

https://dspace.org/

Prevalence and influence of lower back pain on work performance of civil service workers in Botswana

Damba, David

2024
https://hdl.handle.net/10539/37803

Downloaded from a DSpace repository. https://dspace.org/



UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG



PREVALENCE AND INFLUENCE OF LOWER BACK PAIN ON WORK PERFORMANCE OF CIVIL SERVICE WORKERS IN BOTSWANA.

NAME: DAVID DAMBA

STUDENT NUMBER: 927402

A Dissertation submitted to the school of therapeutic sciences of the University of the Witwatersrand, Johannesburg in fulfilment of the requirements for the degree of Master of Physiotherapy.

Johannesburg 2022

Declaration:

I, David Damba, do declare that this Dissertation Report is my own and unaided work. It is being submitted for the Degree of Masters in Science in Physiotherapy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Statements from other peoples' work have been appropriately acknowledged.



David Damba

_____ _____

Candidate's Name. Signature of candidate

12th day of October 2022

Abstract:

Background: Lower back pain (LBP) is a common and costly health condition recognized as one of the conditions that can cause discomfort and loss of work hours for sufferers. Few epidemiological studies have investigated the prevalence and the risk factors of lower back pain among civil service workers, particularly in Africa. The study aimed to establish the prevalence and influence of LBP on the work performance of civil service workers in Botswana.

Methodology: A concurrent mixed-methods approach was used. A retrospective medical record review was conducted on medical records of civil service workers, and descriptive statistics were performed using the statistical package for social services (SPSS) version 22. Semi-structured interviews were conducted among civil service workers and were analyzed using thematic content analysis.

Results: Three hundred thirty-nine (339) medical records of civil service workers were reviewed. The majority of the participants were female n = 234 (69%) and males n = 105 (31%). The prevalence of LBP in this study was found to be 48.7%. There was no association between demographic profiles, age, gender, marital status, and comorbidities with lower back pain because their p-values were above 0.05.

The themes that emerged were: the character of pain, managing LBP, pain affects life domains namely, social life, sleep, mental health, functioning, finances, and work life and performance.

Conclusions: Lower back pain is prevalent among civil service workers and as a result, they are limited in certain activities of everyday life. There is a need for workplace wellness programs to focus more on preventing lower back pain among civil service workers.

Keywords: Lower back pain, civil service workers, risk factors of LBP, work performance.

Dedication:

This Dissertation is dedicated to my beloved wife, Mrs. Harriet Damba, whose patience, perseverance, endless prayers enabled me to have time and save funds to be able to acquire advanced university education.

To my six daughters; may you strive to emulate my desire for academic achievements!

ACKNOWLEDGEMENT:

God is indeed good all the time, all the time God is good! I thank the Almighty God for the gift of life, the care, the many blessings and giving me the will, courage and might to pursue the master's degree and complete it within the prescribed time albeit with a lot of challenges from COVID 19. The victory for this research is attributed to the contributions from very many people. I especially thank my supervisor Dr. Sonti Pilusa for the brilliant and professional assistance she rendered to me throughout my study. Her valuable guidance with critical, fruitful and insight comments, suggestions and support at various stages of my study, enabled me to reach this far.

I also like to convey my sincere thanks and gratitude to Dr. Ajidahun Adedayo Tunde for his useful triangulation ideas which improved the quality of my dissertation.

Family members cannot be forgotten for they stood with me financially and spiritually. My wife and daughters, thanks a lot for your ceaseless praying, the support and love that gave me strength and hope to undertake and complete my study.

Much appreciation with gratitude to my daughter Ms. Sonie Damba for her valuable time of transcribing verbatim all the face to face interviews.

Finally, I thank all the respondents; the Stroke rehabilitation Centre's staff who cooperated and supported me during the interviews and data collection. In particular, I thank Ms. Serwaledi Dongo, for her assistance, especially during the selection of participant's files for the development of the data set and typing work.

I also thank all other persons that I cannot mention by name in this dissertation.

God bless you all!

Table of Contents

CHAPTER 1 1

1.0 Background 1

1.1 Introduction 1

1.2 Statement of the problem 3

1.3 Aim of the study 3

1.3.1 Objectives of the study 3

1.4 Significance of the study 4

1.5 Dissertation outline: 4

CHAPTER 2. 5

Literature Review 5

2.0. Introduction: 5

2.1. Global prevalence of lower back pain 5

2.2. Risk factor associated with lower back pain 6

2.2.1 Aging and lower back pain 6

2.2.2. Gender and LBP 7

2.2.3. Body Mass Index and lower back pain 7

2.2.4. Comorbidities' and LBP 7

2.3 Prevalence of lower back pain among workers 9

2.4. Ergonomics and LBP 10

2.5 Work type and LBP 10

2.6 Working hour's duration and LBP 11

2.7 Duration of work years and lower back pain..... 11

2.8 Work performance and LBP..... 12

2.9. Prevention of low back pain in civil service workers..... 12

2.10 Health Education in LBP..... 13

2.11 Exercises to prevent recurrence of LBP. 13

2.12. Occupational health programs for civil service workers..... 14

2.13 The Management of lower back pain. 14

2.13.1 Medication 14

2.13.2 Alternative medicine 15

2.13.3 Physiotherapy and LBP..... 15

2.14. Summary of the chapter 16

CHAPTER 3 17

3.0 Methodology..... 17

3.1 Introduction: 17

3.2 Study design: 17

3.3 Study setting: 17

3.4 Part 1: Retrospective study..... 19

3.4.1 Type of Study 19

3.4.2 Study participants: 19

3.4.3 Sample Selection..... 20

Sample size..... 20

3.4.4 Instrumentation and Outcome measures..... 21

3.4.5 Procedure..... 21

Pilot Study: 21

Main Study..... 22

3.4.6 Data Analysis 22

3.4.7 Reliability and Validity 24

3.5 Part 2: Qualitative study 24

3.5.1 Type of Study: 24

3.5.2 Study participants 24

3.5.3 Sample Selection..... 25

3.5.4 Data collection tool 25

3.5.5 Procedure 26

Pilot study 26

Main Study ……26

3.6 Data Analysis 27

3.7 Ethical considerations 28

3.8 Summary of the chapter..... 29

CHAPTER 4 30

4.0 Introduction 30

4.1 Section A: Retrospective Study..... 30

4.1.1 Test for normality 31

4.1.2 Demographic profile of the participants. 32

4.1.3 Job classification.....33

4.1.4 Presence of co-morbidities.....33

4.1.5 Back pain..... 34

4.1.6 Association between demographic profile and back pain diagnosis. 35

4.1.7 Association between back pain diagnosis and comorbidities 36

4.1.8 Association between job classification and back pain diagnosis 36

4.1.9 Management of lower back pain in civil service workers. 37

4.2 Section B: Qualitative study 38

4.2.1 Demographic profile of the participants 38

4.2.2 Work type 39

4.3 Results from the interviews 40

4.3.1 The character of pain 40

4.3.2 Pain affects life domains..... 44

4.3.3 Impact on work performance..... 46

4.3.4 Management of lower back pain..... 48

4.4 Summary of the chapter 50

CHAPTER 5 52

Discussion 52

5.0 Introduction 52

5.1 Participants profile..... 52

5.1.1 Demographic profile of the participants. 52

5.1.2 Health profile..... 52

5.2 Prevalence of lower back pain. 53

5.3 LBP and comorbidities..... 54

5.3.1 Lower back pain and body mass index (BMI)..... 55

5.4 Lower back pain and demographic profile..... 55

5.4 1 Lower back pain and gender..... 55

5.4.2 Lower back pain and age..... 56

5.4.3 Association of lower back pain and marital status ……56

5.5 Effects of LBP on the civil service workers 57

5.6 Impact of LBP on work and work performance of civil service workers 57

LBP and work performance 58

5.7 Physiotherapy management of LBP..... 59

5.8 Summary of the chapter 60

CHAPTER 6 61

6.0 Introduction 61

6.1 Conclusion..... 61

6.2 Recommendations. 61

6.4 Limitation of the study..... 62

REFERENCES: 63

APPENDIXES 96

Appendix: A: Permission request to MOH&W to conduct research at Stroke rehabilitation Centre. 96

Appendix: B: Study information sheet. 98

Appendix: C: Informed consent Form. 100

Appendix: D: Permission for audio recording. 101

Appendix E: Permission to Access patients' files. 102

Appendix F: Data extraction sheet (Record review).....103

Appendix G: Semi-structured interview guide for participants living with lower back pain (LBP)..... 104

Appendix H: Human research ethics committee (Medical) clearance certificate no. M210910……..106

Appendix I: Permission from the health research development division MOH&W..... 108

Appendix J: Permission from Stoke rehabilitation Centre to access patients' files 110

Appendix K: Master of Science in Physiotherapy; Approval of title. 111

Appendix L: Turnitin plagiarism report..... 112

LIST OF FIGURES

Figure 3.1 Map of Gaborone ……..…….. 18

Figure 3.2 Concurrent mixed design ……..……29

Figure 4.1 Flow of participants files included in the retrospective study ……...…….. 31

Figure 4.2 Job Classification ……...…….……. 33

Figure 4.3 Back pain diagnosis …….……. 34

Figure 4.4 Specific lower back pain management techniques used ……... 37

Figure 4.5 Work Type ……..…….…… 40

Figure 4.6 Concurrent mixed design ……50

LIST OF TABLES

Table 3.1 Data Analysis / Statistical Test …….…….…… 23

Table 4.1 Test for Normality (Sarpio-Wil test) ……....…… 31

Table 4.2 Demographic profile of the participants ……..……. 32

Table 4.3 Presence of comorbidities …….…… 34

Table 4.4 Association between back pain diagnosis and demographics …….……..… 35

Table 4.5 Association between diagnosis and comorbidities …… 36

Table 4.6 Association between job classification and back pain diagnosis …….. 37

Table 4.7 Demographic profile of the participants …… 38

Table 4.8 Management techniques used by the participants ……..…….……. 48

LIST OF ACRONYMS AND ABBREVIATIONS

LBP – Lower back pain

HIV – Human Immune-deficiency virus.

BMI – Body mass index.

WHO – World health organization.

GBD – Global burden of disease

DEFINITIONS OF TERMS AND CONCEPTS.

In the study, the following terms and concepts had the following meaning:-

Lower back pain – lower back pain is defined as pain and discomfort below the costal margins and above the inferior folds with or without referred pain to the leg (Vrbanic 2011).

Work performance –relates to the process of how individuals carry out or accomplish an action, task or function which represents the individual workers' efficiency and evaluated components (Sickle & Zelenyuk, 2019; Lopez-Garcia et al., 2019).).

Body mass index (BMI) – is the metric used to define anthropometric height/weight characteristics and for categorizing them into groups to reflect an index of an individual's fatness. It's also widely used as a risk factor for the development of or the prevalence of several health issues (Huttall 2015).

Risk factor – is anything or variable that is associated with increased risk of any person's chances of developing a disease or infection (Dovjak 2019).

Civil service worker – is a person employed and works for the government, be it local, state or federal (Reichard and Schröter, 2021).

Prevalence – is the proportion (percentage) in a defined population who have a particular health condition or disease at a given point in time and is usually expressed as a percentage of the population (Spronk et al., 2019).

CHAPTER 1.

1.0 Background

1.1 Introduction

Low back pain (LBP) is a substantial health condition, globally increasing the demand for rehabilitation care (Cieza et al., 2020). Lower back pain is defined as "pain and discomfort localized below the costal margins and above the inferior gluteal folds with or without referred pain to the leg" (Vrbanic 2011). Lower back pain is a major health condition throughout the world (Cieza et al., 2020). Lower back pain is one of the commonest experienced health condition that affects adults and mostly those aged 60 years or older at a certain period in their lifetime (Wong et al., 2017). Lower back pain is one of the top ten health conditions higher than preterm complications, chronic pulmonary conditions, and cancer of the lungs, TB, road traffic injuries and HIV/AIDS (Rahman et al., 2016). Data shows that approximately 1.71 billion people globally do have musculoskeletal conditions, of which LBP is a major contributor for the demand for rehabilitation care (Cieza et al., 2020). The prevalence of LBP is higher in females and persons aged between 40 to 80 years (Damian et al., 2012). Years lived with disability in people with LBP increased by 54% from 1990 to 2015 (Hartvigsen et al., 2018).

Several factors are causing LBP. The major causes of LBP can be due to mechanical injury, overuse, and other medical conditions which may affect the lumbar vertebrae, spinal cord and lumbar spinal nerves, the pelvic and abdominal internal organs, the spinal ligaments and lumbar discs, and the muscles around the lumbar spine (Peggy and McIntosh 2017). On the same note, long term corticosteroids use in older people is also associated with LBP (Chou et al., 2016). There is also evidence that suggests psychological factors such as catastrophic fear are associated with LBP (Alhowimel et al., 2018). In some cases, the cause of pain is obscure and has little linkage to some organic diseases that exist (Azizpour et al., 2017).

Lower back pain can limit functioning and influence participation in life, including work life. The working population experience recurrent LBP causing disability and absence at work associated

with very high indirect costs, including loss of performance or loss of working days (MaVy et al., 2014). Findings from two USA national surveys showed that more than 100 million working days are lost each year due to LBP; with another study showing that LBP is a major cause of morbidity and lost production for USA civil service workers (Guo et al., 2015). In Austria, musculoskeletal problems accounted for the highest number of sick leave days in 2017, with LBP being one of the most commonly reported problems (Mayer et al., 2019). In addition, LBP affects return to work. A systematic study by Wynne-Jones et al, (2014) on work absence and return to work variations due to LBP showed that the proportion of people with LBP who returned to work after one month was 68.2% (Wynne-Jones et al., 2014). The 32% who did not return to work within one month were an important proportion who need intervention in order to prevent prolonged absence from work (Wynne-Jones et al., 2014). Furthermore, there is little or no research done in this regard in Africa.

Lower back pain also affects work performance (Wynne-Jones et al., 2014; MaVy et al., 2014). Work performance is the process of carrying out or accomplishing an action, task or function which represents civil service workers' efficiency and performance (Sickles and Zelenyuk 2019). A study based in rural western Kenya in particular, revealed LBP prevalence of 64.9% among the primary school teachers with the majority of the teachers reporting moderate to disability due the LBP (Elias et al., 2019). Lower back pain can lead to stress, with consequences to physical and mental health and impact on their professional performance. In Botswana, the prevalence appears to be high in other occupations as shown in a study of 1747 teachers over 12-month that showed the prevalence of LBP was 55.7%, with 67.1% of them reporting minimal disability, as compared to documented prevalence rates in other African countries (Patience & Derek 2014). School teachers' regular physical exercise was negatively associated with LBP (Patience & Derek 2014). Thus an understanding of how people experience LBP and how it influences work performance is vital as part of promoting occupational health and wellbeing for civil service workers. It is also important as promoting wellbeing in civil service workers, the medical costs to the state will be reduced and services to the population by the civil service workers will be increased.

1.2 Statement of the problem

Lower back pain is a health problem that causes discomfort; it limits functioning and can influence participation in life events. There is evidence showing that LBP is common and prevalent in school teachers in Botswana as shown in a study of 1747 teachers over a period of 12 months, which showed the prevalence of LBP was 55.7%, with 67.1% of them reporting minimal disability (Patience & Derek 2014). However, the prevalence of lower back pain is not known in other civil service workers in Botswana. From the researcher's experience working with patients with musculoskeletal problems including LBP, many patients request sick leave to manage the pain. This results in a prolonged absence from work, loss of man-hours, and increased medical costs. Research on LBP experience, how it is managed, and its influence on the working population is scarce in Botswana.

1.3 Aim of the study

The study aimed to establish the prevalence and influence of lower back pain on work performance of civil service workers in Botswana.

1.3.1 Objectives of the study

The objectives of the study are:

1. Determine the prevalence and the associated risk factors of LBP in civil servants accessing a physiotherapy private practice in Botswana.

2. Explore how LBP affects civil service workers and how LBP is managed.

3. Explore the influence of LBP on the work performance of civil service workers.

4. Determine the association between LBP and risk factors

1.4 Significance of the study

Lower back pain is recognized as one of the conditions that can cause discomfort and loss of work hours for sufferers. The findings of this study will inform future interventions looking at LBP management and prevention care specific to civil service workers. The findings of this study can inform occupational health-related programs for civil service workers to ensure the prevention of LBP, support workers' wellbeing, and recommend a change in the work-environment and the life-style of the civil service workers. Lastly, the findings of the study can inform future intervention studies looking at developing work based interventions for civil service workers.

1.5 Dissertation outline:

Chapter 1 Gave an overview of the problem statement, study aim and the objectives

Chapter 2 Reviewed relevant literature and focused on general ideas about the influence of lower back pain on work performance. It also critiqued prior studies in the field under investigation.

Chapter 3 Outlined the methodology used to carry out the research. The research design, the setting, the participants, sampling procedures, methods used to collect data, and data collection procedures were outlined, taking into account ethical considerations.

Chapter 4 Presented research findings and interpreted the data.

Chapter 5 Included the discussion of the results in relation to previous studies.

Chapter 6 Presented the conclusion with the recommendations.

Chapter 2

Literature Review

2.0. Introduction:

In chapter two, the researcher presented the review of relevant studies on lower back pain (LBP). The following sub-topics were covered in this review; the global prevalence of LBP; the risk factors associated with LBP (age, body mass index (BMI), gender and comorbidities); prevalence of lower back pain among civil service workers; ergonomics and LBP; work type and LBP; working hours duration and LBP; duration of work years and LBP; work performance and LBP; prevention and management of LBP. This literature review included literature from articles published in the English language from 2011 – 2022. Google scholar, Medline, PubMed, Scopus, and Science direct, were used to search relevant literature. The following keywords were used: lower back pain, civil service workers, risk factors, work performance.

2.1. Global prevalence of lower back pain

Globally, the most known musculoskeletal disorder is the lower back pain (Wu et al., 2017). Hoy et al., (2014) defined lower back pain as pain located between the inferior part of rib number twelve and the inferior gluteal folds accompanied without or with radicular pain to one or both legs and may last for a duration of one week (Hoy et al., 2014). Low back pain is one of the first ten conditions that have a bigger impact on the global burden of diseases more than lung cancer, HIV, premature birth, chronic obstructive pulmonary disorders or malaria and accounting for the sixth highest (Wu et al., 2017). The global burden of disability due to LBP has been rising since 1990, the reported lifetime prevalence of LBP ranges between 7.5 to 11.9% (Wu et al, 2020).

Lower Back pain prevalence varies by country. For example, there are differences in reported LBP prevalence in Africa and high-income countries (Morris et al., 2018). The reported prevalence of LBP in Africa ranges between 17% - 69% (Morris et al., 2018). Whereas the prevalence of LBP in high income countries is between 60% - 70% (World Health Organization 2016). Studies show

that LBP is higher, in high-income countries than the African countries may be due to the fact that there are fewer studies focusing on LBP in African countries and also the health information systems in African countries are inadequate (Mbondji et al., 2014; Koumamba et al., 2021). This points to the need to strengthen surveillance on LBP and the associated risk factors in African countries.

2.2. Risk factor associated with lower back pain

There are multiple risk factors linked to LBP. The reported risk factors include age, gender, smoking, prolonged sitting, heavy physical laboring, long durations of driving, increased body mass index and comorbidities such as hypertension and diabetes (Koyanagi et al., 2015; Sribastav et al., 2018).

2.2.1 Aging and lower back pain

Age plays as a huge contributing factor to LBP. The prevalence of LBP rises from the age of 35 years and then peaks at the age of 55 years (World Health Organization 2016). This implies, that as the population ages, LBP will proportionately increase due to the degeneration of the lumbar spine associated with aging (Berg et al., 2020). Lower back pain prevalence in the older population (60 – 86 years) range between 36% and 70% (de-Souza et al., 2019). People over the age of 80 are three times more likely than those between the ages of 50 and 59 to suffer from severe LBP (Berg et al., 2020). Chronic LBP in females and males aged 65 years or older, was shown to be 24.2% and 12.3% respectively in a Spanish study, while chronic LBP was found to be prevalent in 58 % of patients aged 77 years in an Israeli study (Fernandez-de-las-Pena et al., 2011). The working age group also experience high prevalence of LBP. The majority of back problems usually start from the age of 20-40 years, but the condition gets worse by age of 40 (Casazza 2012). This is the age most workers are engaged in full time employment and hence fill the pain with time. A methodologically stronger study is required to investigate the link between aging and lower back pain and most especially in African context

2.2.2. Gender and LBP

There is evidence showing that females are prone to suffer LBP than males (Shemshaki et al., 2013; Abdulmonem et al., 2014). Data extracted from the global burden of disease (2017) study, showed an age-standardized LBP prevalence was more in females as compared to males (Wu et al., 2017). Similarly, a cross sectional study by Kahere and Ginindza (2021) looked at adults in selected hospitals in Kwazulu Natal and found that female participants had a higher prevalence of chronic LBP than the male participants (Kahere and Ginindza 2021). The increased prevalence of LBP in females than males as compared to the middle aged population could be due to menopause, child care, house duties and work (Wang et al., 2016). The vulnerability among women for LBP needs to be explored further to understand the unique risk factors women face.

2.2.3. Body Mass Index and lower back pain

Evidence shows that there is a significant association between body mass index (BMI) and LBP (Biglarian et al., 2012). Obesity has been a global problem in recent years and can be one of the possible causes of LBP. The lower back joints in the spine becomes strained following the shifting of the pelvis forwards due to the heavier weight gained by an individual producing symptoms of pain, tightness and soreness (Chou et al., 2016). Two studies have shown the rising rate of LBP in young adults is linked to obesity (Hershkovich et al., 2013; Brady et al., 2016). A prospective study by Su et al (2018) based in the United States of America looked at data for a multicenter osteoarthritis initiative and showed the BMI (a ratio of the weight and the height squared) was directly proportional in increase with LBP as higher prevalence of LBP was associated with higher incidence of BMI than in the normal underweight categories of BMI groups (Su et al., 2018). Similarly in another study, low back pain was reported in patients with a higher BMI and associated with obese patients (Wertli et al., 2016). Possible reasons may be due to obese patients living a sedentary life or due to poor postures adapted by patients with a high BMI (Barnes 2012).

2.2.4. Comorbidities' and LBP

Literature shows that obesity is associated with other underlying conditions such as diabetes and hypertension which can increase the risk for LBP (Walsh et al., 2018; Lima et al., 2020). A study

done on an institutional data base in the United States of America demonstrated that the metrics of diabetes disease progression was associated with LBP (Rinaldo et al., 2017). Another study in Iran done to determine the prevalence of LBP in diabetic patients showed a prevalence of 63.4% and LBP presented as a painful and frequently disabling problem (Eivazi & Abadi 2012).

Hypertension is also linked to LBP as some studies have shown. A Korean based study showed a prevalence of 34.4% for LBP in participants with hypertension (Bae et al., 2015). Similarly another study showed that disc degeneration was likely to increase in subjects with hypertension by 50% (Samartzis et al., 2014). This may be due to the fact that hypertensive persons are inactive (Sitorus et al., 2021). And this leads to loss of bone mineralization due to sedentary life styles. However, some authors regard obesity to be probably a LBP causing factor, though less dominant, while other authors consider it is a risk factor (Shiri et al., 2010). More research to establish the association or causality is needed.

Impact of LBP

Lower back pain is a condition that affects people the world over. Lower back pain can affect the health and wellbeing of an individual (Husky et al., 2018). It's been dubbed a "twentieth-century conundrum" because it continues to cause disability and misery in a higher percentage of the adult population lifetime (Manchikanti et al., 2014). Lower back pain also affects work life and it is also the common reason patients seek outpatient Physiotherapy (Tarimo & Diner 2017) and medical doctor consultations (Lim et al., 2019; Ikeda et al., 2019). LBP is a prevalent health condition affecting work life, affecting work performance and in turn, work life can be a risk factor for LBP. Civil service workers typically in administrative jobs who include teachers, health workers, and security workers are at a high risk of development of LBP, as almost 80% of their work postures/positions are suspected to be wanting (Fanta et al., 2020). Similarly, in another study LBP prevalence was 50% among civil servants at a British Whitehall II study cohort (Lallukka et al., 2018). Many civil service workers suffer from LBP but do not report it as an injury (Yang et al., 2016). Lower back pain is known to affect about 80% persons during their life time and this causes pain and disability leading to extended sick leaves among those working (Wong et al., 2017).

2.3 Prevalence of lower back pain among workers

Lower back pain is among the most problematic and commonly experienced condition among the working population worldwide (Wami et al., 2019). According to the Global Health Group (2021), 70% of years lost due to disability relating to LBP accounted for working-age group persons between 20-65 years. Disability in all age groups relating to lower back pain rose between 1990 and 2019 and with biggest numbers in the age ranges of 50 – 54 years age bracket in 2019 (Global Health Group 2021). A study by Yang et al, (2016) looked at data on workers drawn from a national health interview survey and found that LPB affects all the professions (Yang et al., 2016). Reports from high-income countries have shown a high prevalence of LBP among civil servants (Fatoye et al., 2019). In Germany, findings from one study looked at staff members of a school for children with multiple and severe disability and showed that 38.7% of the teachers had LBP (Claus et al., 2014). Whereas a study based in Poland, that analyzed data for 508 participants registered at a professional marketing company, found that LBP prevalence was 22.6% (Henn et al., 2014). Bener et al., (2014) researched on LBP in primary health care employees in Asia and showed a very high prevalence of 56.5% (Bener et al., 2014). From the above reviewed studies, the prevalence has been shown to be high in most high-income countries.

Similar reports on LBP among workers have been highlighted in African based studies. The prevalence of LBP in workers in Africa ranges between 38.6% - 64.9% (Omokhodion and Sanya 2013; Elias et al., 2019). In the study of Omokhodion & Sanya (2013), in Ibadan Nigeria, they reported that 38.6% of the civil service workers, had LBP (Omokhodion & Sanya 2013). Another study based in rural western Kenya in particular, revealed a higher prevalence of 64.9% of the primary civil service workers had LBP and the majority of the civil service workers reported moderate disability due to the LBP (Elias et al., 2019). In Botswana, 55.7% of the school teachers had LBP in 2012 (Patience & Derek 2014). The gap identified in the study in Botswana is that the study only reported on one profession, the teachers. Thus a comprehensive study looking at LBP among civil service workers is needed.

