perceived risk factors of WRMSDs among Ghanaian physiotherapists in order to put in place adequate measures to prevent or limit its development.

1.5 Research Questions

This study therefore seeks to address the following questions:

1. What is the prevalence of work-related musculoskeletal disorders (WRMSDs) amongst Physiotherapists in Ghana?
2. What are the perceived causes of WRMSDs from the perspective of Physiotherapists in Ghana?
3. What are the coping strategies Physiotherapists adopt to prevent or reduce development of WRMSDs?

University of Ghana http://ugspace.ug.edu.gh

1.6 Objectives

1.6.1 General objective

To determine the prevalence and perceived causes of WRMSDs among Physiotherapists in Ghana and the coping strategies adopt.

1.6.2 Specific objectives

1. To determine the prevalence of WRMSDs among Physiotherapists in Ghana.
2. To identify the perceived causes of WRMSDs among Physiotherapists in Ghana
3. To identify coping strategies Physiotherapists adopt to prevent or reduce the occurrence of WRMSDs

University of Ghana http://ugspace.ug.edu.gh

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Physiotherapists (PTs) play an essential part in the healthcare delivery. They treat and manage various medical conditions and injuries such as cerebrovascular accident (CVA), arthritis, musculoskeletal pains, cerebral palsy, brachial plexuses injury (Erb's palsy) etc. These conditions affect the quality of life of the patients which often burdens not only the patients but also their relatives. Physiotherapists use a lot of manual therapy which include soft tissue mobilizations, joint mobilizations etc., in the treatment and management of patients. Manual therapy requires the use of repetitive movements, high intensity force and awkward postures which make Physiotherapists prone to the developing of work-related musculoskeletal disorders (WRMSDs).

Musculoskeletal disorders (MSDs) are range of degenerative and inflammatory conditions affecting soft tissues in the body such as tendons, muscles, ligaments, nerves and the peripheral blood vessels (Punnett & Wegman, 2004a). These disorders can be associated with work and non-work related risk (Barbe & Barr, 2006). WRMSDs are disorders or injuries that affect joints, muscles, tendons, nerves, cartilages, and the spinal discs, that are associated with risk factors from the work place (Bureau of labor statistics, 2005). Work-related musculoskeletal disorders are classified based on the body regions (such as back, hand, elbow, shoulder etc.) or type of tissues (muscles, nerves, ligament etc.) affected (Kenyon & Kenyon, 2004).

The main characteristic features of WRMSDs are pain, discomfort and movement restriction affecting the back, shoulder, neck, arms and hands (Demure et al., 2000). The

University of Ghana http://ugspace.ug.edu.gh

most commonly reported WRMSDs are low back pain, wrist-hand syndrome, neck-shoulder syndrome and carpal tunnel syndrome (Silva, Sa-Couto, Queirós, Neto, & Rocha, 2017). These clinical syndromes such as inflammation of tendons (eg. Tenosynovitis, bursitis etc.), nerve compression disorders (eg. Carpal tunnel syndrome) and other pain syndromes are difficult to be attributed to a single known pathology (Punnett & Wegman, 2004a).

2.2 Risk factors associated WRMSDs

Several risk factors have been linked to the development of WRMSDs in the work environment. These factors include biomechanical, physical, individual susceptibility and psychosocial conditions (Barbe & Barr, 2006). Physical factors include doing high repetitive movement, maintaining awkward position while working, exposure to high level vibration, and stationary working posture, which elevate the physical loading of joints and surrounding soft tissues (including nerves, muscles, blood vessels) leading to injuries (Tantawy et al., 2017).

However, the intensity of the injuries depends on factors such as the frequency, intensity, and duration of the exposure (Bernard, 1997). Other physical risk factors such as, prolong sitting, static poor posture, working over the head, excessive work demands on the employee, and poor work control pattern, are associated with upper limb WRMSDs (Walker-Bone & Cooper, 2005).

Psychosocial risk factors have also been link to the occurrence of WRMSDs (Warren, 2010). These factors include distress, anxiety and depression (Magnavita, Elovainio, Nardis et al., 2011; Nahit, Hunt, Dunn, et al., 2003). Further, when it comes to individual susceptibility, body mass index (BMI) which an indicator of the body's adiposity plays

University of Ghana http://ugspace.ug.edu.gh

an important role in the development of WRMSDs. Body mass index is body's weight divided by the height squared. People with higher BMI has been found to be more likely to develop MSDs compared to those with lower BMI (Viester, Verhagen, Hengel, et al., 2008). Also, high stress level has been found to increase body weight leading to an increase in BMI (Yang et al., 2014) and therefore is a risk factor for occurrence of WRMSDs.

University of Ghana http://ugspace.ug.edu.gh

2.3 Pathways to developing WRMSDs

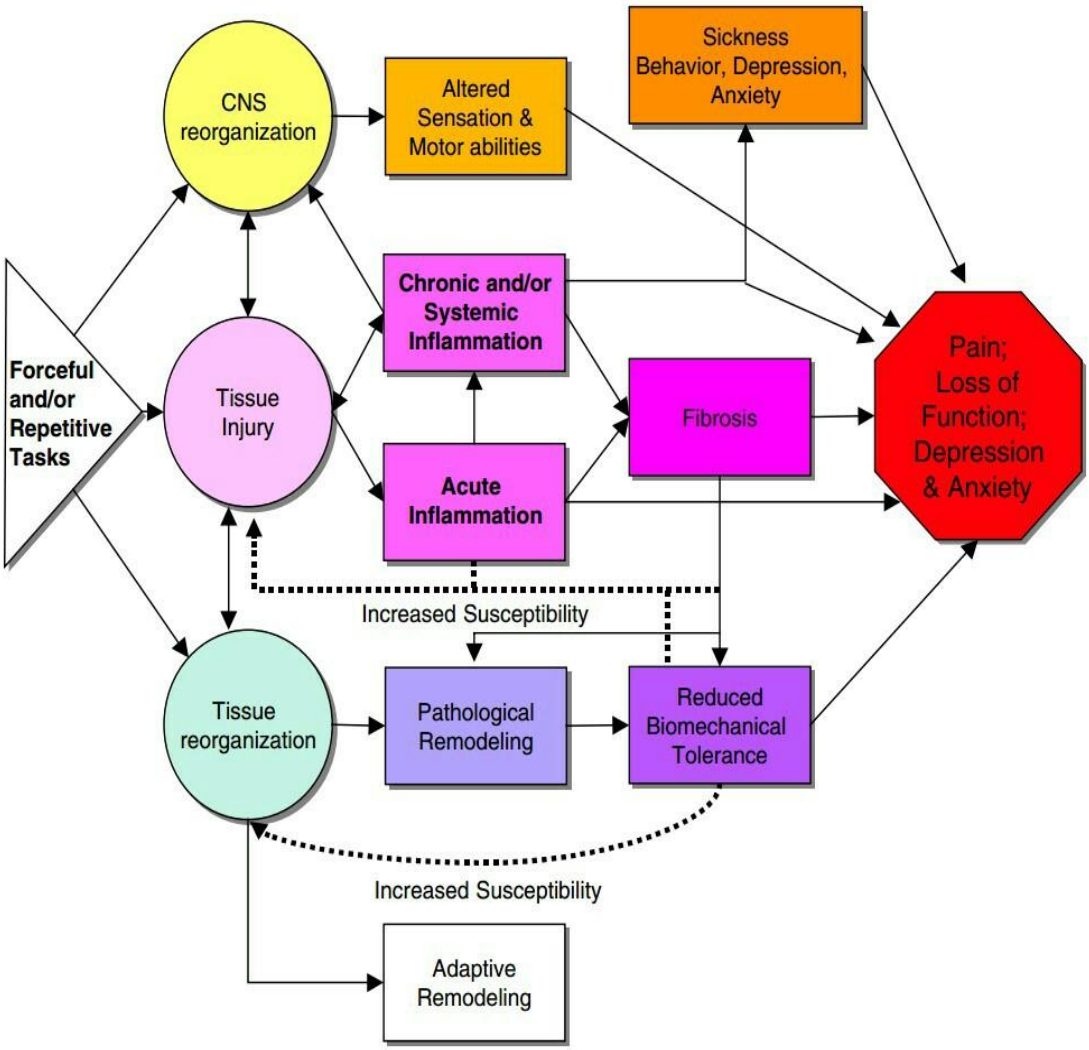

Figure2. The three major pathways that could lead to the development of WRMSDs (Barbe & Barr, 2006).

The primary pathways to occurrence of WRMSDs are

- Central nervous system (CNS) recognition of the forceful and repetitive task leading to altered sensation and motor abilities which result in WRMSDs

University of Ghana http://ugspace.ug.edu.gh

- Forceful and repetitive task causes tissue injury leading to acute or chronic inflammation depending on the duration. This then leads to tissue fibrosis which finally causes WRMSDs
- In the third pathway, forceful and repetitive task leads to either pathological remodeling which results in reduced biomechanical tolerance and finally causing WRMSDs, or adaptive remodeling to compensate for the exertion.

(Barbe & Barr, 2006). However, it is worth noting that these pathways do not work in isolation but are interconnected and interrelated.

2.4 Prevalence and Burden of WRMSDs

Musculoskeletal disorders (MSDs) are wide spread throughout the world with huge costs and adverse effect on quality of life. They form a major percentage of all recorded compensation demands from work related diseases in several countries (Punnett & Wegman, 2004b). In the United State of America, Japan and the Nordic countries, WRMSDs constitute one-third of all registered work-related diseases (National Research Council and the Institute of Medicine, 2001). It is estimated that WRMSDs impose £2.2 billion on the UK economy and this is due to medical cost and short to long term absenteeism (Deeney & O'Sullivan, 2009).

Prevalence of WRMSDs in different work professions has been well documented. For example, Tawiah et al. (2015) estimated the prevalence of WRMSDs amongst mining employees of AngloGold Ashanti, Obuasi mine in Ghana to be 85.5%. Also, the prevalence of lower back pain amongst factory workers at Kano metropolis was found to be 85.7% (Saidu et al., 2015).

University of Ghana http://ugspace.ug.edu.gh

Viester et al. (2008) found prevalence of 57.6% and 52.3% amongst obese and overweight employees respectively (in the Netherlands). In China annual prevalence of upper back, shoulder pain, neck pain and lower back pain amongst nurses of Xinjiang Uygur autonomous region were reported as 39.5%, 49.7%, 59.8% and 62.7% respectively (Yan et al., 2017). Tantawy et al. (2017) reported a prevalence of 77.7% amongst Ahlia University's students. The prevalence was higher in the female students (60.6%) as compared to the male counterparts (44.7%). A narrative review by Agrawal, Maiya, & Kamath, (2017) reported a prevalence between 40% and 60% among laboratory professional.