2.4. Ergonomics and LBP

The international ergonomics association defines ergonomics as a discipline scientifically concerned with the interaction between the human body and the work environment with the aim of maximizing performance and wellbeing (Mao et al., 2015). Work productivity or performance are scalable behaviors or actions and outputs that employees engage in, that brings about contribution and results to relevant goals of an organization (Lopez-Garcia et al., 2019). To ensure quality work performance, essential elements in ergonomics such as workplace risk assessment and management, and worker training, ergonomic program implementation, evaluation of the ergonomic programs and worker return to work care program must be addressed first (Madhwani and Nag 2017). There are many hazards at work that can increase the risk for LBP. Work- related risk factors for LBP include incorrect posture, improper lifting techniques, over use, longer durations of work, heavy manual laboring, and body vibrations (Coenen et al., 2013).

2.5 Work type and LBP

The type of occupation can increase the risk for LBP. According to several previous studies there is strong evidence showing that occupations that require one to sit long hours increase the risk for LBP (Bandpei et al., 2014; Waters and Dick 2015). One study by Korkmaz et al., (2011) carried out on school teachers in Turkey showed that LBP was indeed more in teacher who sat longer more than those who stood long hours (Korkmaz et al., 2011). Similarly, results from another previous study showed that uncomfortable back support, static positions and sitting long hours were risk factors associated with LBP (Yue et al., 2012). Prolonged sitting cause's high pressure and lumbar fatigue which links to the straining of the lumbar curvature or the spinal curves, a precursor for LBP onset (Zemkova et al., 2021).

The use of improper furniture that are not ergonomically designed in the work place also contributes to low back pain. Literature shows that manual work, coupled with other body postures during lifting, pulling/pushing are all potential risk factors (Raffler et al., 2020). Similarly lower back pain, is strongly linked to factors which include work that involves heavy physical demands (Shaw et al., 2011). On the same note, unmodified working position, including work stressors,

pressure to beat deadlines, may be a contributing factor in development of LBP (Janwantanakul et al., 2011).

2.6 Working hours duration and LBP

Work time or duration is an important resource for work performance. The normal standard working hours for employees is estimated to be eight hours per day which totals to 40 hours a week (Giattino et al., 2020). However, in other circumstances, employees may work overtime or long hours and this may affect their body functioning. For example, one study in teachers with a mean number of hours (4.5+/- 2.9) of teaching per day and mean per week of 16.6+/-6.0 hours were associated with lower back pain (Abdulmonem et al., 2014). Another study in Germany done on call-center employees showed an association of LBP with participants who statically sat more hours than the mobile ones (Bontrup et al., 2019). Longer duration of work is a risk factor in the development of LBP that needs to be monitored to prevent the occurrence of lower back pain.

2.7 Duration of work years and lower back pain

Working repeatedly for longer durations of time in active workers was associated with occupational exposure LBP (Plouvier et al., 2011). An Indonesian study showed 53.3% of civil service workers with 10 years and above of working experience complained of LBP (Rachmawati and Muthia 2018). Another systematic literature search study conducted on Medline, PsycIMFO, and CINAHL about employees' workload, showed that over-worked employees where associated with chronic LBP (Buruck et al., 2019). In another similar study in Norway using data from HUNT2 and HUNT3 nationwide surveys, showed a positive relationship of long durations of physical activities at work as the risk of LBP (Heuch et al., 2017). Furthermore in another systematic study on participants engaged in a long time repetitive bending job showed high odds of LBP in senior workers (Wami et al., 2019). Similarly, another study to determine the joint association of LBP intensity and physical work demands revealed that senior workers were associated with LBP (Nygaard et al., 2020).

2.8 Work performance and LBP

Several studies have different contradictory definitions of work performance. A few define work performance, as the measurement of organizational goals and objectives and it is considered a variable independently measured in the organizational behavioral sector (Sihag and Rijsdijk 2019). Work-performance includes observed actions people do that are relevant to the goals achieved and measured in each person (Daryoush et al., 2013). A meta-analysis study, showed an association between standard work performance and the degree of job satisfaction to be significantly related (Ashraf et al., 2017).

2.9. Prevention of low back pain in civil service workers

Prevention of diseases is the action or efforts taken and measures aimed at stopping onset, progression and minimizing the progression of the disease (Martins et al., 2018). There are three types of prevention levels namely; primary, secondary and tertiary prevention (Kisling and Das 2021). Primary prevention of LBP focuses on preventing the occurrence of predisposing factors or risk factors responsible for development of LBP. Examples are; observing ergonomics – correct postures during work, keeping physically fit through exercises etc. Secondary prevention of LBP focuses on earlier detection and diagnosis of LBP onset and early treatment and tertiary prevention targets the clinical outcome stages of LBP in order to reduce the severity of the condition.

Preventing LBP onset in the work place includes identifying risk factors, training workers on ergonomics, such as correct lifting techniques, avoiding poor postures and adapting a healthy lifestyle (Schaafsma et al., 2015; Roman-Liu et al., 2020). According to the spectrum of prevention, interventions have to strengthen skills and knowledge, promote community education, foster networks and coalitions, influence policy and change organizational practices and legislation (Cohen and Swift 1999). There is need for research to apply the spectrum of prevention in LBP prevention in a workplace.

2.10 Health Education in LBP

Health education is the process of imparting information to people through structures that are well planned in order to enable them to make better decisions concerning their health and wellbeing (Hasyim 2018). In patients with acute or sub-acute LBP, patient education has been shown to promote longer-term re-assurance, lessen any suffering relating to pain, so as to minimize healthcare utilization (Traeger et al., 2015). Educating people on low back pain reduces reliance on medications, reduces worries related to the condition and its outcomes, and will result in more patients understanding well all about their condition (Snyder et al., 2011). Another study concluded that when compared to exercise alone, health education reduced pain severity, and improved emotional, physical and mental wellbeing (Geneen et al., 2017). Furthermore, clinical recommendations urge that health education increases individual self-care and re-assurance of instructions to patients is as important as treatment given to persons with LBP (Sharma et al., 2020). Empowering individuals with information is key to increasing personal health and central to person centered care. Correct advice in the management of LBP goes a long way to reduce the recurrence of LBP (Pergolizzi and LeQuang 2020).

2.11 Exercises to prevent recurrence of LBP.

Several studies show that exercise therapy is one of the most widely prescribed treatments for people with persistent nonspecific LBP and there is strong evidence for its effectiveness (Gordon and Bloxham 2016). One researcher discovered that in order to understand better the advantages with exercise, then the length of symptoms of LBP are grouped as chronic (more than 12 weeks), sub-acute (4 – 12 weeks) or acute (from 1 day to 1 month) and specific exercises to all the groups was shown to be beneficial (Gianola et al., 2019). Therefore the role of exercises or movement - based therapy in the treatment of LBP differs depending on how long the symptoms have been present (Hidalgo et al., 2014). Furthermore, research shows that people with chronic LBP who engage in moderate to vigorous leisure activities on a regular basis have less pain and better function than those who are less physically active (Shipton 2018).

2.12. Occupational health programs for civil service workers

There is need for occupational health program to ensure worker safety and good wellbeing (Sorensen et al., 2018). Workers are prone to work or occupational hazards, therefore their safety, welfare during work is important. Through occupational health and safety procedures, workers' health can be secured (Tshoose 2014). Regular occupational health programs which include risk assessments, ergonomics assessment as mandated by the Occupational health act are necessary to ensure worker safety and to minimize injuries (Eliasson et al., 2021). For example the occupational health act of 1993 of South Africa is an example. Though the implementation and monitoring of worker policies and guideline remains a challenge in government institutions (Mohamed et al., 2018; Mwendera et al., 2019).

2.13 The Management of lower back pain.

In managing lower back pain, many strategies can be employed which may include; alternative medicine, peer support, patients' education, exercises, Physiotherapy, counseling, medication (Kizhakkeveettil et al., 2014; Shipton 2018). In case of early development of LBP, treatment may include diagnostic measures, therapeutic measures like Physiotherapy, medication which may include analgesics and anti-inflammatory drugs, or occupational rehabilitation (da Silva et al., 2019).

2.13.1 Medication

Lower back pain intervention may include medication or pharmacological intervention (Furlan and Murphy 2016). People with back pain can buy non-steroid ant-inflammatory drugs (NSAID) like Paracetamol, and topical analgesics over the counter (Bart et al., 2020). However, studies have shown some painkillers are ineffective for the treatment of LBP (Machado et al., 2017). There are international guidelines in the management of LBP by general practitioners, however, some general practitioner follow the guidelines, and others deviate from the guidelines (Piccoliori et at., 2013; Darlow et al., 2014). The management of LBP requires a multi-disciplinary team if better outcomes are to be realized (Petit et al., 2014).

2.13.2 Alternative medicine

Alternative medication in the treatment of LBP is the use of un-tested and not effectively proven medication instead of the mainstream traditional medication (Simmons 2011; Kizhakkeveettil et al., 2014). LBP sufferers have found conventional medical therapies to be ineffective and to find pain relief, have turned to complementary and alternative medication (Ghildayal et al., 2016). Complementary and alternative medicine is prevalent as partly their use depends on personal beliefs and satisfaction in using them, but unknown to their doctors largely (Tsang et al., 2017). Complementary and alternative medicine is quite often not disclosed by the users and health professional are not familiar with them, which may lead to overuse and may be contradictory to other therapies (Liang and Gagliardi 2016). Alternative medication aims to achieve some healing results and is often considered complementary and may include, massage, drinking green tea, acupuncture, meditation, relaxation techniques like Yoga (Akter et al., 2021). Literature on the use and effectiveness of alternative medication in treating LBP is scarce (George and Topaz 2013).

2.13.3 Physiotherapy and LBP

Physiotherapy is one of the treatments for lower back pain (Shipton 2018). Physiotherapy often provides relief and restores function in persons suffering from LBP (Almeida et al., 2018). Literature suggest better outcomes in management of LBP can be achieved with combining modalities like shortwave diathermy, moist heat, manual therapy, traction, and massage (Kjaer et al., 2018). Furthermore, several studies show different approaches are employed in the management of LBP, which may include psychosocial support and health education on top of the conventional management (Karayannis et al., 2012).

Therapeutic exercises form part of the Physiotherapist's modalities in the management of LBP, these may also include exercises to prevent recurrence of LBP (Finta et al., 2018). A study by Fersum et al, (2013) showed that LBP responds well with exercises that stabilize the lumbar spine and strengthen the pelvic muscles (Fersum et al., 2013). One of the most recommended approach in managing LBP is the McKenzie's approach (Namnaqani et al., 2019). Physiotherapists who are

trained in the technique and have experience, choose a combination of conventional treatment of LBP with McKenzie's approach (Hoffmann et al., 2013).

Another important area in managing LBP is the correction of posture to avoid complications arising due to poor posture (Foster et al., 2015). Correct ergonomics is important in managing and preventing LBP (Hill et al., 2011). Lower back posture is deep rooted in thoughts of many people and to fight pain, health care professionals have instructed people to correct their posture (Kripa and Kaur 2021). There's a common belief that bending, lifting, standing or sitting incorrectly causes lower back pain and most health care professionals' advice is in line with this perspective (Slater et al., 2019).

The use of electrotherapy is another treatment modality for LBP (Thiese et al., 2013). Electrotherapy promotes soft tissue healing through increased blood circulation and loosening adhesions (Haile et al., 2021). Physical modalities like heat/cold therapy, low level laser therapy, transcutaneous electrical nerve stimulation (TENS) are effective physical interventions for chronic lower back pain (van Middelkoop et al., 2011).

2.14. Summary of the chapter

This chapter reviewed literature on lower back pain in general, the prevalence of LBP, the influences of LBP on civil servants' work, and the management and prevention of LBP. The literature review clearly showed that LBP is prevalent among civil service workers globally. Lower back pain can cause disability and lead to poor work performance. Risk factors associated with LBP like sitting or standing long hours, BMI/obesity, hypertension and work stress. The next chapter will outline the methodology followed to address the study aim

CHAPTER 3

3.0 Methodology

3.1 Introduction:

Chapter three presents the methodology and the approach in the methods which were employed in this study. Outlined further are the sample selection, population size, study setting and the study design. In addition, the chapter described the instrumentation and outcome measures, the procedures, methods employed to collect the data and analysis of the statistical data plus issues pertaining to ethical clearance.

3.2 Study design: Concurrent mixed methods approach was used. A mixed method study involves the collection, analysis and integration of qualitative and quantitative data in one study (Wisdom and Creswell 2013; Goldman et al., 2015). With employment of the concurrent mixed method, the researcher collected and analyzed both qualitative and quantitative data concurrently. Concurrent mixed methods helped the researcher better understand the extent and the effects of LBP in terms of the work performance of civil service workers in Botswana. The study had two parts: Part 1- retrospective study and Part 2 -qualitative study.

3.3 Study setting:

The study was conducted at a private Physiotherapy practice (No. C02015/13229) established in 2015 and based in Gaborone, Botswana. The Physiotherapy practice offers general out patient's physiotherapy services including rehabilitation for neurological conditions and provision of orthopedic assistive devices. The number of patients seen at the Centre on average are 120 patients per month since the 1st of January 2018.

Gaborone is the capital city of Botswana. Its population is 231,626 (10% of the population of Botswana) and it is home to 421,907 inhabitants according to 2011 population census. Employed persons in Botswana average 391,980. From 2007 to 2020, the employed persons reached an all-time high at an average of 492,914. In Botswana, the age rate of labor participation is between 15 to 65 years and amounts to 73.6% of the total population (Aaron O'Neil 2021).

Botswana government provides universal health care for all of its citizenry through a comprehensive public health care system. It is a decentralized model of health operating 98% of the health care facilities across the country. Private health care services are also available. The pillar of health service delivery is primary health care (PHC). Health facilities in Botswana's 27 health districts include 26 hospitals, 299 clinics, 338 health posts, 844 mobile stops in its extensive network (MOH; Statistics Botswana 2015).

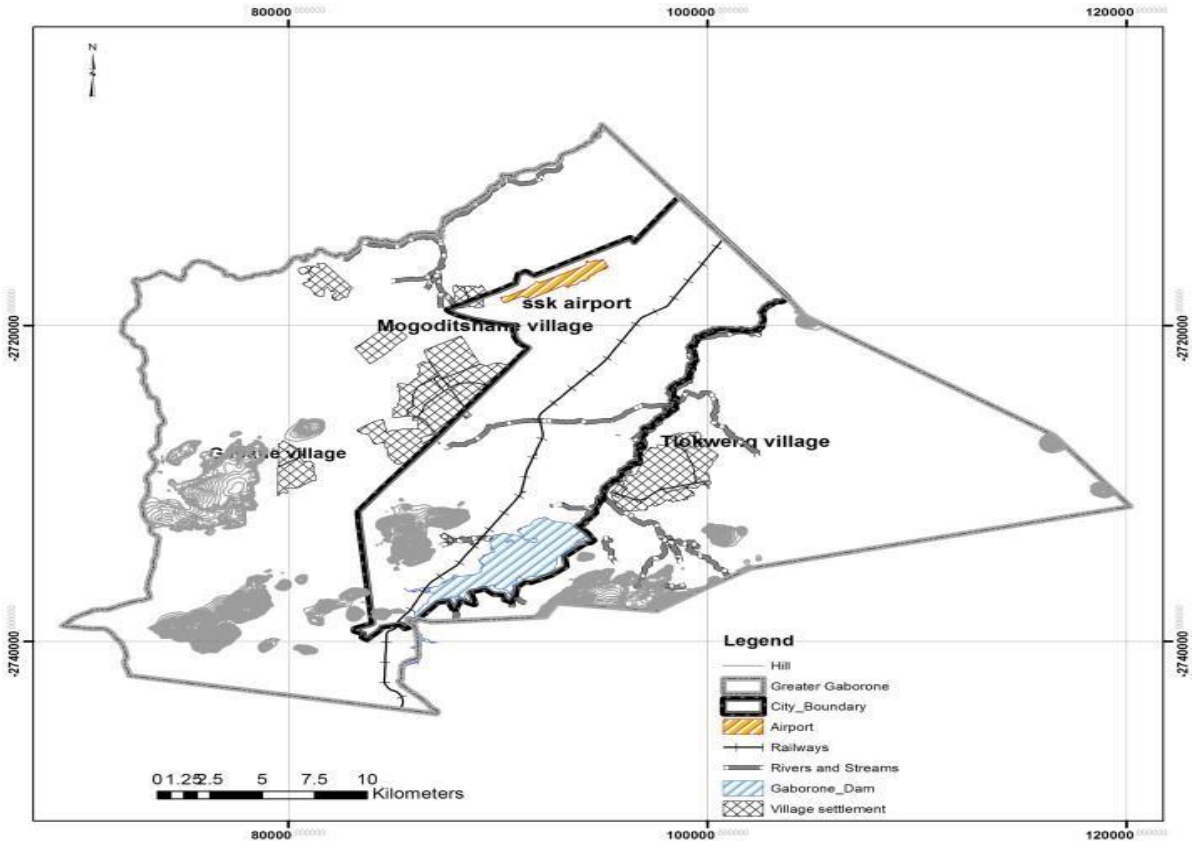


Figure 3.1 Map of Gaborone.

3.4 Part 1: Retrospective study

3.4.1 Type of Study

Retrospective medical record review design is a design that uses data which has already been collected (Sarkar and Seshadri 2014). It is a research design in which pre-recorded, patient-centered data are used to answer one or more research questions (Vassar and Holzmann 2013). The advantage with this study design is that it is a less expensive study and one can use or access readily available and existing data.

The retrospective medical record review design addressed the following objectives:

- To determine the prevalence and the associated risk factors for LBP of civil service workers in a private practice.
- Determine the association between LBP and risk factors

3.4.2 Study participants:

The source of information was extracted through medical records of all civil service workers (who included teachers, nurses, and members of the armed forces, support staff, administrative officers, drivers and any other who qualified as a participant) who used the services at the physiotherapy private practice from 1st January 2018 to January 2021.

Inclusion Criteria: Medical records of civil service workers who sought care at the physiotherapy practice. Male and female civil service workers aged between 18 years and 60 years were included.

Exclusion Criteria: Medical records of civil service workers who were pregnant, had neurological conditions such as stroke, spinal cord injury, amputees and any other disability were excluded.

Amputees, stroke patients, spinal injury patients and pregnant women usually present with LBP which is not necessarily from work or occupational origin or etiology.

3.4.3 Sample Selection

The source of data was from hard copies of the medical records/chats kept in a locked cabinet of the private practice. A summary of the medical records was kept in excel (soft copy) by the private practice administrator. The medical records included the demographic data and treatment for the patients seen at the private practice.

Purposive sampling was used to select the medical records. Purposive sampling is non-random technique where the onus of choice of participants is on the researcher's discretion and it's deliberately done to find the quality of information needed for the study (Ilker et al., 2016). The researcher selected only medical records for civil service workers' disease/s and detailed treatment modalities. The patients' records were first extracted from the Excel soft copy on the practice's computer which indicated the file number for the patient. The patients' files are kept in the filing cabinets of the private practice. Each patient's record was coded with a unique data reference number, and a data extraction sheet (Appendix F) was used to collect information on the participants.

Sample size

Naing et al., (2006) sample size calculator was used to calculate the sample size of medical records. Calculation was based on data from a previous reported study that looked at the prevalence of LBP among 1747 teachers over a 12 months period in Botswana (Patience and Derek 2014). The prevalence of LBP was 55.7% (Patience and Derek 2014). At a level of confidence of 95% and the significance of 5% and 55.7% prevalence of LBP, the minimum calculated sample size required was 380 (Naing et al., 2006).

3.4.4 Instrumentation and Outcome measures

The researcher used a self-designed data extraction sheet (Appendix F) to record all the necessary information from the patient's records. The questionnaire included demographic data and questions related to LBP; date of onset, severity, pain intensity, number of times attended treatment, treatment modality, and presence of pain, intensity and location of pain. To ensure content validity, the data extraction sheet was developed based on previous studies on LBP and was validated for content validity by two senior Physiotherapists with experience in research and treating musculoskeletal problems.

3.4.5 Procedure

Prior to data collection, ethical clearance (Appendix I) from the health research division of the ministry of health and wellness and from the human research ethics committee (medical) of the University of the Witwatersrand (clearance certificate number M210910 - Appendix H) was granted to conduct research in Botswana. The researcher requested permission (Appendix J) from the private practice administrator to access the patients' records. After the researcher requested permission from all the potential participants to use their information in the medical records via email and telephonically, the researcher proceeded to carry out the pilot study first and then the main study.

Pilot Study

A pilot study was conducted by the researcher to test the questionnaire and the data collection procedure after training on the whole data collection process. Only ten (10) patient's files were used in the pilot study. Patients' records were selected starting with the medical records from 1st January 2018 to 30th January 2021. Each patient's record was given a unique data reference number and a data extraction sheet was used to collect information on LBP and risk factors.

The ten files for civil service workers who sought Physiotherapy services at the private practice from 1st January 2018 to 30th January 2021 were extracted from the filing cabinets. A data extraction sheet created by the researcher was used to extract the relevant patients' information. Data extracted from

the file included patient identifier, date, gender, marital status, type of work, department in the government, diagnosis, date of diagnosis, type of pain, severity of the pain, location of the pain, BMI, diabetes, hypertension, any other chronic disease/s, treatment modality and number of times attended. Data were exported to the Microsoft excel spreadsheets version 2013 using a check list designed by the researcher for analysis. The data were captured into Microsoft Excel and then exported into SPSS version 22. Analysis of the quantitative data was done using descriptive statistics on the Statistical Package for Social services (SPSS) version 22. The outcome of the pilot study was discussed with the supervisor and amendments and improvements on the data extraction sheet variables and changes in the data extraction sheet were effected, for example the physical addresses of the participants, the referring doctors, name of medical aid and numbers were dropped. Six out of the ten files were incorporated in the main study.

Main Study

Three hundred and thirty nine (339) files/chats for civil service workers who sought Physiotherapy services at the private practice from 1st January 2018 to 30th January 2021 were extracted from the filing cabinets. A data extraction sheet created by the researcher was used to extract the relevant patients' information. Data extracted from eligible chats included; patient identifier, date, gender, marital status, type of work, department in the government, diagnosis, date of diagnosis, type of pain, severity of the pain, location of the pain, BMI, diabetes, hypertension, any other chronic disease/s, treatment modality and number of times attended. Data were exported to the Microsoft excel spreadsheets version 2013 using a check list designed by the researcher for analysis. The main study followed the same procedure as the pilot study**.**

3.4.6 Data Analysis

All the data were captured on Microsoft Excel spreadsheets version 2013 and then exported into SPSS version 22. Analysis of the quantitative data was done using descriptive statistics on the Statistical Package for Social services (SPSS) version 22.

A p-value < 0.05 was considered to be statistically significant. Descriptive statistics of frequency and percentage was used to summarize categorical variables and median and interquartile range was used to summarize continuous variables. Chi-squared test and Fischer's exact test was used to

determine the association between diagnosis and categorical variables (age, gender, marital status, BMI, presence and absence of comorbidities and job classification).

Table 3.1 Data analysis / statistical test

Research Objective	**Outcome**	**Type of data**	**Statistical test**
Demographic profile	Demographic data	Ordinal Categorical	Median, Mean, Standard deviation, Frequencies, Percentages
Determine the prevalence and the associated risk factors of LBP Association between LBP and the risk factors	LBP prevalence risk factors **Risk factors:** 1. BMI 2. Age 3. Gender 4. Work type	 Linear Linear Linear Categorical	Frequency percentages and Frequency percentages Linear regression. and Linear regression. Linear regression. Logistic regression.
	5. Duration of work	Categorical	Logistic regression.

3.4.7 Reliability and Validity

Reliability measures consistency, precision, repeatability, and trustworthiness of a research (Chakrabartty 2020). To increase reliability, the researcher was trained on data collection process and the researcher followed the proposal plan. The data collection tool was piloted prior to the main study. A test – retest reliability method was employed and done over a period of time on the same data set.

Validity looks at the extent to which the tool measures what it is designed to measure (Bolarinwa 2015). The data extraction sheet was developed based on previous studies on LBP and was validated for content and face validity by two senior Physiotherapists with experience in research (MSC degree) and over ten years physiotherapy practice in the government national referral hospital.

3.5 Part 2: Qualitative study

A qualitative study addressed the following objectives:

- Participants' experiences regarding lower back pain and how LBP is managed.
- The influence of LBP on work performance of civil service workers.

3.5.1 Type of Study: An exploratory qualitative study design using semi-structured interviews was used. An exploratory qualitative study design helps to better explore and understand the nuanced experiences of "why" and "how" rather than "how many" and "how often".

3.5.2 Study participants

Participants were patients with lower back pain who were civil service workers who sought care at the physiotherapy practice from 1st January 2018 to 30th January 2021These participants were a sample from the patients included in the retrospective study.

Inclusion Criteria: Patients working as civil service workers diagnosed with lower back pain and attended Physiotherapy management between 1st January 2018 and 30th January 2021. Male and female participants aged between 18 years to 60 years were included.

Exclusion Criteria: Patients who were currently pregnant, had neurological conditions such as stroke, spinal cord injury, amputees and any other disability were excluded. Whereas people who sustain a spinal cord injury and stroke patients often have permanent and profound neurologic deficits and back pain accompanying the disability, amputee patients and pregnant women also usually present with LBP which is not necessarily from work or occupational origin or etiology.

3.5.3 Sample Selection

These participants were a sample from the patients included in the retrospective study.

The researcher called potential participants with LBP using a landline and others using WhatsApp. Then the researcher explained the study and invited those who acceded to the request to participate in part two of the study. The researcher identified and selected information-rich cases related to the study's objectives from the practice database. Purposive sampling was used to recruit the participants. Purposive sampling is non-random technique where the onus of choice of participants is on the researcher's discretion and it's deliberately done to find the quality of information needed for the study (Ilker et al., 2016). The researcher ensured that different workgroups/classes were covered in the sample selected.

3.5.4 Data collection tool

The researcher developed an interview guide with open ended questions to facilitate the face to face interviews in the English language only (Appendix G). The interview guide had two parts- Part A included the demographic data: age, gender, work type, work duration, and work hours. Part B included open ended questions with probes covering the following topics; the experience of LBP, influence on work performance and how LBP is managed.

3.5.5 Procedure

Subsequent to ethical clearance (Appendix I) from the health research division of the ministry of health and wellness and from the human research ethics committee (medical) of the University of the Witwatersrand (clearance certificate number M210910 - Appendix H) and permission (Appendix J) from the private practice administrator to access the patients' records was granted, data collection commenced. The researcher contacted patients that met the inclusion criteria. The study was explained to the participants, and informed consent was sought.

Pilot study

A pilot study was conducted to practice the interview process. Two participants who met the inclusion criteria were recruited for the pilot study. After the consent was granted and permission to record the interview was given, the pilot interview commenced. The participants completed the demographic data followed by the semi structured face to face interviews at the practice in English. The interviews were audio recorded. The interviews were conducted at the physiotherapy practice at the time and date that suited the participants. Some interview questions and probes were rephrased after the pilot study, for example; how does LBP affect your life in general? And ***Probe:*** *Does LBP Affect Your Job Performance?*

Main Study

Twenty (20) files/chats for (ten males and ten female) civil service workers who sought Physiotherapy services at the private practice from 1st January 2018 to 30th January 2021 were selected from the data set proceeding part one of the study. The researcher telephonically contacted patients that met the inclusion criteria and explained to the patients and invited them to come to the practice at their convenient time and day. When the patients arrived at the practice, informed consent was sought. After the consent was granted and permission to record the interview was given, the interview commenced. The participants completed the demographic data followed by the semi structured face to face interview in English. The main study followed the same procedure as the pilot study. The duration of the interviews was estimated at 20 minutes, however, some interviews took less than 20 minutes and others took more than 20 minutes. The interviews were conducted by the researcher.

3.6 Data Analysis

Data was transcribed verbatim by the researcher with the assistance of a specialist transcriber in the English language spoken in the interview. The research assistant only assist with data analysis. A software for analysis, Max Weber Qualitative Data Analysis (MAXQDA) version 2020 software was used to analyze the qualitative data. A journal was kept by the researcher and notes were jotted during the interview. Thematic content analysis was conducted inductively and then deductively to meet the trustworthiness criteria (Nowell et al., 2017). The transcripts were read and re-read to get a sense of the information shared by the participants. Three transcripts were coded inductively with the supervisor and researcher with qualitative data analysis experience. Meaning units, condensations, coding and categorization were compared and a coding framework was developed. The researcher coded the rest of the transcripts. Thereafter similar codes were categorized and themes were identified together with the supervisor and the research assistant.

Strategies to enhance confirmability, transferability, dependability and credibility, were applied to ensure trustworthiness of the data (Krefting 1991).

Credibility

1. An audit trail throughout the study was kept to capture the daily schedule, logistics of the study, the method and personal reflections like thoughts, feelings, problems, ideas and assumptions.
2. Triangulation of data and interpretation was done by employing a mixed-method research design of both quantitative and qualitative.
3. All interviews were audio recorded.
4. Regular briefing meetings were held with the research supervisor to discuss the research process, findings and data analysis.

Transferability

1. The context and the demographic data of the participants were explained in detail.

Dependability

1. An audit trail of the study process was kept and a detailed description of the data collection, analysis and interpretation was outlined.

2. During data analysis code-recode procedure was employed.

Confirmability

1. All interviews were audio recoded.

2. An audit trail and a journal were kept for the whole study process.

3.7 Ethical considerations

Data collection was done after ethical clearance from the human research ethics committee (Medical) of the University of the Witwatersrand Ref. No. M210910 (Appendix H). Permission from the Health research development division of the MOH&W of the republic of Botswana, to conduct research at a private physiotherapy practice was also sought and granted (Appendix I). Informed consent was requested from all the participants (Appendix B, C, D & E) prior to data collection.

To promote the protection of personal information, the researcher ensured confidentiality and nondisclosure of information from the study participants to any third party. Instead of using actual names of participants, the data was coded. Pseudonyms or letters of the alphabet were used to protect information about individual's personal identifiers such as a name, medical aid numbers, or other identifying numbers.

COVID-19 precautions were adhered to during the face to face interviews;

- The researcher ensured everyone wore a mask that covered both their mouth and nose.
- Stayed 1.5M apart.

- Avoided crowding and poorly ventilated indoor spaces.
- Had sanitizer available.
- Kept a COVID-19 register to document symptoms and included contact details to trace anyone if there was a case of COVID-19.

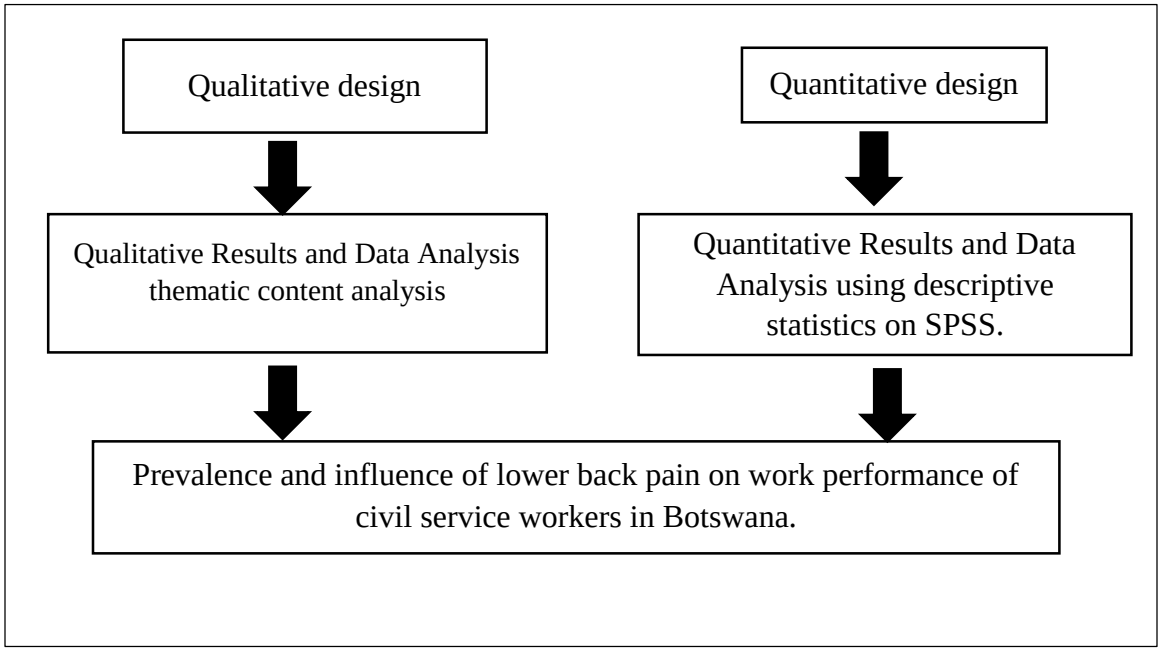


Fig: 3.2 Concurrent mixed design.

Figure 3.2 above illustrated how the concurrent mixed design helped the researcher better understand the extent and the effects of LBP in terms of the work performance of civil service workers in Botswana.

3. 8 Summary of the chapter

This chapter presented the methodology employed in the current study and highlighted the study design selected, the research setting and how the participants were selected. The criteria for inclusion and exclusion were also highlighted. Ethical considerations, procedure for data collection and the instruments used to undertake the study were also presented in this chapter.

Results of the current study are outlined in the next chapter.

CHAPTER 4

Results

4.0 Introduction

Chapter four presented the findings of the study. The results established the prevalence and the associated risk factors of lower back pain (LBP) in a private practice in Botswana, the experience of lower back pain and how LBP is managed and the influence of LBP on work performance of civil service workers.

The results were presented into two sections. Section A - Retrospective Study results and section B - Qualitative study results

4.1 Section A: Retrospective Study

This section presented the findings for objective one;

To determine the prevalence and associated risk factors of lower back pain in a private practice in Botswana.

Three hundred and thirty nine (339) files passed the inclusion criteria of medical records of civil service workers who sought care at the Physiotherapy practice. Records of male and female civil service workers aged between 18 years and 60 years were reviewed and extracted, which was 89.2% of the expected data set.

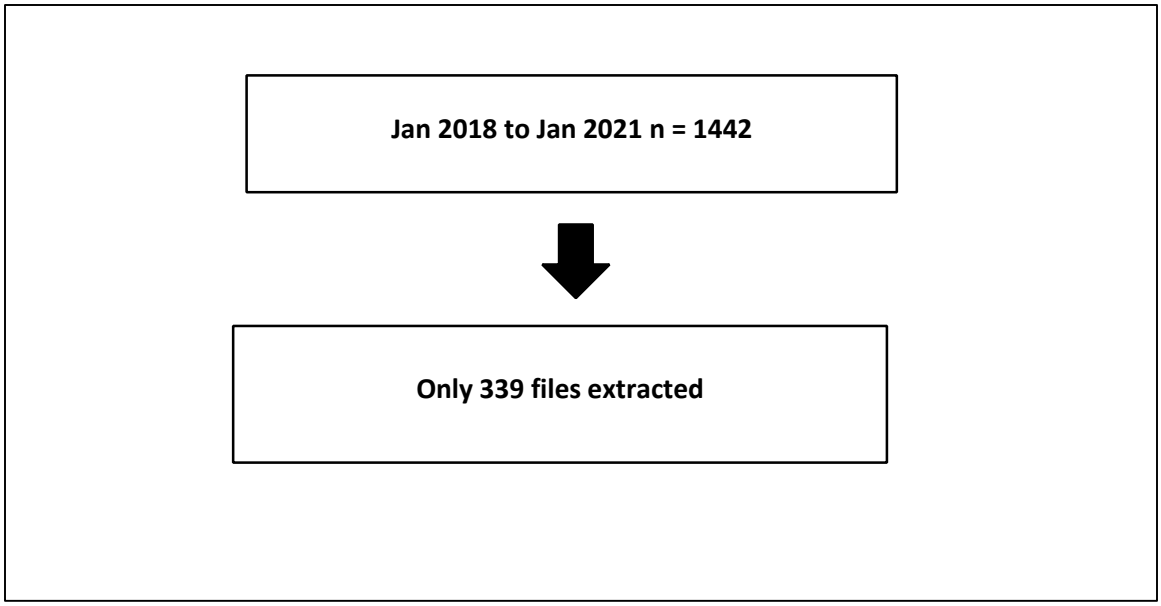


Figure 4.1 Flow of participants files included in the retrospective study (n = 339)

4.1.1 Test for normality

Continuous data of age, duration since injury (months) and number of times attended treatment was tested for normality, the results showed that the continuous variables were not normally distributed ($p < 0.05$), hence non-parametric statistics was used to analyze the data.

Table 4.1: Test for normality (Shapiro-Wilk test)

Continuous variables	**Statistic**	**df**	**p-value**
Duration since injury	0.96	339	0.00
Age	0.97	339	0.00
Frequency of clinic attendance	0.77	339	0.00

4.1.2 Demographic profile of the participants

Table 4.2 below presents the demographic profile of the participants showing the median (interquartile range) was 46 (39 – 52 years) and Standard Deviation of 5.709. The results showed the majority of the participants were female n = 234 (69%) and males n = 105 (31%). Most of the participants 185 (55%) were married.

Table 4.2: Demographic profile n = 339

Demographics n (%)	
Age	
Median (Interquartile range)	46 (39 - 52) years
≤ 35 years	49 (14.5)
36 – 45 years	119 (35.1)
46 – 55 years	134 (39.5)
≥55 years	37 (10.9)
Gender	
Female	234 (69)
Male	105 (31)
Marital status	
Single	150 (44.2)
Married	185 (54.6)
Widowed	4 (1.2)

4.1.3 Job classification

Job classification of the n = 339 participants are shown in figure 4.3. The majority of participants (41%) had office jobs, teaching job classification had 26.8% participants, security was at 13%, and health workers present were 9.7%. The manual labour classification had 5.6% and lastly 3.8% were in the IT/Engineering classification.

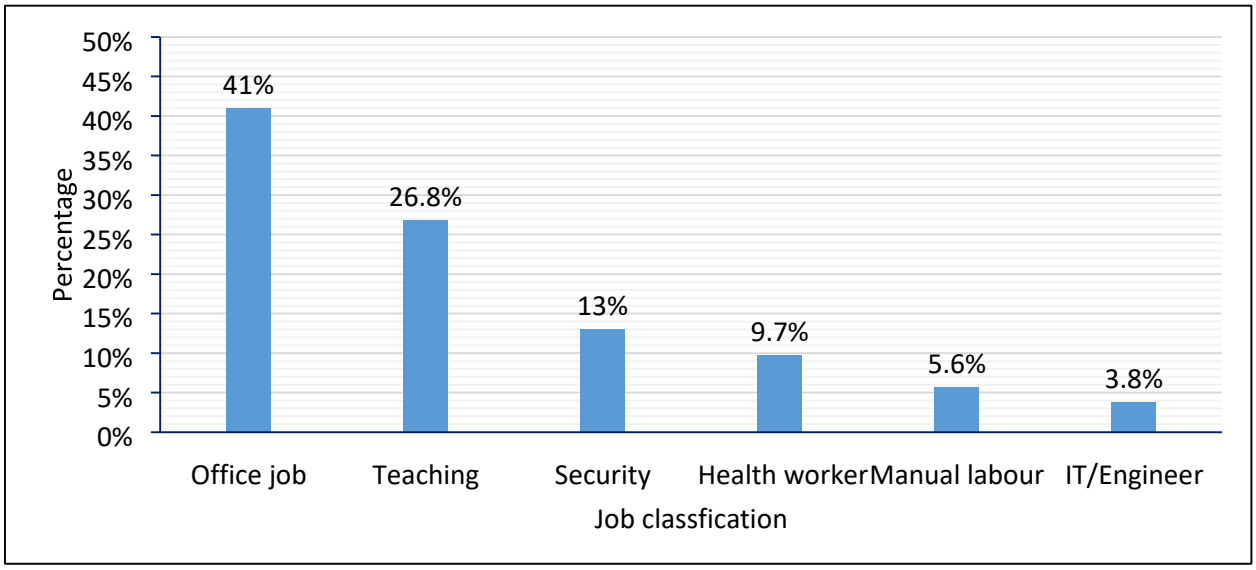


Figure 4.2 Job classification (n = 339)

4.1.4 Presence of co-morbidities

The participants had several co-morbidities such as Hypertension, Diabetes and HIV. Seventeen participants (5%) had diabetes while 322 (95%) did not have. One hundred and three participants (30.4%) had hypertension whereas 236 (69.6%) had no hypertension. Most participants did not report their HIV status 337 (99.4%), while only 2 (0.6%) presented with HIV. Table 4.3 below presents the co-morbidities present in the participants.

Table 4.3: Presence of co-morbidities (n = 339)

Co-morbidities		**n (%)**
Diabetes	Yes	17 (5)
	No	322 (95)
Hypertension	Yes	103 (30.4)
	No	236 (69.6)
HIV	Yes	2 (0.6)
	Not reported	337 (99.4)

4.1.5 Back pain

All the participants experienced back pain. Forty nine point seven (48.7%) percent of the participants had lower back pain as shown in Figure 4.4 below;

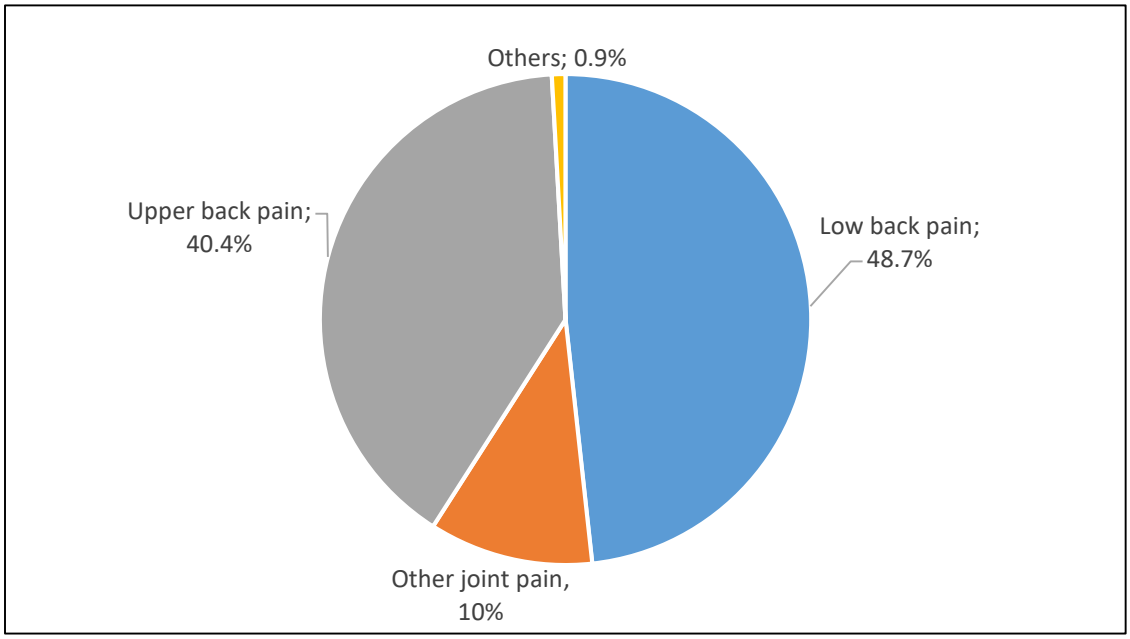


Figure 4.3 Back pain diagnosis (n=339)

4.1.6 Association between demographic profile and back pain diagnosis.

There wasn't any association between the demographic profile and back pain diagnosis ($p > 0.05$). Table 4.4 presents association between demographics profile and back pain diagnosis.

Table 4.4: Association between demographic profile and back pain diagnosis

Demographics	**Low back pain**	**Upper back pain**	**Other joints**	**p-value**
Age in years				
Median (Interquartile range)	45 (39 - 52)	46 (38 - 52	49.5 (39 - 54.5)	0.39
Age in category, n (%)				0.18
≤ 35 years	28 (17)	17 (12.4)	4 (10.8)	
36 – 45 years	56 (33.9)	50 (36.5)	13 (35.1)	
46 – 55 years	64 (38.8)	59 (43.1)	11 (29.7)	
≥55 years	17 (10.3)	11 (8)	9 (24.3)	
Gender, n (%)				0.21
Female	110 (66.7)	101 (73.7)	23 (62.2)	
Male	55 (33.3)	36 (26.3)	14 (37.8)	
Marital status				0.36
Single	69 (41.8)	65 (47.4)	16 (43.2)	
Married	93 (56.4)	72 (52.6)	20 (54.1)	
Widowed	3 (1.8)	-	1 (2.7)	
Fischer's exact test – was used to test the relationship between age category back diagnosis and marital status.				

Chi-Squared test – Gender Kruskal-Wallis test - Age Median (interquartile)

4.1.7 Association between back pain diagnosis and comorbidities

Forty five percent participants with LBP were overweight and obese. There was no significant association between lower back pain diagnosis and all the comorbidities (p-value >0.05).

Table 4.5: Association between diagnosis and comorbidities

Comorbidities	**Low back pain**	**Upper back pain**	**Other joints**	**p-value**
Body Mass Index				0.28
Normal	90 (54.5)	82 (59.9)	21 (56.8)	
Overweight	**45 (27.3)**	**39 (28.5)**	7 (18.9)	
Obese	30 (18.2**)**	16 (11.7)	9 (24.3)	
Diabetes				0.09
Yes	11 (6.7)	3 (2.2)	3 (8.1)	
No	154 (93.3)	134 (97.8)	34 (91.9)	
Hypertension				0.70
Yes	51 (30.9)	39 (28.5)	13 (35.1)	
No	114 (69.1)	98 (71.5)	24 (64.9)	
Fischer's exact test – Diabetes Chi-Squared test – BMI and Hypertension				

4.1.8 Association between job classification and back pain diagnosis

Office job workers experienced LBP, upper back and joint pains more than other workers. There wasn't any significant association between lower back pain and job classification (p-value >0.05). Table 4.6 illustrates the association between LBP diagnosis and job classification.

Table 4.6: Association between job classification and back pain diagnosis

Demographics	**Low back pain n (%)**	**Upper back pain n (%)**	**Other joints n (%)**	**p-value**
Office job	**66 (40)**	**62 (45.3)**	11 (29.7)	0.36
Health worker	13 (7.9)	13 (9.5)	7 (18.9)	
Manual labour	12 (7.3)	6 (4.4)	1 (2.7)	
Security	20 (12.1)	17 (12.4)	7 (18.9)	
Teaching	**48 (29.1)**	**35 (25.5)**	8 (21.6)	
IT / Engineer	6 (3.6)	4 (2.9)	3 (8.4)	
Fischer's exact test				

4.1.9 Management of lower back pain in civil service workers

Several modalities were employed at the private practice to manage the LBP. On average, attendance for physiotherapy was 11 (6 - 20) times.

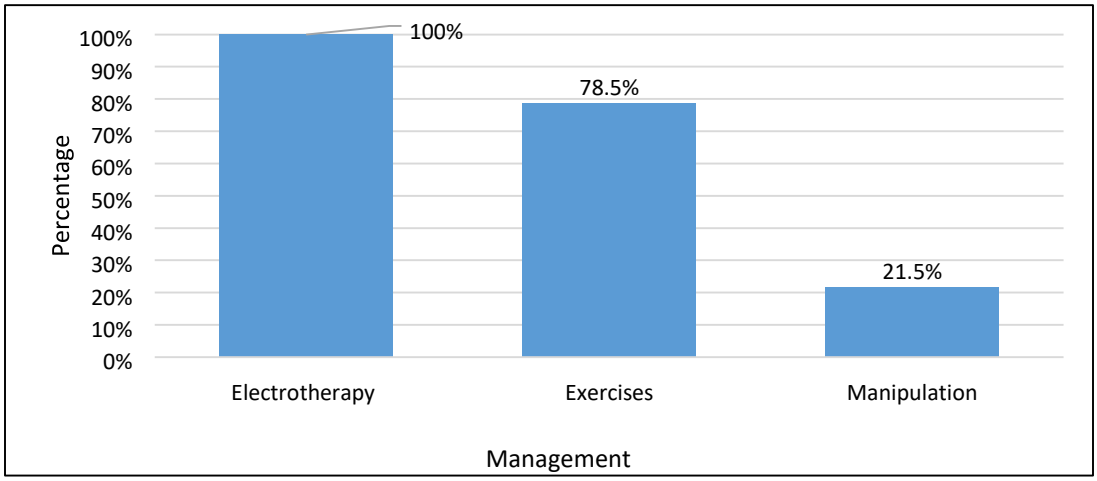


Figure 4.4 Specific LBP management techniques used (n = 339)

The next section presented the findings for the qualitative study

4.2 Section B: Qualitative study

This section presented the results for the second and third objective of the study;

To explore the experience of LBP and how lower back pain is managed.

To explore the influence of LBP on work performance of civil service workers.

4.2.1 Demographic profile of the participants

Twenty (20) civil service workers were recruited to participate in the study. Demographic profiles of the 20 participants as shown in Table 4.7 below shows that the study had 10 (50%) females and 10 (50%) male participants, both genders were balanced at 50% each. Single participants were 10 (50%) while married participants were also 10 (50%).

Table 4.7: -Demographic profile of the participants

Demographic profile n (%)		
Age(years)	Mean	40.5
	Range	35
	Standard deviation	10.87
Gender	Male	10 (50%)
	Females	10 (50%)
Marital status	single	10 (50%)
	Married	10 (50%)
Work type of the participants	Executives (E)	4 (20%)
	Skilled workers (SW)	9 (45%)

	Semi-skilled workers	5 (25%)
	Support staff	2 (10%)
Working hours duration	Mean	7.7
	Range	4
	SD	1.33
Duration of work years	Mean	13.35
	Range	43
	SD	11.65
Duration of work years	1 – 10	12 (60)
	11 – 20	4 (20)
	21 – 30	1 (5)
	31 – And above.	3 (15)

4.2.2. Work type

The work type of the participants as shown in Fig 4.6 shows that the executives were 4 (20%), skilled workers were 9 (45%), Semi-skilled workers were 5 (25%), and Support staff were 2 (10%).

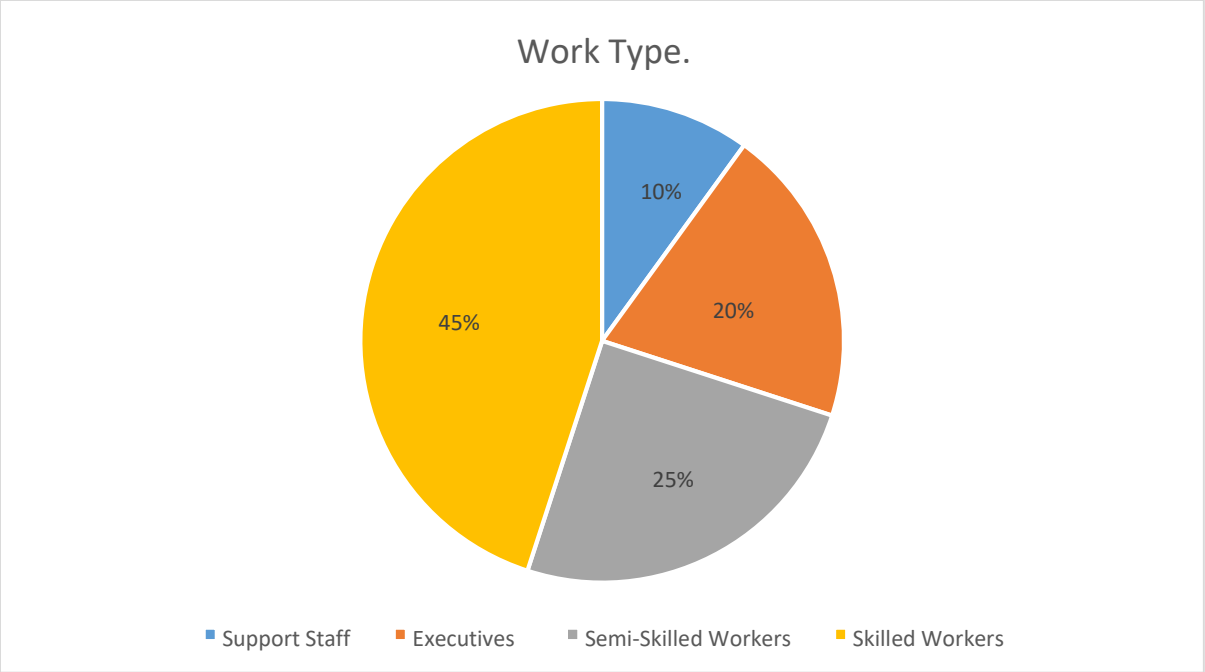


Figure 4.5 Work type (n = 20)

4.3 Results from the interviews

Participants' experiences of lower back pain

The themes that emerged relating to the experience of LBP were:

1. The character of pain.
2. Pain affects life domains.

4.3.1 The character of pain

The participant's described how they experienced pain in terms of its nature, location, severity, intensity, pain frequency, pain timing, pain duration, pain on set and pain triggers.

Nature of pain

The nature of pain was described as intense, shooting, burning, and cramping by some of the participants as described below:

"*I feel like there are stones in my leg and so when it is intense you will feel like crying sometimes you can't help yourself so that is how bad it can be"* (Participant 2).