Higher prevalence of WRMSDs amongst physiotherapists has widely been reported in several other countries: (Adegoke et al., 2008; Al-Eisa, Buragadda, Shaheen et al., 2017; Campo et al., 2008; Glover, McGregor, Sullivan, et al., 2005; Salik & Ozcan, 2004). For example, Campo et al. (2008) reported an incident rate of 20.7% from a one year prospective study amongst Physical therapists of the American Physical Therapist Association. Also, a prevalence of 68.0% among physiotherapists of the chartered society of physiotherapy in the United Kingdom was estimated by Glover et al. (2005).

Cromie et al. (2000) investigated the prevalence, severity, risk and responses, and reported a life time prevalence of 91.0% among members of the Australian physiotherapy association. A prevalence of 85.0% among physiotherapists was reported in Turkey (Salik & Ozcan., 2004). Prevalence of WRMSDs among Indian physiotherapist was reported to be 68.0% (Narendrasinh & Mulla, 2015). In Africa, Adegoke et al. (2008) reported prevalence of WRMSDs among Nigerian physiotherapist to be 91.3%. Also a

University of Ghana http://ugspace.ug.edu.gh

study by Al-Eisa et al. (2017) reported prevalence of 63.0% and 74.0% among Egyptian and Saudi physiotherapists.

2.5 Anatomy of Human backbone

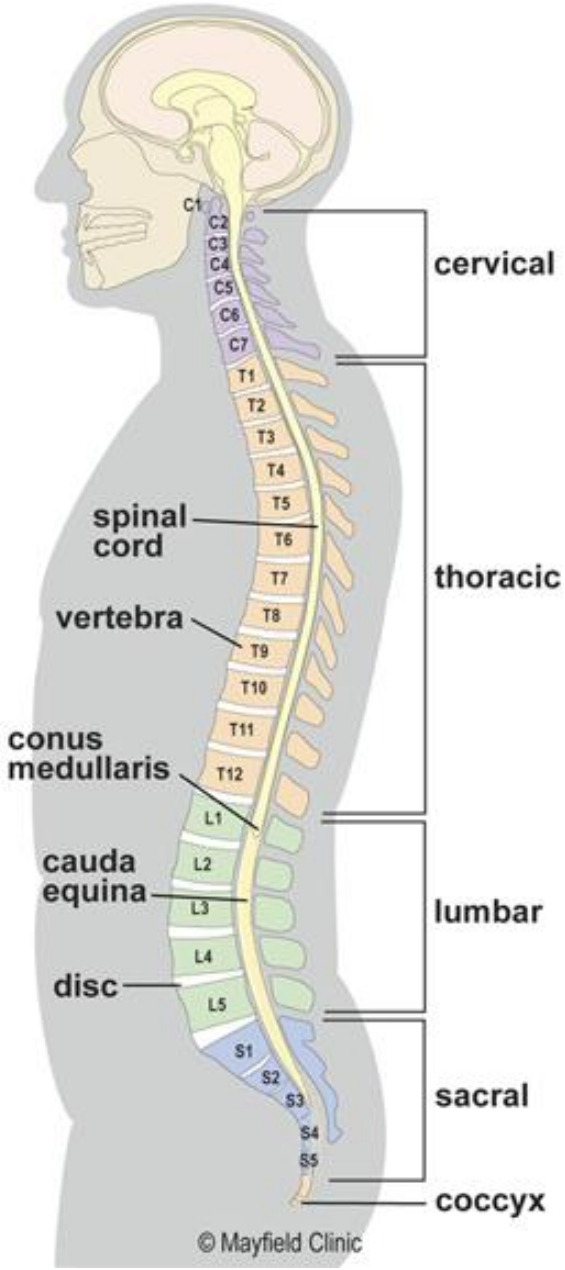

Figure 3: Anatomy of the human backbone

University of Ghana http://ugspace.ug.edu.gh

The human backbone or the vertebral column is made up 33 important group of bones called vertebrae which protect the spine and provide stability to the body. The vertebrae at the neck region are known as the cervical vertebrae and they are made up of 7 vertebrae. The thoracic vertebrae follows the cervical vertebrae and they are made up of 12 vertebrae. The lumbar vertebrae which is made up of 5 vertebrae follows the thoracic vertebrae. The sacrum which is made up of 5 sacral vertebrae fused together also follows the lumbar vertebrae. The vertebral column ends with the coccyx which is made up of 4 coccygeal vertebrae fused together.

Each vertebra is separated from the other by a disc which acts as a shock absorber and helps to make the vertebral column flexible. Each vertebra is connected to the other by a ligament. The backbone is surrounded by muscles, blood vessels and nerves. All these structures can be the source of pain.

2.6 Low back pain

Pain is experience of an unpleasant sensation and emotional state that can potentially cause tissue damage. (Merskey, 1991). Pain is the human body's protective mechanism that prevent further damage to an injured part (s) (Malcom, 1987). Low back pain also known as lumbo-sacral pain affects areas between the 12^{th} rib and the gluteal folds (Waheed, 2003). It can be grouped based on the duration of the signs and symptoms in to acute, sub-acute and chronic, lasting for 6 weeks or less, between 6 and 12 weeks, and over 12 weeks respectively. Low back pain can be localized (when it does not radiate into the lower limbs) or referred (when it radiates into the lower limb(s); known as sciatica).

Lower back pain is the most prevalent WRMSDs and a leading cause of disability amongst workers (Picavet & Schouten, 2003). It is also an essential cause of morbidity,

University of Ghana http://ugspace.ug.edu.gh

early retirement due to ill health, absenteeism, and job changes (Cunningham, Flynn, & Blake, 2006).

Several studies have reported on the prevalence of lower back pain amongst physiotherapists in different countries (Adegoke et al., 2008; Nkhata et al., 2010; Rozenfeld et al., 2010). For example, Nkhata et al. (2010) reported that 52.4% of Zambian physiotherapists who developed WRMSDs had LBP. Similarly, Adegoke et al. (2008) found that 69.8% of WRMSDs reported by Nigerian Physiotherapists were LBP. Also, Rozenfeld et al. (2010) reported that 59.8% of Israeli Physiotherapist who experienced WRMSDs had LBP.

These studies have clearly shown that LBP is the number one WRMSDs experienced by physiotherapists irrespective of the country they find themselves.

2.7 Neck Pain

Neck pain defined as pain in the neck or the cervical region of the body. It is usually common in adults causing morbidity, disability and huge health cost (though not to the extent of LBP) (Boswell, Trescot, Datta et al., 2007; Côté, Van, Cassidy et al., 2008). Lifetime prevalence has been found to be ranging from 26% to 71% with estimated 12 months prevalence of 30% to 50% (Boswell et al., 2007; Côté et al., 2008; Peloso et al., 2007). The health and economic impact of neck pain has been well reported among the working population (Leroux, Dionne, Bourbonnais et al., 2005; Palmer et al., 2001). It accounts for 15% and 30% of physiotherapy and chiropractic visit respectively. Work-related neck pain may lead to absenteeism similar to that of LBP (Peloso et al., 2007). It has been reported to form 7% of all compensation claims and accounts for 24% to 50% of motor vehicle injuries (Cassidy et al., 2000).

University of Ghana http://ugspace.ug.edu.gh

Neck pain often arise from structures around the neck such as muscles, vertebral bones, facet joints, ligaments, and capsules etc. (Cagnie, Danneels,Tiggelen, et al., 2007). Injury to soft tissues in the neck region and/or prolonged wear and tear are the main causes of neck pain. The pain may also be referred from the shoulders and upper back. It can rarely be caused by infection (eg. TB) or Cancers (Ariëns, Van, Bongers et al., 2000; Côté et al., 2008). Neck pain may be described as specific and non-specific. Specific when the cause can be identified and non-specific (or idiopathic) when it cannot be associated to any specific pathology. Only 10% of neck pains are specific, thus the cause of most neck pain cannot be linked to a specific pathology (Mayou & Farmer, 2002).

2.8 Association between Age and WRMSDs

Several studies have established association between age and development of WRMSDs. Heiden, Weigl, Angerer, et al. (2013) revealed that the frequency of developing WRMSDs increased significantly with age among nurses in Germany. In this study, they further reported increase in WRMSDs from young age group (<35) to old age group (≥45) and also from middle age group (35-44) to old age group (≥45). However, they did not find any significant increase in prevalence of WRMSDs from young age group to middle age group.

Darragh, Huddleston and King (2009) also reported that age of 55 years and above is significantly associated with the development of WRMSDs among occupational therapist. Further, Janwantanakul, Pensri, Jiamjarasrangsri, et al. (2008) reported that younger workers (<30 years) were more prone to experience WRMSDs of the upper limb compared to those older than 49 years. Again, Choobineh, Tabatabaei, Mokhtarzadeh, et al. (2007) found a significant association between age and development

University of Ghana http://ugspace.ug.edu.gh

of WRMSDs amongst employees of an Iranian rubber factory. In a recent study, age was found to be significantly associated with occurrence WRMSDs in the lower back, neck and upper back (Yan et al., 2017).

In contrast to all these studies, Landau, Rademacher, Meschke, et al. (2008) reported no significant association between age and development of WRMSDs and suggested that this could be due to the assignment of certain job task to certain specific workers.

2.9 Association between sex and WRMSDs

Only few studies analyzed the association between sex and WRMSDs (Darragh et al., 2009; Janwantanakul et al., 2008; Mohanty, Singh, & Pattnaik, 2017). Janwantanakul et al.(2008) reported that females were more predisposed to developing WRMSDs as compared to their male counter parts. Similarly, Tantawy et al. (2017) reported higher prevalence of WRMSDs in females as compared to their male counter parts. Females were found to have higher prevalence of WRMSDs compared to male counter parts by Campo et al. (2008). These results can explain by the fact that females general have weaker bodies so they are more predisposed to the development of WRMSDs. However, Darragh et al. (2009) found no association between sex and prevalence of WRMSDs.

2.10 Association between Work demand and WRMSDs

Significant association between work demand and development of WRMSDs has been established by several studies. The higher the work demand on the worker, the more likely he or she becomes predisposed to the development of WRMSDs. Heiden et al. (2013) reported that high levels of physical task correlates to higher risk of developing WRMSDs. Lambert, Lambert, Oyeyemi, et al. (2008) similarly reported that working in stationary positions for hours, treating large number of patients in a day and lifting or

University of Ghana http://ugspace.ug.edu.gh

transferring patients were the most perceived risk contributing to the development of WRMSDs among health workers.