Another participant said; *"The low back pain is severe and it even shoots to the thighs"* (Participant 6).

"if the cramps come up, a lot of pain flashes down along my right leg as if it was a nerve pulse" (Participant 12).

Severity of pain

Some participants experienced severe episodes of lower back pain, sometimes it was gradual then worsened with time.

One participant had the following experience with lower back pain; *"It was very painful, it started without any cause I can remember now, but it gradually increased to unbearable levels"* (Participant 17).

Two participants further provided two different experiences with severe lower back pain; Participant 1 said *"Severity I would say on a scale of 0-10 somewhere at 6 and it is just localized on the lower back"* (Participant 1).

Another participant said; *"The low back pain is severe and it even shoots to the thighs"* (Participant 6).

Causes of lower back pain

Causes of lower back pain varied among the participants. Some of the causes were prolonged postures, surgery, injury and incorrect lifting techniques. For example participant eight said the lower back pain started after the C-section; *"It's all started after the delivery of my baby, I was*

given anesthesia injection on my lower back spine for C-section early 2019 and since then I suffered from the low back pain but was taking some pain killers" (Participant 8). Whilst injury from a fall and lifting a heavy object caused LBP in these participants: *"because of the fall and that is why I am experiencing a lot pain and the pain never subsides through sometime"* (Participant 20).

"*I was transferred from Francistown to Gaborone, so I had to move my property to Gaborone, I did lift most of my heavy property, and I suspect it caused this back pain"* (Participant 9).

"I remember to one time I think I was carrying uhh a heavy speaker to church and it kind of came down heavy on me like I was trying to resist and I felt like that crack but I didn't take it serious,". (Participant 11).

Almost all the participants mentioned how different prolonged positions worsened the lower back pains. Standing for long time, sitting long hours, bending worsened the experience of pain; *"so if I stand for a long period it means that that night I can't sleep because it becomes very painful"* (Participant 20).

"Also when I bend to do some work around my house, I feel the pain the following day" (Participant 17).

"I normally have these pains and most especially when I do a lot of sitting in the office" (Participant 18).

Onset and frequency of LBP

The onset of pain ranged from sudden to gradual.

For example; "I *fell in 1999 and it started, and I was diagnosed with scoliosis, and I started experiencing the upper and the lower back pain*" (Participant 18). For some of the participants the pain experience was gradual; *"back pain started gradually uhhh when I would seat for long I would feel a lot of pain, then later it started increasing and of recent it's a challenge because when I seat for long or I don't move, I will have a lot of pain in the back there the lower part of my back* (Participant 11).

Some participants experienced LBP sometimes, whilst others LBP was constant; *"It at first it used to be now and then but nowadays it's consistent. It's consistent every day I have the pain"* (Participant 14).

"It was not all that bad I should say, but with time, it started hurting constantly" (Participant 15).

However, with some participants, LBP was on and off; *"so it comes and it goes and I always come to the Physio to massage when I have that severe pain"* (Participant 16).

"I have lower back pain for a long time. The pain is off and on. I have learnt to live with it" (Participant 17).

"what can I say I have these pains they started a long time back they are on and off and 2019 they got worse" (Participant 3).

The pain timing in some participants was dependent on the participant's comorbidities such as COVID 19, stress and menstrual periods. For example; one participant said; "*Also during my periods, I also feel more back pain"* (Participant 10). Participant 11 said; *"all along it has never been a serious issue until recently when I actually I contracted COVID"* (Participant 11).

Two other participants it was during month end, when it was stressful at work; *"It becomes worse during especially the month end where I have to sit long hours compiling some reports"* (Participant 13).

Pain duration/chronicity of pain

Some participants have been living for a long time with pain: *"I have lower back pain for a long time. The pain is off and on. I have learnt to live with it"* (Participant 17).

"This pain has been a nuisance to me for a long time." (Participant 9).

Pain Location of pain

All the participant had their pain located in the lower back.; *"it affects my lower back side the lower right side of the lumbar that's where it gets to be very painful"* (Participant 14).

"the lower back pain it normally hits on the waist and then of course I have a bit of upper back pain" (Participant 13).

Another participant said: "*the pain began to show that it was located on the lower back especially on the right side of my lower back"* (Participant 20).

Two other participants are quoted to reflect this: "*The pain is a nuisance when it is hurting" (*Participant 15).

"*it would be so painful especially when that lamp develops around the ribs which were broken"* (Participant 19).

4.3.2 Pain affects life domains

Lower back pain affected the different aspects of the life domains. Pain affected mostly the participants' social life, sleep, mental health, functioning, finances and work.

Social life

Most of the life domain of the participants affected was their social life. Participants expressed how they could not be able to get out to participate in social activities and hobbies, they couldn't spending time with family members and others lost touch with peers.

For example: *"I don't get to go out I like going out so yeah am missing out a lot and I don't mix out with my friends so I lost friends"* (Participant 3).

"I cannot even attend family events such as weddings, parties and funerals because I spend most of my time in bed resting" (Participant 5).

"In general I would say, my social life is not the same anymore because my confidence and my esteem has lowered drastically" (Participant 12).

Affects sleeps

Pain disturbed sleep. When pain was severe participants could not fall asleep. As expressed by participant 5 who said; *"Sometimes the pain causes sleep disturbance."* (Participant 5).

Another participant said; *"It has caused me a lot pain first of all. When this pain is running in the legs, it is real bad time for me as I can't walk well, no sleep some nights"* (Participant 9).

Affects mental health

Lower back pain caused problems such as stress, emotional distress and affected the participants' mental health - loss of happiness and thinking a lot;

For example one participant said; *"right now I am thinking about nothing else but this back pain, I cannot, I do try to think about something I could do while am in this state"* (Participant 12).

"Aaaa honestly the back pain has affected my opportunities to be promoted and my happiness sexually has reduced very much" (Participant 9).

Affects functioning

Most of the participants' ability to perform daily living activities and house chores were limited by LBP. Standing and sitting long hours as required by their respective work descriptions were affected. One participant had to say the following; *"Eeish raaa hmm hmm this pain is too, too much hmmm it's a problem. I can't sit, stand for long hours because the pain is so irritating"* (Participant 7).

While another said; *"bending to do house chores becomes difficult"* (Participant 10).

Similarly another participant's walking ability was affected: *"Well, my work requires standing and I cannot do much standing and a lot of patrolling and my strides as I walk are not meeting the requirements for am taking small steps"* (Participant 12).

Affects finances

Lower back pain had a financial impact. Few participants mentioned the need to spend money on medical aid, with one revealing a reduced income due to a reduced rate of working and on one had to persevere with pain due lack of funds to access treatment.

One participant said: *"it has cost me time that's the first thing, the other one is money cause uhmmm you know you have to subscribe money for medical aid so each month you have to pay money for your health, so money which I need to obviously cut off the salary"* (Participant 2).

Another one; *"I can't work at the rate I used to work…, so that means my financial capacity reduces because of that"* (Participant 11).

Accessing health care to treat the LBP also affected the participants finances; *"I also have to spend my money on treatment"* (Participant 10). Some due to lack of fund, learnt to live with the pain;

"*Sometimes I just have to endure with the pain because I don't have enough funds to attend physio regularly"* (Participant 7).

4.3.3. Impact on work performance

All the participants expressed several experiences on about how lower back pain affected their work performance. Participants considered LBP to be a limiting factor to good work performance. LBP increased absenteeism, affected work performance resulting in the loss of work time, and increased job insecurity.

Affects work performance

Lower back pain affected work performance. It was difficult for some participants to carry out normal work activities due to the LBP; "*I can't do my normal duties when the back is hurting, I definitely can't perform properly when I have back pain, if it is severe, I have to get sick leave"* (Participant 10).

When participants experienced LBP at work it affected their work duties. Participants highlighted that pain affected the rate at which they performed their usual pace of work and sometimes they needed to take frequent breaks**.** ; *"the back pain causes loss of time, during sick leaves which causes delays on activities which are specifically for me and I may take breaks and not be so good during some days of pain"* (Participant 6).

In terms of work I said it kind of slows down, at times I would sit for long then I feel the pain then I stop or I kind of take a break. I used to work a lot at night, I no longer do that anymore, so in terms of output certainly it has reduced because of that" (Participant 11).

"It has negatively affected my work performance. I fail to meet the deadline because I cannot multi-task, I cannot complete tasks at hand. This in turn resulted in a poor management the reason being I cannot perform to my full potential" (Participant 5).

Work Absenteeism

LBP caused a lot of participants to take time off and sick leave from work to attend physiotherapy and to go see the doctor.

For example one participant said; *"When it's bad it may force me to take time off in form of sick leaves which sometimes reduces my working and taking longer performing some activities at work"* (Participant 6).

Another participant noted that; *"Yes it has, there are times when I take leave just because of the pain, sometimes it's just sick leave I get from the doctors and sometimes I have to leave in the middle of work just to go rest at home"* (Participant 1).

Increases job insecurity

Experiencing LBP at work caused a lot of job insecurity among the participants due to feeling unproductive at work. For example participant 2 said; *"LBP is bothering me because it is putting my job on the line"* (Participant 2).

One participant even considered early retirement "*I will have go for early retirement, it is allowed in our service"* (Participant 9).

4.3.4 Management of lower back pain

Most participants had some knowledge of management and handling the lower back pain. Participants pointed out several ways they managed LBP such as maintaining a good sitting posture, doing exercises, massage, and physiotherapy. All the participants used physiotherapy as treatment for the lower back pain and found it to be effective. Other strategies used to manage LBP included medication, rest, change of posture/positioning, heat therapy and massage. Some used exercises such as stretching, back extension exercises etc. However most did not find exercises effective.

Table 4.8 below illustrates the various techniques used by some participants in managing the lower back pain.

Table 4.8: Management techniques used by the participants

Types of technique	**Quotes**
Rest	*When the pain is severe, I rest* (participant 5). *"If it is beginning to hurt, I get rest, when I lie on a hard foam, and it gets better somehow"* (Participant 10).

Exercise	*"Exercises are also helpful. I usually make sure that I train because it also helps"* (Participant 5). *"How I make it better? uhmmmm well like I said the exercises just a few exercises I do theses and then am good for a couple of hours"* (Participant 1).
Medication	*"I take painkillers when the pain is too much"* (Participant 11). *"Sometimes I use pain killers most especially during my periods*" (Participant 10).
Physiotherapy	*I always attend physio and physio is what can really help at relive some pain*" (Participant 2). *"I've been doing some physiotherapy then also I do some very light exercises"* (Participant 11).
Positioning	*"I try to stand up a few minutes per day, when am working, I just go off from my post, stand a bit, walk around and then go back and sit down and then I try some exercises, but they only help for a little while and it comes back"* (Participant 1). *"When in office, I try to stand in between the long periods of sitting though it affects my work out put very much"* (Participant 9).
Heat therapy	*"During winter, I could apply a hot water bottle around the lower back and it gives me some relief"* (Participant 10). *"you know when you apply heat in my back and little bit of massaging even but heat does wonders* (Participant 3).
Massage	*"I could also ask my boyfriend for simple massage right before bed time around my lower back and it gives me some relief"* (Participant 8). *"Massage is helpful at times"* (Participant 17).

Acceptance	*"I have lower back pain for a long time. The pain is off and on. I have learnt to live with it"* (Participant 17).

The quantitative and qualitative results were complementary and added to the depth and scope of the findings and validated the findings generated by each method through evidence produced by the each other.

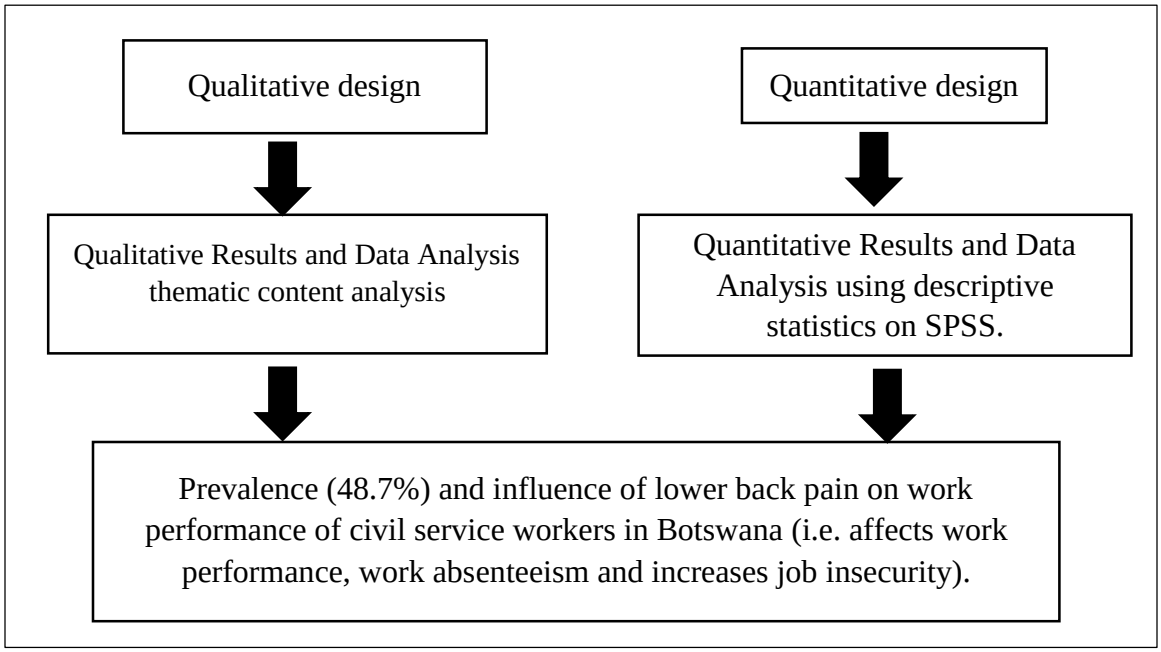


Figure 4.6 Concurrent mixed design.

4.4 Summary of the chapter

Chapter four presented the results of the study. Quantitative and qualitative results to answer the three objectives of the current study were presented. The prevalence and the risk factors associated with lower back pain among civil service workers were presented by the quantitative section whereas the qualitative results highlighted the influence of lower back pain on the participants' work performance and how the participants managed the lower back pain.

The next chapter will discuss the findings in relation to previous studies done on LBP.

CHAPTER 5

Discussion

5.0 Introduction

Chapter five presents discussions of the results of the study derived from the study's aims and objectives. The study aimed to establish the prevalence and influence of lower back pain (LBP) on the work performance of civil service workers in Botswana. Furthermore, this chapter discusses the current study results in comparison with other prior studies on similar topics and in support of relevant literature by different researchers written on similar issues.

5.1 Participants profile

5.1.1 Demographic profile of the participants.

This study had 69% female and 31% male participants. The majority of participants (41%) had office jobs which were more of administrative work done in sitting position. The median (interquartile range) was 46 years (39 – 52 years). The participants were classified as managers/administrators, professionals, technicians and associate professionals, clerical support officers, skilled agricultural officers etc. and the majority were female. The current demographic profile results are in line with the working groups or classes according to Botswana statistics (Statistics Botswana 2015).

5.1.2 Health profile

Thirty-five percent (35.4%) of the participants had chronic conditions such as diabetes (5%) and hypertension (30.4%). This is in line with the percentage rate of the burden of non-communicable diseases in Botswana. According to a Botswana demographic survey report of 2017, results showed that hypertension was the leading non-communicable disease affecting 34.9% followed by HIV & AIDS and Asthma at 33.5% and 12.5% respectively (Botswana Demographic Study 2017). Current estimates in Botswana indicate at least 4.3% of the adults from 20 to 79 years are diabetic (Centre for Disease Control 2020). Results showed 16.2% of the civil service workers were

categorized as obese while 26.8% were overweight. This is a risk for diabetes and hypertension. There is need for health promotion at the work place to address chronic conditions among civil service workers.

Only 0.6% of the study population had HIV. This was surprising given that the prevalence of HIV was estimated to be 20.3% in 2018 (UNAIDS 2020). The non-disclosure of the sero-status of most civil service workers who attended physiotherapy at the private practice may be due to the importance of observance and maintenance of the privacy of a person's HIV status. However, for adequate physiotherapy management it is important to fully understand the health status of the patients and to address them as they can affect LBP management and intervention outcomes.

5.2 Prevalence of lower back pain.

Results of the current study showed that the prevalence of lower back pain among civil service workers was 48.7% in a period of twenty four months. In comparison with other European studies, the LBP prevalence among the civil service workers was higher than the reported prevalence in Turkey (43.8%) and Poland (22.6%) (Korkmaz et al., 2011; Henn et al., 2014). It is noted that the methodologies employed in the current study in Botswana and the other studies conducted in Poland and Turkey are different. For example in Turkey, a random sample of 7897 (4006 men and 3789 women) was included in the study as compared to a purposive sample of 339 participants that participated in the current study. In Poland, surveys were conducted using the Internet whereas the current study used the medical records of the patients in physiotherapy practice. Again variations in the countries' socioeconomic status could also have contributed to lower LBP prevalence in Turkey and Poland, as both are high income countries.

Lower back pain prevalence in the current study was lower than other studies done in Africa (Kenya and Botswana). A study based in Botswana reported a higher LBP prevalence of 55.7% among teachers (Patience and Derek 2014). This was a cross-sectional study using self-administered questionnaires among 3100 school teachers and carried out over a period of five months (Patience and Derek 2014). Another study in Kenya reported the prevalence of 64.9%

among civil service workers (Elias et al., 2019). Although the study based in Kenya included civil service workers, it was a cross-sectional study done within a duration of one year (Elias et al., 2019). Given the fact that the current study participants were patients in a private practice, future epidemiological research using cross sectional study design is recommended for civil service workers

5.3 LBP and comorbidities

There was no significant association between lower back pain and comorbidities such as diabetes (p-value = 0.09)). The current study results differ from several studies that show an association between chronic condition such as diabetes, hypertension and LBP (Rinaldo et al., 2017; Pozzobon et al., 2019). There is evidence showing that individuals with diabetes are more likely to have lower back pain than the general population without diabetes (Pozzobon et al., 2019; Lima et al., 2020). In addition, although hypertension among the civil service workers was moderately high (30.4%), there was no significant association between LBP and hypertension. This finding is different from a study based in Korea which showed that there was an association between LBP and hypertension (Bae et al., 2015). The same study also showed that LBP prevalence increased with longer hypertension durations (Bae et al., 2015). There moderately high prevalence of hypertension in the current study civil service workers that attended Physiotherapy in private practice in a period of 24 months, is high enough to warrant the importance of work based health promotion programs on hypertension prevention and management.

The current study showed no association between HIV and LBP. This was of interest because HIV has been linked to limitation in functioning and disability (Myezwa et al, 2018). A study by Myezwa et al, (2018) looked at HIV related impact on functional disability in an urban cohort and found that people with HIV experienced functional limitations with impairments in mobility and the domains of participation (Myezwa et al., 2018). Also a study based in Malawi found that people with HIV experienced low bone mineralization density which was significantly lower in the lumbar spine, which is a precursor for LBP development (Chisati et al., 2020). Workers with HIV must be monitored for functional limitation and impairments such as LBP.

5.3.1 Lower back pain and body mass index (BMI)

There was no association between obesity and LBP, although a considerable percentage of the workers (42.2%) of the participants with LBP were overweight and obese. This is contrary to a previous study on obesity and LBP. Hashimoto et al (2017) conducted a retrospective cohort study based in Japan, looking at the association between obesity (BMI) and low back pain among males and the study found a significant positive relationship between BMI and persistent low back pain (Hashimoto et al., 2017). Similarly Chou et al (2016) population-based sample of men in an Australian study, results showed a high-intensity LBP and disability were associated with increased levels of obesity (Chou et al., 2016). Although these studies show the link between LBP and BMI, they only included male participants only.

5.4 Lower back pain and demographic profile

5.4 1 Lower back pain and gender

There was no significant association between the LBP and all the demographic profile (p-value > 0.05). Although, in the current study, no association was evident between lower back pain and gender, the prevalence of lower back pain was higher in the female participants. The higher prevalence of female participants was expected as worldwide, a bigger percentage of civil service workers are female (Esteban et al., 2018). Furthermore, women also seek medical services more than men (Thompson et al., 2016). Though the current study shows a LBP prevalence of 69% of female gender, it is less than the two studies reported in Germany which showed a prevalence rate of 86.8% (Claus et al., 2014) and in Ethiopia 75.9% (Beyen et al., 2013). In addition, data extracted from the global burden of disease study in 2017, showed an age-standardized prevalence of LBP which was higher in females than males (Wu et al., 2017). The higher prevalence rate of LBP in female civil service workers compared to male civil service workers could be due to the fact that women tend to bear more responsibilities for household tasks than males in everyday life which increases the risk for LBP (Shemshaki et al., 2013). Secondly, the higher LBP prevalence could be due to female hormonal fluctuation and menstruation experienced by women (Wang et al., 2016). Therefore there is need for gender specific work health interventions to ensure the needs of both genders are addressed.

5.4.2 Lower back pain and age

There was no association between lower back pain and age. However, the highest prevalence of lower back pain in the current study was between the age group of 36-55 years (72.7%). Similarly, results in the current study are in line with results from a global study that showed that from 1990 to 2017, the highest years lived with disabilities due to LBP were "in females than males and increased initially with age; they peaked at 35–39 years of age in 1990, before decreasing, whereas in 2017, they peaked at 45–49 years of age, before decreasing" (Wu et al., 2017). In the same range, another study of employees in German showed a lower back pain prevalence of 48.7% in age group of 36 years and above (Claus at el., 2014). There is need for workplace health promotion to ensure workers' occupational health and also ensure that even at the peak of the workers career, they are still healthy.

What is of great interest is, in the current study, the young age group of 35 and below of civil service workers were affected by lower back pain. In the current study, 14.5% of the civil service workers in the age group of youths (35 years and below) presented with lower back pain. A similar study done in India showed even a higher prevalence of LBP (42.4%) in the youthful age group (Ganesan et al., 2017). Another study in the Nordic countries showed the younger age groups were more physically active than their senior colleagues due to the higher demands of work leading to their exposure to risk factors associated with the development of lower back pain (Therese et al., 2019). Considering the results of LBP presence in the young age group, future studies on LBP in the youthful civil service workers is needed.

5.4.3 Association of lower back pain and marital status

From the current study, 56.4% of the participants were married and 43.6% were not married. There was no significant association between lower back pain and marriage. Other studies, have however, shown the opposite. One study showed an increase in lower back pain odds in participants who are married (Biglarian et al., 2012). A study in Saudi Arabia, showed 71.6% of the civil service workers (Physicians) who complained of LBP were married (Al-Ruwaili and Khalil 2019). In another similar research, people who are married and with lower back pain accounted for 89.9%

(Alhowimel et al., 2018). Yet in another study it was shown that better physical and psychological health is related to a happy marriage (Robles 2014).

5.5 Effects of LBP on the civil service workers

In this study, we found that pain affects different life domains. Lower back pain disrupts life and makes it harder for the sufferer to complete daily tasks and to engage socially and also participate in leisure activities. The results of the current study are in line with another study that showed that patients with lower back pain experienced emotional, economic, social and physical disability (Esson et al., 2020). Low back pain has profound impacts on leisure activities, work, and social interaction which are basically self-care activities (Mousavi et al., 2011).

Most of the participants experienced anxiety related to LBP. These findings confirms previous studies that have shown that chronic lower back pain contributed more to health issues like short tempers, sleep disturbances, stomachaches, headaches, stress and difficulties in concentrating (Alturkistani et al., 2020). One study showed that hypertension, low immunity insomnia and anxiety are as a result of chronic stress (Morey et al., 2015). In another study some injuries and poor health were a result of lower back pain due to work stress (Bae et al., 2019). These findings underscore the need for health professionals treating LBP to holistically take care of the associated psychological conditions LBP sufferers may present with during treatment. Also further studies to explore more on the effects of LBP on life domains are recommended.

5.6 Impact of LBP on work and work performance of civil service workers

Findings in the current study suggest that LBP has a negative influence on work and work performance.

Lower back pain and type of work

There was no association between the type of work and LBP. The majority of the Office job workers experienced LBP more than other workers. From the qualitative study the majority of the

participants had jobs which required sitting and standing long hours. LBP found among the civil service workers could be as a result of standing for long hours or sitting, frequent walking and repeated lifting when executing their duties. Other studies done previously showed that risk factors like long working hours, long standing hours, long sitting hours which are some of the activities related to work were increasingly associated with lower back pain (Korkmaz et al., 2011). A systematic review showed the occurrence of LBP is related to the nature and intensity of the physical activities undertaken by the participants (Heneweer 2011; Yue et al., 2012; Bandpei et al., 2014). This shows that longer work hours, prolonged standing and sitting longer hours which are activities related to work were increasingly associated with risks of developing lower back pain. This also may perhaps be explained by the fact that civil service workers in the current study spend more time in the sitting position. These findings point to the need for ensuring ergonomics at work places are enforced by the employer and the employees to minimize and prevent the occurrence and re-currency of LBP.

Duration of work years and lower back pain

In the current study, more civil service workers (60%) with lower back pain were in the working experience range of 1 to 10 years compared to those in the 11 to 20 years work experience and more than 20 years working experience. The current study has similar results with an Indonesian study where 53.3% civil service workers with 10 years and below of working experience complained of LBP (Rachmawati and Muthia 2018). On the contrary another study based in Saudi Arabian showed 40.8% of health workers who were working for more than ten years had LBP (Amer 2020). It is difficult to draw a conclusion on the work experience because these studies were a systematic review and meta-analysis so are methodologically different from the current study.

LBP and work performance

Work performance relates to the process of how individuals carry out or accomplish an action, task or function which represents the individual workers' efficiency and evaluated components (Sickle & Zelenyuk, 2019; Lopez-Garcia et al., 2019). In line with previous study, work life can be affected by

LBP (Compare et al., 2016). Previous studies indicate that LBP increases to work absenteeism (Serranheira et al., 2020; Compare et al., 2016) and can lead to early retirement (Lallukka et al., 2018). When civil workers are absent, no work gets done and those on duty are burdened as they are likely to take on the extra responsibility of those workers who are absent and this results in low productivity. Considering the influence of LBP on work performance of civil service workers, future studies are needed to explore strategies to prevent a further negative impact of LBP on work performance.

5.7 Physiotherapy management for LBP

From the current study results, LBP was managed through several strategies such as exercises, massage, physiotherapy, medication, rest, correct posture and heat therapy. Recent guidelines on the management of LBP recommend non-pharmacological interventions like exercise therapy, manual therapy, and advice (London: NICE 2016). Exercises and physical activities such as strengthening exercises, and stretching, have been used by several studies with curative and preventive benefits such as improving bone health, strengthening muscles, helping with osteoporosis, improving mental health and managing chronic pain (Benedetti et al., 2018; Pinheiro et al., 2020). Although exercises are beneficial, the benefits in acute low back pain management remains uncertain with conflicting evidence from systematic reviews (Karlsson et al., 2020). Exercise programs can be incorporated in the self-management program for LBP (Gay et al., 2016; Gay et al., 2018).

Health education is central to promoting wellbeing and has been used to manage lower back pain. According to a study by Kovacs et al., (2022), health education was used to manage LBP in a school setting and they found that it improved the outcome of the usual care and more effective especially in terms of disability (Kovacs et al., 2022). Health professionals must remember to empower their patients with information and skills to manage their pain. More specifically for workers, their health can include measures to maintain correct posture (Foster et al., 2015). Health education can cover topics on LBP and management, correct posture, ergonomics, use of suitably designed furniture at work aimed to minimize the onset of LBP (Hill et al 2011).

Other LBP treatment modalities can include short wave diathermy, traction, ultrasound, massage, moist heat therapy or single modalities (Kjaer et al., 2018). Studies that have employed heat found that low-level heat therapy is a non-pharmacological cost effective option in relieving non-specific mild and moderate lower back pain (Freiwald et al., 2021). Heat therapy also increases elasticity of connective tissues, increases blood flow and metabolism which significantly provides pain relief than cold therapy (Malanga et al., 2015). In acute conditions, local heat applications have positive therapeutic effects predominantly on pain, range of joint motion and physical function of soft tissues (Clijsen 2022).

Lastly work-based risk assessment and ergonomic assessments are needed to support worker wellbeing and maintain a safe workplace in line with the occupational and health safety law (OSH - Factories Act 1973. No. 31. (S 6). The OSH ACT stipulates the regulation, rules and the standards to ensure worker safety. Supporting workers' health in a workplace is a role recognized by organizations, institutions, firms, businesses and companies providing services and goods be it for profit or not for profit. While enterprises have the responsibility to provide safe and hazard-free work environments, they also have the opportunity to promote worker health and foster healthy workplaces (Stoewen 2016).

5.8 Summary of the chapter

Chapter five comprehensively provided the broader understanding of findings and the aim of the study in context of previous studies done elsewhere. Other existing literature and the study objectives were compared and discussed in this chapter. Further studies with strong methodologies are however recommended to explore more findings on LBP and associated factors.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

Recommendations and the conclusion of the current study are outlined in this chapter.

6.1 Conclusion

Results from the current study showed that LBP and the risk factors associated with it are very prevalent (48.7%) among civil service workers in Botswana. Results showed no association between lower back pain and gender (female workers p=0.21) and comorbidities p-value=0.70). The themes that emerged were; pain nature, LBP affects life domains and work performance. The majority reported that LBP affected different aspects of their life domains such as their social life, sleep, mental health and emotional distress, functioning, finances and work performance. The strategies used to treat LBP included maintaining a good sitting posture, doing exercises, massage, and attending Physiotherapy. The majority of civil service workers were able to continue doing their usual work duties on a daily basis. This kind of diligence by civil service workers that participated in the study could be attribute to either fear to lose their jobs or uncompromising supervisors. These findings show the importance of public health strategies and work based health promotion intervention needed for civil service workers in Botswana. Civil service workers are a vulnerable group of persons who require occupational health and safety measures as their routine nature of work predisposes them to lower back pain development.

6.2 Recommendations.

Recommendations based on the current study results are outlined below.

Practice:

There is a need to promote awareness of lower back pain risk factors and prevention strategies in civil service workers at all government departments.

There's need for the development of a self-care and preventative handbook on the management of LBP targeting civil service workers.

Policy:

Policies on occupational health and safety must be implemented and monitored on a regular basis.

Research:

Future research can focus on developing work-based prevention interventions in the government departments.

Strength of the study

The employment of a concurrent mixed method design enhanced the understanding of lower back pain in civil service workers.

Strategies to enhance credibility, confirmability, transferability and dependability to ensure the trustworthiness of the data were applied.

6.4 Limitation of the study

A number of limitations were identified in the current study. Focusing on one private practice in an urban area was a considerable limitation because the circumstances of civil service workers in an urban setting might be different from those for civil service workers working near rural areas; hence it becomes a limitation in terms of generalizability of the findings, since valuable input that could come from rural and peri-urban civil service workers were excluded. However, the findings in this current study do have several implications that can be considered in programs meant to support and prevent lower back pain in civil service workers.

REFERENCES:

Aaron O'Neill (2021) Population density in Botswana 2008 to 2018

Published April 2021 https://www.statista.com/statistics/071334/population-density-in – Botswana. https://www.statista.com/aboutus/our-research-commitment/2127/aaron-oneill (Accessed online 26th April 2021).

Ashraf S, Sarfraz M, Abdullah MI, (2017). The Organizational Identification Perspective of CSR on Creative Performance: The Moderating Role of Creative Self-Efficacy. *Sustainability*. 2017; 9(11):2125. https://doi.org/10.3390/su9112125 (Accessed 24/02/2022).

Abdulmonem, A., Hanan, A., Elaf, A., Haneen T, Jena A (2014).

The prevalence of musculoskeletal pain & its associated factors among female Saudi school teachers. *Pakistan journal of medical sciences*, *30*(6), 1191–1196. https://doi.org/10.12669/pjms.306.5778 [PubMed].

Akter, S. et al., M, Nazmul Hasan, B. Rokeya, H. Akhter, M. Shamim Gazi, F. Sabrin and S. S. Kim (2021), 'Alternative Medicine: A Recent Overview', in M. Akram (ed.), *Alternative Medicine* - Update, IntechOpen, London. 10.5772/intechopen.97039. (Accessed 3/03/2022)[Google Scholar].

Alhowimel A, AlOtaibi M, Radford K, Coulson N. (2018). Psychosocial factors associated with change in pain and disability outcomes in chronic low back pain patients treated by physiotherapist: A systematic review. *SAGE open medicine*, *6*, 2050312118757387. https://doi.org/10.1177/2050312118757387 [PubMed].

Almeida M, Saragiotto, Richards B, Maher C. (2018)

Primary care management of non-specific low back pain: key messages from recent clinical guidelines. *Med J* Aust 2018; 208 (6): 272-275 [PubMed].

Al-Ruwaili B, Khalil T (2019). Prevalence and Associated Factors of Low Back Pain Among Physicians Working at King Salman Armed Forces Hospital, Tabuk, Saudi Arabia. Open Access *Maced J Med Sci.* 2019 Aug 31; 7 (17):2807-2813. doi: 10.3889/oamjms.2019.787. PMID: 31844441; PMCID: PMC6901851. (Accessed 18/07/20220) [Pubmed].

Alturkistani LH, Hendi OM, Bajaber AS, Alhamoud MA, Althobaiti SS, Alharthi TA, Atallah AA. (2020).

Prevalence of Lower Back Pain and its Relation to Stress among Medical Students in Taif University, Saudi Arabia. *Int J Prev Med.* 2020 Mar 16; 11:35. doi: 10.4103/ijpvm.IJPVM_264_19. PMID: 32363022; PMCID: PMC7187552. (Accessed 12/02/2022) [PubMed].

Amer Al H. S. (2020). Low back pain prevalence and risk factors among health workers in Saudi Arabia: A systematic review and meta-analysis. *Journal of occupational health*, *62*(1), e12155. https://doi.org/10.1002/1348-9585.12155 (Accessed 24/02/2022) [PubMed].

Aweto, H. A., Tella, B. A., and Johnson, O. Y. (2015).

Prevalence of work-related musculoskeletal disorders among hairdressers. *International Journal of Occupational Medicine and Environmental Health,* 28(3), pp.545-555. https://doi.org/10.13075/ijomeh.1896.00291 (Accessed 12/02/2022) [PubMed].

Azizpour, Y, Delpisheh, A, Montazeri, Z and K Sayehmiri (2017)

Prevalence of low back pain in Iranian Nurses: a systematic review and Meta – analysis. *BMC Nurs* 16, 50 https://doi.org/10.1186/s12912-017-0243-1 (accessed 11th May 2021) [PubMed].

Bae Y-S, Shin E-C, and Van Eden W (2019). Editorial: Stress and Immunity. *Front. Immunol.* 10:245. https://doi.org/10.3389/fimmu.2019.00245 (Accessed 19/02/2022) [PubMed].

Bae YH, Shin JS, Lee J, Kim MR, Park KB, Cho JH, Ha IH. (2015). Association between Hypertension and the Prevalence of Low Back Pain and Osteoarthritis in Koreans: A Cross-Sectional Study. *PloS one*, *10*(9), e0138790. https://doi.org/10.1371/journal.pone.0138790 [PubMed].

Bandpei Mohseni MA, Ehsani F, Behtash H, Ghanipour M. (2014). Occupational low back pain in primary and high school teachers: prevalence and associated factors. *J Manipulative Physiol Ther.* 2014 Nov-Dec; 37(9):702-8. doi: 10.1016/j.jmpt.2014.09.006. Epub 2014 Oct 1. PMID: 25280458. (Accessed 24/02/2022) [PubMed].

Barnes A. S. (2012). Obesity and sedentary lifestyles: risk for cardiovascular disease in women. *Texas Heart Institute journal*, *39*(2), 224–227. (Accessed 3/03/2022) [PubMed].

Bart Koes, Marco Schreijenberg & Alexander Tkachev (2020) Paracetamol for low back pain: the state of the research field. *Expert Review of Clinical Pharmacology*, 13:9, 10591066, DOI: 10.1080/17512433.2020.1817738 (Accessed 3/03/2022).

Benedetti MG, Furlini G, Zati A, Letizia Mauro G. (2018). The Effectiveness of Physical Exercise on Bone Density in Osteoporotic Patients. *Biomed Res Int.* 2018 Dec 23; 2018:4840531. doi: 10.1155/2018/4840531. PMID: 30671455; PMCID: PMC6323511. (Accessed 17/08/2022) [PubMed].

Bener A, Dafeeah EE, Alnaqbi K. (2014). Prevalence and correlates of low back pain in primary care: what are the contributing factors in a rapidly developing country, *Asian Spine J*. 2014 Jun; 8(3):227-36. doi: 10.4184/asj.2014.8.3.227. Epub 2014 Jun 9. PMID: 24967035; PMCID: PMC4068841. [PubMed].

Beyen TK, Mengestu MY, Zele YT (2013)

Low Back Pain and Associated Factors among Teachers in Gondar Town, North Gondar, and Amhara Region, Ethiopia. *Occup Med Health* Aff 1:127. doi: 10.4172/23296879.1000127 (Accessed 12/02/2022) [Google Scholar].

Berg AJ, Ahmadje U, Jayanna HH, Trégouët P, Sanville P, Kapoor V. (2020). The prevalence of lumbar disc degeneration in symptomatic younger patients: A study of MRI scans. *J Clin Orthop Trauma*. 2020 Sep-Oct; 11(5):932-936. doi: 10.1016/j.jcot.2020.07.021. Epub 2020 Jul 28. PMID: 32879583; PMCID: PMC7452323. (Accessed 7.07.2022) [PubMed].

Biglarian A, Seifi B, Bakhshi E, Mohammad K, Rahgozar M, Karimlou M, Serahati S. (2012).

Low back pain prevalence and associated factors in Iranian population: findings from the national health survey. *Pain research and treatment*, *2012*, 653060. https://doi.org/10.1155/2012/653060 [PubMed].

Bolarinwa OA. (2015). Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Niger Postgrad Med* J 2015; 22:195-201 (Accessed 5.07.2022)

Botswana demographic study, 2017 (survey report) SBN NO. 978-99968-2-046-5 www.statsbots.org.bw

Brady SRE, Hussain SM, Brown WJ, Heritier S, Billah B, Wang Y, Teede H, Urquhart DM, Cicuttini FM. (2016). Relationships between Weight, Physical Activity, and Back Pain in Young Adult Women. *Medicine, 95*(19), e3368. https://doi.org/10.1097/MD.0000000000003368 [PubMed].

Buruck G, Tomaschek A, Wendsche J, Ochsmann E, Dörfel D. (2019). Psychosocial areas of worklife and chronic low back pain: a systematic review and meta-analysis. *BMC Musculoskelet Disord* **20,** 480 (2019). https://doi.org/10.1186/s12891-019-2826-3 (Accessed 3/03/2022) [Google Scholar].

Bontrup C, Taylor WR, Fliesser M, Visscher R, Green T, Wippert PM, Zemp R. (2019) Low back pain and its relationship with sitting behavior among sedentary office workers, *Applied Ergonomics*, 81, 2019, 102894, ISSN 0003-6870, https://doi.org/10.1016/j.apergo.2019.102894 [PubMed].

Carregaro RL, Tottoli CR, Rodrigues DDS, Bosmans JE, da-Silva EN, van Tulder M. (2020). Low back pain should be considered a health and research priority in Brazil: Lost productivity and healthcare costs from 2012 to 2016. *PLoS ONE* 15(4): e0230902. https://doi.org/10.1371/journal.pone.0230902

Casazza, Brian A MD (2012) Diagnosis and Treatment of Acute Low Back Pain. *Am Fam Physician.* 2012 Feb 15; 85(4):343-350. https://familydoctor.org/familydoctor/en/diseases-conditions/low-backhttps://familydoctor.org/familydoctor/en/diseases-conditions/low-back-pain.htmlpain.html (Accessed 24/02/2022).

Centre for Disease Control, 2020 (National Diabetes Statistics Report 2020). Diabetes prevalence (% of population ages 20 to 79) - Botswana International Diabetes Federation, Diabetes Atlas. https://data.worldbank.org/indicator/ (Accessed online 24/02/2022).

Chakrabartty, S. N. (2020). Reliability of test battery. *Methodological Innovations*, 13(2) https://doi.org/10.1177/2059799120918340 (Accessed 5.07.2022)

Chisati, E. M., Constantinou, D., & Lampiao, F. (2020). Reduced bone mineral density among HIV infected patients on anti-retroviral therapy in Blantyre, Malawi: Prevalence and associated factors. *PloS one*, *15*(1), e0227893. https://doi.org/10.1371/journal.pone.0227893 (Accessed 24/02/2022).

Chou L, Bredy SRE, Urquhart DM, Teichtahl AJ, Cicuttini FM, Pasco JA, Brennan-Olsen SL, Wluka AE. (2016). the Association between Obesity and Low Back Pain and Disability Is Affected by Mood Disorders: A Population-Based, Cross-Sectional Study of Men. *Medicine*, *95*(15), e3367. https://doi.org/10.1097/MD.0000000000003367 (Accessed 3/03/2022) [PubMed].

Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T. (2020).

Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2020.

A systematic analysis for the Global Burden of Disease Study 2019. *Lancet. 2021* Dec 19; 396 (10267):2006-2017. doi: 10.1016/S0140-6736(20)32340-0. Epub 2020 Dec 1. Erratum in: *Lancet.* 2020 Dec 4; PMID: 33275908; PMCID: PMC7811204 [PubMed].

Clark Stephanie and Horton Richard (2018). Low back pain: a major global challenge. *The Lancet* 3 21, 2018 V 391, ISSUE 10137, P2302, 06 09, 2018 DOI: https://doi.org/10.1016/S0140-6736 (18)30725-6 (Accessed 11/07/2022) [PubMed].

Claus M, Kimbel R, Spahn D, Dudenhöffer S, Rose DM, Letzel S. (2014). Prevalence and influencing factors of chronic back pain among staff at special schools with multiple and severely handicapped children in Germany: results of a cross-sectional study. *BMC Musculoskelet Disord* **15,** 55 https://doi.org/10.1186/1471-2474-15-55 (Accessed 12/02/2022) [PubMed].

Clijsen, R., Rahel Stoop, Erich Hohenauer, Dirk Aerenhouts, Peter Clarys, Carlina Deflorin, Jan Taeymans, (2022). Local Heat Applications as a Treatment of Physical and Functional Parameters in Acute and Chronic Musculoskeletal Disorders or Pain, *Archives of Physical Medicine and Rehabilitation*, Volume 103, Issue 3, 2022, Pages 505-522, ISSN 0003-9993, https://doi.org/10.1016/j.apmr.2021.06.015. (Accessed 17/08/2022) [PubMed].

Coenen P, Kingma I, Boot CR, Twisk JW, Bongers PM, van Dieën JH. (2013). Cumulative low back load at work as a risk factor of low back pain: a prospective cohort study. *Journal of occupational rehabilitation*, *23*(1), 11–18. https://doi.org/10.1007/s10926-012-9375-z (Accessed 3/03/2022) [PubMed].

Cohen L, Swift S. (1999). The spectrum of prevention: developing a comprehensive approach to injury prevention. *Inj Prev*. 1999 Sep; 5(3):203-7. doi: 10.1136/ip.5.3.203. PMID: 10518268; PMCID: PMC1730534. (Accessed 18/07/2022) [PubMed].

Compare, A., Marchettini, P., & Zarbo, C. (2016).

Risk Factors Linked to Psychological Distress, Productivity Losses, and Sick Leave in Low-Back-Pain Employees: A Three-Year Longitudinal Cohort Study. *Pain research and treatment, 2016*, 3797493. https://doi.org/10.1155/2016/3797493 [PubMed].

da Silva T, Mills K, Brown BT, Pocovi N, de Campos T, Maher C, Hancock MJ. (2019).

Recurrence of low back pain is common: a prospective inception cohort study. J *Physiother*. 2019; 65(3):159-165. (Accessed 17/02/2022) [PubMed].

Damian H, Bain C, Williams G, March L, Brooks P, Blyth F, Woolf A, Vos T, Buchbinder R (2012). A systematic review of the global prevalence of low back pain. *Arthritis Rheum.* 2012 Jun; 64(6):2028-37. doi: 10.1002/art.34347. Epub 2012 Jan 9. PMID: 22231424. (Accessed 18/07/2022) [PubMed].

Darlow B, Dean S, Perry M, Mathieson F, Baxter GD, Dowell A. (2014). Acute low back pain management in general practice: uncertainty and conflicting certainties. *Family practice*, *31*(6), 723–732. https://doi.org/10.1093/fampra/cmu051 (Accessed 24/02/2022) [PubMed].

Daryoush Younes, Abu Daud Silong, Zohara Omar, Jamilah Othman (2013). Improving Job Performance:

Workplace Learning is the First Step. (2013) *International Journal of Education & Literacy Studies* ISSN 2201-568X (Print), ISSN 2201-5698 (Online) Vol. 1 No. 1; July 2013 http://dx.doi.org/10.7575/aiac.ijels.v.1n.1p.100 (Accessed 24/02/2022).

de-Souza, I., Sakaguchi, T. F., Yuan, S., (2019).

Prevalence of low back pain in the elderly population: a systematic review. *Clinics (Sao Paulo, Brazil)*, *74*, e789. https://doi.org/10.6061/clinics/2019/e789 (Accessed 17/02/2022) [PubMed].

Diamantidis, A D and Chatzoglou, P. (2019), "Factors affecting employee performance: an empirical approach", *International Journal of Productivity and Performance Management*, Vol. 68 No. 1, pp. 171-193. https://doi.org/10.1108/IJPPM-01-2018-0012 (Accessed 3/03/2022) [Google Scholar].

Dovjak, M., Kukec, A. (2019). Identification of Health Risk Factors and Their Parameters. In: Creating Healthy and Sustainable Buildings. *Springer, Cham.* https://doi.org/10.1007/978-3-030-19412-3_3 (Accessed 4.07.2022)

Eivazi, M., & Abadi, L. (2012). Low back pain in diabetes mellitus and importance of preventive approach. *Health promotion perspectives*, *2*(1), 80–88. https://doi.org/10.5681/hpp.2012.010 (Accessed 20/02/2022) [PubMed].

Elias, H. E., Downing, R., & Mwangi, A. (2019). Low back pain among primary school teachers in Rural Kenya: Prevalence and contributing factors. *African journal of primary health care & family medicine*, *11*(1), e1–e7. https://doi.org/10.4102/phcfm.v11i1.1819 (Accessed 24/02/2022) [PubMed].

Eliasson Kristina, Gunilla Dahlgren, T. Hellman, Charlotte Lewis, Peter Palm, Magnus Svartengren, Teresia Nyman. (2021) Company Representatives' Experiences of Occupational Health Surveillance for Workers Exposed to Hand-Intensive Work: A Qualitative Study. *International Journal of Environmental Research and Public Health* 18:4, doi/citedby/10.1080/10803548.2020.1870836 (Accessed 18/07/2022) [Google Scolar]

Esson, A, Axén I, Mior S, Røe Y, Hondras M, Kretz L, Côté P. (2020).

"I stay in bed, sometimes all day." A qualitative study exploring lived experiences of persons with disabling low back pain. *The Journal of the Canadian Chiropractic Association*, *64*(1), 16–31 [PubMed].

Esteban Ortiz-Ospina, Sandra Tzvetkova and Max Roser (2018)

"Women's employment". *Published online at OurWorldInData.org.* Retrieved from: 'https: //ourworldindata.org/female-labor-supply' (Online Resource, accessed 03.02.2022).

Fanta M., Alagaw, A., Kejela, G., & Tunje, A. (2020). Low Back Pain and Associated Factors among Civil Service Sectors Office Workers in Southern Ethiopia. *International Journal of Occupational Safety and Health* (IJOSH) doi: https://doi.org/10.3126/ijosh.v10i1.29883 (Available Online at https://www.nepjol.info/index.php/IJOSH).

Fatoye, F., Gebrye, T. & Odeyemi, I. (2019). Real-world incidence and prevalence of low back pain using routinely collected data. *Rheumatol Int* **39,** 619–626 https://doi.org/10.1007/s00296-019-04273-0 (Accessed 16/02/2022) [PubMed].

Fernandez-de-las-Pena C, Hernández-Barrera V, Alonso-Blanco C, Palacios-Ceña D, Carrasco-Garrido P, Jiménez-Sánchez S, Jiménez-García R. (2011). Prevalence of neck and low back pain in community-dwelling adults in Spain: a population-based national study. *Spine* (Phila Pa 1976). 2011 Feb 1; 36(3):E213-9. doi: 10.1097/BRS.0b013e3181d952c2. PMID: 21079541. (Accessed 24/02/2022) [PubMed].

Fersum, K Vibe P O'Sullivan, JS Skouen, A, Smith, and A, Kvåle1. (2013)
Efficacy of classification-based cognitive functional therapy in patients with non-specific chronic low back pain: A randomized controlled trial. *Eur J Pain.* 2013 Jul; 17(6): 916–928 [PubMed].

Finta R, Nagy E, Bender T. (2018).
The effect of diaphragm training on lumbar stabilizer muscles: a new concept for improving segmental stability in the case of low back pain. *Journal of pain research.* 11:3031 [PubMed].

Forson, J.A., Ofosu-Dwamena, E., Opoku, R.A. Samuel E Adjavon (2021). Employee motivation and job performance: a study of basic school teachers in Ghana. *Futur Bus J* **7,** 30 (2021). https://doi.org/10.1186/s43093-021-00077-6 (Accessed 3/03/2022) [PubMed].

Foster NE, Hill JC, O'Sullivan P, Hancock M. (2015). Stratified models of care for low back pain. *WCPT Congress,* Singapore, 2015 [PubMed].

Freiwald J, Magni A, Fanlo-Mazas P, Paulino E, Sequeira de Medeiros L, Moretti B, Schleip R, Solarino G. (2021)A Role for Superficial Heat Therapy in the Management of Non-Specific, Mild-to-Moderate Low Back Pain in Current Clinical Practice: A Narrative Review. *Life (Basel).* 2021 Aug 2; 11(8):780. doi: 10.3390/life11080780. PMID: 34440524; PMCID: PMC8401625. (Accessed 17/08/2022) [PubMed].

Furlan A. D., & Murphy, L. (2016). A 46-year-old man with acute low-back pain. *CMAJ: Canadian Medical Association journal = journal de l'Association medicale canadienne*, *188*(6), 441–442. https://doi.org/10.1503/cmaj.150660 (Accessed 3/03/2022) [PubMed].

Ganesan, S., Acharya, A. S., Chauhan, R., & Acharya, S. (2017).

Prevalence and Risk Factors for Low Back Pain in 1,355 Young Adults: A Cross-Sectional Study. *Asian spine journal*, *11*(4), 610–617. https://doi.org/10.4184/asj.2017.11.4.610 [PubMed].

Gay C, Guiguet-Auclair C, Pereira B, Goldstein A, Bareyre L, Coste N, Coudeyre E. (2018) Efficacy of self-management exercise program with spa therapy for behavioral management of knee osteoarthritis: research protocol for a quasi-randomized controlled trial (GEET one). BMC *Complement Altern Med.* 2018 Oct 16; 18(1):279. doi: 10.1186/s12906-018-2339-x. PMID: 30326906; PMCID: PMC6192279. (Accessed 17/08/2022) [PubMed].

Gay, C., A. Chabaud, E. Guilley, E. Coudeyre (2016). Educating patients about the benefits of physical activity and exercise for their hip and knee osteoarthritis. Systematic literature review, Annals of Physical and Rehabilitation Medicine, Volume 59, Issue 3, 2016, Pages 174-183, ISSN 1877-0657, https://doi.org/10.1016/j.rehab.2016.02.005. (Accessed 17/08/2022) [PubMed].

Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. (2017). Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. *The Cochrane database of systematic reviews*, *4*(4), CD011279. https://doi.org/10.1002/14651858.CD011279.pub3 (Accessed 24/02/2022) [PubMed].

George, M., & Topaz, M. (2013). A systematic review of complementary and alternative medicine for asthma self-management. *The Nursing clinics of North America*, *48*(1), 53–149. https://doi.org/10.1016/j.cnur.2012.11.002 (Accessed 3/03/2022) [Google Scholar].

George SZ, Fritz JM, Silfies SP, Schneider MJ, Beneciuk JM, Lentz TA, Gilliam JR, Hendren S, Norman KS (2021). Interventions for the Management of Acute and Chronic Low Back Pain: Revision 2021. J Orthop Sports Phys Ther. 2021 Nov; 51(11):CPG1-CPG60. doi: 10.2519/jospt.2021.0304. PMID: 34719942. (Accessed 15/08/2022)[PubMed].

Ghildayal N, Johnson PJ, Evans RL, Kreitzer MJ. (2016). Complementary and Alternative Medicine Use in the US Adult Low Back Pain Population. *Global advances in health and medicine*, *5*(1), 69–78. https://doi.org/10.7453/gahmj.2015.104 (Accessed 3/03/2022) [PubMed].