Campo et al. (2008) also found a correlation between work demand and the prevalence of WRMSDs. They reported those therapists who transfer six (6) to ten (10) patients a day had 2.4 times odds in the development of WRMSDs than those who did not transfer any patient a day. Yan et al. (2017) found that excessive workload and poor postures were the risk factors for the development of WRMSDs. Garbin, Soares, Arcieri, et al. (2017) similarly found significant association between work demand and development of WRMSDs. They reported that dentist working in Brazil associated their WRMSDs to twisting or bending their back awkwardly, continuing to work when in pain, working in stationary posture for long time interval and working in an unfriendly environment.

2.11 Association between working experience and WRMSDs

Working experience correlates with the age of the worker largely. Workers who have worked for several years have also advanced in age, so similar association between age and WRMSDs is expected when it comes to number of years of experience. Campo et al. (2008) found that the more experience a physiotherapist is, the more likely he or she becomes prone to the development of WRMSDs. Yan et al. (2017) also reported similarly that working for 6 years and over predisposes nurses to the development of WRMSDs.

In sharp contrast however, Tawiah et al. (2015) found no significant association between number of years of working and the development of WRMSDs amongst mining employees at Anglogold Ashanti, Obuasi mine. In similar results, Lambert et al. (2008) found no significant association between work experience as a nurse and the development of WRMSDs. This results may be explained by the fact that senior staff

University of Ghana http://ugspace.ug.edu.gh

often leave certain job task for their junior staff to perform leading to their reduction in the risk of developing WRMSDs.

2.12 Coping strategies to reduce WRMSDs

Physiotherapists have been reported to use the following strategies to reduce or prevent the development of WRMSDs:

- Calling for help to handle a heavy patient
- Modification of patient's or therapist's posture
- Use of different body part to administer a manual technique
- Warm up and stretch before treatment session
- Using electrotherapy in place of manual therapy techniques
- Pause of treatment to regularly stretch and change posture
- Adjustment of couch or bed height before treating a patient
- Use of treatment technique that will not exacerbate or provoke pain
- Stoppage of treatment when it causes or exacerbate pain

(Lambert et al., 2008).

Nkhata et al. (2010) found that 68.3% of respondents (physiotherapists) modified patients' treatment as a coping strategy. They identified the most common coping strategies to include modification of patient's/physiotherapist's position (58.5%), selecting treatment techniques that would not exacerbate pain, (56.1%) and adjusting couch or bed height before treatment (47.6%). Similarly, Salik and Ozcan, (2004) found that 16.4% of physiotherapists in Turkey who developed WRMSDs avoided lifting,

University of Ghana http://ugspace.ug.edu.gh

13.7% changed work position frequently and 6.9% decreased manual therapy as strategy of reducing the development WRMSDs.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER THREE

3.0 METHODS

3.1 Study design

A cross-sectional study design was used to collect data from study participants.

3.2 Study location

The study was conducted in nine (9) facilities located in five regions in Ghana. The regions were selected to represent the rest of the country. The facilities are Korle-bu Teaching hospital, Ridge regional hospital, 37 military hospital, Tema general hospital, Eastern regional hospital, Efia Nkwanta regional hospital, Komfo Anokye Teaching, Ashanti-Mampong district hospital and Cape coast Teaching hospital. Korle-bu Teaching hospital which is the largest referral hospital in Ghana is located at Korle Gonno in the greater Accra region. It also serves as a centre for training of doctors, nurses and other health personnel. The ridge regional hospital is also found in the greater Accra region. It is located at ridge and serves the people of ridge and its environs. Also located in the greater Accra region 37 military hospital (which serves the Ghana armed forces officers and their families and the general public) and Tema general hospital (which serves the people of Tema and its environs). Furthermore, Komfo is located in Kumasi in the Ashanti region of Ghana. It is the second largest referral hospital in Ghana and like Korle-bu Teaching hospital, it is a major centre for training of health personnel. Ashanti-Mampong district hospital is also located in the Ashanti region. Eastern regional hospital is located at Koforidua, Efia Nkwanta regional hospital is located at Sekondi-Takoradi in the Western region, and Cape Coast Teaching hospital is located at Cape Coast. All these facilities have physiotherapists working in them.

University of Ghana http://ugspace.ug.edu.gh

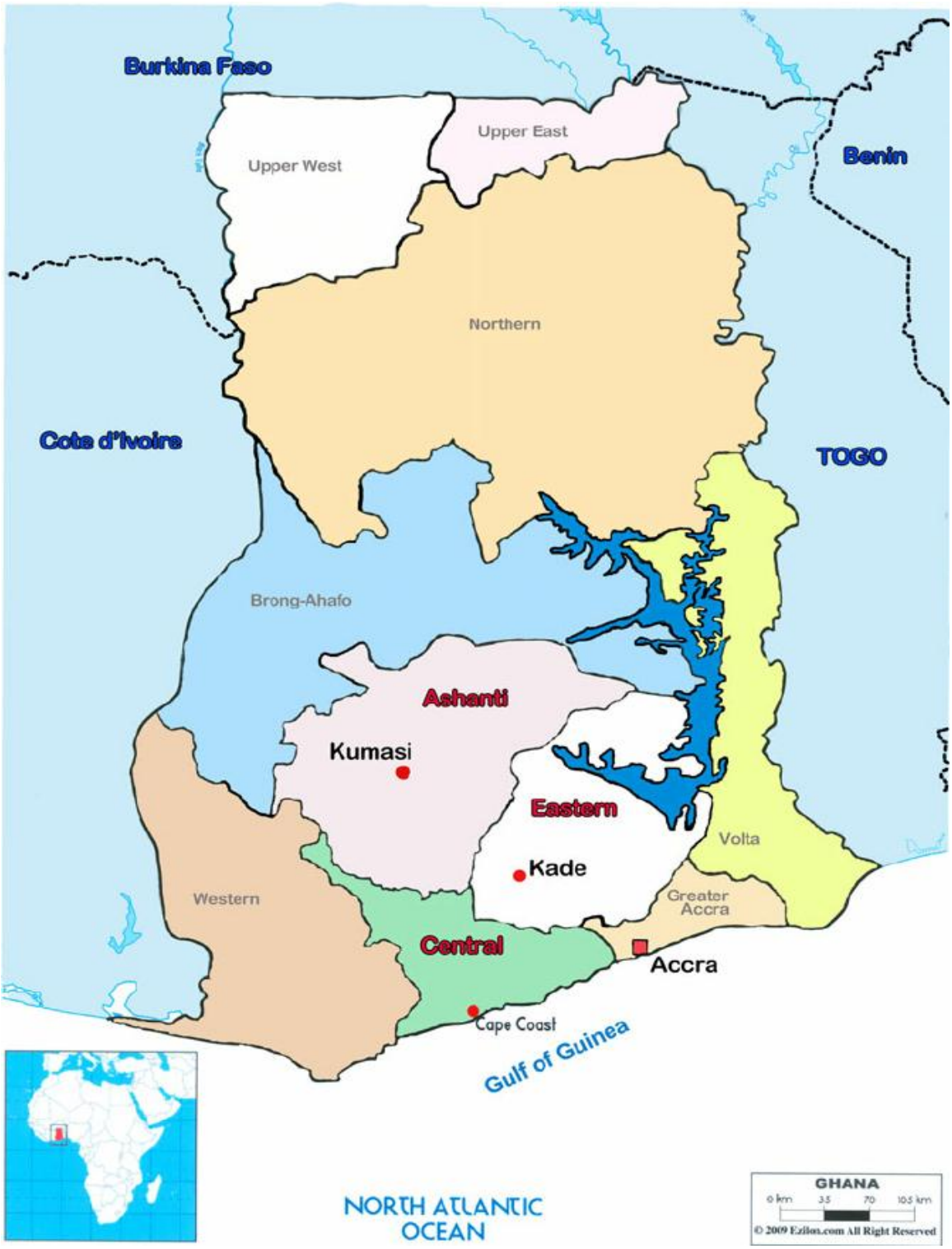

Figure 4: Map of Ghana showing the regions where study was conducted in Red

University of Ghana http://ugspace.ug.edu.gh

3.3 Variables

3.3.1 Dependent variable

The dependent or outcome variable for this study is the occurrence of WRMSDs which are inflammatory and degenerative conditions that affect muscles, tendons, ligaments etc., and are influenced by execution of work or workstation design. They result in pains at the low back, upper back, neck, shoulders, wrists, hips, knees, and at the ankles depending on the body part affected.

3.3.2 Independent variables

The independent or exposure variables for this study are the risk factors that affect the occurrence of WRMSDs. These factors are demographic characteristics or Personal factors of Physiotherapists (age, sex, BMI, level of education, work-experience), work factors (such as working in an awkward postures- positions that put undue strain on parts of the body, repetitive movements- which is using the same body parts to execute the work repeatedly, bending the back continuously, lifting heavy patients or objects which are more than half weight of the therapist, performing manual therapy which includes massaging and mobilization, work overload- therapist treating ten or more patients in a day, and insufficient rest break- Not resting at a least one (1) hour during an eight 8 hour shift) and coping strategies adopted by Physiotherapists to reduce or prevent the development of WRMSDs (reducing workload, calling for help from a colleague, changing postures, stretching, modifying treatment techniques, taking regular breaks, adjusting treatment couch and stopping treatment when pain is exacerbated).

University of Ghana http://ugspace.ug.edu.gh

3.4 Study population

The study population was made up of Physiotherapists (PTs) working in the Greater Accra region, Western region, Ashanti region, Central region and Eastern region of Ghana and are registered with both the Allied Health Professions Council of Ghana and Ghana Physiotherapy Association (GPA). These PTs work at government hospitals, private clinics or both. PTs treat and manage patients with various health conditions such cerebrovacular accident (CVA), cerebral Palsy, arthritis, musculoskeletal pains etc. They use a lot of manual therapy in treatment and management of their patients. This increases their risk of developing of WRMSDs.

3.5 Inclusion criteria

Physiotherapists who met the following criteria were recruited in to the study:

- The Physiotherapist must have worked for a minimum of one year.
- The Physiotherapist must be in active service. He or she must be practicing as a Physiotherapist.
- The Physiotherapist must not have any pathological deformity that may predispose him or her to WRMSDs.

3.6 Exclusion criteria

The following physiotherapists were excluded from the study:

- Physiotherapists who have worked for less than one year.
- Physiotherapists who are retired or are on study leave and are currently not actively practicing.

University of Ghana http://ugspace.ug.edu.gh

- Physiotherapists who have any deformity that can predispose them to the development of WRMSDs.