Gianola S, Bargeri S, Del Castillo G, Corbetta D, Turolla A, Andreano A, Moja L, Castellini G. (2019). Effectiveness of treatments for acute and sub-acute mechanical non-specific low back pain: protocol for a systematic review and network meta-analysis. *Syst Rev* **8,** 196 (2019). https://doi.org/10.1186/s13643-019-1116https://doi.org/10.1186/s13643-019-1116-33 (Accessed 3/03/2022) [PubMed].

Giattino Charlie, Esteban Ortiz-Ospina and Max Roser (2020) - "Working Hours". *Published online at OurWorldInData.org.* Retrieved from: 'https: //ourworldindata.org/working-hours' [Online Resource] (Accessed 18/07/2022).

Global Health Group 2021 (Data Exchange 2021. http://ghdx.healthdata.org/gbd-results-tool (Accessed 01-11-2021)

Goldman RE, Parker DR, Brown J, Walker J, Eaton CB, Borkan JM. (2015). Recommendations for a mixed methods approach to evaluating the patient-centered medical home. *Ann Fam Med*. 2015 Mar; 13(2):168-75. doi: 10.1370/afm.1765. PMID: 25755039; PMCID: PMC4369592.

Gordon, R., & Bloxham, S. (2016). A Systematic Review of the Effects of Exercise and Physical Activity on Non-Specific Chronic Low Back Pain. *Healthcare (Basel, Switzerland), 4*(2), 22. https://doi.org/10.3390/healthcare4020022 (Accessed 24/02/2022) [PubMed].

Guo HR, Tanaka S, Cameron LL, Seligman PJ, Behrens VJ, Ger J, Wild DK, Putz-Anderson V (2015). Back pain of civil service workers in the United States: national estimates and civil service civil service workers at high risk. *AmJ IndMed.;* 28(5):591–602. [PubMed].

Haile G, Hailemariam TT, Haile TG. (2021). Effectiveness of Ultrasound Therapy on the Management of Chronic Non-Specific Low Back Pain: A Systematic Review. *J Pain Res*. 2021; 14:1251-1257 https://doi.org/10.2147/JPR.S277574 (Accessed 3/03/2022) [PubMed]

Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, Hoy D, Karppinen J, Pransky G, Sieper J, Smeets RJ, Underwood M; (2018). What lower back pain is and why we need to pay attention. *Lancet Low Back Pain Series Working Group.* Lancet 2018 Jun 9; 391 (10137):2356-2367. Doi: 10.1016/S01406736 (18)30480-X. Epub 2018 Mar 21. PMID: 29573870 [PubMed].

Hasyim Ridwan, M. A. and Junadi, P. (2018) "Analyzing Patient Education Methods to Improve Patient Care in Hospital: A Systematic Review", *KnE Life Sciences*, 4(9), pp. 244–264. doi: 10.18502/kls.v4i9.3576. (Accessed 25/02/2022).

Heneweer H, Staes F, Aufdemkampe G, van Rijn M, Vanhees L. (2011).

Physical activity and low back pain: a systematic review of recent literature. *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*, *20*(6), 826–845. https://doi.org/10.1007/s00586-010-1680-7 [PubMed].

Henn, L., Schier, K., Brian, T., & Hardt, J. (2014). Back pain in Poland and Germany: a survey of prevalence and association with demographic characters. *BioMed research international*, *2014*, 901341. https://doi.org/10.1155/2014/901341 [PubMed].

Hershkovich O, Friedlander A, Gordon B, Arzi H, Derazne E, Tzur D, Shamis A, Afek A. (2013). Associations of Body Mass Index and Body Height with Low Back Pain in 829,791 Adolescents. *American Journal of Epidemiology*. doi: 178. 10.1093/aje/kwt019.

Heuch I, Hagen K, Zwart J-A (2017) Physical activity level at work and risk of chronic low back pain: A follow-up in the Nord-Trøndelag Health Study. PLoS ONE 12(4): e0175086. https://doi.org/10.1371/journal.pone.0175086 (Accessed 3/03/2022).

Hidalgo B, Detrembleur C, Hall T, Mahaudens P, Nielens H. (2014). The efficacy of manual therapy and exercise for different stages of non-specific low back pain: an update of systematic reviews. *The Journal of manual & manipulative therapy*, *22*(2), 59–74. https://doi.org/10.1179/2042618613Y.0000000041 (Accessed 24/02/2022) [PubMed].

Hill JC, Whitehurst DG, Lewis M, Bryan S, Dunn KM, Foster NE, Konstantinou K, Main CJ, Mason E, Somerville S, Sowden G, Vohora K, Hay EM. (2011). Comparison of stratified primary care management for low back pain with current best practice (STarT Back): a randomized controlled trial. *Lancet* 2011; 378:1560-71 [PubMed].

Hoffmann TC, Del Mar CB, Strong J, Mai J. (2013). Patients' expectations of acute low back pain management: implications for evidence uptake. *BMC Fam Pract* 2013; 14: 7 [PubMed].

Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, Williams G, Smith E, Vos T, Barendregt J, Murray C, Burstein R, Buchbinder R. (2014). The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis.* 2014 Jun; 73(6):968-74. doi: 10.1136/annrheumdis-2013-204428. Epub 2014 Mar 24. PMID: 24665116. (Accessed 24/02/2022) [PubMed].

Husky MM, Ferdous Farin F, Compagnone P, Fermanian C, Kovess-Masfety V. (2018). Chronic back pain and its association with quality of life in a large French population survey. *Health Qual Life Outcomes* **16,** 195 (2018). https://doi.org/10.1186/s12955-018-1018-4 (Accessed 3/03/2022) [PubMed].

Ikeda T, Sugiyama K, Aida J, Tsuboya T, Watabiki N, Kondo K, Osaka K. (2019). Socioeconomic inequalities in low back pain among older people: the JAGES cross-sectional study. *Int J Equity Health* **18,** 15 (2019). https://doi.org/10.1186/s12939-019-0918-1 (Accessed 24/02/2022) [PubMed].

Ilker Etikan, Sulaiman Abubakar Musa, & Rukayya Sunusi Alkassim (2016)

Comparison of Convenience Sampling and Purposive Sampling, *American Journal of Theoretical and Applied Statistics.* Vol. 5, No. 1, 2016, pp. 1-4. doi: 10.11648/j.ajtas.20160501.11

Janwantanakul P, Pensri P, Moolkay P, Jiamjarasrangsi W. (2011). Development of a risk score for low back pain in office workers--a cross-sectional study. *BMC musculoskeletal disorders*, *12*, 23. https://doi.org/10.1186/1471-2474-12-23 (Accessed 3/03/2022) [PubMed].

Kahere, M., & Ginindza, T. (2021). The prevalence and risk factors of chronic low back pain among adults in KwaZulu-Natal, South Africa: an observational cross-sectional hospital based study. *BMC Musculoskelet Disord* **22,** 955 (2021). https://doi.org/10.1186/s12891https://doi.org/10.1186/s12891-021-04790-9021-04790-9 (Accessed 17/02/2022) [PubMed].

Kahere M, and Ginindza T (2020). The burden of non-specific chronic low back pain among adults in KwaZulu-Natal, South Africa: a protocol for a mixed-methods study. *BMJ Open* 2020; 10:e039554. doi: 10.1136/bmjopen-2020-039554 (Accessed 11/07/2022) [PubMed].

Kandala NB, Campbell EK, Rakgoasi SD, Madi-Segwagwe BC, Fako TT. (2012).

The geography of HIV/AIDS prevalence rates in Botswana. *HIV/AIDS (Auckland, N.Z.)*, *4*, 95–102. https://doi.org/10.2147/HIV.S30537 [PubMed].

Karayannis, N. V., Jull, G. A., & Hodges, P. W. (2012). Physiotherapy movement based classification approaches to low back pain: comparison of subgroups through review and developer/expert survey. *BMC musculoskeletal disorders*, *13*, 24. https://doi.org/10.1186/1471-2474-13-24 (Accessed 24/02/2022) [PubMed].

Karlsson M, Bergenheim A, Larsson MEH, Nordeman L, van Tulder M, Bernhardsson S (2020). Effects of exercise therapy in patients with acute low back pain: a systematic review of systematic reviews. Syst Rev. 2020 Aug 14; 9(1):182. doi: 10.1186/s13643-020-01412-8. PMID: 32795336; PMCID: PMC7427286). [Accessed 15/08/2022] PubMed.

Kisling LA, & M Das J (2022). Prevention Strategies. [Updated 2021 May 9].

In: StatPearls [Internet]. Treasure Island (FL): *Stat Pearls Publishing;* 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK537222/ (Accessed 20/02/2022) [PubMed].

Kizhakkeveettil A., Rose, K., & Kadar, G. E. (2014). Integrative therapies for low back pain that include complementary and alternative medicine care: a systematic review. *Global advances in health and medicine*, *3*(5), 49–64. https://doi.org/10.7453/gahmj.2014.043 (Accessed 3/03/2022) [PubMed].

Kjaer P, Kongsted A, Ris I, Abbott A, Rasmussen CDN, Roos EM, Skou ST, Andersen TE, Hertvigsen J. (2018). Back group-based patient education integrated with exercises to support self-management of back pain-development, theories and scientific evidence. *BMC musculoskeletal disorders.* 2018 Dec 1; 19(1):418. [PubMed].

Korkmaz Nilufer Cetisli, Uğur Cavlak and Emine Aslan Telci. (2011). Musculoskeletal pain, associated risk factors and coping strategies in school teachers. *Scientific Research and Essays Academic Journals* Vol. 6(3), pp. 649-657, 4 Feb, 2011 DOI: 10.5897/SRE10.1064 ISSN 1992-2248 Available online at http://www.academicjournals.org/ (Accessed 24/02/2022).

Koumamba, A.P., Bisvigou, U.J., Ngoungou, E.B. and Gayo Diallo (2021). Health information systems in developing countries: case of African countries. *BMC Med Inform Decis Mak* **21,** 232 (2021). https://doi.org/10.1186/s12911-021-01597-5 (Accessed 3/03/2022). [PubMed].

Kovacs FM, Burgos-Alonso N, Martín-Nogueras AM, Seco-Calvo J. (2022). The Efficacy and Effectiveness of Education for Preventing and Treating Non-Specific Low Back Pain in the Hispanic Cultural Setting: A Systematic Review. *Int J Environ Res Public Health.* 2022 Jan 12; 19(2):825. doi: 10.3390/ijerph19020825. PMID: 35055646; PMCID: PMC8776076. (Accessed 17/08/2022) [PubMed].

Koyanagi, A., Stickley, A., Garin, N. M. Miret, J. L. Ayuso-Mateos, M. Leonardi, S. Koskinen, A. Galas & J. M. Haro (2015). The association between obesity and back pain in nine countries: a cross-sectional study. *BMC Public Health* **15,** 123 (2015). https://doi.org/10.1186/s12889-015-1362-9 (Accessed 24/02/2022) [PubMed].

Krefting Laura Rigor in qualitative research: The assessment of trustworthiness. *American journal of occupational therapy*, March 1991, Vol. 45, 214-222 https://doi.ord/10.5014/ajot.45.3.214

Kripa S., & Kaur, H. (2021). Identifying relations between posture and pain in lower back pain patients: a narrative review. *Bull Fac Phys Ther* **26,** 34 (2021). https://doi.org/10.1186/s43161-021-00052-w (Accessed 3/03/2022) [PubMed].

Lallukka T, Mänty M, Cooper C, Fleischmann M, Kouvonen A, Walker-Bone KE, Head JA, Halonen JI. (2018). Recurrent back pain during working life and exit from paid employment: a 28-year followup of the Whitehall II Study. *Occupational and Environmental Medicine, 75*(11), 786–791.

Liang Ng, J.Y., L. & Gagliardi, A.R. (2016). The quantity and quality of complementary and alternative medicine clinical practice guidelines on herbal medicines, acupuncture and spinal manipulation: systematic review and assessment using AGREE II. *BMC Complement Altern Med* **16,** 425 (2016). https://doi.org/10.1186/s12906-016-1410-8 (Accessed 3/03/2022) [PubMed].

Lim MT, Lim YMF, Tong SF, Sivasampu S. (2019). Age, sex and primary care setting differences in patients' perception of community healthcare seeking behaviour towards health services. *PLoS ONE* 14(10): e0224260. https://doi.org/10.1371/journal.pone.0224260 (Accessed 24/02/2022).

Lima Florencio L, Lopez-de-Andres A, Hernández-Barrera V, Palacios-Ceña D, Fernández-de-Las-Peñas C, Jimenez-Garcia R, Perez-Farinos N, Carabantes-Alarcon D, Martinez-Hernandez D, Albaladejo-Vicente R. (2020). Is There an Association between Diabetes and Neck and Back Pain? Results of a Case Control Study. *J Clin Med.* 2020; 9(9):2867. Published 2020 Sep 4. doi: 10.3390/jcm9092867 [PubMed].

Lopez-Garcia J. R. S. García-Herrero, J. M. Gutiérrez, M. A. Mariscal, (2019). "Psychosocial and Ergonomic Conditions at Work: Influence on the Probability of a Workplace Accident", *BioMed Research International*, vol. 2019, Article ID 2519020, 13 pages, 2019. https://doi.org/10.1155/2019/2519020 (Accessed 24/02/2022) [PubMed].

Machado GC, Maher CG, Ferreira PH, Day RO, Pinheiro MB, Ferreira ML. (2017). Non-steroidal anti-inflammatory drugs for spinal pain: a systematic review and meta-analysis. *Annals of the Rheumatic Diseases* 2017; 76:1269-1278. doi: 10.1136/annrheumdis-2016-210597. (Accessed 3/03/2022) [PubMed].

Macphail K (2018) Physiotherapy Management of Chronic Low Back Pain Patients with Yellow Flags: A Systematic Review. J Musculoskelet Disord Treat 4:060. doi.org/10.23937/2572-3243.1510060 (Accessed 15/08/2022) [PubMed].

Madhwani KP, Nag P K. 2017). Effective office ergonomics awareness: Experiences from global corporates. *Indian J Occup Environ Med* [serial online] 2017 [cited 2022 Feb 24]; 21:7783. Available from: https://www.ijoem.com/text.asp?2017/21/2/77/225340 (Accessed 24/02/2022) [PubMed].

Magalhaes Franchi U, Luiz Carregaro R, Paula de Souza L, Augusto Penha A, Padula RS (2019). Occupational health and ergonomics physiotherapists in Brazil: investigation of the socio-demographic profile and professional practices. *Physiother Theory Pract.* 2021 Dec; 37(12):1466-1473. doi: 10.1080/09593985.2019.1703228. Epub 2019 Dec 17. PMID: 31847664. (Accessed 11/07/2022) [PubMed].

Malanga GA, Yan N, Stark J. Mechanisms and efficacy of heat and cold therapies for musculoskeletal injury. *Postgrad Med.* 2015 Jan; 127(1):57-65. doi: 10.1080/00325481.2015.992719. Epub 2014 Dec 15. PMID: 25526231. (Accessed 17/08/2022) [PubMed].

Manchikanti L, Singh V, Falco FJ, Benyamin RM, Hirsch JA. (2014). Epidemiology of low back pain in adults. *Neuromodulation: Technology at the Neural Interface,* 17, 3-10. [PubMed].

Mao X, Jia P, Zhang L, Zhao P, Chen Y, Zhang M. (2015)

An Evaluation of the Effects of Human Factors and Ergonomics on Health Care and Patient Safety Practices: A Systematic Review. *PLoS ONE* 10(6): e0129948. https://doi.org/10.1371/journal.pone.0129948 (Accessed 17/02/2022) [PubMed].

Martins C, Godycki-Cwirko M, Heleno B, Brodersen J. (2018). Quaternary prevention: reviewing the concept. *The European journal of general practice*, *24*(1), 106–111. https://doi.org/10.1080/13814788.2017.1422177 (Accessed 24/02/2022) [PubMed].

MaVy Chan L, Carruthers KJ. Incidence, (2014). Incidence, prevalence, costs, and influence on disability of common conditions requiring rehabilitation in the United States: stroke, spinal cord injury, traumatic brain injury, multiple sclerosis, osteoarthritis, rheumatoid arthritis, limb loss, and back pain. *Arch Phys Med Rehabil.* 2014; 95(5):986–995e1. https://doi.org/10. 1016/j.apmr.2013.10.032. [PubMed].

Mayer S, Spickschen J, Stein KV, Crevenna R, Dorner TE, Simon J. (2019). The societal costs of chronic pain and its determinants: the case of Austria. *PLoS ONE*. 2019; 14(3):e213889. https://doi.org/10.1371/ journal.pone.0213889.

Mbondji PE, Kebede D, Soumbey-Alley EW, Zielinski C, Kouvividila W, Lusamba-Dikassa PS. (2014). Health information systems in Africa: descriptive analysis of data sources, information products and health statistics. *Journal of the Royal Society of Medicine*, *107*(1 suppl), 34–45. https://doi.org/10.1177/0141076814531750 (Accessed 3/03/2022) [PubMed].

Moffett J, McLean S (2006). The role of physiotherapy in the management of non-specific back pain and neck pain. Rheumatology (Oxford). 2006 Apr; 45(4):371-8. doi: 10.1093/rheumatology/kei242. Epub 2005 Dec 6. PMID: 16332949. (Accessed 15/08/2022) [PubMed].

Mohajan, Haradhan (2017). Two Criteria for Good Measurements in Research: Validity and Reliability (2017). 1 October 2017 *Online* at https://mpra.ub.uni-muenchen.de/83458/ MPRA Paper No. 83458, posted 24 Dec 2017 08:48 UTC

Mohamed SF, Juma P, Asiki G, Kyobutungi C. (2018).

Facilitators and barriers in the formulation and implementation of tobacco control policies in Kenya: a qualitative study. *BMC Public Health* **18,** 960 (2018). https://doi.org/10.1186/s12889-018-5830-x (Accessed 20/02/2022) [PubMed].

Morey JN, Boggero IA, Scott AB, Segerstrom SC. (2015). Current Directions in Stress and Human

Immune Function. *Current opinion in psychology*, *5*, 13–17. https://doi.org/10.1016/j.copsyc.2015.03.007 (Accessed 25/02/2022) [PubMed].

Morris LD, Daniels KJ, Ganguli B, Louw QA. (2018). An update on the prevalence of low back pain in Africa: a systematic review and meta-analyses. *BMC Musculoskeletal Disord* **19,** 196 (2018). https://doi.org/10.1186/s12891-018-2075-x (Accessed 24/02/2022)

Mousavi SJ, Akbari ME, Mehdian H, Mobini B, Montazeri A, Akbarnia B, Parnianpour M. (2011). Low back pain in Iran: a growing need to adapt and implement evidence-based practice in developing countries. *Spine* (Phila Pa 1976). 2011 May 1; 36(10):E638-46. doi: 10.1097/BRS.0b013e3181fa1da2. PMID: 21270691.
(Accessed 24/02/2022) [PubMed].

Mwendera, C. A., de Jager, C., Longwe, H., Kumwenda, S, Hongoro, C. Mutero, C. M. (2019).

Challenges to the implementation of malaria policies in Malawi. *BMC health services research*, *19*(1), 194. https://doi.org/10.1186/s12913-019-4032-2 (Accessed 20/02/2022).

Myezwa H, Hanass-Hancock J, Ajidahun AT, Carpenter B. (2018).

Disability and health outcomes - from a cohort of people on long-term anti-retroviral therapy. *SAHARA J: journal of Social Aspects of HIV/AIDS Research Alliance*, *15*(1), 50–59. https://doi.org/10.1080/17290376.2018.1459813 (Accessed 18/02/2022) [PubMed].

Naing N. N. Determination of sample size *The Malaysian Journal of medical science* MJMS 10(2), 84-86 2011.

Namnaqani FI, Mashabi AS, Yaseen KM, Alshehri MA. (2019). The effectiveness of McKenzie method compared to manual therapy for treating chronic low back pain: a systematic review. *Journal of musculoskeletal & neuronal interactions*, *19*(4), 492–499. (Accessed 3/03/2022) [PubMed].

National Guideline Centre (UK). Low Back Pain and Sciatica in Over 16s: Assessment and Management. London: National Institute for Health and Care Excellence (NICE); 2016 Nov. PMID: 27929617. https://www.nice.org.uk/guidance/ng59/chapter/recommendations (Accessed 5/03/2022). [PubMed].

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*. https://doi.org/10.1177/1609406917733847 (Accessed 18/07/2022)

Nuttall FQ (2015). Body Mass Index: Obesity, BMI, and Health: A Critical Review. *Nutr Today.* 2015 May; 50(3):117-128. doi: 10.1097/NT.0000000000000092. Epub 2015 Apr 7. PMID: 27340299; PMCID: PMC4890841 (Accessed 31.07.2022) [PubMed].

Nygaard PP, Skovlund SV, Sundstrup E, Andersen LL (2020). Is low-back pain a limiting factor for senior workers with high physical work demands? A cross-sectional study. *BMC Musculoskelet Disord.* 2020 Sep 21; 21(1):622. doi: 10.1186/s12891-020-03643-1. PMID: 32958013; PMCID: PMC7507239. (Accessed 18/07/2022) [PubMed].

Okati-Aliabad H, Ansari-Moghaddam A, Kargar S, Jabbari N (2022). Prevalence of Obesity and Overweight among Adults in the Middle East Countries from 2000 to 2020: A Systematic

Review and Meta-Analysis. *J Obes.* 2022 Feb 3; 2022:8074837. doi: 10.1155/2022/8074837. PMID: 35154826; PMCID: PMC8831052. (Accessed 18/07/2022) [PubMed].

Omokhodion F. O. and A. O. Sanya (2013). Risk factors for low back pain among office workers in Ibadan, Southwest Nigeria *Occupational Medicine;* 53:287–289 DOI: 10.1093/occmed/kqg063 [PubMed].

Padula RS, Oliveira AB, Carregaro RL, Sato TO (2016). Physical therapy in occupational health and ergonomics: practical applications and innovative research approaches. *Braz J Phys Ther.* 2016 Nov 16; 20(5):490-492. doi: 10.1590/bjpt-rbf.2014.0193. PMID: 27849288; PMCID: PMC5123268. (Accessed 11/07/2022) [PubMed].

Patience N Erick and Derek R Smith. (2014). Low back pain of school teachers in Botswana, prevalence and risk factors. *BMC Musculoskeletal Disorders* 2014, 15:359 http://www.biomedcentral.com/1471-2474/15/359 [PubMed].

Peggy Pletcher and James McIntosh (2017). What is causing this pain in my back? February 23 2017 https://www.medicalnewstoday.com/articles/172943 (Access 26th April 2021)

Pergolizzi, J.V., LeQuang, J.A. (2020). Rehabilitation for Low Back Pain: A Narrative Review for Managing Pain and Improving Function in Acute and Chronic Conditions. *Pain Ther* **9,** 83–96 (2020). https://doi.org/10.1007/s40122-020-00149-5 (Accessed 24/02/2022) [PubMed].

Petit A, Roche-Leboucher G, Bontoux L, Dubus V, Ronzi Y, Roquelaure Y, Richard I. (2014). Effectiveness of three treatment strategies on occupational limitations and quality of life for patients with non-specific chronic low back pain: Is a multidisciplinary approach the key feature to success: study protocol for a randomized controlled trial. *BMC Musculoskelet Disord* **15,** 131 (2014).

https://doi.org/10.1186/1471-2474-15-131 (Accessed 3/03/2022) [PubMed].

Piccoliori G, Engl A, Gatterer D, Sessa E, in der Schmitten J, Abholz HH. (2013).

Management of low back pain in general practice – is it of acceptable quality: an observational study among 25 general practices in South Tyrol (Italy). *BMC Fam Pract* **14,** 148 (2013). https://doi.org/10.1186/1471-2296-14-148 (Accessed 17/02/2022) [PubMed].

Pinheiro, M.B., Oliveira, J., Bauman, A. N., Fairhall, W., Kwok & C., Sherrington (2020). Evidence on physical activity and osteoporosis prevention for people aged 65+ years: a systematic review to inform the WHO guidelines on physical activity and sedentary behaviour. *Int J Behav Nutr Phys* Act 17, 150 (2020). https://doi.org/10.1186/s12966-020-01040-4 (Accessed 17/08/2022) [PubMed].

Plouvier, S., Gourmelen, J., Chastang, JF. Jean-Louis Lanoë & Annette Leclerc (2011).

Low back pain around retirement age and physical occupational exposure during working life. *BMC Public Health* **11,** 268 (2011). https://doi.org/10.1186/1471-2458-11-268 (Accessed 20/02/2022) [PubMed].

Pozzobon D, Ferreira PH, Dario AB, Almeida L, Vesentini G, Harmer AR, Ferreira ML. (2019).

Is there an association between diabetes and neck and back pain? A systematic review with meta-analyses. *PLoS One.* 2019; 14(2):e0212030. Published 2019 Feb 21. doi:10.1371/journal.pone.0212030

Rachmawati Siti and Muthia Zulfia. (2016). Factors affecting low back pain complaint to workers in gravity casting area automotive industry Indonesia. *E3S Web Conf.,* 73 (2018) 06013 DOI: https://doi.org/10.1051/e3sconf/20187306013 (Accessed 24/02/2022) [PubMed].

Reichard, C., and Schröter, E. (2021). Civil Service and Public Employment. In: Kuhlmann, S., Proeller, I., Schimanke, D., Ziekow, J. (eds) Public Administration in Germany.

Governance and Public Management. *Palgrave Macmillan,* Cham. https://doi.org/10.1007/978-3-030-53697-8_13 (Accessed 4.07.2022).

Raffler N, Rissler J, Ellegast R, Schikowsky C, Kraus T, Ochsmann E. (2020). Is low-back pain a limiting factor for senior workers with high physical work demands? A cross-sectional study. *BMC Musculoskelet Disord* **21,** 622 (2020). https://doi.org/10.1186/s12891-020-03643-1 (Accessed 20/02/2022) [PubMed].

Rahman HWA, Qahtani AL, Salem HI (2016). Magnitude and risk factors of lower back pain of Saudi teachers in Abha City, *Saudi Arabia. Medical Journal of Cairo University 2016*; 84:87-92

Rathnayake APS, Sparkes V, Sheeran L (2021). What is the effect of low back pain self-management interventions with exercise components added? A systematic review with meta-analysis. *Musculoskelet Sci Pract.* 2021 Dec; 56:102469. doi: 10.1016/j.msksp.2021.102469. Epub 2021 Oct 18. PMID: 34735866. (Accessed 15/08/2022) [PubMed].

Rinaldo L, McCutcheon BA, Gilder H, Kerezoudis P, Murphy M, Maloney P, Hassoon A, Bydon M. (2017). Diabetes and Back Pain: Markers of Diabetes Disease Progression Are Associated With Chronic Back Pain. *Clinical diabetes: a publication of the American Diabetes Association*, *35*(3), 126–131. https://doi.org/10.2337/cd16-0011 (Accessed 18/02/2022) [PubMed].

Robles TF 2014). Marital quality and health: Implications for marriage in the 21st century. *Curr Dir Psychol Sci.* 2014 Dec; 23(6):427-432. doi: 10.1177/0963721414549043. PMID: 25544806; PMCID: PMC4275835. (Accessed 01/08/2022) [PubMed]

Roman-Liu D, Kamińska J, Kokarski T. (2020)

Effectiveness of workplace intervention strategies in lower back pain prevention: a review. *Ind Health.* 2020; 58:503-519. (Accessed 17/02/2022) [PubMed].

Samartzis D, Karppinen J, Luk KD, Cheung KM. (2014). Hypertension is Independently Associated with Lumbar Disc Degeneration: A Large-Scale Population-Based Study. *Global Spine Journal*. 2014; 4 (1_suppl): s-0034-1376579-s0034-1376579. doi:10.1055/s-0034-1376579 [PubMed].

Sarkar, S & Seshadri D (2014). Conducting record review studies in clinical practice. *Journal of clinical and diagnostic research; JCDR,* 8(9) JG01-JG4. https://doi.org/10.7860/JCDR/2014.8301. 4806 [PubMed].

Schaafsma, F. G., Anema, J. R., & van der Beek, A. J. (2015). Back pain: prevention and management in the workplace. Best Practice & Research Clinical *Rheumatology, 29*(3), 483-494. (Accessed 17/02/2022) [PubMed].

Serranheira F, Sousa-Uva M, Heranz F, Kovacs F, Sousa-Uva A. (2020). Low Back Pain (LBP), work and absenteeism. *Work.* 2020; 65(2):463-469. doi: 10.3233/WOR-203073. PMID: 32007966 [PubMed].

Sharma S, Adrian T C, Reed B, Melanie H, Denise A O, Tammy C H, Carissa B, Rachelle B, Chris G M (2020). Clinician and patient beliefs about diagnostic imaging for low back pain: a systematic qualitative evidence synthesis *BMJ Open* 2020; 10:e037820. doi: 10.1136/bmjopen-2020-037820 http://orcid.org/0000-0002-4797-6460 (Accessed 24/02/2022) [PubMed].

Shaw WS, Main CJ, Johnston V. (2011) Addressing occupational factors in the management of low back pain: implications for physical therapy practice. *Phys Ther, 91*(5):1-13. [PubMed].

Shemshaki H, Nourian SM, Fereidan-Esfahani M, Mokhtari M, Etemadifar MR. (2013).

What is the source of low back pain? *Journal of cranio-vertebral junction & spine*, *4*(1), 21–24. https://doi.org/10.4103/0974-8237.121620 [PubMed].

Shipton E. A. (2018). Physical Therapy Approaches in the Treatment of Low Back Pain. *Pain and therapy*, *7*(2), 127–137. https://doi.org/10.1007/s40122-018-0105-x (Accessed 20/02/2022) [PubMed].

Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. (2010). The association between obesity and low back pain: a meta-analysis. *American Journal of Epidemiology, 171*(2), 135-154. [PubMed].

Shiriyedeve, S., Dlungwane, T. P., & Tlou, B. (2019).

Factors associated with physical activity in type 2 diabetes mellitus patients at a public clinic in Gaborone, Botswana, in 2017. *African journal of primary health care & family medicine*, *11*(1), e1–e7. https://doi.org/10.4102/phcfm.v11i1.2036).

Sickles R., & Zelenyuk V. (2019). Measurement of Performance and Efficiency: Theory and Practice. *Cambridge: Cambridge University Press.* doi: 10.1017/9781139565981 [Google Scholar].

Sihag, Vikrant and Rijsdijk, Serge A., (2019). Organizational Controls and Performance Outcomes: A Meta-Analytic Assessment and Extension (January 2019). *Journal of Management Studies*, Vol. 56, Issue 1, pp. 91-133, 2019, Available at SSRN: https://ssrn.com/abstract=3300924 or http://dx.doi.org/10.1111/joms.12342 (Accessed 24/02/2022).

Simmons, Susan PhD, ARNP-BC (2011). Complementary and alternative therapies for low-back pain, *Nursing*: May 2011 - Volume 41 - Issue 5 - p 54-55 doi: 10.1097/01.NURSE.0000396447.81875.ee (Accessed 3/03/2022).

Sitorus N, Hanafi AS, Simbolon D, Martina. (2021). Joint effect of high blood pressure and physical inactive on diabetes mellitus: a population based cross-sectional survey. *Journal of preventive medicine and hygiene*, *61*(4), E614– E620. https://doi.org/10.15167/2421-4248/jpmh2020.61.4.1406 (Accessed 20/02/2022) [PubMed].

Slater D, Korakakis V, O'Sullivan P, Nolan D, O'Sullivan K. (2019) "Sit Up Straight": Time to Rehttps://www.jospt.org/doi/abs/10.2519/jospt.2019.0610evaluate. *Journal of Orthopaedic & Sports Physical Therapy* 2019 49:8, 562-564 [PubMed].

Snyder CF, Wu AW, Miller RS, Jensen RE, Bantug ET, Wolff AC. (2011). The role of informatics in promoting patient-centered care. *Cancer journal (Sudbury, Mass.), 17*(4), 211–218. https://doi.org/10.1097/PPO.0b013e318225ff89 [PubMed].

Sorensen G, Sparer E, Williams JAR, Gundersen D, Boden LI, Dennerlein JT, H. D, Katz JN, McLellan DL, Okechukwu CA, Pronk NP, Revette A, Wagner GR. (2018). Measuring Best Practices for Workplace Safety, Health, and Well-Being: The Workplace Integrated Safety and Health Assessment. *J Occup Environ Med.* 2018 May; 60(5):430-439. doi: 10.1097/JOM.0000000000001286. PMID: 29389812; PMCID: PMC5943154. (Accessed 11/07/2022) [PubMed].

Spronk Inge, Joke C. Korevaar, René Poos, Rodrigo Davids, Henk Hilderink, François G. Schellevis, Robert A. Verheij & Mark M. J. Nielen (2019). Calculating incidence rates and prevalence proportions: not as simple as it seems. BMC Public Health 19, 512 (2019). https://doi.org/10.1186/s12889-019-6820-3 (Accessed 31.07.2022)

Sribastav SS, Long J, He P, He W, Ye F, Li Z, Wang J, Liu H, Wang H, Zheng Z. (2018). Risk Factors Associated with Pain Severity in Patients with Non-specific Low Back Pain in Southern China. *Asian spine journal*, *12*(3), 533–543. https://doi.org/10.4184/asj.2018.12.3.533 (Accessed 17/02/2022) [PubMed].

Statistics Botswana 2015 (Stats brief. Health Statistics – 2007 – 2015) https://www.statsbots.org.bw (Accessed 26th April 2021).

Stoewen DL. (2016). Wellness at work: Building healthy workplaces. *Can Vet J.* 2016 Nov; 57(11):1188-1190. PMID: 27807385; PMCID: PMC5081153. (Accessed 11/07/2022) [PubMed]

Su CA, Kusin DJ, Li SQ, Ahn UM, Ahn NU. (2018). the Association between Body Mass Index and the Prevalence, Severity, and Frequency of Low Back Pain: Data from the Osteoarthritis Initiative. *Spine* (Phila Pa 1976). 2018 Jun 1543(12):848-852. doi: 10.1097/BRS.0000000000002601. PMID: 29462069. (Accessed 25/02/2022) [PubMed].

Tarimo, N., & Diener, I. (2017). Knowledge, attitudes and beliefs on contributing factors among low back pain patients attending outpatient physiotherapy treatment in Malawi. *The South African journal of physiotherapy*, *73*(1), 395. https://doi.org/10.4102/sajp.v73i1.395 (Accessed 24/02/2022) [PubMed].

Therese H N, Kines P, Nykänen M, Thomée S, Holte KA, Vuori J, Wærsted M, Veiersted KB. (2019). Occupational Safety and Health among Young Workers in the Nordic Countries: *Safety and Health at Work*, 10, 1, 2019, ISSN 2093 7911,https://doi.org/10.1016/j.shaow.2018.12.003 [PubMed].

Thiese, M. S., Hughes, M., & Biggs, J. (2013). Electrical stimulation for chronic non-specific low back pain in a working-age population: a 12-week double blinded randomized controlled trial. *BMC musculoskeletal disorders*, *14*, 117. https://doi.org/10.1186/1471-2474-14-117 (Accessed 3/03/2022) [PubMed].

Thompson AE, Anisimowicz Y, Miedema B, Hogg W, Wodchis WP, Aubrey-Bassler K. (2016). The influence of gender and other patient characteristics on health care-seeking behaviour: a QUALICOPC study. *BMC Fam Pract* **17,** 38 (2016).

https://doi.org/10.1186/s12875https://doi.org/10.1186/s12875-016-0440-0016-0440-0) [PubMed].

Traeger AC, Hübscher M, Henschke N, Moseley GL, Lee H, McAuley JH. (2015). Effect of Primary Care-Based Education on Reassurance in Patients with Acute Low Back Pain: Systematic Review and Meta-analysis. *JAMA Intern Med.* 2015 May; 175(5):733-43. doi: 10.1001/jamainternmed. 2015.0217. PMID: 25799308. (Accessed 24/02/2022) [PubMed].

Tsang VHM, Lo PHW, Lam FT, Chung LSW, Tang TY, Lui HM, Lau JTG, Yee HF, Lun YK, Chan HT, Cheung JPY. (2017) 'Perception and use of complementary and alternative medicine for low back pain', *Journal of Orthopaedic Surgery*. doi: 10.1177/2309499017739480.
(Accessed 3/03/2022) [PubMed].

Tshoose, C. (2014). Placing the right to occupational health and safety within a human rights framework: trends and challenges for South Africa. *The Comparative and International Law Journal of Southern Africa*, *47*(2), 276–296. http://www.jstor.org/stable/24585872 (Accessed 18/07/2022) [PubMed].

UNAIDS 2019 'AIDS info' 2019 'Ending AIDS: Progress towards 90-90-90 targets' [pdf].

UNAIDS 2020. Aids info (2020) Global HIV & AIDS statistics — Fact sheet GLOBAL HIV STATISTICS. https://www.unaids.org/en/resources/fact-sheet. (Accessed online).

Vassar M and Holzmann M (2013). The retrospective chart review: important methodological considerations. J Educ Eval Health Prof. 2013 Nov 30; 10:12. doi:

10.3352/jeehp.2013.10.12. PMID: 24324853; PMCID: PMC3853868. (Accessed 20/07/2022) [PubMed].

van Middelkoop M, Rubinstein SM, Kuijpers T, Verhagen AP, Ostelo R, Koes BW, van Tulder MW. (2011). A systematic review on the effectiveness of physical and rehabilitation interventions for chronic non-specific low back pain. *Eur Spine J* **20,** 19–39 (2011). https://doi.org/10.1007/s00586-010-1518-3 (Accessed 3/03/2022) [PubMed].

Vrbanic TS. Krizobolja--OD definicije do dijagnoze (2011) Low back pain--from definition to diagnosis. *Rheumatism.* 2011; 58(2):105-7. Croatian. PMID: 22232956. (Accessed 2/03/2022) [PubMed].

Walsh JJ, Barnes JD, Cameron JD, Goldfield GS, Chaput JP, Gunnell KE, Ledoux AA, Zemek RL, Tremblay MS. (2018). Associations between 24 hour movement behaviours and global cognition in US children: a cross-sectional observational study. *Lancet Child Adolesc Health*. 2018 Nov; 2 (11):783-791. doi: 10.1016/S2352-4642(18)30278-5. Epub 2018 Sep 27. PMID: 30268792; PMCID: PMC6298223 (Accessed 13/07/2022) [PubMed].

Wami SD, Abere G, Dessie A, Getachew D. (2019). Work-related risk factors and the prevalence of low back pain among low wage workers: results from a cross-sectional study. *BMC Public Health* **19,** 1072 (2019). https://doi.org/10.1186/s12889-019-7430-9 (Accessed 20/02/2022) [PubMed].

Wang, Y. X., Wáng, J. Q., & Káplár, Z. (2016). Increased low back pain prevalence in females than in males after menopause age: evidences based on synthetic literature review. *Quantitative imaging in medicine and surgery*, *6*(2), 199–206. https://doi.org/10.21037/qims.2016.04.06) [PubMed].

Waters, T. R., & Dick, R. B. (2015). Evidence of health risks associated with prolonged standing at work and intervention effectiveness. *Rehabilitation nursing: the official journal of the Association of Rehabilitation Nurses, 40*(3), 148–165. https://doi.org/10.1002/rnj.166 (Accessed 17/02/2022) [PubMed].

Wertli M.M., Held, U., Campello, M. & Shira Schecter Weiner (2016). Obesity is associated with more disability at presentation and after treatment in low back pain but not in neck pain: findings from the OIOC registry. *BMC Musculoskelet Disord* **17,** 140 (2016). https://doi.org/10.1186/s12891-016-0992-0 (Accessed 24/02/2022) [PubMed].

Wisdom, J., & Creswell, J. W. (2013). Mixed Methods: Integrating Quantitative and Qualitative Data Collection and Analysis While Studying Patient-Centered Medical Home Models (pp. 1-5). *PCMH Research Methods Series* 13.

Wong, A., Karppinen, J., & Samaritzis, D. (2017). Low back pain in older adults: risk factors, management options and future directions. *Scoliosis and spinal disorders,* 12, 14. https://doi.org/10.1186/s13013-017-0121-3 (Accessed 20/02/2022) [PubMed].

World Health Organization 2014. *Non-communicable disease country profiles*, *2014*. Geneva: WHO; 2014. (Accessed 1/11/2021) [Google Scholar])

World Health Organization 2016 *Global report on diabetes – World Health Organization*. Report No.: 9789241565257 WHO; 2016. (Accessed 1/11/2021) [Google Scholar]).

Wu A, March L, Zheng X, Huang J, Wang X, Zhao J, Blyth FM, Smith E, Buchbinder R, Hoy D. (2017). Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017. *Annals of translational medicine*, *8*(6), 299. https://doi.org/10.21037/atm.2020.02.175 (Accessed 24/02/2022) [PubMed].

Wynne-Jones G, Cowen J, Jordan JL, Uthman O, Main CJ, Glozier N, van der Windt D. (2014) Absence from work and return to work in people with back pain: a systematic review and meta-analysis. *Occupational and environmental medicine*, *71*(6), 448–456. https://doi.org/10.1136/oemed-2013-101571 [PubMed].

Yang, H., Haldeman, S., Lu, M. L., & Baker, D. (2016). Low Back Pain Prevalence and Related Workplace Psychosocial Risk Factors: A Study Using Data from the 2010 National Health Interview Survey. *Journal of manipulative and physiological therapeutics*, *39*(7), 459–472. https://doi.org/10.1016/j.jmpt.2016.07.004 (Accessed 16/02/2022) [PubMed].

Hashimoto Y, Matsudaira K, Sawada SS, Gando Y, Kawakami R, Kinugawa C, Okamoto T, Tsukamoto K, Miyachi M, Naito H (2017). Obesity and low back pain: a retrospective cohort study of Japanese males. *J Phys Ther Sci.* 2017 Jun; 29(6):978-983. doi: 10.1589/jpts.29.978. Epub 2017 Jun 7. PMID: 28626304; PMCID:

Yue, P., Liu, F. & Li, L. (2012). Neck/shoulder pain and low back pain among school teachers in China; Prevalence and risk factors. *BMC Public Health* 12, 789 (2012). https://doi.org/10.1186/1471-2458-12-789) [PubMed].

Zemkova E., Cepková, A., & Muyor, J. M. (2021). The association of reactive balance control and spinal curvature under lumbar muscle fatigue. *PeerJ*, *9*, e11969. https://doi.org/10.7717/peerj.11969 (Accessed 24/02/2022) [PubMed].

APPENDIXES

Appendix: A Permission request to MOH&W to conduct research at Stroke rehabilitation Centre.

Date: 10th July 2021

To: Health Research Development Division,

MOH&W

Private Bag 0036

Gaborone.

RE: PERMISSION TO CONDUCT A STUDY AT THE STROKE REHABILITATION CENTRE

David Damba is my name, a post graduate scholar of Master of Physiotherapy. Am required to conduct a study and submit a dissertation report as part of the requirement for the award of degree of Master of Physiotherapy. The title of my study is: "**Prevalence and influence of lower back pain on work performance of civil service workers in Botswana"**

The aim of the study is to establish the prevalence and influence of lower back pain (LBP) on work performance of civil service workers in Botswana.

The objectives of the study are;

1. Determine the prevalence and the associated risk factors of LBP in a private practice in Botswana.
2. Explore the experience of lower back pain and how LBP is managed.
3. Explore the influence of LBP on work performance of civil service workers.

The significance of the study: LBP is recognized as one of the conditions that can cause discomfort and loss of work hours by sufferers. The findings of the study will contribute to the existing

literature about LBP. Secondly, the findings of this study will inform future intervention research to management and prevention of LBP and lastly, the findings of this study can inform practice, especially for Physiotherapist when managing patients with LBP.

Participation is voluntary as no patient will be compelled to take part in this study. Participants can withdraw at any point in the course of the study and confidentiality will be maintained.

A retrospective medical record review of patients' chats who presented with LBP at Stroke Rehabilitation Centre from January 2018 to January 2021 will be done followed by a face to face interview.

Am requesting for clearance to conduct the study at the stroke rehabilitation Centre

For more information, you can either contact my research supervisor; Dr. Sonti Pilusa on Tel No. +27 117173715 or the Human research ethics committee (Medical) of the University of Witwatersrand, Research office, private bag 3, Wits 2050, Johannesburg, Gauteng, SA. Tel +27 11 171 1234, email; anisa.keshahav@wits.ac.za

Your kind consideration in this regard is greatly appreciated.

Thanks very much,

Best regards,

David Damba,

Principal Researcher,

Senior Physiotherapist

Contact: +267 777 698 32

Email: dambaphysio@gmail.com

Supervisor: Dr. Sonti Pilusa,

Email: pilusa@wits.ac.za

Appendix: B. Study information sheet.

Study Title: "**Prevalence and influence of lower back pain (LBP) on work performance of civil service workers in Botswana"**

Good morning Sir / Madam. I am David Damba, a scholar of MSc of Physiotherapy with the University of Witwatersrand. I am doing research on the prevalence and influence of LBP on work performance of civil service workers in Botswana. Research is a process used in seeking new knowledge. In this study I want to learn about;

1. The prevalence and the associated risk factors of LBP in a private practice in Botswana.

2. Explore the experience of lower back pain and how LBP is managed.

3. Explore the influence of LBP on work performance of civil service workers.

What is involved: The study will involve a face to face interview between yourself and the researcher. The interview will include part 1: Demographic data, age, gender, work type, work duration, working hours. Part 2 of the interview will include open ended questions on the experience of LBP, impact on work life and how LBP is managed.

You will participate in a short face to face interview of about 20 minutes about your experience of having LBP.

The venue of the face to face interview will be at Stroke Rehabilitation Centre, in Gaborone at a date of your own convenience.

The following questions will be asked about your experience living with lower back pain.

How does LBP affect your life?

When it started? (Details on the LBP triggers, severity, location)

Please tell me how – you manage the LBP

What makes the LBP better or worse?

Please can you share with how the does LBP affect your work life?
Has it caused any inability to perform your duties or absence at work?

For how long have you been at your present career?

What does your work entail?

With your permission, the face to face interview will be audio recorded

The benefits of this study are that the findings will inform future intervention research to manage and prevent LBP.

Lastly, the findings of this study can inform practice, especially for Physiotherapist when managing patients with LBP.

Participation in this study is entirely voluntary. It is important that you read and clearly understand the explanations of the study and the procedures before agreeing to take part.

Feel free to take part in the study. If you agree to take part in the interview, you are also still free to withdraw from the study at any later stage and nothing will be held against you.

This information sheet is to assist you decide whether you would like to take part in the study and please ask me any questions if you have.

If you decide to participate in this interview, you will be asked to sign this document to confirm that you understand and agree to participate in the study. You will be provided with a copy of this sheet for you to keep.

Reimbursements for "out of pocket" expenses may be allowed, but there is to be no payment or cost associated with participation, travel expenses and refreshments will be provided.

Date: _____ Month; _____ Year; _____ Signature; _____

Appendix: C Informed consent Form.

Study Title: "Prevalence and influence of lower back pain (LBP) on work performance of civil service workers in Botswana"

Informed consent form.

I hereby confirm that I have been informed by the study investigator, Mr David Damba about the nature, benefit, conduct and risks of the study. I have also received, read and understood the above participant's information sheet regarding the study.

Participant's Names: _____

Signature: _____

Date: _____

Appendix: D Permission for audio recording.

Study Title: "Prevalence and influence of lower back pain (LBP) on work performance of civil service workers in Botswana"

Permission for audio recording.

I hereby confirm that I have been informed by the study investigator Mr David Damba about the nature, benefit, conduct and risks of the study. I have also received, read, and understood the above participants' information regarding the study.

Tick as appropriate.

	YES.	I do agree that Mr. David Damba may audio record my interview discussion with him and that he will omit out my names and venues that we talk about when the interview is typed up.

	NO.	I do not agree that Mr. David Damba may audio record my interview discussion with him.

Participants Name: _____

Signature: _____

Date: _____

Appendix E: Permission to Access patients' files.

File No: _____

I am David Damba, a scholar at the University of the Witwatersrand. I am doing a study on the prevalence and influence of LBP on work performance of civil service workers in Botswana. In this study I want to learn about; the prevalence and the associated risk factors of LBP in a private practice in Botswana.

I am asking you for permission to access your file at Stroke Rehabilitation Centre to extract information for this research.

Your personal information will be treated in confidence and will only be accessed by myself and also shared with my supervisor

I, **David Damba**, herewith confirm that this participant has been contacted and a request for permission to access his / her file has been communicated to him / her and granted by him / her.

Principal Investigator signature: _____ Date: _____

Contacts: David Damba, (PI), Senior Physiotherapist. Tel: 3114712 (Office) +267 77769832 (Mobile) Email: dambaphysio@gmail.com

Research supervisor: Dr. Sonti Pilusa on Tel No. +27 117173715,

Appendix F: Data extraction sheet (Record review)

Patient identifier:			Date:
Gender	Male	Female	
Marital status			
Work			
Type of work			
Department in the government			
Diagnosis			
Lower Back pain			
Date of diagnosis			
Type of pain			
Severity of the pain			
Location of the pain			
Risk factors			
BMI			
Chronic diseases			
Diabetes	YES	NO	
Hypertension	YES	NO	
Any other chronic disease/s:			
Treatment: treatment modality.			
Number of times attended.			

Appendix G: Semi-structured interview guide for participants living with lower back pain (LBP)

Good morning Sir/Madam.

Thank you for allowing me time for this interview.

I am David Damba, a scholar at the University of the Witwatersrand. I am doing a study on the prevalence and influence of LBP on work performance of civil service workers in Botswana. I would like you to share with me your experience of LBP, how you manage LBP and how it affects your work performance.

This interview will last about 20 minutes. It will be audio recorded, so please speak slowly, louder and clearly so that your comments can be audio recorded and feel free to provide any other additional information.

Do you have any other questions before we start?

Section: A. Participant's demographic data.

Study No.:		
Gender:	Male:	Female:
Marital Status:		
Work		
Type of work		
Work hours		
Date since employed		
Diagnosis		

Section: B. Interview guide

1. Tell me about yourself and your work.

Probe: what does your work entail?

Probe: how long have you been working at your workplace?

2. Please tell me about the LBP that you are experiencing.

Probe: Elaborate on when and how LBP started? (Details on the LBP triggers, severity, location)

Probe: *How often do you experience low back pain?"*

Probe: What makes the LBP worse?

3. Please tell me how you manage the LBP

Probe: can you share with me how you make LBP better?

4. How does LBP affect your life in general?

5. Please can you share with me how LBP affect your work life? Work routine?

Probe: *Does LBP Affect Your Job Performance?*

Probe: how does LBP affect your ability to do your work?

Appendix H: Human research ethics committee (Medical) clearance certificate no. M210910

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO:	Mr D Damba School of Therapeutic Sciences Department of Physiotherapy Medical School University E-mail: dambaphysio@gmail.com
CC:	Supervisor: Ms S Pilusa <Sonti.Pilusa@wits.ac.za> and <HREC-Medical Research Office@wits.ac.za>
FROM:	Mr Iain Burns Human Research Ethics Committee (Medical) Tel: 011 717 1252 E-mail: Iain.Burns@wits.ac.za
DATE:	2021/12/03
REF:	R14/49
PROTOCOL NO:	**M210910** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)
PROJECT TITLE:	*Prevalence and influence of lower back pain on work performance of civil service workers in Botswana*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.



MSWorks2000/Iain0007/Clearscan.wps

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

R49 Mr D Damba

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M210910

NAME: (Principal Investigator)	Mr D Damba
DEPARTMENT:	School of Therapeutic Sciences Department of Physiotherapy Medical School University
PROJECT TITLE:	*Prevalence and influence of lower back pain on work performance of civil service workers in Botswana*
DATE CONSIDERED:	2021/10/01
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Ms S Pilusa
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2021/12/03

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in September and therefore reports and re-certification will be due in the month of **September** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator _____ Date _____

Appendix I Permission from the health research development division MOH&W

PRIVATE BAG 0038
GABORONE
BOTSWANA
REFERENCE:

REPUBLIC OF BOTSWANA
MINISTRY OF HEALTH AND WELLNESS

TEL: (+267) 363 2500
FAX: (+267) 391 0647
TELEGRAMS: RABONGAKA
TELEX: 2818 CARE BD

REFERENCE NO: HPDME 13/18/1 **10 August 2021**

Health Research and Development Division

Notification of IRB Review: **New application**

David Damba
P.O.Box 46136
Gaborone

Dear David Damba

Protocol Title: PREVALENCE AND INFLUENCE OF LOWER BACK PAIN ON WORK PERFORMANCE OF CIVIL SERVICE WORKERS IN BOTSWANA

HRDD Approval Date:	10 August 2021
HRDD Expiration Date:	09 August 2022
HRDD Review Type:	Expedited Review
HRDD Review Determination:	Approved
Risk Determination:	Minimal risk

Thank you for submitting new application for the above referenced protocol. The permission is granted to conduct the study.