3.7 Sampling

3.7.1 Sample size calculation

The sample size for this study was estimated by using the formula designed by (Yamane, 1973) for proportions with a definite population. This gives a well representative and manageable sample.

$$n = N/[1+Ne^2]$$

Where n = sample size to be determined

N = the population size (126)

e = the margin of error (5% = 0.05)

Substituting the values in the formula

$$n = 126/[1+(126)(0.05)^2]$$

$$= 95.8$$

Approximately 10 % of the calculated sample size of 96 was added to take care of events such as non-completion of questionnaires or non-response. Therefore a total of 106 Physiotherapists were sampled for this study.

University of Ghana http://ugspace.ug.edu.gh

3.7.2 Sampling technique

A proportionate method (stratification) was used to allocate exact number of participants to each region. The overall number of Physiotherapists in the five regions was 126. The proportion of sample that was allocated to each region is shown in the table 1 below.

Table1. Sample size stratification among the five regions

Region	Total number of PTs	Proportion allocated	Exact sample size
Greater Accra	75	75/126*100 = 59.5%	59.5/100 * 106 = **63**
Kumasi	24	24/126 *100 = 19.0%	19.0/100 * 106 = **20**
Eastern	13	13/126 * 100 = 10.3%	10.3/100 * 106 = **11**
Western	8	8/126 * 100 = 6.3%	6.3/100 * 106 = **7**
Central	6	6/126 * 100 = 4.8%	4.8/100 * 106 = **5**
Total	**126**	**100%**	**106**

Consecutive sampling was then used to actually recruit participants who met the inclusion criteria. Participants were recruited during their regional meetings, workshops and also through visits to the various facilities. Physiotherapy facilities visited were

- Korle Bu Teaching Hospital, Accra

University of Ghana http://ugspace.ug.edu.gh

- Ridge Regional Hospital, Accra
- 37 military Hospital, Accra
- Tema General Hospital, Tema
- Eastern Regional Hospital, koforidua
- Effia Nkwanta Regional Hospital, Takoradi
- Komfo Anokye Teaching Hospital, Kumasi
- Cape Coast Teaching Hospital, Cape Coast
- District Hospital, Ashanti-Mampong

3.8 Data collection Technique

After a participant had consented to take part in the study, a stadiometer was used to measure the weight and height. The participant was then given a self-administered questionnaire adopted and modified from Nkhata et al. (2010), which was used to obtain information. The questionnaire had three sections. Section A captured information on demographic characteristics of participants such as age, sex, BMI (calculated from weight divided by height squared), level of education, marital status and work-experience. Section B part of the questionnaire was used to collect information on whether or not a participant experienced WRMSDs that lasted for more than 3 days in the last 12 months prior to this study. Those who have experienced WRMSDs were then asked to indicate the level of the pain or discomfort and the body parts that were affected. Finally, the section C part of the questionnaire was used to collect information on the perceived risk factors and the coping strategies.

3.9 Anthropometric measurements

A stadiometer was used to measure the height and weight of study participants. The weight of participants was measured to the nearest 0.1kg and the height to the nearest 0.1m. The body mass index (BMI) was then calculated using weight divided by height

University of Ghana http://ugspace.ug.edu.gh

squared (kg/m²). Body mass index was grouped into categories stated in the table 2 below.

Table 2: Body mass index categorization

Category	BMI
Underweight	**< 18.5**
Normal weight	**18.5 - 24.9**
Over weight	**25.0-29.9**
Obese	**≥ 30.0**

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004.

3.10 Quality assurance

Research assistants with adequate background in health were recruited and trained before helping with data collection. The principal researcher reviewed all questionnaires handled by research assistants to ensure that all entries were completely and correctly filled. Those that were not completed or filled correctly were returned for all necessary corrections to be done.

3.11 Data processing and analysis

Data were coded in to STATA version 15 and analyzed using description statistics such as mean and standard deviation (on age and BMI), frequency and percentage (on all other variables). The association between WRMSDS and demographic characteristics (such as age, BMI, sex, marital status, number of years of experience and level of education) was analyzed using Chi square and Fisher's exact test. Alpha was set at $p = 0.05$

3.12 Ethical considerations/issues

Ethical approval was obtained from the Ghana health service ethical review committee before commencing with data collection. Permission were sought from the heads of various physiotherapy departments. Furthermore, participants who agreed to take part in

University of Ghana http://ugspace.ug.edu.gh

the study after all processes have been clearly explained to them were asked to sign an informed consent form before data collection.

3.13 Pre-test/Pilot study

Questionnaire for the study was piloted on physiotherapists at the Sunyani regional hospital in the Brong-Ahafo region of Ghana. All inconsistencies were corrected before the start of the main study.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics of participants

The demographic characteristics of study respondents is presented in table 3 below.

Table 3: Demographic characteristics of respondents

Variable	Frequency(N)	Percentage (%)
Age (mean ± SD*)	31.0 ± 6.3	
BMI (mean ± SD)	24.7 ± 4.2	
Age group		
21-30	52	51.0
31-40	45	44.1
41+	5	4.9
Sex		
Male	55	53.9
Female	47	46.1
Marital Status		
Single	60	58.8
Married	42	41.2
Region		
Greater Accra	59	57.8
Ashanti	20	19.6
Western	7	6.9
Central	5	4.9
Eastern	11	10.8
Work facility		
Public	87	85.3
Private	9	8.8
Both Combined	6	5.9
BMI Status		
Normal weight**	62	69.8
Over weight/Obese***	40	30.2
Educational Level		
Bachelor's degree	83	81.4
Masters/PhD****	19	18.6

University of Ghana http://ugspace.ug.edu.gh

Work experience		
1-5	54	52.9
6-10	38	37.3
10+	10	9.8
Total	102	100

SD*- Standard deviation ** One (1) underweight was added to normal weight

***Number of overweight =30, number of Obese = 10

****Number of Masters holders = 18, number of PhD holders = 1

One hundred and two (102) respondents took part in the study, made up of 55 males (53.9%) and 47 females (46.1%). The mean age of respondents was 31.0 ± 6.3 years and BMI of 24.7 ± 4.2. Most of the respondents had bachelor's degree (81.4%), 17.6% had masters and 1.0% had PhD. Majority of the respondents work in public or government facilities (85.3%), 8.8% in private facilities and 5.9% in both public and private facilities.

4.2 Prevalence of WRMSDs and level of pain amongst respondent

During the last 12 months prior to this study, 78 (76.5%) of respondents experienced discomfort or pain in some part(s) of their bodies that lasted over 3 days as shown in table 4. The prevalence is slightly higher in females (80.9%) than in male (72.7%).

Table 4: Prevalence of WRMSDs amongst respondents

WRMSDs	Males (%)	Females (%)	Frequency	Percentage (%)
YES	40 (72.7%)	38 (80.9%)	78	76.47
NO	15 (27.3%)	9 (19.1%)	24	23.53
Total	55 (100%)	47 (100%)	102	100

University of Ghana http://ugspace.ug.edu.gh

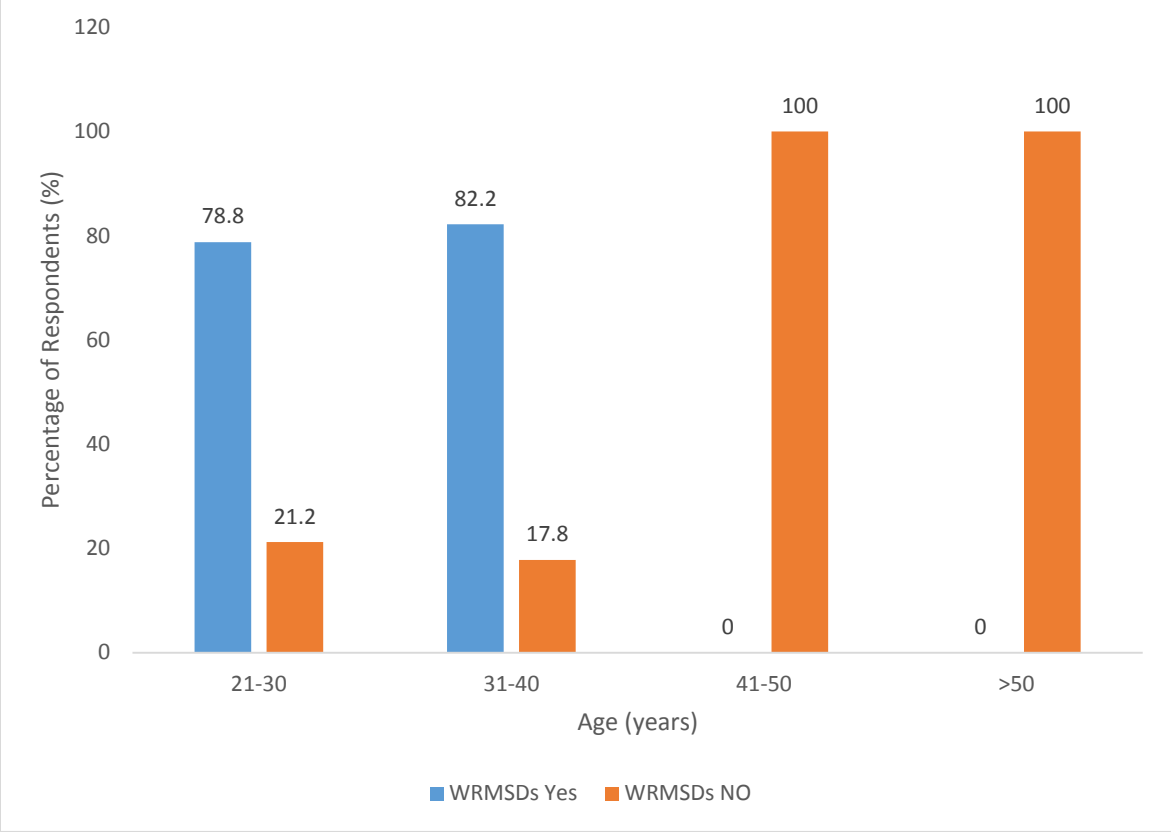

Figure 5: Prevalence of WRMSDs amongst different age groups

Figure 5 shows high prevalence of WRMSDs amongst the younger Physiotherapists (21-30 and 31-40 years) compared to older ones (41-50 and >50 years) who recorded no WRMSDs in the last 12 months prior to the study.

University of Ghana http://ugspace.ug.edu.gh

Fifty one percent (51%) of respondents reported their pain or discomfort to be moderate, 13.7% mildly painful and 11.8% to be severely painful. Figure 6 shows level of pain or discomfort reported by respondents.