This permit does not however give you authority to collect data from the selected sites without prior approval from the management. Consent from the identified individuals should be obtained at all times.

The research should be conducted as outlined in the approved proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health and Wellness within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.

Continuing Review

In order to continue work on this study (including data analysis) beyond the expiry date, submit a Continuing Review Form for Approval at least three (3) months prior to the protocol's expiration date. The Continuing Review Form can be obtained from the Health Research Division Office (HRDD), Office No. 7A.7 or Ministry of Health website: www.moh.gov.bw or can be requested via e-mail from Mr. Kgomotso Motlhanka, e-mail address: kgmmotlhanka@gov.bw As a courtesy, the HRDD will send you a reminder email about eight (8) weeks before the lapse date, but failure to receive it does not affect your responsibility to submit a timely Continuing Report form

Amendments

During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek HRDC approval before implementing it. Please summarize the proposed change and the rationale for it in the amendment form available from the Health Research Division Office (HRDD), Office No. 7A 7 or Ministry of Health website: www.moh.gov.bw or can be requested via e- mail from Mr. Kgomotso Motlhanka, e-mail address: kgmotlhanka@gov.bw . In addition submit three copies of an updated version of your original protocol application showing all proposed changes in bold or "track changes".

Reporting

Other events which must be reported promptly in writing to the HRDC include:

- Suspension or termination of the protocol by you or the grantor
- Unexpected problems involving risk to subjects or others
- Adverse events, including unanticipated or anticipated but severe physical harm to subjects.

If you have any questions please do not hesitate to contact Mr. K. Motlhanka at kgmmotlhanka@gov.bw, Tel +267-3632751 and Ms D. Mgadla at dbabini@gov.bw Tel +267-3632754. . Thank you for your cooperation and your commitment to the protection of human subjects in research.

Yours sincerely

Dr. Patrick Masokwane
for /PERMANENT SECRETARY

MINISTRY OF HEALTH AND WELLNESS
RESEARCH DIVISION
10 AUG 2021
P/BAG 0038
GABORONE
REPUBLIC OF BOTSWANA

Appendix J: Permission from Stroke rehabilitation Centre to access patients' medical records

STROKE REHABILITATION CENTRE
& GENERAL PHYSIOTHERAPYSERVICES
"We Touch for Health"

Plot 21165, Hippopotamus Road, Village, Gaborone
P O Box 46136 Gaborone, Botswana
Tel: +267 3114712 (BTC) +267 754 016 01 (Mascom) +267 732 791 80 (beMobile)
Email: touched2017@gmail.com, dambaphysio@gmail.com

29th June 2021

The HREC (Medical) of the University of Witwatersrand,

Research office, private bag 3, Wits 2050,

Johannesburg, Gauteng SA.

Dear Sir/Madam

RE: Mr. David Damba

This letter serves to confirm that Mr. David Damba of passport number B1597762, is an employee of Touch Support (Pty) Limited t/a Stroke Rehabilitation Centre as a Senior Physiotherapist.

His request to conduct his study at Stroke rehabilitation Centre has been acceded to.

He will have access to patients' records at the Centre and the variables to be extracted are limited to the tools attached as appendix D and E in his application for ethical clearance.

Please assist him in any way you can.

Thank you

Serwaledi Dongo,

Administrative Officer

STROKE REHABILITATION CENTRE
Tel: +267 3114712
29 JUN 2021
P.O. BOX 46136
GABORONE
AND GENERAL PHYSIOTHERAPY SERVICES

Appendix K: Master of Science in Physiotherapy; Approval of title.

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

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

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

26 August 2021
Person No: 927402
PAG

Mr D Damba
Box 46136 Gaborone
267
Botswana

Dear Mr David Damba

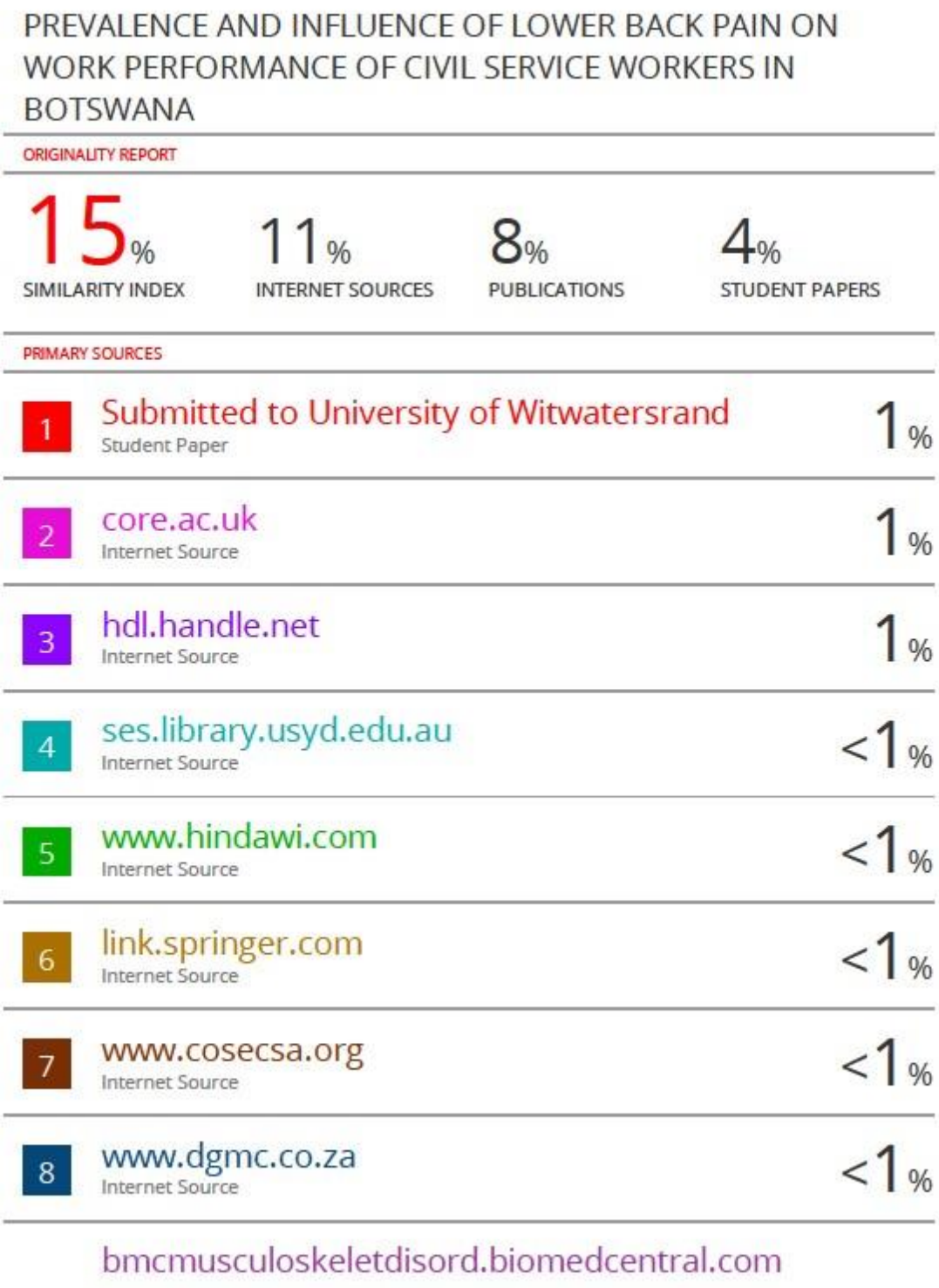
Master of Science in Physiotherapy: Approval of Title

We have pleasure in advising that your proposal entitled *Prevalence and influence of lower back pain on work performance of civil service workers in Botswana* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Appendix L: Turnitin plagiarism report.



PREVALENCE AND INFLUENCE OF LOWER BACK PAIN ON WORK PERFORMANCE OF CIVIL SERVICE WORKERS IN BOTSWANA

ORIGINALITY REPORT

15%	11%	8%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of Witwatersrand Student Paper	1%
2	core.ac.uk Internet Source	1%
3	hdl.handle.net Internet Source	1%
4	ses.library.usyd.edu.au Internet Source	<1%
5	www.hindawi.com Internet Source	<1%
6	link.springer.com Internet Source	<1%
7	www.cosecsa.org Internet Source	<1%
8	www.dgmc.co.za Internet Source	<1%

bmcmusculoskeletdisord.biomedcentral.com

9	Internet Source	<1%
10	worldwidescience.org Internet Source	<1%
11	Submitted to Bindura University of Science Education Student Paper	<1%
12	SONTI PILUSA, Myezwa Hellen, Potterton Joanne. "Secondary health conditions and their impact on the wellbeing of people with spinal cord injury, South Africa: Patients perspective.", Research Square, 2019 Publication	<1%
13	Submitted to International Health Sciences University Student Paper	<1%
14	nsuworks.nova.edu Internet Source	<1%
15	orca.cf.ac.uk Internet Source	<1%
16	Mulatu Fanta, Amsalu Alagaw, Gemechu Kejela, Abayneh Tunje. "Low back pain and associated factors among civil service sectors office workers in Southern Ethiopia", International Journal of Occupational Safety and Health, 2020 Publication	<1%

17	oamjms.eu Internet Source	<1%
18	ugspace.ug.edu.gh Internet Source	<1%
19	Submitted to University of Surrey Roehampton Student Paper	<1%
20	"Handbook of Pain and Palliative Care", Springer Science and Business Media LLC, 2018 Publication	<1%
21	etd.uum.edu.my Internet Source	<1%
22	Submitted to University of Southern Mississippi Student Paper	<1%
23	uir.unisa.ac.za Internet Source	<1%
24	www.physio-pedia.com Internet Source	<1%
25	www.tandfonline.com Internet Source	<1%
26	d-nb.info Internet Source	<1%
	Submitted to University of Northampton	

27	Student Paper	<1%
28	bmcpublichealth.biomedcentral.com Internet Source	<1%
29	publichealthmy.org Internet Source	<1%
30	www.pubfacts.com Internet Source	<1%
31	Akira Minematsu. "Chapter 1 Epidemiology", IntechOpen, 2012 Publication	<1%
32	Submitted to National postgraduate Medical College of Nigeria Student Paper	<1%
33	livrepository.liverpool.ac.uk Internet Source	<1%
34	ogma.newcastle.edu.au Internet Source	<1%
35	researchspace.ukzn.ac.za Internet Source	<1%
36	umispace.umi.ac.ug Internet Source	<1%
37	"Principles and Concepts of Behavioral Medicine", Springer Science and Business Media LLC, 2018	<1%

	Publication	
38	kclpure.kcl.ac.uk Internet Source	<1%
39	www.christianityoasis.com Internet Source	<1%
40	"Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018)", Springer Science and Business Media LLC, 2019 Publication	<1%
41	Submitted to Pathfinder Enterprises Student Paper	<1%
42	ir.jkuat.ac.ke Internet Source	<1%
43	lirias.kuleuven.be Internet Source	<1%
44	research.library.mun.ca Internet Source	<1%
45	rguhs.ac.in Internet Source	<1%
46	www.frontiersin.org Internet Source	<1%
47	De Gouveia, Janine. "Prevalence of and Risk Factors for Low Back Pain Among High School Teachers in the Gauteng North Public and	<1%

	Private Sector", University of Johannesburg (South Africa), 2021 Publication	
48	Matshaka, Lorato. "Student Nurses' Perceptions of the Relationship Between Mindfulness and Caring", University of Johannesburg (South africa), 2021 Publication	<1%
49	blog.vantagecircle.com Internet Source	<1%
50	Submitted to Cardiff University Student Paper	<1%
51	Submitted to Higher Education Commission Pakistan Student Paper	<1%
52	Submitted to Southern Illinois University Student Paper	<1%
53	www.atsjournals.org Internet Source	<1%
54	Submitted to Heriot-Watt University Student Paper	<1%
55	Submitted to Kenyatta University Student Paper	<1%
56	Submitted to National University of Ireland, Galway Student Paper	<1%

57	Submitted to University of KwaZulu-Natal Student Paper	<1%
58	Submitted to iGroup Student Paper	<1%
59	ir.canterbury.ac.nz Internet Source	<1%
60	F. Serranheira, M. Sousa-Uva, F. Heranz, F. Kovacs, A. Sousa-Uva. "Low Back Pain (LBP), work and absenteeism", Work, 2020 Publication	<1%
61	Inder, Antalaya. "A Secondary Analysis of the Prevalence and Risk Factors Associated with Musculoskeletal Disorders in Medical Imaging and Radiation Sciences Undergraduate Students at the University of Johannesburg", University of Johannesburg (South Africa) Publication	<1%
62	Submitted to Leeds Beckett University Student Paper	<1%
63	Submitted to Middlesex University Student Paper	<1%
64	Noelhi Hermes Punch. "Work-related musculoskeletal disorders among nurses at the Georgetown Public Hospital Corporation in Guyana", Universidade de Sao Paulo,	<1%

	Agencia USP de Gestao da Informacao Academica (AGUIA), 2021 Publication	
65	Submitted to Swinburne University of Technology Student Paper	<1%
66	Taylor, Kenneth A.. "Sleep Diagnoses and Low Back Pain in U.S. Military Veterans", University of South Florida, 2021 Publication	<1%
67	Submitted to University of Bedfordshire Student Paper	<1%
68	Submitted to University of Bradford Student Paper	<1%
69	Submitted to University of Queensland Student Paper	<1%
70	Submitted to University of St Mark and St John Student Paper	<1%
71	docplayer.net Internet Source	<1%
72	jcdr.net Internet Source	<1%
73	palevel.unza.zm Internet Source	<1%

74	geriatricscareonline.org Internet Source	<1%
75	peerj.com Internet Source	<1%
76	v-scheiner.brunel.ac.uk Internet Source	<1%
77	www.journal.poltekkes-mks.ac.id Internet Source	<1%
78	Submitted to Anglia Ruskin University Student Paper	<1%
79	Bridget Jivanelli, Rie Goto, Sarah K. Page. "Charting Consumer Health: Online Orthopedic Resources", Journal of Hospital Librarianship, 2022 Publication	<1%
80	Submitted to Da Vinci Institute Student Paper	<1%
81	Fraser, Barry. "A Comparison of Two Common Chiropractic Manipulative Techniques in the Treatment of Lumbar Facet Syndrome.", University of Johannesburg (South Africa), 2021 Publication	<1%
82	Submitted to Laureate Higher Education Group Student Paper	<1%

83	Mosca, Colin Giovanni. "The Lived Experiences of Emergency Care Personnel in the Management of Pre-Hospital Paediatric Emergencies", University of Johannesburg (South Africa), 2021 Publication	<1%
84	Mukadas Akindele, Mubasshir Rabiu, Efe Useh. "Assessment of the awareness, adherence, and barriers to low back pain clinical practice guidelines by practicing physiotherapists in a low - resourced country", Physiotherapy Research International, 2019 Publication	<1%
85	Patrick Pascal Nygaard, Sebastian Venge Skovlund, Emil Sundstrup, Lars Louis Andersen. "Is low-back pain a limiting factor for senior workers with high physical work demands? A cross-sectional study", BMC Musculoskeletal Disorders, 2020 Publication	<1%
86	Sai Kripa, Harmanpreet Kaur. "Identifying relations between posture and pain in lower back pain patients: a narrative review", Bulletin of Faculty of Physical Therapy, 2021 Publication	<1%
87	ir.uz.ac.zw Internet Source	<1%

88	ris.dpmc.gov.au Internet Source	<1%
89	scoliosisjournal.biomedcentral.com Internet Source	<1%
90	www.ncbi.nlm.nih.gov Internet Source	<1%
91	www.phcfm.org Internet Source	<1%
92	www.statpearls.com Internet Source	<1%
93	Alsiddiky, Abdulmonem. "The prevalence of musculoskeletal pain and its associated factors among female Saudi school teachers", Pakistan Journal of Medical Sciences, 1969. Publication	<1%
94	Esther, Makhale Masodi. "Strategies to Facilitate Advocacy for the Human Rights of Mental Health Care Users by Psychiatric Nurses in the Sedibeng District of Gauteng Province", University of Johannesburg (South Africa) Publication	<1%
95	Maria Sohail, Ashfaq Ahmad, Syed Asadullah Arslan, Arooj Munawar, Fareeha Amjad, Ayesha Asjad. "Translation, Cultural Adaptation and Validation of the Urdu Version	<1%

of Ronald Morris Low Back Pain and Disability Questionnaire in Pakistani Population", Research Square Platform LLC, 2022
Publication

96	Mohsen Sadeghi-Yarandi, Mohammad Ghasemi, Ali Ghanjal, Mojtaba Sepandi, Ahmad Soltanzadeh. "The Prediction of Chronicity in Patients With Acute and Subacute Nonspecific Low Back Pain and Associated Risk Factors: A Case-Control Study", Pain Management Nursing, 2022 Publication	<1%
97	Sanjib Saha, Birgitta Grahn, Ulf-G. Gerdtham, Kjerstin Stigmar, Sara Holmberg, Johan Jarl. "Structured physiotherapy including a work place intervention for patients with neck and/or back pain in primary care: an economic evaluation", The European Journal of Health Economics, 2018 Publication	<1%
98	Ses.Library.Usyd.Edu.Au Internet Source	<1%
99	Shabbir Ahmed Sany, Taukir Tanjim, Md Ikbal Hossain. "Low back pain and associated risk factors among medical students in Bangladesh: a cross-sectional study", F1000Research, 2021 Publication	<1%

100	bmcnutr.biomedcentral.com Internet Source	<1%
101	cdt.amegroups.com Internet Source	<1%
102	dlib.bc.edu Internet Source	<1%
103	journals.co.za Internet Source	<1%
104	norma.ncirl.ie Internet Source	<1%
105	www.atlantis-press.com Internet Source	<1%
106	www.ijphrd.com Internet Source	<1%
107	www.ijpot.com Internet Source	<1%
108	www.innerouterhealth.com.au Internet Source	<1%
109	Badenhorst, Christelle. "The Efficacy of Chiropractic Treatment and Percutaneous Radiofrequency Facet Rhizotomy in the Management of Chronic Lumbar Facet Syndrome.", University of Johannesburg (South Africa), 2021 Publication	<1%

110	Bmcpublichealth.Biomedcentral.Com Internet Source	<1%
111	Booysen, Naomi. "An Analysis of Diagnosed Conditions and Treatment Frequency in Patients Presenting to the UJ Chiropractic Clinic in 2016", University of Johannesburg (South Africa), 2021 Publication	<1%
112	Fox, Simba Kathleen. "How Women Who Have Recidivated Describe Their Readiness for Employment after Release from Prison", Walden University, 2021 Publication	<1%
113	Frese, Monica. "A Study to Determine the Prevalence of Low Back Pain in Registered Pharmacists in Johannesburg and the Individual and Work-Related Risk Factors Involved.", University of Johannesburg (South Africa), 2021 Publication	<1%
114	Jivan, Neeha Shard. "The Efficacy of R53 (Comedonin®) Acne Drops in the Treatment of Acne Vulgaris", University of Johannesburg (South africa), 2021 Publication	<1%
115	Jones, Megan Anne. "Intact Set-Shifting in South African Patients with Anorexia	<1%

Nervosa", University of Johannesburg (South Africa), 2021
Publication

116	Julie Ayre, Hazel Jenkins, Kirsten J. McCaffery, Christopher G. Maher, Mark J. Hancock. "Unique considerations for exercise programs to prevent future low back pain", Pain, 2021 Publication	<1%
117	Karin Schröder, Birgitta Öberg, Paul Enthoven, Henrik Hedevik, Allan Abbott. "Improved adherence to clinical guidelines for low back pain after implementation of the BetterBack model of care: A stepped cluster randomized controlled trial within a hybrid type 2 trial", Physiotherapy Theory and Practice, 2022 Publication	<1%
118	Kelley, Nadine Amber. "Stepping Out of the Institutional Blind Spot: Addressing Black Female Undergraduate Intersectional Needs at Hispanic-Serving Institutions", California State University, Long Beach Publication	<1%
119	Submitted to Kingston University Student Paper	<1%
120	Mahmoud Ahmad Mahmoud, Shuhymee Ahmad, Donny Abdul Latief Poespowidjojo. "Psychological safety and individual performance: the mediating effect of	<1%

	intrapreneurial behavior", International Journal of Productivity and Performance Management, 2021 Publication	
121	Miller, Oneilia Antoinette. "24/7 Economy and Quality of Working Life of US Call Center Employees.", Grand Canyon University, 2021 Publication	<1%
122	Mostafa A. Abolfotouh, Fay M. Alomair, Dalal Z. Alangari, Ibraheem Bushnak, Bader Aldebasi, Afaf S. Almansoof. "Epidemiology of work-related lower back pain among rehabilitation professionals in Saudi Arabia", Eastern Mediterranean Health Journal, 2021 Publication	<1%
123	Seyedeh - Somayeh Kazemi, Sedigheh - Sadat Tavafian, Claire E. Hiller, Alireza Hidarnia, Ali Montazeri. "The effectiveness of social media and in - person interventions for low back pain conditions in nursing personnel (SMILE)", Nursing Open, 2020 Publication	<1%
124	Spencer, Lamarr. "Workplace Bullying in Small Business Organizations: A Qualitative Inquiry.", Capella University, 2020 Publication	<1%
125	WWW.MDPI.COM Internet Source	<1%

126	Www.Medrxiv.Org Internet Source	<1%
127	associacaopaulistamedicina.org.br Internet Source	<1%
128	creativecommons.org Internet Source	<1%
129	digiresearch.vut.ac.za Internet Source	<1%
130	go.gale.com Internet Source	<1%
131	gymnasium.ub.ro Internet Source	<1%
132	healthjade.com Internet Source	<1%
133	ijpvmjournal.net Internet Source	<1%
134	ir.msu.ac.zw:8080 Internet Source	<1%
135	journals.sagepub.com Internet Source	<1%
136	manualzz.com Internet Source	<1%
137	openlibrary-repo.ecampusontario.ca Internet Source	<1%

138	repository.kemu.ac.ke:8080 Internet Source	<1%
139	repository.unair.ac.id Internet Source	<1%
140	repository.up.ac.za Internet Source	<1%
141	researchinvolvement.biomedcentral.com Internet Source	<1%
142	sajcd.org.za Internet Source	<1%
143	sproingfitness.com Internet Source	<1%
144	theses.lib.polyu.edu.hk Internet Source	<1%
145	univendspace.univen.ac.za Internet Source	<1%
146	vbn.aau.dk Internet Source	<1%
147	wiredspace.wits.ac.za Internet Source	<1%
148	www.abacademies.org Internet Source	<1%
149	www.atrainceu.com Internet Source	<1%

150	www.holosuniversity.org Internet Source	<1%
151	www.mdpi.com Internet Source	<1%
152	www.nature.com Internet Source	<1%
153	www.rsisinternational.org Internet Source	<1%
154	www.science.gov Internet Source	<1%
155	Graham Brennan, Amir Shafat, Ciarán Mac Donncha, Carmel Vekins. "Lower back pain in physically demanding college academic programs: a questionnaire based study", BMC Musculoskeletal Disorders, 2007 Publication	<1%
156	Igor Grabovac, Thomas Ernst Dorner. "Association between low back pain and various everyday performances", Wiener klinische Wochenschrift, 2019 Publication	<1%
157	Takaaki Ikeda, Kemmyo Sugiyama, Jun Aida, Toru Tsuboya, Ken Osaka. "The Contextual Effect of Area-Level Unemployment Rate on Lower Back Pain: A Multilevel Analysis of Three Consecutive Surveys of 962,586	<1%

150	www.holosuniversity.org Internet Source	<1%
151	www.mdpi.com Internet Source	<1%
152	www.nature.com Internet Source	<1%
153	www.rsisinternational.org Internet Source	<1%
154	www.science.gov Internet Source	<1%
155	Graham Brennan, Amir Shafat, Ciarán Mac Donncha, Carmel Vekins. "Lower back pain in physically demanding college academic programs: a questionnaire based study", BMC Musculoskeletal Disorders, 2007 Publication	<1%
156	Igor Grabovac, Thomas Ernst Dorner. "Association between low back pain and various everyday performances", Wiener klinische Wochenschrift, 2019 Publication	<1%
157	Takaaki Ikeda, Kemmyo Sugiyama, Jun Aida, Toru Tsuboya, Ken Osaka. "The Contextual Effect of Area-Level Unemployment Rate on Lower Back Pain: A Multilevel Analysis of Three Consecutive Surveys of 962,586	<1%

Workers in Japan", International Journal of Environmental Research and Public Health, 2019
Publication

158 Aimin Wu, Lyn March, Xuanqi Zheng, Jinfeng Huang et al. "Global low back pain prevalence and years lived with disability from 1990 to 2017: estimates from the Global Burden of Disease Study 2017", Annals of Translational Medicine, 2020 <1%
Publication

159 Elaine Miyuka Sato, Mauricio Oliveira Magalhães, Beatriz Coelho Jenkins, Lays da Silva Ferreira et al. "Low Back Pain in Elderly from Belém-Pa, Brazil: Prevalence and Association with Functional Disability", Healthcare, 2021 <1%
Publication

160 Gwenllian Wynne-Jones, Jemma Cowen, Joanne L Jordan, Olalekan Uthman, Chris J Main, Nick Glozier, Danielle van der Windt. "Absence from work and return to work in people with back pain: a systematic review and meta-analysis", Occupational and Environmental Medicine, 2014 <1%
Publication

161 Hamad S. Al Amer. "Low back pain prevalence and risk factors among health workers in <1%

	Saudi Arabia: A systematic review and meta - analysis", Journal of Occupational Health, 2020 Publication	
162	Mihretu Jegnie, Mekbeb Afework. "Prevalence of Self-Reported Work-Related Lower Back Pain and Its Associated Factors in Ethiopia: A Systematic Review and Meta-Analysis", Journal of Environmental and Public Health, 2021 Publication	<1%
163	Sharma, Shubham. "Application of Machine Learning Techniques for the Classification of Lower Back Pain in Human Body.", The University of Regina (Canada), 2020 Publication	<1%
164	Srikandarajah, Nisaharan. "Development of the Cauda Equina Syndrome Core Outcome Set for Research Studies", The University of Liverpool (United Kingdom), 2020 Publication	<1%
165	Steven J. Lamontagne, Diego A. Pizzagalli, Mary C. Olmstead. "Does inflammation link stress to poor COVID - 19 outcome?", Stress and Health, 2020 Publication	<1%
166	eprints.lancs.ac.uk Internet Source	<1%