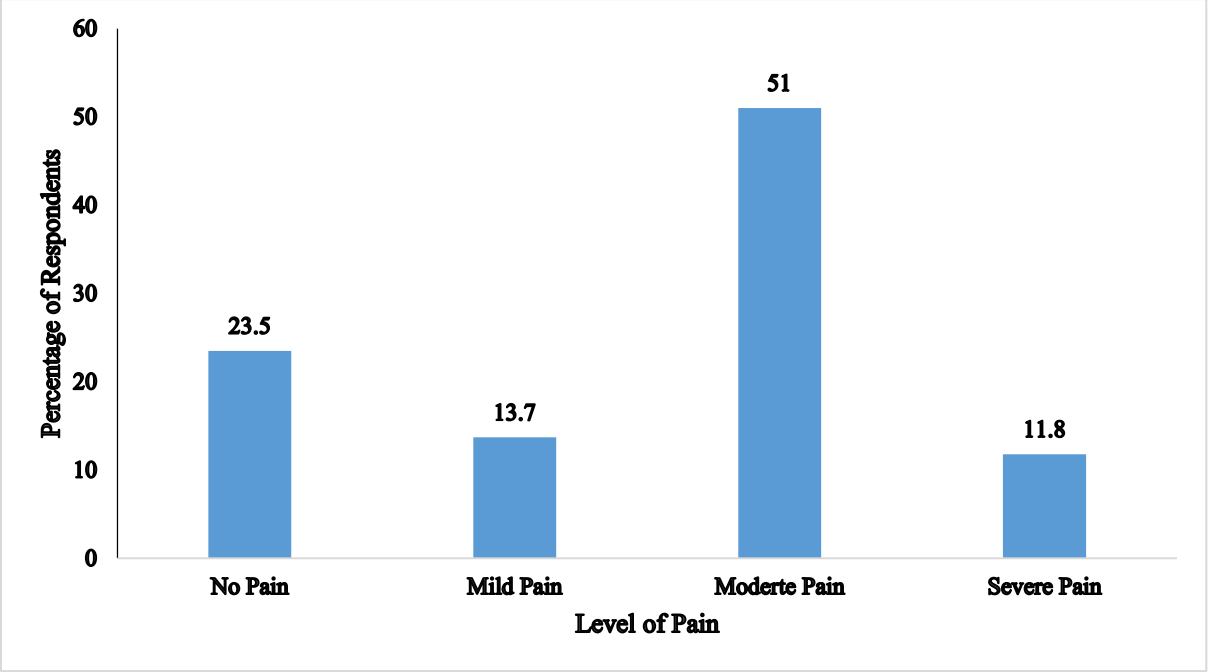

Figure 6: Level of Pain or discomfort reported by respondents

4.3 Body parts affected by WRMSDs

The body part reported by respondents to be most affected by WRMSDS is lower back (69.6%), followed by the upper back (38.2%) and the neck (22.6%). The least affected body part is the elbow or forearm (1.0%) as shown in table 5.

University of Ghana http://ugspace.ug.edu.gh

Table 5: Body Parts affected by WRMSDs

Body parts affected	Frequency (N)	Percentage (%)
Lower back	71	69.6
Upper back	39	38.2
Neck	23	22.6
Wrist	18	17.7
Knee	17	16.7
Hands/fingers/thumbs	16	15.7
Shoulder	14	13.7
Ankles/feet	9	8.8
Hips	8	7.8
Elbow/Forearm	1	1.0

4.4 Perceived causes of WRMSDs

The most perceived causes of WRMSDs as reported by respondents are treating large number of patients in a day (58.8%), Using the same body parts to perform the work over (repetitive movements) (58.8%), and working in an awkward posture like bending and twisting (47.1%) etc. as shown in table 6.

University of Ghana http://ugspace.ug.edu.gh

Table 6: Perceived causes of WRMSDs as reported by respondents

Perceived Causes of WRMSDS	Frequency (N)	Percentage (%)
Treating large number of patients in a day	60	58.8
Performing same job task over and over (repetitive movements)	60	58.8
Working in an awkward posture (bending, twisting etc.)	48	47.1
Poor workstation settings	44	43.1
Lifting or transferring patients	43	42.2
Continuing to work when injured or hurt	41	40.2
Working in a stationary posture for long periods of time	37	36.3
Performing manual therapy techniques	33	32.4
Insufficient rest breaks	33	32.4
Assisting patients during exercise training	33	32.4
Working beyond your physical strength (carrying heavy equipment or materials)	23	22.6
Sudden falls or unanticipated movements by patients	20	19.6
Work scheduling (overtime, length of work day etc.)	17	16.7
Working with disoriented patients	15	14.7
Inadequate training on prevention of injuries at work	11	10.8

4.5 Strategies adopted by respondents to cope or prevent WRMSDs

Strategies adopted by respondents (Physiotherapists) includes: changing patient's position or therapist's posture (84.3%), getting help from other colleagues (72.6%), break regularly in order to stretch and change posture (56.9%), adjusting couch to appropriate height before treating a patient (53.9%), using different body part to administer a manual therapy technique (52.0%) etc. as displayed in table 7.

University of Ghana http://ugspace.ug.edu.gh

Table 7: Strategies adopted by respondents to cope or prevent WRMSDs

Coping strategies	Frequency (N)	Percentage (%)
I change patient's position/my posture	86	84.3
I get help from other colleagues to handle a heavy patient	74	72.6
I break regularly in order to stretch and change my posture	58	56.9
I adjust the couch to appropriate height before treating a patient	55	53.9
I use different body part to administer a manual therapy technique	53	52.0
I stop a treatment if it increases or provokes my pain or discomfort	42	41.2
I select treatment techniques that will not increase or provoke my pain or discomfort	40	39.2
I warm up and stretch before starting manual therapy techniques	18	17.7
I use electrotherapy instead of manual therapy techniques	8	7.8

4.6 Association between WRMSDs and demographic characteristics of respondents

Chi square / fisher's exact test analysis shows significant association between WRMSDs and age (fisher's exact test, p = 0.001) and also between development of WRMSDs and work experience (fisher's exact test, p = 0.025). There is however, no significant association between WRMSDs and the rest of the demographic characteristics of respondents such as marital status, sex, level of education, region in which the respondent practice, the type of institution in which the respondents practice (public, private or both) and BMI as displayed in table 8.

University of Ghana http://ugspace.ug.edu.gh

Table 8: Association between WRMSDs and demographic characteristics of respondents

Demographic characteristic	WRMSDs YES (%) (N= 78)	WRMSDs NO (%) (N= 24)	(df)	X^2 / Fisher's exact test	p-value
Age					
21-30	41 (78.9)	11 (21.1)	3	Fisher's**	0.001*
31-40	37 (82.7)	8 (17.7)			
41-50	0 (0.0)	1 (100)			
50+	0 (0.0)	4 (100)			
Sex					
Male	40 (72.7)	15 (27.3)	1	0.9295	0.335
Female	38 (80.9)	9 (19.1)			
Marital status					
Single	47 (78.3)	13 (21.7)	1	0.2810	0.596
Married	31 (73.8)	11 (26.2)			
Region of practice					
Greater Accra	47 (79.7)	12 (20.3)	4	Fisher's**	0.339
Ashanti	16 (80.0)	4 (20.0)			
Western	6 (85.7)	1 (14.3)			
Central	3 (60.0)	2 (40.0)			
Eastern	6 (54.5)	5 (45.5)			
BMI status					
Under weight	1(100)	0 (0.0)	3	Fisher's**	0.265
Normal weight	45 (73.8)	16 (26.2)			
Over weight	22 (73.3)	8 (26.7)			
Obese	10 (100)	0 (0.0)			
Educational level					
Degree	64 (77.1)	19 (22.9)	2	Fisher's**	0.332
Masters	14 (77.8)	4 (22.2)			
PhD	0 (0.0)	1 (100.)			
Work experience					
1-5	44 (81.5)	10 (18.5)	2	Fisher's**	0.025*
6-10	30 (78.9)	8 (21.1)			
10+	4 (40.0)	6 (60.0)			
Work institution					
Public	66 (75.9)	21 (24.1)	2	Fisher's**	1.00
Private	7 (77.8)	2 (22.2)			
Both combined	5 (83.3)	1 (16.7)			

* p-value < 0.05, hence significant association. Fishers**:- Fisher's Exact test

University of Ghana http://ugspace.ug.edu.gh

CHAPTER FIVE

5.0 DISCUSSION

5.1 Introduction

This study investigated the prevalence of Work-related musculoskeletal disorders (WRMSDs) amongst physiotherapists in Ghana who were selected from five regions namely; Greater Accra, Ashanti, Western, Central and Eastern regions. The study also investigated perceived causes and the coping strategies.

5.2 Prevalence of WRMSDs amongst physiotherapists in Ghana and the body parts affected

The prevalence of WRMSDS amongst physiotherapists in Ghana was found to be high (76.5 %) overall, and was slightly higher in females (80.9%) than in males (72.7%) but difference not statistically significant. The most affected body part was the lower back (69.7%), followed by the upper back (38.2%) and then the neck (22.6%). The least affected body part was the elbow/forearm (1.0%). Globally, high prevalence of WRMSDs amongst physiotherapists have been reported. For example, Prerana, Saravanan, Krunal et al. (2015) reported prevalence of 62.7% amongst physiotherapists in India. Also Nazari, Mahjoob, Tapak et al. (2017) reported a prevalence of 65.9% amongst physiotherapists in Iran. In Africa, 68.3% was reported amongst Zambian Physiotherapists (Nkhata et al. 2010), 63.9% amongst Egyptian Physiotherapists (Al-Eisa, Buragadda, Shaheen et al. 2017) and 91.3% amongst Nigerian Physiotherapists (Adegoke et al. 2008). Adegoke et al. (2008) further reported a significantly higher prevalence amongst females compared to males. In this current study, a slightly higher prevalence was found in females but was not statistically significant. All these studies

University of Ghana http://ugspace.ug.edu.gh

reported high prevalence in WRMSDS amongst Physiotherapists because physiotherapists globally do similar work and are exposed to similar work-related risk factors. They are involved in doing repetitive movements during manual therapy, lifting and transferring patients, maintaining awkward postures for long period during treatment etc. All these factors have been found to cause WRMSDs (Tantawy et al., 2017).

Several studies have identified lower back as the most affected body area with regards to WRMSDs (Narendrasinh & Mulla, 2015; Nkhata et al., 2010; Prerana et al., 2015; Rozenfeld et al., 2010). The lower back is affected mostly because it is subjected to more mechanical stresses most of the time from awkward movements such as bending and twisting and it also bears the weight of the upper back and the head.

5.3 Perceived causes of WRMSDs

This study revealed the number one perceived risk factors of WRMSDs amongst physiotherapists as treating large number of clients in a day and performing the same task over and over (as reported by 58.8% of the respondents). Similar results have been reported by several studies. For example, Narendrasinh & Mulla, (2015) also reported that treating large number of patients in a day is perceived to be the leading cause of WRMSDs as stated by 55% of their responding Physiotherapists. Treating large number of patients in a day increases the workload on the Physiotherapist and therefore there will be less or no time for the body to recover from the mechanical stress it has been exposed to during treatment.

Other causes of WRMSDs revealed by this study include; working in an awkward posture such as bending, twisting etc., poor workstation settings, lifting or transferring patients, and insufficient rest breaks etc. Interestingly, 10.8% of physiotherapists

University of Ghana http://ugspace.ug.edu.gh

perceived inadequate training on prevention of WRMSDs as the cause of their pain. Physiotherapists are widely involved in management and prevention of WRMSDs, so it is worrying if they have inadequate training in this area.

5.4 Coping strategies adopted by Physiotherapists to reduce and (or) prevent WRMSDs

To reduce or prevent the development of WRMSDs, majority (84.3%) of the respondents adopt to changing patient's position or their own posture. This ensures they avoid awkward postures which predispose them to development of the WRMSDS. Other strategies respondents adopt include; getting help from other colleagues to handle a heavy patients (72.6%), breaking regularly in order to stretch and change posture (56.9%), stopping a treatment when it increases or provokes pain or discomfort (41.2%) etc. Interestingly, 39.2% of the physiotherapists reported that they select treatment techniques that may not increase or provoke their pain. The selection of treatment techniques for patients however, must solely be based on what is best for the patients and not the therapists. Similarly, 7.8% of the respondents said they use electrotherapy instead of manual therapy. This may not be of best interest to the patients who may not benefit from the electrotherapy but were given that treatment because the Physiotherapists wanted to prevent or reduce the development of WRMSDs.

The strategies adopted can be grouped in to three level; workplace level strategies such as putting in place ergonomically friendly workstation, legislatures to enable workers to take regular breaks to stretch etc., therapist's level strategies such as calling for help from colleagues, changing postures etc., and reactive strategies such as stopping treatment

University of Ghana http://ugspace.ug.edu.gh

when pain or discomfort appears, substituting electrotherapy for manual therapy etc. (Rozenfeld et al., 2010).

5.5 Association between WRMSDs and demographic characteristics of the respondents.

The study found significant association between age and development of WRMSDs (Fisher's exact test, p-value = 0.001) and between work experience and development of WRMSDs (Fisher's exact test, p-value = 0.025). This findings are similar to that of Campo et al. (2008) where age had a positive correlation with experience. As one ages, he or she also gain experience and can reduce or prevent WRMSDs better. Also as one ages and gain more experience, they get promotions and tend to play more supervisory roles and office duties instead of doing those tedious works the junior physiotherapists does, hence they are exposed to less risk of developing WRMSDs.

The study also found that prevalence of WRMSDs was higher in females than in males. This was however not statistically significant and is similar to the findings of Cromie & Robertson (2000). Females are generally physically weak and may have difficulty in doing job task such as lifting and transferring patients which may predispose them to the development of WRMSDs (Narendrasinh & Mulla, 2015). No significant association was found between development WRMSDs and other demographic characteristics of physiotherapists such as level of education, marital status, institution, region in which one practices and BMI. This may be due to the fact that physiotherapists may be exposed to similar risks irrespective of their marital status, weight, place of work etc.

University of Ghana http://ugspace.ug.edu.gh

CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The findings of this study showed high prevalence of WRMSDs amongst physiotherapists in Ghana (76.5%) which was slightly higher in females (80.9%) than in males (72.7%) although not statistically significant. Most of the respondents (51.0%) graded their pain or discomfort to be moderate.

The most prevalent body part affected by WRMSDs was lower back (69.6%) whilst the elbow was the least affected part (1.0%). Performing the same job task repeatedly and treating large number of clients in a day were perceived by respondents as the main causes of WRMSDs (58%) amongst physiotherapists in Ghana. The least perceived cause was inadequate training on prevention of WRMSDs at the work place (10.8%).

Majority of respondents adopt changing position of patients or their own posture as a way of reducing or preventing WRMSDs (84.3%) whilst few of them adopt to the use of electrotherapy instead of using manual therapy (7.8%).

There was significant association between age of respondents and WRMSDs and also between work experience of the respondents WRMSDs. There was however no significant association between the other demographic characteristics participants (such as sex, educational level, marital status, BMI, region and type institution in which the respondent practice) and WRMSDs.

University of Ghana http://ugspace.ug.edu.gh

6.2 Limitation of study

The first limitation to this study is recall bias. Participants were required to recall whether or not they experienced pain or discomfort which lasted for more than 3 days in the last 12 months prior to this study. The second limitation of this study is the study design which is cross-section and as such there is a limit to generalization.

6.3 Recommendations

The prevalence of WRMSDs was high amongst physiotherapists in Ghana irrespective of whether they work in public or private facilities. If adequate measures are not put in place, this could lead to Presenteeism (where workers come to work but are not productive), Absenteeism, huge financial loss to the employers and the employees, permanent and temporary disabilities and even death when severe.

The following measures are recommended to all stake holders to help prevent or reduce WRMSDs:

Ministry of Health / Ghana Health Service

- There is a need to reduce work load on physiotherapists in Ghana by engaging more of them in both public and private facilities
- Ergonomists and physiotherapists should be consulted during the construction phase of physiotherapy departments to make the work-station ergonomically friendly. Equipment such as couch and beds must be adjustable so that they can fit the heights of physiotherapists to avoid bending and over stretching.
- Prevention of WRMSDs should be inculcated in the in-service trainings and workshops of physiotherapists.

University of Ghana http://ugspace.ug.edu.gh

Researchers

The study design was cross sectional and self –reporting, and so may have encountered recall bias and potential exaggeration of symptoms. As such, a longitudinal study is recommended. Also, there is the need to explore the financial and psychosocial impact of WRMSDs amongst physiotherapists in Ghana.

University of Ghana http://ugspace.ug.edu.gh

REFERENCES

Adegoke, B. O. A., Akodu, A. K., & Oyeyemi, A. L. (2008). Work-related muculoskeletal disrders among Nigerian Physiotherapist, *9*, 1–9. https://doi.org/10.1186/1471-2474-9-112

Agrawal, P., Maiya, A., & Kamath, V. (2017). Work related musculoskeletal disorders among medical laboratory professionals: a narrative review. *International Journal of*. Retrieved from http://www.msjonline.org/index.php/ijrms/article/view/2406

Al-Eisa, E., Buragadda, S., Shaheen, A. A., Ibrahim, A., & Melam, G. (2017). Work Related Musculoskeletal Disorders : Causes , Prevalence and Response Among Egyptian and Saudi Physical ..., (May). https://doi.org/10.5829/idosi.mejsr.2012.12.4.6632

Ariëns, G. A., Van, M. W., Bongers, P. M., Bouter, L. M., & van der Wal, G. (2000). Physical risk factors for neck pain. *Scandinavian Journal of Work, Environment & Health*, *26*(1), 7–19. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/10744172

Barbe, M. F., & Barr, A. E. (2006). Inflammation and the pathophysiology of work-related musculoskeletal disorders. *Brain, Behavior, and Immunity*, *20*, 423–429. https://doi.org/10.1016/j.bbi.2006.03.001

Bernard, B. P., Putz-Anderson, V., Susan Burt Libby L Cole, M. E., Fairfield-Estill Lawrence Fine, C. J., Katharyn Grant, D. A., Gjessing Lynn Jenkins Joseph Hurrell Jr, C. J., … Tanaka, S. (1997). Musculoskeletal Disorders and Workplace Factors A Critical Review of Epidemiologic Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back. Retrieved from https://www.cdc.gov/niosh/docs/97-141/pdfs/97-141.pdf

Bernard, P. B. (n.d.). Musculoskeletal Disorders and Workplace Factors, (July 1997).

Bork, B.E., T.M. Cook, J.C. Rosecrance, K.A. Engelhardt, M.E.J. Thomason, I.J. (1996) Wauford and R.K. Worly. Work-related Musculoskeletal Disorders Among Physical Therapists. Physical Therapy;76:826-835.

Boswell, M. V, Trescot, A. M., Datta, S., Schultz, D. M., Hansen, H. C., Abdi, S., … American Society of Interventional Pain Physicians. (2007). Interventional techniques: evidence-based practice guidelines in the management of chronic spinal pain. *Pain Physician*, *10*(1), 7–111. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17256025

Cagnie, B., Danneels, L., Van Tiggelen, D., De Loose, V., & Cambier, D. (2007). Individual and work related risk factors for neck pain among office workers: a cross sectional study. *European Spine Journal : Official Publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society*, *16*(5), 679–686. https://doi.org/10.1007/s00586-006-0269-7

Campo, M., Weiser, S., Koenig, K. L., & Nordin, M. (2008). Work-Related Musculoskeletal Disorders in Physical Therapists: A Prospective Cohort Study With 1-Year Follow-up. *Physical Therapy*, *88*(5), 608–619. Retrieved from https://oup.silverchaircdn.com/oup/backfile/Content_public/Journal/ptj/88/5/10.2522_ptj.20070127/4/ptj0608.pdf?Expires=1500254751&Signature=MWat7~W8GHLy

Carroll, C., Rick, J., Pilgrim, H., & Cameron, J. (2010). Workplace involvement

University of Ghana http://ugspace.ug.edu.gh

improves return to work rates among employees with back pain on long-term sick leave: a systematic review of the effectiveness and cost-. *Disability and*. Retrieved from http://www.tandfonline.com/doi/abs/10.3109/09638280903186301

Cassidy, J. D., Carroll, L. J., Côté, P., Lemstra, M., Berglund, A., & Nygren, Å. (2000). Effect of Eliminating Compensation for Pain and Suffering on the Outcome of Insurance Claims for Whiplash Injury. *New England Journal of Medicine*, *342*(16), 1179–1186. https://doi.org/10.1056/NEJM200004203421606

Choobineh, A., Tabatabaei, S. H., Mokhtarzadeh, A., & Salehi, M. (2007). Musculoskeletal Problems among Workers of an Iranian Rubber Factory. *Journal of Occupational Health*, *49*(5), 418–423. https://doi.org/10.1539/joh.49.418

Côté, P., Van, V. G., Cassidy, J. D., Carroll, L. J., Hogg-Johnson, S., Holm, L. W., … Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. (2008). The Burden and Determinants of Neck Pain in Workers. *Spine*, *33*(Supplement), S60–S74. https://doi.org/10.1097/BRS.0b013e3181643ee4

Cromie, J. E., & Robertson, V. J. (2000). Work-Related Musculoskeletal Disorders in Physical Therapists: Prevalence, Severity, Risks, and Responses, *80*(4). Retrieved from https://oup.silverchair cdn.com/oup/backfile/Content_public/Journal/ptj/80/4/10.1093_ptj_80.4.336/1/ptj0336.pdf?Expires=1500253095&Signature=dUyrZNGwxjMoLl

Cromie, J. E., Robertson, V. J., & Best, M. O. (2001). Occupational health and safety in physiotherapy : Guidelines for practice. *Australian Journal of Physiotherapy*, *47*(1), 43–51. https://doi.org/10.1016/S0004-9514(14)60297-X

Cunningham, C., Flynn, T., & Blake, C. (2006). Low back pain and occupation among Irish health service workers. *Occupational Medicine*, *56*, 447–456. https://doi.org/10.1093/occmed/kql056

Darragh, A. R., Huddleston, W., & King, P. (2009). Work-Related Musculoskeletal Injuries and Disorders Among Occupational and Physical Therapists. *American Journal of Occupational Therapy*, *63*(3), 351–362. https://doi.org/10.5014/ajot.63.3.351

Deeney, C., & O'Sullivan, L. (2009). Work related psychosocial risks and musculoskeletal disorders: Potential risk factors, causation and evaluation methods. *Work*, *34*(2), 239–248. https://doi.org/10.3233/WOR-2009-0921

Demure, B., Luippold, R. S., Bigelow, C., Ali, D., Mundt, K. A., & Liese, B. (2000). Video Display Terminal Workstation Improvement Program: I. B... : Journal of Occupational and Environmental Medicine. *Journal of Occupational & Environmental Medicine*, *42*(8), 783–791. Retrieved from http://journals.lww.com/joem/Abstract/2000/08000/Video_Display_Terminal_Workstation_Improvement.4.aspx

Garbin, A. J. Í., Soares, G. B., Arcieri, R. M., Garbin, C. A. S., & Siqueira, C. E. (2017). Musculoskeletal Disorders And Perception Of Working Conditions : A Survey Of Brazilian Dentists In São Paulo. *International Journal of Occupational Medicine and Environmental Health*, *30*(3), 367–377. https://doi.org/10.13075/ijomeh.1896.00724

Ghana Statistical Service. (2012). *2010 POPULATION AND HOUSING CENSUS FINAL RESULTS GHANA STATISTICAL SERVICE*. Retrieved from http://www.statsghana.gov.gh/docfiles/2010phc/2010_

University of Ghana http://ugspace.ug.edu.gh

POPULATION_AND_HOUSING_CENSUS_FINAL_RESULTS.pdf %0A
Glover, W., McGregor, A., Sullivan, C., & Hague, J. (2005). Work-related musculoskeletal disorders affecting members of the Chartered Society of Physiotherapy. *Physiotherapy*. https://doi.org/10.1016/j.physio.2005.06.001
Heiden, B., Weigl, M., Angerer, P., & Müller, A. (2013). Association of age and physical job demands with musculoskeletal disorders in nurses. *Applied Ergonomics*, *44*, 652–658. https://doi.org/10.1016/j.apergo.2013.01.001
Janwantanakul, P., Pensri, P., Jiamjarasrangsri, V., & Sinsongsook, T. (2008). Prevalence of self-reported musculoskeletal symptoms among office workers. *Occupational Medicine*. https://doi.org/10.1093/occmed/kqn072
Kenyon, A., & Kenyon, K. (2004). *Musculoskeletal pathologies. The physiotherapist's pocket book: Essential facts at your finger tips*. London: Churchill Livingstone.
Kuorinka, I., Jonsson, B., Kilbom, A., Vinterberg, H., Biering-S6rensen, F., Andersson, G., & J6rgensen, K. (1987). Standardised Nordic questionnaires for the analysis of musculoskeletal symptoms. *Applied Ergonomics*, *183*, 233–237. Retrieved from http://www.uresp.ulaval.ca/backpaindefs/en/PDF/KuorinkaPaper.pdf
Lambert, V., Lambert, C., Oyeyemi, A. L., Fabunmi, A. A., Hattori, Y., Hori, F., … Shepard, K. (2008). Nurses' workplace stressors and coping strategies. *Indian Journal of Palliative Care*, *14*(1), 38. https://doi.org/10.4103/0973-1075.41934
Landau, K., Rademacher, H., Meschke, H., Winter, G., Schaub, K., Grasmueck, M., … Schulze, J. (2008). Musculoskeletal disorders in assembly jobs in the automotive industry with special reference to age management aspects. *International Journal of Industrial Ergonomics*, *38*, 561–576. https://doi.org/10.1016/j.ergon.2008.01.006
Leroux, I., Dionne, C., Bourbonnais, R., & Brisson, C. (2005). Prevalence of musculoskel- etal pain and associated factors in the Quebec working population. *Int Arch Occup Environ Health*, *78*, 379–386.
Lost-worktime injuries and illnesses: characteristics and resulting days away from work, 2003. (2005). Retrieved from https://www.bls.gov/news.release/archives/osh2_03302005.pdf
Magnavita, N., Elovainio, M., Nardis, I. De, Heponiemi, T., & Bergamaschi, A. (2011). Environmental discomfort and musculoskeletal disorders, (i), 196–201. https://doi.org/10.1093/occmed/kqr024
Malcom, I. (1987). *Back pain: the facts*. *Oxford: Oxford University Press* (2nd ed.).
Manjunatha, R., Kiran, D., & Thankappan, K. R. (2011). Sickness Absenteeism, Morbidity and Workplace Injuries among Iron and Steel Workers-A cross sectional study from Karnataka, Southern India. AMJ, 4(3), 144-147 Retrieve from http//dx.doi.org/10.4066/AMJ.2011.576

Mayou, R., & Farmer, A. (2002). ABC of psychological medicine: Functional somatic symptoms and syndromes. *BMJ (Clinical Research Ed.)*, *325*(7358), 265–268. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12153926
Merskey, H. (1991). The Definition Of Pain. *Eur . J. Psychiatry*, *6*, 153–159.
Mohanty, P., Singh, A., & Pattnaik, M. (2017). Risk Factors Responsible for Musculoskeletal Pain among Computer Operators. *EC Orthopardic Research Article*, *6.1*, 15–31. Retrieved from https://www.ecronicon.com/ecor/pdf/ECOR-06-00153.pdf

University of Ghana http://ugspace.ug.edu.gh

Mulcahy, A. J., Jones, S., Strauss, G., Cooper, I., Rivett, D., Ruston, S., … Sullivan, J. (2010). The impact of recent physiotherapy graduates in the workforce: a study of Curtin University entry-level physiotherapists 2000–2004. *Australian Health Review*, *34*(2), 252. https://doi.org/10.1071/AH08700

Nahit, E. S., Hunt, I. M., Dunn, G., Silman, A. J., & Macfarlane, G. (2003). Effects of psychosocial and individual psychological factors on the onset of musculoskeletal pain: common and site-specific effects, 755–761.

Narendrasinh, J. U., & Mulla, A. (2015). Prevalence and Risk Factors of Work Related Injuries among Physical Therapists in Indian Population, *4*(6), 2575–2578.

Nazari, H., Mahjoob, H. H., Tapak, L., & Mortazavi, S. S. (2017). I ranian R ehabilitation Journal Prevalence of Work-related Musculoskeletal Disorders and Injuries in Occupational and Physical Therapists and Its Comparison. *Iranian Rehabilitation Journal*, *15*(1). Retrieved from http://irj.uswr.ac.ir/article-1-598-en.pdf

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

Palmer, K. T., Walker-Bone, K., Griffin, M. J., Syddall, H., Pannett, B., Coggon, D., & Cooper, C. (2001). Prevalence and occupational associations of neck pain in the British population. *Scandinavian Journal of Work, Environment & Health*, *27*(1), 49–56. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11266146

Peloso, P. M. J., Gross, A., Haines, T., Trinh, K., Goldsmith, C. H., Burnie, S. J., & Cervical Overview Group. (2007). Medicinal and injection therapies for mechanical neck disorders. In P. M. J. Peloso (Ed.), *Cochrane Database of Systematic Reviews* (p. CD000319). Chichester, UK: John Wiley & Sons, Ltd. https://doi.org/10.1002/14651858.CD000319.pub4

Picavet, H. S. J., & Schouten, J. S. A. G. (2003). Musculoskeletal pain in the Netherlands: prevalences, consequences and risk groups, the DMC(3)-study. *Pain*, *102*(1–2), 167–178. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12620608

Prerana, S., Saravanan, M., Krunal, L., Krishna, R., & Ruchi, V. (2015). Prevalence, risk factors and coping strategies to work related musculoskeletal disorders reported by physiotherapists in surat district, india. *Physiotherapy*, *101*(1), e1338. https://doi.org/10.1016/j.physio.2015.03.1268

Punnett, L., & Wegman, D. H. (2004a). Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *Journal of Electromyography and Kinesiology*, *14*, 13–23. https://doi.org/10.1016/j.jelekin.2003.09.015

Punnett, L., & Wegman, D. H. (2004b). Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *Journal of Electromyography and Kinesiology*, *14*, 13–23. https://doi.org/10.1016/j.jelekin.2003.09.015

Rozenfeld, V., Ribak, J., Danziger, J., Tsamir, J., & Carmeli, E. (2010). Prevalence , Risk Factors and Preventive Strategies in Work-Related Musculoskeletal Disorders among Israeli Physical Therapists, *176*, 176–184. https://doi.org/10.1002/pri.440

Saidu, I. A., Utti, V. A., Jaiyesimi, A. O., Ahmad, A., Maduagwu, S. M., Onuwe, H. A., & Maduagwu, S. M. (2015). Prevalence of Musculoskeletal Injuries Among Factory Workers in Kano Metropolis , Nigeria, *3548*(June 2017). https://doi.org/10.1080/10803548.2011.11076874

University of Ghana http://ugspace.ug.edu.gh

Salik, Y., & Ozcan, A. (2004). work-related musculoskeletal disorders: A survey of physical therapist in Izmir-Turkey. *BMC Musculoskeletal Disorders*, *5:27*. https://doi.org/10.1186/1471-2474-5-27

Silva, A. G., Sa-Couto, P., Queirós, A., Neto, M., & Rocha, N. P. (2017). Pain, pain intensity and pain disability in high school students are differently associated with physical activity, screening hours and sleep. *BMC Musculoskeletal Disorders*, *18*(1), 194. https://doi.org/10.1186/s12891-017-1557-6

Smith, G. S., Wellman, H. M., Sorock, G. S., Warner, M., Courtney, T. K., Pransky, G. S., & Fingerhut, L. A. (2005). Injuries at work in the US adult population: Contributions to the total injury burden. *American Journal of Public Health*, *95*(7), 1213–1219. https://doi.org/10.2105/AJPH.2004.049338

Tantawy, S. A., Abdul Rahman, A., Abdul Ameer, M., Haleem, D., Mohd, S., & Zakaria, N. (2017). The relationship between the development of musculoskeletal disorders, body mass index, and academic stress in Bahraini University students. *The Korean Journal of Pain*, *30*(2), 126. https://doi.org/10.3344/kjp.2017.30.2.126

Tawiah, A. K., Oppong-Yeboah, B., & Bello, A. I. (2015). Work-related Musculoskeletal Disorders among Workers at Gold Mine Industry in Ghana: Prevalence and Patterns of Occurrence. *British Journal of Medicine & Medical Research Nigeria*, *9*(84), 1–9. https://doi.org/10.9734/BJMMR/2015/18747

Viester, L., Verhagen, E. A., Oude Hengel, K. M., Koppes, L. L., Van Der Beek, A. J., & Bongers, P. M. (2013). The relation between body mass index and musculoskeletal symptoms in the working population. *BMC Musculoskeletal Disorders*, *14*, 238. https://doi.org/10.1186/1471-2474-14-238

Viester, L., Verhagen, E., Hengel, K. M. O., Koppes, L. L., & Beek, A. J. Van der. (2008). The Association between Obesity and the Prevalence of Low Back Pain in Young Adults: The Cardiovascular Risk in Young Finns Study. *American Journal of Epidemiology*, *167*(9), 1110–1119. https://doi.org/10.1093/aje/kwn007

Waheed, A. (2003). Effect of interferential therapy on low back pain and its relevance to total lung capacity. *JNMRT*, *8*(2), 6–18.

Walker-Bone, K., & Cooper, C. (2005). occupational associations with soft tissue musculoskeletal, (April). https://doi.org/10.1136/ard.2003.020016

Warren, N. (2010). Causes of musculoskeletal disorders in dental hygienists and dental hygiene students: A study of combined biomechanical and psychosocial risk factors. *Work*, *35*(4), 441–454. https://doi.org/10.3233/WOR-2010-0981

Woolf, A. D., & Åkesson, K. (2001). Understanding the burden of musculoskeletal conditions. *BMJ*, *322*(7294). Retrieved from http://www.bmj.com/content/322/7294/1079

Yamane, T. (1973). *Statistics: An Introductory Analysis* (2nd ed.). New York: Harper and Row. Retrieved from https://books.google.com.gh/books?id=Wr7rAAAAMAAJ&source=gbs_navlinks_s&redir_esc=y

Yan, P., Li, F., Zhang, L., Yang, Y., Huang, A., Wang, Y., & Yao, H. (2017). Prevalence of Work-Related Musculoskeletal Disorders in the Nurses Working in Hospitals of Xinjiang Uygur Autonomous Region, *2017*.

Yang, T., Mathews, S. A., & Chen, V. Y. . (2014). Stochastic variability in stress, sleep duration and sleep quality across the distribution of body mass index: Insights from

University of Ghana http://ugspace.ug.edu.gh

quantile regression. *Int J Behav Med*, *21*(2), 282–291. https://doi.org/10.1007/s12529-013-9293-2.Stochastic

University of Ghana http://ugspace.ug.edu.gh

APPENDICES

Appendix 1: Informed consent Form

Institutional Affiliation
School of Public Health, College of Health Sciences, University of Ghana.
Background
Dear colleague,

I am Emmanuel Bart Plange, a student of School of Public Health, University of Ghana; pursuing Master of Public Health (MPH) with the department of Biological, Environmental and Occupational Health (BEOH). I am a Physiotherapist with Tarkwa Municipal hospital and a member of Ghana Physiotherapy Association (GPA). As part of my MPH program, I am conducting a research titled "**Work-related Musculoskeletal Disorders Among Physiotherapists In Ghana: Prevalence, Perceived Causes And Coping Strategies".** The main purpose of the study is to determine the prevalence of work-related musculoskeletal among physiotherapists in Ghana, and the perceived causes linked to it, in order to make recommendations to policy makers such as Ministry of Health (MOH), Ghana Health Service(GHS), Allied Health Professions' Council of Ghana etc.

Procedures

The study involves answering questions from a questionnaire. Your weight and height will be measured. A maximum of 10 minutes is required to complete the entire process. I will be glad for your full participation. The study is only for academic purpose.

Risks and Benefits

There are no associated risks for participating in this study. No biological sample will be collected; so no invasive procedure will done. The findings of this study will be

University of Ghana http://ugspace.ug.edu.gh

disseminated to policy makers such as MOH, GHS, Allied health professions' council etc. this may lead to improvement or enforcement of occupational health and safety policies in all physiotherapy departments in the country to protect physiotherapists and other staff.

Right to refuse

Participation in this study is voluntary and you can decide not to answer any individual question or all the questions. You have the right to withdraw from the study at any time. You are however encouraged to participate since your participation is important in determining the outcome of the study.

Anonymity and Confidentiality

I would like to assure you that whatever information you will provide will be handled with strict confidentiality and will be used purely for the research purposes. Your responses will not be shared with anybody who is not part of the research team. Data analysis will be done at the aggregate level to ensure anonymity.

Dissemination of results

The result of this study will be mailed to you if you provide your address below. The findings from this study will be presented at the department of biological, environmental and occupational health, school of public health, University of Ghana. Publications will be made out of this study.

Do you have any question?

Yes □

No □ (if yes, questions to be noted below)

……

University of Ghana http://ugspace.ug.edu.gh

You can also contact the principal investigator; Emmanuel Bart Plange on 0242252910 / 0577173412, if you have any further question (s).

Consent

I certify that I have read the information above and the purpose of this study has been fully explained to me. I therefore voluntarily agree to participate.

…….. ……

Participant's signature Date

Investigator's Statement

I, Emmanuel Bart Plange, declare that participant has been given ample time to read this informed consent form and that the purpose of this study with its associated benefits and risk have been fully explained to the participant.

…….. ..……

Investigator's Signature Date

University of Ghana http://ugspace.ug.edu.gh

Appendix 2: Questionnaire

Work-related Musculoskeletal Disorders Among Physiotherapists In Ghana: Prevalence, Perceived Causes and Coping Strategies

Dear colleague,

I am Emmanuel Bart Plange, a student of School of Public Health, University of Ghana; pursuing Master of Public Health (MPH) with the department of Biological, Environmental and Occupational Health (BEOH). I am a Physiotherapist with Tarkwa Municipal hospital and a member of Ghana Physiotherapy Association (GPA). As part of my MPH program, I am conducting a research titled "**Work-related Musculoskeletal Disorders among Physiotherapists in Ghana: Prevalence, Perceived Causes and Coping Strategies".** The main purpose of the study is to determine the prevalence of work-related musculoskeletal among physiotherapists in Ghana, and the perceived risk factors (causes) linked to it, in order to make recommendations to policy makers such as Ministry of Health, Ghana Health Service, Allied Health Professions' Council of Ghana etc.

You are required to answer questions from this questionnaire and will be glad for your full participation. All information collected for this study will be treated confidential and will be used only for the purpose of this research.

SECTION A : DEMOGRAPHIC CHARACTERISTICS

1. Age …….

2. Sex: male [ ] Female [ ]

3. Marital status: Single [ ] Married [ ] Divorced [ ] Widowed [ ]

4. Height (m) …….

University of Ghana http://ugspace.ug.edu.gh

5. Weight (Kg)……

6. BMI (Kg/m²)……

7. Level of education: Degree [ ] Masters [ ] PHD [ ]

8. How long have you been working as a physiotherapist? 1-5 years [ ] 6-10 years [ ] Above 10 years [ ]

9. Which institution do you work? Public or Government [ ] Private [ ] Both [ ]

SECTION B: OCCURRENCE OF WORK- RELATED MUSCULOSKELETAL DISORDERS

10. Have you experienced work-related pain or discomfort in any body part that lasted for more than three (3) days in the last twelve (12) months prior to the start of this study?

Yes [ ] No [ ] If Yes, continue from 11. If No, move to number 14

11. How would you grade the intensity of the pain or discomfort?

Mild [ ] Moderate [ ] Severe [ ]

12. Which body part(s) was/were affected? (Tick as many as applicable to you)

Body part affected	**Tick**
Neck	
Upper back	
Lower back	
Shoulders	
Elbows/forearms	
Wrists	
Hands/fingers/thumbs	
Hips	
Knees	
Ankles/feet	

SECTION C: PERCEIVED RISK FACTORS AND COPING STRATEGIES

13. What risk factors do you perceive to cause your pain or discomfort?

(Tick as many as applicable to you)

University of Ghana http://ugspace.ug.edu.gh

Perceived risk factors	**Tick**
Treating large number of patients in a day	
Performing same job task over and over (repetitive movements)	
Lifting or transferring patients	
Continuing to work when injured or hurt	
Insufficient rest breaks	
Work scheduling (overtime, length of work day etc.)	
Working in an awkward posture (bending twisting etc.)	
Working beyond your physical strength (carrying heavy equipment or materials)	
Performing manual therapy techniques	
Working in a stationary posture for long periods of time	
Sudden falls or unanticipated movements by patients	
Assisting patients during exercise training	
Working with disoriented patients	
Poor workstation settings	
Inadequate training on prevention of injuries at work	

14. How do you cope or strategize to prevent work related the pain or discomfort?

(Tick as many as applicable to you)

Coping strategy	**Tick**
I get help from other colleagues to handle a heavy patient	
I change patient's position/my posture	
I use different body part to administer a manual therapy technique	
I warm up and stretch before starting manual therapy techniques	
I use electrotherapy instead of manual therapy techniques	
I break regularly in order to stretch and change my posture	
I adjust the couch to appropriate height before treating a patient	
I select treatment techniques that will not increase or provoke my pain or discomfort	
I stop a treatment if it increases or provokes my pain or discomfort	

Thank you for your participations

University of Ghana http://ugspace.ug.edu.gh

Appendix 3: Ethical Clearance

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: ghserc@gmail.com
16th March, 2018

MyRef. GHS/RDD/ERC/Admin/App 118/016
Your Ref. No.

Emmanuel Bart Plange
University of Ghana
School of Public Health
Legon, Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 065/12/17**
Project Title	Perceived Work-Related Musculoskeletal Disorders among Physiotherapists in Ghana: Prevalence, Causes and Coping Strategies
Approval Date	16th March, 2018
Expiry Date	15th March, 2019
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra