WORK-RELATED LOWER BACK PAIN AMONG PRIMARY SCHOOL TEACHERS IN DAR ES SALAAM, TANZANIA

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Lower back pain (LBP) is one of the most common work-related health problems in economically developed countries and the most prevailing musculoskeletal condition that causes disability in the developing nations. School teachers are susceptible to LBP due to the nature of their daily work routine which is physically demanding and include common activities such as long hours of sitting, standing and bending that have been identified as risk factors for LBP. The aim of the study was to determine the role of work-related activities in the prevalence of LBP amongst primary school teachers in the Dar-es-Salaam region of Tanzania. To achieve this goal, the study sought to meet the following three objectives: to determine the prevalence of LBP among primary school teachers; to determine the work-related physical activities contributing to LBP among primary school teachers, and to determine and explore the application of kinetic handling principles in their daily work environment. The study was conducted in eighty randomly selected primary schools from the Temeke, Ilala and Kinondoni districts. A sequential explanatory mixed method approach was utilised. A cross-sectional descriptive design was employed. A self-administered questionnaire consisting of three sections (socio-demographic information; the Nordic Back Pain Questionnaire and the Oswestry Lower back pain Questionnaire) was completed by two hundred and eighty six primary school teachers with a mean age of 41.2 years (SD=9.9), 78.7% female and 21.3% male. Thirty primary school teachers participated in the participant observation of the application of kinetic handling principles in their daily work environment and focus group discussions. Results of the study found that 17.1% of the teachers had LBP during the past week while 82.9% experienced LBP during the past year. In addition, 30.8% of the teachers had referred pain, mostly to the thigh area (43.9%). Less than fifty percent (43.5%) of the participants had severe pain in sitting (76 – 100mm on the VAS scale) while
26.9% was not able to sit for more than an hour while teaching due to LBP. A significant relationship was found for severe functional disability and gender (p=0.032). The study demonstrated poor application of kinetic handling principles at work. Factors impeding teachers’ efforts to implement best practices and back care techniques in their daily teaching activities were work environment (poor facilities and equipment; heavy workload and staff shortage) and uncertainty about desired practice. In order to address the higher prevalence of lower back pain the study recommended, inter alia, improvement of the work environment for teachers by providing proper office furniture, re-assessment of education standards such as students/class ratio, students/desk ratio and number of teachers for schools and lastly, the implementation of health education and health promotion strategies to prevent LBP amongst primary school teachers.
DECLARATION

I hereby declare that “Work-related Lower Back Pain among Primary School Teachers in Dar es Salaam, Tanzania” is my own work, which has not been submitted, or part of it, for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Crese Damas Nilahi

Signature…………………………… November 2014

Witness: ……………………………

Dr Tania Steyl
DEDICATION

This thesis is dedicated to the Lord God Almighty. I also dedicate this work to my daughter,

Xanadu Isabella.
ACKNOWLEDGEMENTS

First and foremost, I thank the Almighty God for giving me the power, wisdom, knowledge and the courage to successfully accomplish my mission as a student.

“The LORD is my shepherd, I have everything I need” (Psalms 23:1-4).

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter provides background information on the thesis. It explains the problem statement, research question, aim of the study as well as the specific objectives. Furthermore, the chapter outlines the significance of this study as well as providing working definitions on key concepts used in this thesis. The chapter ends with abbreviations used in the study as well as a summary of the forthcoming chapters.

1.2 Background of the study

Lower back pain (LBP) is the most prevailing musculoskeletal condition that causes disability in low and middle income countries (Louw, Morris, & Grimmer-Somers, 2007). The prevalence of LBP is increasing globally at the estimate of 60% - 70 % of people in developed countries (Duthey, 2013). Furthermore, the annual incidence of LBP is approximated to be 5% with a prevalence of 15% – 45% annually in developed countries. There has been significant increase of people with LBP in North Carolina, USA, affecting both races with 9.8% white and 10% black respectively, with whites presenting with more chronic LBP than other groups. More than 34 million people (17%) living in USA are reported to have LBP (Strine & Hootman, 2007); the prevalence is lower than Iran 29.3% (Biglarian et al., 2012) and UK 59% respectively (Waxman, Tennant, & Helliwell, 2000). The global annual prevalence is ranging between 25% to 60% (Andersson, 1999; McBeth & Jones, 2007; Louw et al., 2007). Furthermore, the prevalence was lower in the Latino population (6.3%) (Carey et al., 2009; Carey et al., 2010). People working in rural areas are not spared from lower back pain as findings from China indicated a prevalence of 64% (Ehrlich and Khaltaev, 1999 quoted in Duthey, 2013). In Australia, LBP is the second major
disease with a prevalence of 7% of which 45% of them have chronic LBP (Department of Health, 2013).

The prevalence of LBP is also increasing in Africa with a rate of 46.8% reported in Nigeria (Ogunbode, Adebusoye, & Alonge, 2013). A comparative systematic review conducted in South Africa compared lifetime prevalence in African and Western societies. The study reported a higher prevalence of LBP, ranging between of 30% and 80% in Western societies as compared to African (28% to 74%) (Van Vuuren, Zinzen, Van Heerden, Becker, & Meeusen, 2007). This is similar to another systematic review by Louw et al., (2007) which reported that the prevalence of LBP is notably lower in Africa than in developed countries, although the difference is minimal. In Ethiopia, the prevalence of LBP was highest among nurses working in the Obstetrics and Gynaecology Units (26.67%) and least among tutors (4.17%) (Lamina Sikiru & Shmaila, 2009). In Rwanda the prevalence of LBP in nurses in Kanombe Military Hospital is as high as 78% of nurses (Mukaruzima, 2010). Tanzania recorded the prevalence of LBP at the rate of 48.5% among nurses who work in the Paediatric ward in Muhimbili Referral Hospital (Mwilila, 2008).

LBP is reported to be one of the five major causes of disability in Australia, ranking first among of the four leading causes of disability followed by other musculoskeletal conditions since 1990 to 2010 (Department of Health, 2013). In the 1990s LBP was the second most common reason for visits to medical doctors and the fifth-ranking cause of admission to hospital and the third most common cause of surgery in USA (Andersson, 1999). The condition is considered as part of disability, of which 5% of the people suffering LBP spend more time and financial resources on the health care services globally (Chou et al., 2007). According to (Luo, Pietrobon, Sun, Liu, & Hey, 2004), the health care costs for persons with LBP is approximately 60% higher than people without LBP.
Lower back pain is becoming more prevalent in our societies due to a number of modifiable factors in addition to factors inherent to the individuals. Prolonged sitting position at work places, lack of exercise, obesity and overweight, to mention a few, account for modifiable factors. LBP is widely defined as pain that is limited to the region between the lower margins of the last rib and the gluteal folds, regardless of the presence or absence of leg pain (Manek & MacGregor, 2005; Louw et al., 2007). Erick and Smith (2011) categorised risk factors for LBP into individual, physical and psychosocial factors (also see Yilmaz & Dedeli, 2012). The individual factors include age and gender. LBP is highly prevalent among both males and females (Bener et al., 2013). Physical factors such as prolonged standing, weakness of the lower limbs and sitting for long periods contribute significant to sustaining LBP. Furthermore, smoking, anxiety and lack of support at work are among the psychosocial factors recorded. Another study highlights that socio-demographic and lifestyle factors such as smoking, age, and physical conditioning are potential risk factors for LBP (Davis & Heaney, 2000). Andersson (1999) reports significant relationship between an individual’s body height and LBP. The researcher suggested that taller people have more risk of getting disc instability than short people under same external loading (Andersson, Gunnarsson, Rosèn, & Moström Åberg, 2014; “Low Back Pain,” n.d.). This is also complimented by (Hollingworth et al., 2002; Karacan et al., 2004) who found the alterations of facet joints in taller patients with lumbar disc hernia as compared to others. Another risk factor is a higher body mass index (BMI). There is an association between obesity and LBP in both genders (Woolf & Pfleger, 2003).

The majority of the members of the productive age group of the global population (35 years to 55 years old) are more affected by LBP due to the deterioration of disc bones (Duthey, 2013). Age is regarded as a constant contributing factor to LBP among societies. It is
considered that as long as the population is ageing, the global population of people with lower back pain is likely to increase substantially over the coming years (Hoy et al., 2012).

Hoy et al., (2012) report that people with lower back pain have a higher chance of missing work, among different working age groups, including school teachers. Globally, 37% of LBP are attributed to occupation. Different professionals whose work demands prolonged standing or sitting, for example, health-care workers and occupational drivers, as well as those exposed to vibrations (construction and mining workers) are also more likely to suffer from LBP. This is due to the fact that LBP is highly associated with biomechanical risk factors including bending, and twisting. This finding was consistent with other studies (Punnett et al., 2005; Bener et al., 2006; Karacan et al., 2004; Coeuret-Pellicer, Descatha, Leclerc, & Zins, 2010). The abovementioned risk factors can increase the chances of LBP due to unrecovered fatigue. It is therefore noted that the risk of getting LBP could be higher in workers who do heavy physical work, or whose posture is awkward during work (Duthey, 2013).

Although biomechanical risk factors such as poor ergonomics, prolonged standing, bending, lifting, or improper office furniture are the widely considered predisposing factors for LBP and have been traditionally investigated, there is a growing trend for research on psychosocial factors as possible risk factors for LBP (Yilmaz & Dedeli, 2012). It was argued that LBP is not only related to low quality of life but also a major cause towards a decrease in labour productivity due to absenteeism from work and early retirement ((Tsuboi, Takeuchi, Watanabe, Hori, & Kobayashi, 2002). More so, LBP is a renowned musculoskeletal disease, which is categorised as an occupational disease basing on its effect on work (Padula, Carregaro, Melo, da Silva, & Oliveira, 2012; Yilmaz & Dedeli, 2012). It is further highlighted by (Padula et al., 2012) that factors such as extensive working hours, inappropriate posture, psychological and physical stresses contribute to the emergence of
work-related LBP. Lambeek, van Mechelen, Knol, Loisel, and Anema (2010) reported that lower back pain is liable for 10-25% of patients’ absenteeism from work, the rising social and financial deprivation and is responsible for 75% of the cost due to sick leave and disability in Western societies. These figures are substantially lower than the results from Guo (2002), who reported that LBP is responsible for about 40% of sick leave from work, making it the second major cause of organisational absenteeism after the common cold. However, Yilmaz and Dedeli (2012), found that industries incur more costs due to sick leave and compensation to their employees who suffered LBP at work. Although literature identified a number of risk factors for LBP related to work among teachers such as occupational posture, depressive moods due to working environment, obesity, body height and age, the causes of the onset of lower back pain remain ambiguous (Duthey, 2013).

Lower back pain is a burden and it is considered to be among one of the commonest health problems globally, affecting individuals, communities and the financial status of societies (Dionne, Dunn, & Croft, 2006; Rapoport, Jacobs, Bell, & Klarenbach, 2004). LBP is a substantial health problem with reported lifetime prevalence between 49% and 70% (Manuel et al., 2012; Manuel et al., 2012). It is one of the most common work-related health problems in developed and developing countries, causing an enormous economic burden on individuals, families, societies, industries and governments (Hoy et al., 2012). Despite the economic status of developed countries, lower back pain is remains a remarkable health concern and a major cause of decline in activity among people aged 45 years and above (Andersson, 1999). It is the cause of activity limitation that leads to absence from work world-wide (Hoy et al., 2012).

School teachers nevertheless form part of an occupational group among which the prevalence of LBP and other musculoskeletal disorders are considered high (Yue, Liu, & Li, 2012).
Bayar, Bayar, Yakut and Yakut (2004), vividly describe that the work of teachers are not only limited to class work, but that the occupation involving holding as well as body movements such as frequent bending, twisting, sudden movement, and working in bent-over postures was found to have a significant potential for producing lower back pain (Garg & Moore, 1992). Teachers’ work also includes preparation of lessons, assessing students’ work, participation in continuing professional development and being involved in extracurricular activities such as sport. According to Lemoyne, Laurencelle, Lirette and Trudeau (2007) teachers involved in high energy activities such as gymnastics and sports activities at school are at higher risk of developing acute and chronic LBP injuries, which often result in permanent disability. Consequently, a study in Ireland showed that one of the leading causes of ill health retirement among teachers was musculoskeletal problems, including LBP which was responsible for up to 10 percent of the ill health retirement in the population (Maguire & O’Connell, 2007). The researchers conducted extensive investigation into the school environment with regard to the teachers’ safety, and suggested changes in ergonomics, with specific reference to furniture and the general working atmosphere. This change was recommended to contribute to a decrease in the prevalence of LBP amongst teachers.

1.3 Problem statement

School teachers are susceptible to lower back pain (LBP) due to the nature of their daily work routine which is physically demanding and include common activities that have been identified as important risk factors for lower back pain (Padula et al., 2012). Lower back pain (LBP) is also very common among workers whose work encompasses activities that involve long hours of sitting, standing and bending. There is inadequate documented information regarding the prevalence of and factors that may contribute to work-related LBP among primary school teachers in the Dar-es Salaam region of Tanzania. Therefore there is a need to identify specific risk factors for work-related LBP in this population, in order to
develop prevention strategies and health promotion interventions to curb the emergence of LBP in this population.

1.4 Research question

What is the role of work-related activities in the prevalence of LBP among primary school teachers in the Dar-es-Salaam region of Tanzania?

1.5 Aim of the study

The study aims to determine the role of work-related activities in the prevalence of LBP amongst primary school teachers in the Dar-es-Salaam region of Tanzania.

1.6 Objectives of the study

The specific objectives of the study are:

1.6.1 To determine the prevalence of LBP among primary school teachers with a history of previous LBP in the Dar-es-Salaam region of Tanzania.

1.6.2 To determine work-related physical activities that could contribute to LBP among primary school teachers the in Dar-es-Salaam region of Tanzania.

1.6.3 To examine the knowledge and application of kinetic handling principles in the prevention of work-related LBP in the Dar-es-Salaam region of Tanzania.

1.7 Significance of the study

Lower back pain (LBP) is amongst the disabling musculoskeletal disorder with a negative impact on an individual as well as on a nation, both in developed and developing countries (Galukande, Muwazi, & Mugisa, 2006). The information obtained from this study could be useful in recommending change in the work-environment and the life-style of the primary school teachers. It could also assist in developing specific interventions for prevent of lower
back pain among these professionals. Interventions would positively contribute in reducing absenteeism rates at work, early retirement and in cutting off associated medical costs all of which in return could lessen the economic impact of LBP on individual teachers and the government in general. Furthermore, the newly uncovered information would assist schools management in Tanzania in coming up with appropriate health policies address the emerging problem of LBP and enhance the quality of life and productivity of teachers.

1.8 Definition of key words and terms

**Lower Back Pain:** It is defined as pain that is limited to the region between the lower margins of the last rib and the gluteal folds, regardless of the presence or absence of the leg pain (Manek & MacGregor, 2005; Louw et al., 2007).

**Acute lower back pain:** Acute back pain is the most common presentation and is usually self-limiting, lasting less than three months regardless of treatment (“Low Back Pain,” n.d.).

**Chronic lower back pain:** It is considered to be chronic if it has been present for longer than three month (Andersson, 1999).

**Work-related low back pain:** Work-related low back pain, is any back pain originating in the context of work and considered clinically to have been probably caused, at least in part, or exacerbated by the claimant’s job (European Agency for Safety and Health at Work, 2000).

**Ergonomics:** It is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance (Schutte, 2005).
Primary school teacher: Is a person on who teachers a school for children between the ages of four or five to eleven (Fowler & Fowler, 2011).

Posture: This described the orientation of anybody segment relation to the gravitational vector, it is an angular measure from the vertical (Winter, 1995).

1.9 Abbreviations

LBP: Lower back pain

MSDs: Musculoskeletal disorder

USA: United States of America

UK: United Kingdom

WHO: World Health Organisation

NCHS: National Centre for Health Statistics

ICF: The International Classification of Functioning, Disability and Health

BMI: Body Mass Index

ADL: Activities of daily living

1.10 Summary of chapters

This chapter provides background information on lower back pain in a global perspective as in economically developed nations and developing nations. The purpose of the study is explained and the specific aim and objectives are outlined. Furthermore, the significance of the study explains the need for interventions to prevent lower back pain in primary school
teachers; hence decreasing absenteeism from work and increasing the quality of life of the teachers. The chapter ends with the definition of terms and abbreviations used in the study as well as a summary of the chapters that will follow.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the existing literature pertaining to work-related lower back pain (LBP) in developed and developing countries. In addition, on the prevalence of LBP in both developed and developing countries, the risk factors contributing to LBP, work-related physical activities and LBP and the role of physiotherapy in the management of low back pain. It also discusses prevention measures for work-related lower back pain, including the application of kinetic handling principles, health education and physical fitness and exercise. Lastly, the chapter ends with a summary of the discussion.

2.2 Global prevalence of lower back pain

Lower back pain is a global health issue of which Browning (2012) describes as a musculoskeletal condition presumably affecting at least 80% of all people at some time in their life and almost 20 – 30% of all people at any given time. Browning (2012) reported that LBP is highlighted as the fifth most common reason for all physician visits in the United States of America (USA). LBP may be recurrent with the subsequent incidences being more severe than the former. It is more common among people leading sedentary lives and workers who perform manual activities. Although LBP may occur at any age, it is more prevalent at 30-60 years of age (Browning, 2012). In addition, Hoy et al. (2012) stated that globally, females are more likely to suffer from LBP than males in the age group of 40 years and older. A study in Thailand identified that females working in a rice farm were more likely to suffer from LBP than males (Taechasubamorn, Nopkesorn, & Pannarunothai, 2011). Research by Yue et al. (2012) in China reported a 45.6% prevalence of lower back pain among teachers. A study in Turkey showed that 43.8-74.9% of Turkish school teachers...
reported having experienced LBP (Korkmaz, Cavlak, & Telci, 2011; Durmus & Ilhanli, 2012). In Brazil 41.1% of elementary school teachers reported experience of lower back pain (Cardoso, Ribeiro, Araújo, Carvalho, & Reis, 2009; Erick & Smith, 2011). Likewise, in Malaysia 40.4%, of elementary school teachers had lower back pain (Samad, Abdullah, Moin, Tamrin, & Hashim, 2010). Nevertheless, lower back pain in the United Kingdom (UK) accounts for a 40% prevalence in the general working population (Naido & Coopoo, 2007), whereas a German study reported a higher prevalence of 58.9% for LBP in the general population (Sven Schneider, 2005).

According to Louw et al. (2007) most of the studies (67%) conducted in Africa reported on the prevalence of LBP in the urban areas of Africa. The researchers concluded that LBP is rising and is becoming a general concern for occupational health. In South Africa, a study by Van Vuuren, Zinzen, Van Heerden, Becker and Meeusen (2007) indicated that workers who feel more in control on their jobs and who have good family and workplace support systems are less likely to experience LBP. The prevalence of LBP among those in control and supported by family was 15.3% while those not in control and with minimal support was 35.8%. The study found a significant association between LBP and negative perception of family support.

A study on the prevalence of LBP among nurses in Nigeria identified a significantly high incidence of LBP (73.53%) amongst nurses working in a typical Nigerian specialised hospital (Sikiru & Hanifa, 2010). The general prevalence of LBP among nurses in Nigeria was almost three quarters of the population and more prevalent among female nurses (68% ) than among male nurses (32%) (Sikiru & Hanifa, 2010). The study further investigated the predisposing factors for LBP among Nigeria nurses and reported associations between LBP and occupational hazards as well as poor knowledge of back care ergonomics (Sikiru & Hanifa,
2010). Moreover, the researchers reported a higher prevalence of LBP among nurse working in the obstetrics unit (26.67%) and a low prevalence of 4.17% among tutor nurses (Sikiru & Shmaila, 2009).

While comparing the results of a systematic review regarding the prevalence of LBP in Africa to various studies in the Western countries, Louw et al. (2007) reported that the prevalence of LBP in Africa ranged between 14% and 72% annually. As for the Western societies, a prevalence of LBP that ranged between 20% and 62% was reported (Walker, 2000). The prevalence of LBP in Africa is therefore not lower than that of the Western world, as portrayed by Louw et al. (2007).

The heterogeneity of LBP with change in populations in Nigeria was reported in a study by (Ogunbode et al., 2013). With a sample of 485 patients attending an outpatient clinic in a hospital in Nigeria, Ogunbode et al. (2013) observed 46.8% point prevalence of LBP. Ogunbode et al. (2013) has explained that the prevalence of LBP among adult patients is highly preventable and treatable. This was based on the fact that most cases of LBP were associated to modifiable risk factors such as poor occupation posture, tobacco smoking, ergonomics and posture. Public health efforts should be directed at educating people regarding ergonomics in occupational activities and life style habits. Moreover, a study by Biglarian et al. (2012) reported that obesity is related to LBP and that there is a need for programmes to mitigate obesity-related LBP in Iran, with a LBP prevalence of 29.3% among obese workers. The researchers further stated that LBP is influenced by age, gender, sexual activity, marital status, economic index, smoking, residence (rural or urban) and levels of educational attainment (Biglarian et al., 2012).
2.3. **Prevalence of lower back pain among school teachers**

School teachers are an occupational group that is not exempted from being affected by LBP (Korkmaz et al., 2011; Yue et al., 2012). The unfavourable conditions that teachers find themselves in, in order to meet teaching production objectives, are compromising musculoskeletal health (Cardoso et al., 2009). Erick and Smith (2011) describe the role of a teacher as one that goes beyond teaching. It involves preparation of lessons, assessing students’ work and being involved in extracurricular activities such as sport. Research indicated relationships between perceptions of intensified workload and high work pace, and self-report of the presentation of back pain (Bernard, 1997; European Agency for Safety and Health at Work, 2000). The work tasks of teachers may vary, depending on the school level that the teacher is involved in. Nursery school teachers, for instance, may get involved in tasks that require sustained mechanical load and constant trunk flexion while other teachers may be more involved in standing to write on the board or sitting to prepare for lessons and marking (Erick & Smith, 2011). Furthermore, teachers spend a significant amount of time in a ‘heads down’ posture while reading books and marking students’ exercises or assignments. As a result, this may lead to teachers experiencing pain in the back, neck and upper limbs (Burton et al., 2005; Samad et al., 2010; Durmus & Ilhanli, 2012).

The prevalence of LBP among teachers in China was identified at 45% annually (Yue et al., 2012). In Turkey, out of nine different musculoskeletal pain reported by teachers, 43.8% had LBP. The situation in Malaysia is no different to that of Turkey as Samad et al. (2010) reported a 40.4% prevalence of LBP among primary school teachers. The researchers further reported that women were more affected (48.1%) than their male counterparts (39.6%). Rural (46.3%) and urban-based (47.8%) primary school teachers were also more affected compared to teachers working at schools in developed countries.
Although only a few studies on LBP in teachers have been identified, it clearly illustrates a high level of lower back involvement among this group of workers. Most of the studies were conducted in developed and some middle-income countries. Figl-Hertlein, Horsak, Dean, Schöny and Stamm (2014) indicate that, despite studies that have reported on teachers’ experience of physical as well as psychological workplace strain, very little occupational health research regarding work ergonomics and LBP have been conducted.

2.4 Risk factors for the development of lower back pain

Studies on lower back disorders have categorised the risk factors of lower back pain in various ways. Some have grouped them into physical, psychosocial and personal risk factors (Bernard, 1997; European Agency for Safety and Health at Work, 2000; Ehrlich, 2003; Lionel, 2013). Others used terms such as psychological, psychosocial and individual risk factors (European Agency for Safety and Health at Work, 2000; Marras, 2000). In the present study the predisposing factors for lower back pain are categorised into work-related (physical activities) factors, psychosocial factors, and socio-economic factors. In the real world however, these factors may interact in different ways to cause LBP.

2.4.1 Work-related (physical activities) factors and lower back pain

Numerous literature attributes most of the musculoskeletal disorders (MSDs), including LBP, to occupational duties. MSDs are common across social class boundaries and are therefore viewed as a major, most common and most expensive occupational health problem, both in developed and developing countries (Louw et al., 2007; Yue et al., 2012). Non-neutral body postures, vibration, forceful exertions, rapid work pace and repetitive motion are the physical ergonomic features of work considered to be risk factors for MSDs (European Agency for Safety and Health at Work, 2000; Punnett & Wegman, 2004; Punnett et al., 2005). Evidence suggest that LBP is associated with work-related lifting and forceful movements and is well
documented in literature (Marras et al., 1995; Bernard, 1997; Hoogendoorn, van Poppel, Bongers, Koes, & Bouter, 1999; Marras, 2000). According to Durmus and Ilhanli (2012), frequent heavy lifting, awkward back postures and repetitive activities are among the occupational predisposing factors to lower back pain.

Nevertheless, Burton et al., (2005), Samad et al., (2010 and Durmus and Ilhanli (2012) indicated that unfavourable working conditions play a significant role in LBP among teachers. These conditions include a bigger number of students to attend to in class, insufficient educational resources and limited rewards for teachers’ work. Samad et al. (2010) also investigated the risk factors associated with LBP and ranked load lifting as the most common risk factor, contributing to 28% of all cases of LBP in Malaysia. This finding is in line with that of Tessa (2010), as quoted in Samad et al. (2010) who adds some clarity on the situations that lead to primary school teachers’ high prevalence of LBP, namely lifting loads such as heavy books and small children and not utilising correct posture. Likewise, teachers lean, stoop or bend over the tables when instructing children without prior stretching activities in preparation for such physical activities (Samad et al., 2010 quoting Tessa, 2010). It should however be noted that the type of schools, subject taught and level of students that teachers are tasked to facilitate may all be risk factors for LBP.

Tsuboi et al. (2002) investigated the relationship between LBP and various physical and psychosocial conditions among school personnel. The study reported a high incidence of LBP among male teachers in schools for people with disability, physical education teachers as well as Kindergarten teachers (Tsuboi et al., 2002). The study further illustrated that teachers working with children with disabilities experience physical load at the low back region due to exertion experienced during the activities of assisting the children into wheelchairs and buses, unexpected sudden behaviours and administration of lessons in strenuous positions such as
half sitting. Similarly, Kindergarten teachers experience shear forces to the back when they perform their duties while leaning forward, squatting or kneeling (Tsuboi et al., 2002).

2.4.2 Psychosocial factors and lower back pain

Psychosocial factors, especially at work, have received some attention in research. The European Agency for Safety and Health at Work (2000) reported that a considerably smaller number of epidemiological studies paid attention to psychosocial risk factors at work. Kerr et al. (2001) reported a strong correlation between work-related psychosocial and biomechanical variables and suggested that studies regarding primary work-related LBP should focus on both psychosocial and biomechanical risk factors in order to achieve success. There has been acceptance that psychosocial factors play an important role during a patient’s transition from acute to chronic LBP (Pincus, Burton, Vogel, & Field, 2002). Factors such as high workload, high perceived stress level, low job satisfaction, depression, distress and monotonous work are most likely to cause lower back pain among teachers in schools (Burton et al., 2005).

It is also reported that people with LBP are likely to have fair or poor health and are four times more likely to experience psychological distress compared to people without LBP (Department of Health, 2013). LBP can be related to a number of psychological implications, including loss of self-esteem, loss of self-efficacy, anger and depression. Several researchers reported that patients with LBP usually feel helpless, depressed or angry due to their inability of executing their tasks effectively (Reid, Ewan, & Lowy, 1991; Strunin & Boden, 2004). Literature suggests four reasons for an association between psychosocial and musculoskeletal symptoms (Hoogendoorn et al., 1999; Hoogendoorn, van Poppel, Bongers, Koes & Bouter, 2000). Firstly, psychosocial work characteristics are known to influence the biomechanical load through changes in posture, movement and exerted forces.
(Hoogendoorn et al., 1999; Hoogendoorn et al., 2000). Increased muscle tension or increased hormonal excretion can also be triggered by psychosocial factors which in the long-term could lead to more intense musculoskeletal pain perception and symptoms (Hoogendoorn et al., 1999; Hoogendoorn et al., 2000). Thirdly, illness coping mechanism and abilities of an individual may be changed by psychosocial factors, hence influencing the reporting of musculoskeletal symptoms (Hoogendoorn et al., 2000). Lastly, the association may well be confounded by the effect of physical factors at work (Hoogendoorn et al., 2000).

2.4.3 Socio-economic factors and lower back pain

Lower back pain has been associated with a number of occupational factors. (Link, Nicholson, Shaddeau, Birch, & Gossman, 1990; Mukandoli, 2004). Work place environment, equipment layout and furniture characteristics constitute physical factors for LBP. For example, the type of chair an individual use may influence alignment of his/her lumbar spine, and therefore lead to lower back pain (Link et al., 1990). The chair can influence the load on the spine, push the body a in certain posture that increase lower back pain by adding pressure between vertebral disc and by increasing muscles contraction (Link et al., 1990; Mukandoli, 2004).

Socio-economic factors are also identified as predisposing factors for LBP and disability (Katz, 2006). Younger individuals with more years of education and higher economic status were found to be more susceptible to sustaining LBP because of less involvement in physical exercise as they spend more time on studies and use motor vehicles and other modes of transport than walking (Hancock, Maher, Laslett, Hay, & Koes, 2011).

In addition, low social support in the workplace, including support of co-workers and supervisors, relationships at work and problems with work mates and superiors has been repeatedly reported as risk factors for lower back pain (European Agency for Safety and
Health at Work, 2000; Hoogendoorn et al., 2000). High workload and decreased social support from colleagues or supervisors were reported by Bongers et al. (1990) as prominent psychosocial risk factors for LBP.

2.5 The effect of lower back pain on individuals

The impact of lower back pain on individuals encompasses various aspects of their lives, ranging from the quality of life to economic situations of the individual sufferers and the society in general. The impact of work-related back injuries in individuals include loss or impairment in physical function due to pain (Bener et al., 2006), as highlighted by the International Classification of Functioning, Disability and Health (ICF) framework. Victims of LBP experiences disabling pain that negatively impact the quality of their lives (Van Nieuwenhuyse et al., 2006). The dilapidation of physical ability leads to further deterioration of general health, recurrent or progressive pain and prolonged periods of disability (Samad et al., 2010).

Loss of productivity among patients with lower back pain (LBP) can be associated with the internal and external environment. The internal environment involves the patient’s home, whereas the external environment involves the patient’s work area. As far as the internal environment is concerned, patients with LBP will be less productive as they will not be able to effectively execute domestic-related activities such as laundry, cooking, and household chores (Mwilila, 2008). The decline in productivity can be associated with fear of movement or re-injury that patients with chronic LBP develop due to the stress from the pain they encounter during the activities (McCracken, Gross, Sorg, & Edmands, 1993).

As for the external environment, patients with LBP are less productive when executing their roles at work. In relation to the teaching profession, teachers may find it difficult to stand for a long time while teaching, sit down for a long time when marking assignments or students’
work, bending towards a desk when assisting or monitoring students and carrying heavy objects such as books (Lemoyne et al., 2007; Samad et al., 2010). Researchers further reported that 10-25% of patients with LBP in the working industry experience long term absenteeism from work, early retirement and sick leave (Guo, 2002; Lambeek et al., 2010).

Moreover, Strunin and Boden (2004) report that males were very concerned that they could not sustain their role of the ‘breadwinner’ for the family (Strunin & Boden, 2004). As a result, the wives had to work longer hours and do more work in order to compensate for their husband’s inability to generate an income due to LBP. Consequently, women are affected in their role as housewives. These women hardly do household activities such as cooking, laundry, mopping and sweeping the house (Reid et al., 1991; Mwilila, 2008).

Lower back pain also has socio-economic consequences on the resources of the individual and the society (Katz, 2006). Less than a decade ago, Katz (2006, p. 21) reported that “the total costs of low-back pain in the United States exceed 100 billion dollars per year”. These costs are inclusive of both indirect costs (loss of wages and low productivity) as well as direct costs (costs of hospitalisation, out-patient visits, medication, assistive devices, diagnostic tests and alternative therapies) (Katz, 2006). Both costs contribute vastly to the negative social economic implications of LBP on the individual and the society. Although biomechanical, psychosocial, and social economic consequences of LBP are high and evidence-based, the disorder has still been under-prioritised and under-funded, possibly due to inconsistency in defining LBP, lack of suitable data and low ranking of global burden of disease (Hoy et al., 2012).

It is clearly evident that patients suffering from lower back pain incur huge costs in the process of managing the problem (Darwish & Al-Zuhair, 2013). Maniadakis and Gray (2000) reported that approximately 9% of patients suffering from lower back pain in the United
Kingdom (UK) seek medical attention from physiotherapists; attending an average of six (6) to 11 sessions of physiotherapy. In addition, the researchers stated that 51% of patients with LBP do not seek medical consultation about their illness. They rather seek treatment such as over the counter medication (18%) and purchase local creams and sprays (35.6%) from local pharmacies (Maniadakis & Gray, 2000). As a result, the patients incur great expenses for the treatment of LBP that is not always effective and may lead to the development of chronic lower back pain (Roupa et al., 2008).

Studies evaluating the social economic effect of lower back pain in communities and governments raised concern on the cost of both absenteeism and management of the problem. In the USA approximately 149 million days of work are lost annually due to LBP. According to Strine and Hootman (2007, p. 656), within the United States of America lower back problems “are the second leading cause of disability and the leading cause of job-related disability”. This makes a loss of up to US$ 200 billion per year due to decreased wages and efficiency (Duthey, 2013). Furthermore, among 255,980 work-related back injuries reported by the U.S. Bureau of Labour Statistics in 2011, 2% are compensated for back injuries every year. In the United Kingdom more than 100 million work days are lost yearly due to LBP disability in young adults, which is considered to be the productive group (Ehrlich, 2003).

It is further noted that LBP health care utilisation is up to $96 million per annum in most Western countries, but increases up to $2,577 for those with chronic LBP (Mehra, Hill, Nicholl, & Schadrack, 2012). Moreover, a review found that physiotherapy, as part of the direct medical costs, accounts for 17% of medical expenses. It is more than expenses of both pharmacy (13%) and primary health care (13%) (Dagenais, Caro, & Haldeman, 2008).

Statistics on LBP in Tanzania seem to be very scant. In South Africa, statistics indicate that LBP is responsible for a high percentage of absenteeism from work and account for a large
portion of medical expenses. Since 1992, the Professional Provident Society (PPS) has paid R6.2 million for permanent disability due to back problems (Professional Provident Society, 1998). The Workmen’s Compensation Association (WCA) of South Africa however, paid six times more for LBP conditions (R38.4 million) for the year 1994 (Workman’s Compensation Association, 1995).

2.6 The role of physiotherapy in the management of lower back pain

Physiotherapy plays a vital role in managing LBP. It has been used as one of the forms of treatment adopted for gaining relief from lower back pain (London Pain Clinic, 2012). Literature suggests that both a single modality of physiotherapy or a combination of modalities such as ultrasound, traction, heat, short wave diathermy or massage can be used in the treatment of LBP (Karayannis, Jull, & Hodges, 2012; London Pain Clinic, 2012). The use of different approaches, including health education, psychosocial support and exercises is well documented in literature (Karayannis et al., 2012).

As an expert, physiotherapist has the role of assessing and examining the patient to determine the structures responsible for the lower back pain (Chown et al., 2008; Karayannis et al., 2012). This is done in order to get a better understanding of the cause of specific pain (Physiotherapy Links, 2014). According to Moffett and McLean (2006), once the physiotherapist has assessed the patient, she/he should prescribe specific exercises relevant to the patient’s symptoms.

Exercise prescription and treatment are the other roles of the physiotherapist in the management of LBP. Exercise therapy normally forms part of the treatment given by a physiotherapists for patients presenting with lower back pain (Bekkering et al., 2003). It can vary significantly in content and mode of delivery (Moffett & McLean, 2006; London Pain Clinic, 2012). Exercise therapy includes general exercises and stretches as well as specific
stabilisation exercises, depending on the patient’s individual condition (London Pain Clinic, 2012). Stabilisation exercises aim to improving the core muscles’ strength and stability that is weakened by lower back pain. Luque-Surez, Daz-Mohedo, Medina-Porqueres, and Ponce-Garc (2012) noted that lumbar-pelvic stabilisation is a very effective approach in managing chronic LBP cases.

Physiotherapy also includes mobilisation or manipulative techniques for the management of LBP (Bekkering et al., 2003; London Pain Clinic, 2012). Although the chosen treatment is based on the particular physiotherapist’s training or experience, the McKenzie approach is one of the most recommended approaches for the management of LBP (Moffett & McLean, 2006). Moreover, since work-related hazards contribute to most lower back problems, physiotherapists also focus on giving accurate ergonomic device and patient guidance on using the suitable infrastructure at work to prevent and cure lower back pain (Bekkering et al., 2003; Chown et al., 2008; Karayannis et al., 2012; London Pain Clinic, 2012). Posture correction is another aspect of physiotherapy that aims to avoid more ailments due to LBP (London Pain Clinic, 2012; Physiotherapy Links, 2014).

In addition to the abovementioned aspects of physiotherapy management, physiotherapists provide advice to patient with LBP (Bekkering et al., 2003; Moffett & McLean, 2006). Advice such as early movement in case of lower back pain has been documented by the London Pain Clinic (2012) as one of the most significant aspects of the treatment of LBP.

2.7 Prevention of work-related lower back pain

In a study by Dankaerts, O’Sullivan, Burnett and Straker (2006) it was hypothesised that several cases of non-specific chronic LBP have a motor control impairment of the lumbar spine. It exposes the patient to repeated stress and strain, thereby providing a basis for ongoing pain. O’Sullivan (2000) and Burnett, Cornelius, Dankaerts and O’Sullivan (2004)
have suggested that deficiencies in motor control during sitting lead to changes in posture that cause LBP. Clinicians therefore consider it important to improve a patient’s sitting posture (Dankaerts et al., 2006). Likewise, work related change of position while standing is also recommended to curb the occurrence of LBP (Lionel, 2013; Physiotherapy Links, 2014). A number of factors affecting the lower back region during various activities were identified, namely lifting frequency, load moment, trunk lateral velocity, trunk twisting velocity and the trunk sagittal angle (Dankaerts et al., 2006). It is vital for individuals to have preventive measures in place in order to avoid LBP. A few of the preventive measures available in literature are discussed below.

2.7.1 Application of kinetic handling principles in the prevention of LBP

Kinetic handling, also referred to as biomechanical aspects of LBP, include physical activities such as sitting, standing, lifting and bending. A suitable sitting position was documented by Saunders (1990) as one of the ways to prevent lower back pain. It is recommended to sit up straight in a chair that is low enough to have the feet placed on the floor, not leaning forward and making sure that the lower back is supported in a slightly curved position. However, prolonged sitting in one place for a long time without getting up is not recommended (Saunders, 1990; Dankaerts et al., 2006).

Regarding the standing position, Saunders (1990) observed that good balance while standing is the major concern with regard to preventing low back pain. When standing for a long time, it is advisable to always keep one foot on a small step and often change positions (Saunders, 1990; Darwish & Al-Zuhair, 2013). High heels or platform shoes should not be worn for a prolonged time (Dankaerts et al., 2006; Darwish & Al-Zuhair, 2013).

With regards to lifting and bending, Burdorf and Sorock (1997) and Burdorf and Jansen (2006) argued that improper lifting mechanisms could result in the development of acute and
chronic LBP. The necessary mechanisms that one must practice in order to prevent LBP are as follows: lift an object with a firm grip while holding it close to one’s body, squat with the feet spread and one foot ahead as one lift the object (Burdorf & Sorock, 1997; European Agency for Safety and Health at Work, 2000; London Pain Clinic, 2012). It is suggested to maintain the feet about shoulder width apart and take short steps while lifting (Saunders, 1990; Darwish & Al-Zuhair, 2013). Individuals are recommended to bend their knees while keeping their backs straight. Lastly, it is appropriate for individuals to tighten the core muscles while lifting an object (Dankaerts et al., 2006; Darwish & Al-Zuhair, 2013; Physiotherapy Links, 2014).

2.7.2 Health Education

The term health education, as described by O’Donnell (1989), refers to influencing behavioural change in individuals, groups, and broader populations from undesirable behaviours to desired behaviours. Currently the term health promotion is more used than health education. Health promotion refers to both the science and art of aiding people change their lifestyle in order to maintain good health. A combination of factors to enhance awareness, change behaviour, and create environments that support good health practices can facilitate lifestyle change (O’Donnell, 1989).

With the rapidly ageing global population, the burden of LBP disease deterioration will increase unless specific measures in primary health care prevention are implemented. The aspects of healthy diet, physical exercise, suitable office and home furniture, and proper ergonomics at workplace should be addressed globally (Duthey, 2013). Most people, including teachers, are not aware of how to avoid lower back pain because they are not exposed to health education. Therefore, health awareness programmes must be implemented in order to educate people on the prevention of LBP. People could be educated through
seminars, workshops and the mass media. Consequently, health education could alleviate the problem of LBP and its related problems including absenteeism, the economic burden of LBP on the Government, loss of productivity in the work environment and early retirement. The health promotion programme should be modified and arranged to influence one’s health behaviour (Glanz, Rimer, & Viswanath, 2008). This is due to the fact that, awkward postural behaviour is significant and is related to an individual as a starting point. This is complimented by Duthey (2013) who established three categories of health behaviour. The researchers believed that an individual has a role to play in preventive health behaviour by undertaking certain activities for the purpose of detecting disease and take responsive measures. Areas of health promotion to the communities and education programmes as well as interventions are considered to be beneficial to most participants, families and communities at large. Health education in the working environment, especially in schools, should focus more on classroom teaching environments, teachers training, and change in general school environments that can support healthy behaviours of teachers (Glanz et al., 2008).

2.7.3 Physical Fitness and Exercise

Patients with LBP present more often with fatigue, impaired physical strength, and higher numbers of tender points due to more severe pain and depression (Nordeman, Gunnarsson, & Mannerkorpi, 2012). Another study reported that adults with LBP lack strength in both physical and mental health, more than people without LBP. It is further explained that 28% of adults who had LBP reported to have limited activities due to pain, as compared to 10% of adults who did not have LBP (National Center for Health Statistics, 2006). One study established that adults with LBP reports extensive pain, more impaired body functions, severe activity limitations, as well as participation restrictions than others, affecting their perception of the environment and their quality of life (Nordeman et al., 2012). According to Saunders
(1990), individuals must practice a series of aerobic exercises at least 3 to 5 times a week in order to maintain a strong healthy back. The authors further noted a range of exercises that can be helpful in this regard, including jogging, running and swimming. These activities influence one’s flexibility and the strength of their abdominal and spinal muscles, which helps to prevent LBP.

2.8 Summary of the Chapter

Chapter Two presented a review of literature for the areas that the research is particularly focussed on, including the prevalence of LBP in general and among teachers specifically, risk factors for the development of lower back pain, the effect of LBP on the individual, the role of physiotherapy in the management of LBP and the prevention of work-related LBP. The next chapter presents the research methods that were used in conducting the study.
CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides an overview of the research approach and methods used in this study. Furthermore the research question, description of the research setting, study population and sampling method is outlined. In addition, the chapter describes the study design, instrument, data collection methods, statistical data analysis as well as ethical issues pertaining to this study.

3.2 Research setting

The study was conducted in selected schools of the Dar es Salaam region of the United Republic of Tanzania. Tanzania is a country in the Eastern region of Africa with a general population of 44.9 million (United Republic of Tanzania, 2013), bordered by Kenya and Uganda to the North; Malawi, Zambia and Mozambique to the South; Democratic Republic of Congo, Rwanda and Burundi to the West; and the Indian Ocean to the East. The Dar es Salaam region harbours the commercial capital of the country and is administratively formed by three districts, namely Kinondoni, Ilala and Temaek, hosting 322 government primary schools. The allocations of primary schools per district are as follows: 128 schools in the Kinondoni district, 105 schools in the Temaek district and 89 schools in the Ilala district.
3.3 Research approach

This study applied the triangulation research method in investigating the work-related lower back pain among primary school teachers in Dar es Salaam, Tanzania. A sequential explanatory mixed method approach was utilised. According to Creswell and Clark (2007), a sequential explanatory mixed method consists of two different independent phases, namely quantitative and qualitative. The quantitative data was first collected and analysed followed by the qualitative data collection and analysis. Qualitative results assisted to elaborate on the quantitative results and increased the understanding of the phenomenon under investigation.

The quantitative approach was employed to address the first two research objectives of the study, namely to determine the prevalence of LBP among primary school teachers, and to
determine the work-related physical activities that contribute to LBP among primary school teachers in Dar-es-Salaam region, Tanzania. According to Daniels (2008), the quantitative approach involves drawing conclusions on procedures and controlled conditions that uses numeric methods. This approach gave the researcher an opportunity to use measurable deductive reasoning and logic to obtain data. This approach was helpful in collecting numeric data with regard to the prevalence of lower back pain (LBP) and the role of work-related activities on the prevalence of LBP amongst primary school teachers in the Dar es Salaam region of Tanzania.

Whereas quantitative methods worked best in isolating and identifying the correlates associated with the prevalence of lower back pain, qualitative techniques were useful in gaining insight into the application of kinetic handling principles in the prevention of lower back pain. The qualitative approach applied in this study therefore addressed the last objective of the study. The method contextually examined the application of kinetic handling principles in the daily work environment of primary school teachers. The triangulation of the two approaches was evident in the discussion of the results, as presented in Chapter Five of the study.

3.4 Research design

This study employed a cross-sectional descriptive design, which involved the use of systematic informational data collection for the quantitative part of the study. A cross-sectional research design was employed because of its appropriateness in measuring the prevalence of a phenomenon at one point in time (Levin, 2006). It also offers an inexpensive way of collecting a lot of epidemiological data within a short period of time. It furthermore allows a researcher to define and compare sub groups within a sample population (Williams & Robertson, 2009).
Patient observation and focus group discussion (FGD) were employed for the qualitative part of the study. This design enables researchers to learn about the activities of participants in the study in the natural setting through observing and participating in those activities (DeWalt & DeWalt, 2010). Observation according to Taylor-Powell and Steele (1996, p. 1) “gives an opportunity to record activities and behaviour without relying on participants willingness and ability of responding to the question.” Fox (1998) describes observation studies as a form of research that goes beyond trusting the respondent’s opinion to include the visual and reflective perception of what goes on in a setting. It involves making sense of data gathered not only through hearing but active participation in the events studied. Russell (1994) identified different components that can be used to obtain data, namely observation, natural conversations, interviews of various sorts, check lists and questionnaires.

3.5 Study population and sampling

3.5.1 Quantitative component

The study population included all the primary school teachers working in the Dar es Salaam region of Tanzania. According to current regional government records in Dar es Salaam, a total of 322 primary schools are located in the three districts of the Dar es Salaam region. An approximated average of 15 teachers are employed at each school; hence accounting for a population of 4,830 teachers (Ministry of Education, 2012). Based on the Yamane formula, as described by Israel (1992), the minimum sample size to allow for generalisability was calculated as follow: 

\[ n = \frac{N}{1 + N(e)^2} \]

where (n) stands for sample size, N for study population, e is a constant equal to 0.05. Accordingly, a minimum of 369 government primary school teachers were invited to participate in the study.
The study incorporated a probability sample, where every government primary school teacher who was eligible for inclusion in the study had an equal chance of being selected to participate in the study. In addition, it also enables generalisation of the findings to the designated population (Israel, 2013). Stratified random sampling was employed in this study. The strata were the three (3) districts of Dar es Salaam, namely Kinondoni, Temeke and Ilala. To ensure equal representation from each district, random selection of the schools was done proportionately. Therefore the strata were 25, 23 and 32 schools for Temeke, Ilala and Kinondoni respectively. To ensure equal representation from the three districts, 127 (34.4%), 104 (28.2%) and 138 (37.4%) participants from Kinondoni, Temeke and Ilala were invited to participate in the study.

Inclusion criteria

Teachers that are permanently employed in government primary schools from the three (3) districts of Dar-es-Salaam, with a work experience of at least 1 year and had experienced LBP during their teaching career.

Exclusion criteria

Teachers with a history of LBP due to trauma such as road traffic accidents, falls as well as conditions such pregnancy and/or other pathologies.

3.5.2 Qualitative component

The population for the qualitative component of the study comprised of all the teachers that completed the questionnaires in the quantitative section of the study. A sample of 30 participants, 10 from each district of Dar-es-Salaam was purposively selected to participate in the observation as well as one of three FGDs. According to Carpenter and Suto (2008, p. 78)
purposive sampling “involves the deliberate selection of particular settings, persons or events for the important information they can provide that cannot be acquired through other means”.

3.6 Instrument for data collection

3.6.1 Quantitative component

A self-administered questionnaire was used to collect data to address Objective 1 and 2. The questionnaire was developed based on existing validated and reliable scales, namely the Nordic Back Pain Questionnaire (NBPQ) and the Oswestry Lower Back Pain Questionnaire (OLQ). The questionnaire (Appendix 10 and 11) comprised of three sections, as outlined below.

Section A: Socio-demographic information

This self-constructed scale measured demographic and socio-economic information of the participants. Age was measured on a continuous scale to assist with analysis and interpretation (e.g. mean age). Categorical variables were used for gender, work experience, level of education and marital status.

Section B: The Nordic Back Pain Questionnaire (NBPQ)

The participants were required to locate a painful area on a body chart and rate their pain experience on a visual analogue scale (VAS) of 0 – 100 mm in order to assess intensity of pain during the last twelve (12) months and last seven (7) days respectively. Four categories are identified for interpretation purposes of the VAS scale, namely 0 – 5mm indicates no pain; 6 – 45 mm = mild pain; 46 – 75 mm = moderate pain; 76 – 100 mm = severe pain respectively (Jensen, Chen, & Brugger, 2003). The higher the score on the VAS scale, the higher the intensity of the back pain.
Section C: The Oswestry Lower back pain Questionnaire (OLQ)

This scale comprises questions that assess the functional disability of a client (Fairbank & Pynsent, 2000). It comprises of the following sections: sitting, standing, walking and lifting/bending. Each of the four sections had five questions. Thus, a total score of 20 can be achieved. A percentage was calculated for each participant. The higher the score obtained, the higher the functional level of the disability (Fairbank & Pynsent, 2000). Interpretation of the calculated scores was as follows: 0 – 20% = minimal disability; 21 – 40% = moderate disability; 41 – 60% = severe disability; 61 – 80% = crippled and >81% = bed-bound or have an exaggeration of their symptoms.

3.6.2 Qualitative component

A semi-structured guide was used to direct the focus group discussions (Appendix 12). The question asked included: What is the best way of sitting, standing and picking objects (bending) at work? How do you protect your back during your teaching practice? What kind of challenges (barriers) do you experience in your efforts to prevent yourself from lower back pain?

Participants were also asked to demonstrate the application of kinetic handling principles in sitting, standing, bending and lifting. Direct observation was used to record information on a developed check list (YES / NO option) regarding the teachers’ application of kinetic handling principles in the work environment. The use of checklists was justifiable because the study had specific observable actions and pre-determined list of things to look for. However, field notes were also used to record extra information from the observation in a less structured way.
3.7 Reliability and validity of the developed questionnaire (quantitative data)

Validity refers to the extent to which an empirical study measures precisely the concept it is anticipated to measure (Babbie, 2004). A strong construct validity for the OLQ was established by correlating the questionnaire with a similar tool and yielded $r = 0.66$, $p = 0.000$ on day one and $r = 0.78$, $p = 0.000$ on day seven (Bayar et al., 2004). The validity of the NBPQ was assessed through establishing the level of variation between an answered questionnaire and clinical tests. The number of non-identical answers varied from 0-20%. To ensure validity of the questionnaire, the sub-sections were adapted from previous questionnaires used in similar studies, namely the Nordic Back Pain Questionnaire (NBPQ) and the Oswestry Lower Back Pain Questionnaire (OLQ).

Reliability refers to the stability of consistency of the measuring tool in yielding similar results from the sample population at different times (Monette, Sullivan, & DeJong, 2013). The closer the p-value to one, the higher the reliability of a specific instrument. Reliability of the NBPQ was established through a test-retest procedure using the kappa coefficient agreement test. P-values ranging from 0.88 to 1 were established (de Barros & Alexandre, 2003). The Chronbach’s reliability test for the OLQ reflected a day one p-value of 0.722 and a day seven p-value of 0.717 (Bayar et al., 2004).

A draft of the questionnaire, with all the sub-sections was translated into Kiswahili by an independent health care professional fluent in both English and Kiswahili. It was then back translated to English by a linguist fluent both languages. The Kiswahili version of the questionnaire was then administered to fifteen randomly selected primary school teachers who met the inclusion criteria of the study, after written informed consent was obtained. The aim was to assess the time it would take to complete the questionnaire as well as the clarity of the questions. The participants took 15 to 20 minutes to complete the questionnaire. A 30-
minute focus group discussion followed the completion of the questionnaire to inquire whether it was necessary to rephrase or change any of the questions. Only a few grammatical changes were made. The results indicated that the instrument was relevant to the population and was easily used by the participants. The participants in the pilot study were not included in the main study.

After minor grammatical changes were done, the Kiswahili version of the questionnaire was administered to twenty primary school teachers. To test reliability, the same questionnaire was administered two weeks later to the same sub-group of teachers. Test-retest reliability was measured using the correlation-coefficient. According to Nunnally and Bernstein (1994), an ICC of above 0.81 was considered almost perfect agreement; between 0.61 and 0.80 indicates substantial agreement; between 0.41 and 0.60 indicates moderate agreement; between 0.21 and 0.40 indicates fair agreement and below 0.20 is poor agreement. The sub-sections of the questionnaire, namely the NBPQ had a Chronbach alpha score of 0.71 while the OQL had a reliability score of 0.83, indicating good stability.

3.8 Validity of the qualitative data

Trustworthiness refers to a series of techniques used to ensure rigor of qualitative designs (Guba, 1981). According to (Shenton, 2004), trustworthiness of qualitative data is measured through credibility, transferability, dependability and confirmability. To ensure trustworthiness in the study, the following steps were taken:

**Credibility** was enhanced through reframing, repetition and expansion of questions occasionally for the participants to understand what they were being asked, as stated by (Krefting, 1991). Member checking was also done whereby the tape recording was played back to the participants after the FGDs. In addition, the transcribed verbatim draft was given to colleagues (peer debriefing) who were not involved in the study for their view.
**Dependability** was increased by giving a profuse description of the study to enable the readers to relate the phenomenon described with their situations (Shenton, 2004).

**Transferability** was assured as the researcher gave a detailed process of the qualitative data collection method to ensure repeatability of the study. This was also achieved by giving a description of the text, participant’s characteristics and excerpts.

To ensure **confirmability**, the study supervisor went through the process notes (data collection procedures and design strategies), field notes and transcriptions and data synthesis products (thematic categories and interpretations).

### 3.9 Data collection procedure

#### 3.9.1 Quantitative component

Ethical clearance and permission was sought from all relevant authorities (Appendix 8 and 9). A pilot study was done to test for clarity and understanding of the instrument (face validity), the time taken to complete the questionnaire as well as to do the test-retest reliability of the Kiswahili version of the questionnaire. Two research assistants were trained to assist with data collection. Each of the assistants collected data from the same three teachers to assure inter-rater reliability of the collected data. Each of the research assistants was allocated a specific district while the researcher collected data from the third district. Approval was sought from the head masters of the selected schools. Thereafter a convenient time for data collection was arranged with the teachers. The researcher and research assistants met with the teachers and explained the purpose of the study (Appendix 1 and 2). Informed written consent was (Appendix 3 and 4) obtained from the participating teachers. The questionnaire (Appendix 10 and 11) was self-administered and was completed in the presence of the researcher or research assistant. Initially, some respondents showed negative attitudes towards filling in the questionnaire and others even argued that they used to do the same in
the past but with no impact on their health problems. However, when the researcher took the time to explain the purpose of the study, its significance and primary back care education to their health and the society in general, the majority of respondents developed interests and showed greater cooperation. Their write to not participate in the study was also reiterated and no one was negatively influenced by their decision to withdraw from the study.

3.9.2 Qualitative component

Thirty primary school teachers who completed the questionnaire for the quantitative phase of the study were invited and agreed to participate in the observation and FGDs. The participants were divided into three groups; therefore three (3) FGDs were held. Permission was obtained from the head teachers to conduct the focus group discussion within the nearby school compound. The venue was convenient and reachable to all participants. Written, informed consent (Appendix 3 and 4) was obtained from each participant before the procedure began. The researcher explained to each of the participants that their participation was voluntary and they had the right to withdraw from the study at any time.

A semi-structured interview guide and check list (Appendix 12) was used during the data collection procedure. Only the researcher completed the check list based on the observations made. The FGDs were conducted in Kiswahili and continued until saturation was reached. It was tape-recorded with the consent of the participants and field notes were taken. The FGDs lasted approximately 45 minutes each and a probing technique was used to ensure that no information was missed. The interviews were audio-taped and the research assistant took field notes during every interview. The tape recordings were played to the participants at the end of the FGD clarity and to confirm what was discussed during the interview.
3.10 Data analysis

3.10.1 Quantitative component

Data cleaning was performed to ensure completeness of data by double entering. The Statistical Package for Social Sciences (SPSS) version 22 was used to capture and analyse the gathered data. Descriptive statistics were employed to summarise the socio-demographic data of the study sample and presented using tables and figures. Categorical variables were expressed as frequency and percentages. Continuous variables were expressed as mean, standard deviation and percentages. Inferential statistics (cross tabulations) were used to determine the distribution of cases in various groups. Significant differences were tested for using Chi-square for categorical variables and student t-tests for continuous variables. Alpha level was set at $p < 0.05$.

3.10.2 Qualitative component

Audio-taped data from the FGDs were transcribed verbatim by an independent person with experience in transcription to produce a manuscript that preserves the words of the participants (Hammell & Carpenter, 2004). The transcriptions were compared several times to the audiotape recordings and field notes to ensure accuracy. Thematic analysis was done manually on two levels; analysis of individual data was carried out and across all participants comparing all the themes and categories. The transcriptions and field notes were read several times to familiarise the researcher with the content. Common ideas were coded into emerging themes and then grouped into broad categories. After the derivation of themes, and independent researcher read through the transcripts and generated themes that were then compared to the themes of the researcher. Code-recode process increases trustworthiness in qualitative research (Krefting, 1991).
3.11 Ethical considerations

Permission and ethical clearance was obtained from Senate Higher Degrees Committee of the University of the Western Cape (UWC) (Appendix 7). Further permission was obtained from the Ministry of Education (Appendix 9) and the school heads of the participating schools. The purpose of the study was clearly explained by the researcher and research assistants to the participants (Appendix 1 and 2). Informed written consent was obtained from every participant (Appendix 3 and 4). The consent form, focus group confidentiality binding form (Appendix 5 and 6) information sheet and questionnaire were available in English and Kiswahili. Participants were informed of their right to withdraw from the study at any stage without prejudice. The participants were assured that all information given to the study will be treated with confidentiality and anonymity. The questionnaires were anonymously coded and only accessed by the researcher and the research assistants. Information obtained from participants is for the study only and was handled with confidentiality. The researcher and research assistants collected the questionnaires personally and the researcher was responsible for ensuring the storage of the questionnaires in a locked and secure place. All information will be kept for a minimum of five years where after it will be destroyed. Minimal perceived risks were expected in the study. However, participants were neither affected by the study nor perceived the questions to be traumatising as none of them was referred to a counsellor for management. A copy of final report of this study will be submitted to the Ministry of Education, the Regional Education Department and the heads of the participating schools.

3.12 Summary of the Chapter

Chapter Three presented the methodology used in the study. The information provided included the research setting, approach and design that were selected for the study. The chapter also highlighted how the participants were sampled and the criteria for their inclusion
in the study. The instruments used to gather data, the data collection procedure undertaken in
the study and the ethical considerations which applied to the study are also presented. The
next chapter presents the results of the study.
CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the results that attempted to answer the objectives of the study, namely to determine the prevalence of lower back pain (LBP) among primary school teachers; to determine work-related physical activities that could contribute to LBP among primary school teachers and to observe and explore primary school teachers application of kinetic handling in the prevention of work-related LBP in the Dar-es-Salaam region of Tanzania. The following will be presented in this chapter: an overview of the socio-demographic profile of primary teachers with work-related LBP; the prevalence of LBP within the last seven (7) days and past year respectively; the prevalence and severity of LBP during different working positions, the prevalence and area of referred pain; and the application of principles of kinetic handling in the prevention of work-related LBP. Quantitative results are summarised in tables and figures where necessary. In the presentation of the qualitative findings, verbatim quotations were used to exemplify the themes and sub-themes. Cryptograms are employed to ensure anonymity and confidentiality of the participants of the presented data.

4.2 Socio-demographic characteristic of the primary school teachers with lower back pain (LBP)

Of the 369 primary school teachers who were approached to participate in the study, 318 met the inclusion criteria of the study and received questionnaires. Two hundred and eighty six (286) questionnaires were completed and returned. A response rate of 77.5% was thus achieved.

As shown in Table 4.1, a total of 286 primary school teachers with a mean age of 41.2 years (SD = 9.9) from the three districts of Dar es Salaam completed the questionnaire, 225 females
(78.7%) and 61 males (21.3%). The majority of the participants were married (n=212; 74.1%). Thirty six per cent of the participants (n = 103) were in the age group 30 - 39 years, while the majority (n = 209; 73.1%) of the participants’ highest level of education is a certificate in teaching. Just more than one third (n =107; 37.4%) of the participants had teaching experience of 10 and 19 years.

Table 4.1 Socio-demographic characteristics of primary school teachers with lower back pain (n=286)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total population n (%)</th>
<th>Female n (%)</th>
<th>Male n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Mean = 41.2 years, SD = 9.9)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29 years</td>
<td>33 (11.5)</td>
<td>24 (8.4)</td>
<td>9 (3.1)</td>
</tr>
<tr>
<td>30 – 39 years</td>
<td>103 (36.0)</td>
<td>77 (26.9)</td>
<td>26 (9.1)</td>
</tr>
<tr>
<td>40 – 49 years</td>
<td>75 (26.2)</td>
<td>59 (20.6)</td>
<td>16 (5.6)</td>
</tr>
<tr>
<td>50 – 59 years</td>
<td>69 (24.1)</td>
<td>59 (20.6)</td>
<td>10 (3.5)</td>
</tr>
<tr>
<td>&gt; 60 years</td>
<td>6 (2.1)</td>
<td>6 (2.1)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>212 (74.1)</td>
<td>170 (59.4)</td>
<td>42 (14.7)</td>
</tr>
<tr>
<td>Single</td>
<td>42 (14.6)</td>
<td>25 (8.7)</td>
<td>17 (5.9)</td>
</tr>
<tr>
<td>Widow</td>
<td>20 (7.0)</td>
<td>20 (7.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Divorced</td>
<td>12 (4.2)</td>
<td>10 (3.5)</td>
<td>2 (0.7)</td>
</tr>
<tr>
<td><strong>Level of Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>209 (73.1)</td>
<td>192 (67.2)</td>
<td>17 (5.9)</td>
</tr>
<tr>
<td>Diploma</td>
<td>38 (13.2)</td>
<td>23 (8.0)</td>
<td>15 (5.2)</td>
</tr>
<tr>
<td>University</td>
<td>39 (13.6)</td>
<td>26 (9.1)</td>
<td>13 (4.5)</td>
</tr>
<tr>
<td><strong>Working experience</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 9 years</td>
<td>81 (28.3)</td>
<td>55 (19.2)</td>
<td>26 (9.1)</td>
</tr>
<tr>
<td>10 – 19 years</td>
<td>107 (37.4)</td>
<td>85 (29.7)</td>
<td>22 (7.7)</td>
</tr>
<tr>
<td>20 – 29 years</td>
<td>43 (15.0)</td>
<td>35 (12.2)</td>
<td>8 (2.8)</td>
</tr>
<tr>
<td>30 – 39 years</td>
<td>52 (18.2)</td>
<td>47 (16.4)</td>
<td>5 (1.8)</td>
</tr>
<tr>
<td>&gt; 40 years</td>
<td>3 (1.0)</td>
<td>3 (1.0)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
4.2.1 Physical measurements of primary school teachers with lower back pain (LBP)

The physical measurements of the participants by gender are presented in Table 4.2 below. The mean weight of the participants was 76.76 kg (SD= 11.28), ranging between 51 kg and 110 kg. The mean BMI of the study sample was 22.58 (SD= 2.50). The CDC (2011) standard weight status categories associated with BMI range for adults’ guidelines were used to classify the participants into underweight, normal, overweight or obese. Among the 286 participants, 82.52% were classified as having normal weight, 14.34% as overweight, 2.4% as obese and 0.70% as underweight.

Independent-samples t-test was performed to test whether there was a statistically significant difference in the mean scores of the physical measurements for male and female participants. As shown in Table 4.2, no significant difference was found in height for male (mean=1.82, SD= 0.20) and female (mean=1.83, SD=0.17, t= -0.23, p= 0.105) as well as in weight for male (mean= 75.80, SD= 12.46) and female (mean= 77.02, SD= 10.95, t= -0.745, p= 0.43) respectively. Likewise, there was no statistically significant difference in body mass index (BMI) for male (mean=22.46, SD=2.71) and female (mean=22.61, SD=2.45, t= -0.43, p=0.43). No significant differences were found for the other physical measurements.
Table 4.2 Physical measurements of primary school teachers by gender (n = 286)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (n = 286)</th>
<th>Female (n = 225)</th>
<th>Male (n = 61)</th>
<th>p-value</th>
<th>95% CI for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Height (m)</td>
<td>1.83 (0.18)</td>
<td>1.83 (0.17)</td>
<td>1.82 (0.20)</td>
<td>0.821</td>
<td>-5.705 – 4.526</td>
</tr>
<tr>
<td>Mean Weight (kg)</td>
<td>76.76 (11.28)</td>
<td>77.02 (10.95)</td>
<td>75.80 (12.46)</td>
<td>0.457</td>
<td>-4.422 – 1.993</td>
</tr>
<tr>
<td>Mean BMI (kg/m²)</td>
<td>22.58 (2.50)</td>
<td>22.61 (2.45)</td>
<td>22.46 (2.71)</td>
<td>0.670</td>
<td>-0.8669 – 0.558</td>
</tr>
<tr>
<td>BMI Categories (n, %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>2 (0.70)</td>
<td>1 (0.44)</td>
<td>1 (1.64)</td>
<td>0.733</td>
<td>–</td>
</tr>
<tr>
<td>Normal</td>
<td>236 (82.52)</td>
<td>186 (82.67)</td>
<td>50 (81.97)</td>
<td>0.733</td>
<td>–</td>
</tr>
<tr>
<td>Overweight</td>
<td>41 (14.34)</td>
<td>33 (14.67)</td>
<td>8 (13.11)</td>
<td>0.733</td>
<td>–</td>
</tr>
<tr>
<td>Obese</td>
<td>7 (2.45)</td>
<td>5 (2.22)</td>
<td>2 (3.28)</td>
<td>0.733</td>
<td>–</td>
</tr>
</tbody>
</table>
4.3 Characteristics of work environment of primary school teachers with lower back pain (LBP) (n=286)

This study also assessed the work environment of the participant in terms of amount of class periods taught, hours worked per day and number of student in class per day. The result in Table 4.3 below shows that the majority of the teachers (n = 208; 72.7%) taught 4 – 6 class periods per day, while just more than a quarter (n = 78; 27.2%) of the teachers only taught 1 – 3 class periods per day.

With regards to daily working hours, almost seventy per cent (n = 198; 69.2%) of the teachers spent 7-9 hours daily on teaching while 21.3% (n = 61) spent at least 3– 6 hours and 9.4% (n = 27) taught for two hours or less daily respectively.

In addition, almost sixty per cent (n = 166; 58.0%) of teachers had 45 – 50 pupils in their class, while 31.1% (n = 89) and about ten per cent of teachers (n = 31; 10.8%) had classes with 55 – 60 and 35 – 40 pupils respectively.
Table 4.3 Characteristics of the work environment of primary school teachers with LBP (n=286)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total population n (%)</th>
<th>Female n (%)</th>
<th>Male n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class periods per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 3</td>
<td>78 (27.2)</td>
<td>57 (19.9)</td>
<td>21 (7.3)</td>
</tr>
<tr>
<td>4 – 6</td>
<td>208 (72.7)</td>
<td>158 (55.2)</td>
<td>50 (17.5)</td>
</tr>
<tr>
<td>Working hours per day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 2</td>
<td>27 (9.4)</td>
<td>16 (5.6)</td>
<td>11 (3.8)</td>
</tr>
<tr>
<td>3 – 6</td>
<td>61 (21.3)</td>
<td>51 (17.8)</td>
<td>10 (3.5)</td>
</tr>
<tr>
<td>7 – 9</td>
<td>198 (69.2)</td>
<td>187 (65.4)</td>
<td>11 (3.8)</td>
</tr>
<tr>
<td>Number of pupils per class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 – 40</td>
<td>31 (10.8)</td>
<td>28 (9.8)</td>
<td>3 (1.0)</td>
</tr>
<tr>
<td>41 – 50</td>
<td>166 (58.0)</td>
<td>143 (50.0)</td>
<td>23 (8.0)</td>
</tr>
<tr>
<td>51 – 60</td>
<td>89 (31.1)</td>
<td>72 (25.2)</td>
<td>17 (5.9)</td>
</tr>
</tbody>
</table>

4.4 Prevalence of work-related lower back pain among primary school teachers (n=286)

Less than twenty per cent (n = 49; 17.1%) of the participants experienced LBP during the last seven (7) days. The chi-square test indicates a significant relationship between gender and lower back pain in last seven days (p=0.008). More than eighty per cent of the participants (n = 237; 82.9%) experienced LBP in the past year. The chi-square test did not identify a significant relationship between gender and lower back pain in past one year (p=0.378) (see Table 4.4).
Table 4.4 Prevalence of work-related lower back pain among primary school teachers (n=286)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total population n (%)</th>
<th>Female n (%)</th>
<th>Male n (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain within last 7 days</td>
<td>49 (17.1)</td>
<td>28 (9.8)</td>
<td>21 (7.3)</td>
<td>0.008</td>
</tr>
<tr>
<td>Pain during the past one year</td>
<td>237 (82.9)</td>
<td>191 (66.8)</td>
<td>46 (16.1)</td>
<td>0.378</td>
</tr>
</tbody>
</table>

In addition, almost seventy per cent (n = 198; 69.2%) of the teachers had localised LBP while 30.8% (n =88) had referred pain. No significant relationship between was indicated in the chi-square test for gender and localised pain (p≤0.05).

Figure 4.1 below illustrates the prevalence of referred pain of the participants. Thirty-nine (43.9%) of the participants reported having pain in the thigh. No significant relationship was found for gender and thigh pain (p=0.05). More than a quarter (n = 24; 26.2%) of the participants had referred pain to the knee while referred pain to the ankle was reported by 15.1% (n = 25) of the participants.
4.5 Severity of lower back pain during daily school activities in Visual analogy scale (n=286)

Results of the VAS scale, as indicated in Figure 4.2 below, shows that less than fifty per cent (n=124; 43.5%) and one hundred and eleven (38.9%) of the teachers had severe LBP ranging from 76 – 100 mm when performing daily activities in a sitting and standing position respectively. Only twenty participants (7%) experienced moderate LBP ranging from 46 – 75 mm on the VAS scale in the sitting position, while less than ten per cent (n = 57) of the teachers experienced no pain (0 – 5 mm on the VAS scale) while standing.

In addition, one hundred and twenty three (43.0%) of the teachers experienced severe LBP when walking at work (76– 100 mm on the VAS scale) whereas one third of the participants (n = 95; 33.3%) reported mild LBP (6 – 45 mm on the VAS scale) while in the bending position. Severe (76 – 100 mm) and mild (6 – 45 mm) LBP were reported by 37.8% (n=108) and 31.9% (n=91) of
the participants respectively while lifting. The chi-square test revealed no significant association for gender and severity of pain while lifting (p>0.05).

![Figure 4.2](image.png)

**Figure 4.2  Severity of lower back pain during school activities using the VAS scale**

### 4.6 Prevalence of lower back pain during different teaching activities (n=286)

Table 4.4 shows that less than a third of the participants (n = 77; 26.9%) was not able to sit more than one hour while teaching due to LBP. In addition, 39.5% (n = 113) of the teachers were able to stand during teaching while experiencing LBP. Only 3.5% (n = 10) of the teachers were not able to stand at all in a class due to LBP. Furthermore, almost half of the teachers (n = 136; 47.6%) were able to walk with a painful lower back, while only a few teachers (n = 6; 2.1%) were not able to walk at all at work. It is also noted that 39.9% (n = 114) of the participants were capable of lifting things at work despite having LBP. The study also found that half of the teachers (n = 144; 50.3%) were capable of continuing their daily routine at work although they had LBP.
### Table 4.5 Prevalence of lower back pain during different teaching activities

<table>
<thead>
<tr>
<th>ACTIVITIES DURING TEACHING</th>
<th>FREQUENCY (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITTING</strong></td>
<td></td>
</tr>
<tr>
<td>1. Able to sit</td>
<td>71 (24.8)</td>
</tr>
<tr>
<td>2. Sitting only on favourite chair</td>
<td>73 (25.5)</td>
</tr>
<tr>
<td>3. Unable to sit &gt; 1 hour</td>
<td>77 (26.9)</td>
</tr>
<tr>
<td>4. Unable to sit &gt; 30mins</td>
<td>61 (21.3)</td>
</tr>
<tr>
<td>5. Pain: no sitting at all</td>
<td>4 (1.4)</td>
</tr>
<tr>
<td><strong>STANDING</strong></td>
<td></td>
</tr>
<tr>
<td>1. No pain while standing</td>
<td>61 (21.3)</td>
</tr>
<tr>
<td>2. Able to stand with pain</td>
<td>113 (39.5)</td>
</tr>
<tr>
<td>3. Pain prevent standing for &gt; 1 hour</td>
<td>29 (10.1)</td>
</tr>
<tr>
<td>4. Pain prevent standing for &gt; 10 min</td>
<td>73 (25.5)</td>
</tr>
<tr>
<td>5. Pain prevent any standing</td>
<td>10 (3.5)</td>
</tr>
<tr>
<td><strong>WALKING</strong></td>
<td></td>
</tr>
<tr>
<td>1. Able to walk with pain</td>
<td>136 (47.6)</td>
</tr>
<tr>
<td>2. Pain prevent walking for &gt; 2 km</td>
<td>73 (25.5)</td>
</tr>
<tr>
<td>3. Pain prevent walking for &gt; 1 km</td>
<td>63 (22.0)</td>
</tr>
<tr>
<td>4. Walk with stick/crutches</td>
<td>8 (2.8)</td>
</tr>
<tr>
<td>5. Pain preventing any walking</td>
<td>6 (2.1)</td>
</tr>
<tr>
<td><strong>LIFTING</strong></td>
<td></td>
</tr>
<tr>
<td>1. No pain during lifting</td>
<td>46 (16.1)</td>
</tr>
<tr>
<td>2. Able to lift with pain</td>
<td>114 (39.9)</td>
</tr>
<tr>
<td>3. Pain prevent lifting from floor</td>
<td>65 (22.7)</td>
</tr>
<tr>
<td>4. Lift light weight only</td>
<td>50 (17.5)</td>
</tr>
<tr>
<td>5. Pain prevent any lifting</td>
<td>11 (3.8)</td>
</tr>
<tr>
<td><strong>EXECUTING DUTIES AT WORK</strong></td>
<td></td>
</tr>
<tr>
<td>1. No pain during work</td>
<td>57 (19.9)</td>
</tr>
<tr>
<td>2. Pain but still performing work</td>
<td>144 (50.3)</td>
</tr>
<tr>
<td>3. Pain prevent hard work</td>
<td>57 (19.9)</td>
</tr>
<tr>
<td>4. Pain prevent light duties</td>
<td>28 (9.8)</td>
</tr>
<tr>
<td>5. Pain prevent any duties</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
4.7 Functional disability of primary school teachers (n = 286)

Primary school teachers’ functional disability was measured for the following positions: sitting, standing, walking and lifting, according to the Oswestry Disability Index (ODI). For each position, five options were given. Independent samples t-tests were performed to test whether there was a statistically significant difference in the mean scores of the functional disability for male and female participants. As shown in Table 4.6, no significant difference (p=1.0) was found for minimal disability (p=1.0) and moderate disability (p=0.167) for male and female participants respectively. However, a significant difference was found for severe disability for males (mean=54.62, SD=5.30) and females (mean=52.55, SD=5.35, t = 2.16, p = 0.032).
Table 4.6 Functional disability according to the Oswestry Pain Index of participants (n = 286)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total (n = 286)</th>
<th>Female (n = 225)</th>
<th>Male (n = 61)</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td>mean(SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal disability (0 - 20%)</td>
<td>20.0 (0)</td>
<td>20.0 (0)</td>
<td>20.0 (0)</td>
<td>1.0</td>
<td>–</td>
</tr>
<tr>
<td>Moderate disability (21 - 20%)</td>
<td>36.34 (4.65)</td>
<td>36.72 (4.56)</td>
<td>35.0 (4.85)</td>
<td>0.167</td>
<td>-4.174 – 0.737</td>
</tr>
<tr>
<td>Severe disability (41 - 60%)</td>
<td>52.97 (5.39)</td>
<td>52.55 (5.35)</td>
<td>54.62 (5.30)</td>
<td><strong>0.032</strong> *</td>
<td>0.176 – 3.957</td>
</tr>
<tr>
<td>Crippled (61 - 80%)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Bed-bound (81% - 100%)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

*significant value
4.8 Application of kinetic handling principles at school

This section presents the results of the observation of kinetic handling principles of participants as well as the responses from the focus group discussions (FGD) that seek to address the third objective of the study. A semi-structured guide was used to collect data from the participants in the three focus group discussions (see Appendix 12).

Overall, the results of the FGDs indicated that the majority of teachers who participated in the observational section had poor kinetic handling skills. Most respondents reported that they never received any training on principles of kinetic handling and the prevention of lower back pain. Observation of the application of kinetic handling principles showed that even the little knowledge the teachers had could not influence their behaviour, as most of them were not consistent in practicing those principles. Respondents also indicated that skills on kinetic handling principles were not included in their teaching college curriculum.

A few respondents, particularly the science teachers, showed some understanding by linking the kinetic handling principles with kinematic principles of physics.

“I learned something about ki..., kinematic. This was in physics. It was talking about how to balance the load, how to lift, and recommended distance from the object to be lifted, the required force, acceleration and so forth. I think Kinetic is another way of saying kinematic.” (FG-01/8)

The results are further presented according to the following positions and activities observed, namely, sitting, standing, bending and lifting.
4.8.1 Sitting

The majority of participants (n=25; 83%) had a poor sitting posture (see Figure 4.3 below). Most of the participants sat too far away from the table and with no lumbar support.

Proper kinetic principles for the sitting posture are as follows: sitting close to the desk; sitting in a chair that is low enough to place both feet on the floor; having a chair that supports your lower back in a slightly arched position, and periodically getting up from the chair (Saunders 2003). Results from the three focus group discussions indicated that participants had some knowledge of kinetic handling principles when sitting. Participants were able to partially point out to the above principles of maintaining a good sitting posture. One participant had the following to say:

“From what I understand, proper sitting posture includes sitting straight in a chair...hands rested on the table while reading a book.” (FG-02/7)
Another participant observed:

“You know what! What I normally do when sitting is to make sure that I place my feet on the ground and stretch them every now and then to avoid stiffness of muscles.”

(\textit{FG-03/6})

4.8.2 Standing

Forty percent (n=12; 40\%) of the participants maintained a proper standing posture when observed. However, poor standing posture were observed among the majority of participants (n=18; 60\%), as shown in Figure 4.4 below.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{posture_in_standing.png}
\caption{Posture in standing}
\end{figure}
In principle a teacher is required to maintain proper standing posture when delivering lessons in a
class by putting one foot up and changing positions frequently when standing for a long period of
time, keeping work up at a comfortable height, and abstaining from wearing high-heeled shoes
for long periods of time (Darwish & Al-Zuhair, 2013). Some participants do attempt to apply
these principles in their daily work environment, as illustrated in the excerpts below:

“Normally, when teaching in class I makes sure that I don’t keep my knees locked for
long; and in most cases try to change positions from one side of the blackboard to
another or walk around the class.” (FG-01/10)

“For me I don’t think there is an ideal way of standing because we learn from our
childhood how to do this. So I can’t say I must do this or that when standing.
Everything just happens naturally.” (FG-02/4)

4.8.3 Lifting

When bending to lift an object the general rules or best practices include: keeping the load close
to the body, keeping the upper body and back straight; squatting; keeping your head up with the
chin tucked in; and standing with one foot in front of the other to maintain a wide balanced base
of support (Darwish & Al-Zuhair, 2013; Saunders, 2003). As shown in Figure 4.5, the majority
of participants (n=26; 87%) failed to maintain proper posture when bending and lifting. Most of
them bent with their backs and not their knees, did not keep the load close to their body and lift
without squatting. Those who maintained proper bending and lifting posture were less than a
fifth (n=5; 17%) of the participants.
The qualitative results indicated that participants did not apply good kinetic handling skills when bending or lifting and object. The excerpts below illustrate:

“...you need to make sure that you hold the box firmly so that it does not slip from your hands and harm your feet. You should also make sure that your back is well bent to reach the box you want to lift.” (FG-02/9)

“You must tight your muscles for ease of lifting because if you do it sluggishly you may end up causing injuries to your body.” (FG-01/2)

4.9 Preventative measures for lower back pain

Although knowledge of best practice does not necessarily lead to the application or implementation of it, it could make people aware of the better options with regards to kinetic
Most of the respondents reported that they never attended any training on handling principles. Respondents also indicated that skills on prevention of musculoskeletal disorders were not included in the curriculum of the colleges they attended. A participant noted:

“...to be frank, I can’t say I don’t have the knowledge of how to prevent myself from back injuries. I would have been a disabled by now if that was the case. I gained some skills from the media, like TV and radio. Through a TV programme by the name ‘Afya ya jamii’ and the radio programme ‘radio one doctor’ I became aware of these things but I never paid attention to details.” (FG-03/2)

Other participants responded as follows:

“...the curriculum used in the teachers college fall short of equipping us to becoming effective and healthier teachers. These skills we are talking about today were not part and parcel of our curriculum during our college years.” (FG-02/7)

“...which training are we talking about! I never attended any course about preventing my back from injuries, be it on-the-job or at any training institution since I became a government school teacher. Not even once. So where should I get such knowledge from?” (FG-01/3)

The results further suggest that despite the diminutive knowledge the teachers had about prevention of lower back pain in their daily work environment, it could not influence them to apply it in their career. Many teachers, despite knowing the possible negative implications of
incorrect kinetic handling on their back, kept practicing poor kinetic handling skills. The excerpt below illustrates:

“Even if you hear that doing this or that at work can harm your back, only a few of us can pay attention to such information until one has already suffered back injury. It is hard to switch from our way of doing things to what the books say we should do.” (FG-02/8)

4.10 Barriers to effective back care

Participants expressed concerns about a number of factors impeding their efforts to implement the best practices and techniques for back care in their daily teaching activities. Two themes emerged from their responses, namely work environment and uncertainty about the desired practice.

4.10.1 Work environment

Concerns about working environment were raised in all three focused group discussions. Participants considered the work environment in primary schools in the Dar es Salaam region of Tanzania as an impeding factor to the effective application of back care techniques. Responses were grouped into two (2) categories, namely poor facilities and equipment in schools; and heavy workload and staff shortage.
Poor facilities and equipment in schools

Participants were of the opinion that their work environment is not conducive to good back care. It is dirty and lacks the basic equipment necessary for teachers’ welfare. The majority indicated that the office furniture available to teachers do not meet the basic required ergonomic standards. To apply the best practices for sitting is made impossible by the nature of chairs provided for teachers. The common office chairs that teachers use at work do not have the recommended backrest, and some are already wrecked with no replacement. Their sentiments are shared below:

“Applying that what you call the general rules or good posture for sitting, standing and bending as you just mentioned to us may not be easy and practical here in our working environment. I mean how could you, for example, squat with your feet spread in the class while some students are sitting on the floor in front of you? Hell not!” (FG-01/4)

“Just look at the kind of chairs we are sitting on. This one do not have a backrest, yet a teacher is sitting on, that one is even wrecked but still in use because there is no replacement. That is why I say no matter how enthusiastic we are in maintaining a good posture when seated, the working environment will always pull us back unless necessary efforts are made by our employer to make conducive environment for us.” (FG-03/5)

The participants also indicated that the type of equipment they use during teaching (the blackboard), and the uneven rough surface of the floor of most classrooms do not allow for teachers to practice good standing postures when teaching. Participants lamented:
“It becomes very difficult for me to stand comfortably during teaching in the class. The surface of my classroom has a lot of potholes. Of such, you should always look for a place to fix yourself, sometime with limited motion of your feet. Plus, the kind of shoes we female teachers wear, I can’t imagine how I can practice good posture when teaching.” (FG-01/9)

“...blackboards we use in our classes give us hard time when writing notes for pupils. We are forced to bend instead standing straight when delivering lessons.” (FG-03/3)

Heavy workload and staff shortage

Participants raised concerns about heavy workload which impedes their efforts to practicing back care principles. The work is so demanding that teachers find themselves working without taking frequent breaks. According to the respondents, the heavy workload is intensified by a high number of pupils per class and shortage of staff in schools.

“Back pain has become part of my daily endeavour and there is no way I can prevent it because my work is too demanding. I am teaching many periods than the normal work requirement because of shortage of staff in my school.” (FG-02/6)

Participants added that with such heavy loads they could hardly pay attention to the best practices for the prevention of lower back pain as they just had to finish their assigned duties. The following was a view of one participant:

“Just imagine, teaching more than one class with a large number of students, and many periods per week. Would you even dare think of taking regular breaks at work?
That is why at the end of day I find myself so exhausted and with pains all over my body.” (FG-01/1)

Consequently, the physical exhaustion due to sustained mechanical load and constant trunk flexion, especially when teachers stand to write on blackboard, sit to prepare for lessons and marking, and bend to assist pupils with lessons results into the majority of teachers sustain lower back injuries.

4.10.2 Uncertainty about the desired practice

Participants raised concerns about the uncertainty of the desired best practices for low back care. Many responses indicated that the desired kinetic handling principles are too demanding and difficult to adopt. The fear and uncertainty of the applicability of kinetic handling principles became a barrier to the teachers’ efforts to attempt to learn the best practices for back care in their daily life at work. It was indicated that the step by step rules of manual handling for example, makes a simple task a lengthy process. The main issue raised here is the time it would take for the teacher to become used to the recommended principles and remember to apply it, as stated by one of the participants:

“...these principles are too laborious. I mean, how can I memorise the step by step course of action before performing a simple task of lifting a box? You people are saying I should keep weight closer to body, that I should squat, spread my feet and keep one foot ahead only to perform a simple task of lifting a box. This is impractical, especially if you are overwhelmed by work.” (FG-02/4)
In addition, the fear of unintended consequences of applying kinetic handling principles when doing their daily physical activities at work haunted their eagerness to applying best practices for back care. The recommended kinetic handling principles, for example when lifting an object, may not be suitable for old people and one participant feared that applying the best practices would inflict more pain. One participant narrated:

“...I’m worried that these best practices may not be suitable to senior citizens like me. We old people might end up falling down when squatting because our feet are no longer strong enough to do that. So instead of preventing we may end up causing more injuries to our bodies.” (FG-03/3)

4.11 Summary of the Chapter

This chapter presented the results that attempted to answer the objectives of the study. The quantitative results presented in this chapter highlighted on the overview of the socio-demographic profile of the teachers and the prevalence of lower back pain among primary school teachers during the activities of daily living at school. The prevalence of LBP was found to be 82.9% in past year and 17.1% within the last seven days. Observation of the application of kinetic handling principles in the daily work environment indicated that most of the participants have poor sitting (83%) and standing (60%) posture while 87% of the participants had poor posture when bending or lifting an object. Barriers to effective implementation of back care principles in the workplace included poor facilities and lack of equipment as well as heavy workload and staff shortage. In addition, uncertainty about desired best practice was noted by the participants in the observation study.
CHAPTER FIVE

DISCUSSION

5.1 Introduction

The main aim of this study was to determine the role of work-related activities in the prevalence of lower back pain (LBP) among primary school teachers in Dar-es-Salaam, Tanzania. This chapter discusses the results of the study in relation to the research objectives. Both quantitative and qualitative results will be discussed with reference to relevant literature.

5.2 Prevalence of lower back pain among primary school teachers with a history of previous LBP

Primary school teachers in Tanzania are not spared from lower back pain. The current study found a high prevalence rate of 82.9% for LBP in the past year compared to a low prevalence rate of 17.1% for the last seven days among primary school teachers in Tanzania. Although (Louw et al., 2007) reported two decades ago that prevalence rates of lower back pain in high-income countries are higher than in low and middle income countries, the current study has proved otherwise. Primary school teachers in Tanzania, one of the lower income countries in the world, had a much higher prevalence rate of LBP when compared to literature from high-income countries. None of the studies conducted in countries such as Turkey, Sweden, Thailand, German, USA, Brazil, China and Japan had LBP prevalence rates above 80%. The results is also in stark contrast to a systematic review by Punnett and Wegman (2004) on lower back pain where the global burden LBP was reported to be 37%, predominantly amongst the working group.

The finding from the current study is alarming as it is much higher than results of previous studies on prevalence of lower back pain among school teachers. A study conducted by Pihl,
Matsin, and Jürimäe, (2002) in Estonia, recorded a low prevalence rate of 11.8% of school teachers suffered LBP within the past year. The one year prevalence rate of the current study was almost twice as high when compared to the 43.8% of school teachers in Turkey (Korkmaz, Cavlak, & Telci, 2011b) and 59.2% of Chinese school teachers (Chong & Chan, 2010) that reported LBP in the past year. However, it is important to note that methodological differences between the current study and the two studies conducted in Turkey and China could contribute to the difference in results. The studies conducted in Turkey and China reported on the prevalence of LBP amongst both primary and secondary school teachers, whereas the current study only reported on primary school teachers. Moreover, these studies were conducted in developed countries which are far ahead in teaching technology when compared to Tanzania.

In Africa, there is scarcity of literature with regard to lower back pain among school teachers. In Ethiopia, the documented prevalence rate among school teachers within the past year was 53.8% which was lower compared to the current study (Beyen, Mengestu, & Zele, 2013). Once again, the methodological difference between the current study and the study conducted in Ethiopia could be a contributing factor to the difference in results as the later involved teachers from primary and secondary schools, college and university.

It is important to note that the study population could greatly contribute to the varied prevalence rates of lower back pain amongst the teaching population. The daily activities and work environment of pre-school teachers for instance differs vastly to that of high school teachers. In addition, teachers working with pupils with physical and mental challenges (Yamamoto, Saeki, & Kurumatani, 2003) are also more exposed to strenuous activities at work, and therefore the high prevalence rates of 52.4% (Wong, Lee, & Yeung, 2009) and 76.7% are understandable when compared to the lower rates of 43.3% amongst Japanese pre-school teachers (Tsuboi et al., 2002)
Lower prevalence rates were reported in several studies conducted globally, e.g. 34.8% of primary school teachers in France suffered with LBP (Kovess-Masféty, Sevilla-Dedieu, Rios-Seidel, Nerrière, & Chee, 2006), 41.1% of primary and secondary school teachers in Brazil (Cardoso et al., 2009) and 53.3% of secondary school teachers in Philippines (Atlas et al., 2007). Similarly in Shanghai, primary school teachers reported to have a LBP prevalence rate of 40% (Jin, Sorock, & Courtney, 2004) which was almost the same (40.4%) for teachers in Malaysia (Samad et al., 2010). Research also showed that school teachers are prone to the development of chronic LBP due to the nature of their work. In Germany, (Claus, Sachse, & Ried, 2014) found that more than a third (38.7%) of the teaching staff suffered from chronic LBP within the past year.

With regard to other professional groups, the prevalence rate of the current study remains slightly higher compared to the prevalence rate of 73.7% for nurses working in Tanzania (Mwilila, 2008); 78% of nurses in Rwanda (Mukaruzima, 2010), and; 76.53% among office workers in Kenya (Mukandoli, 2004). It is important to note that higher prevalence rates of LBP were reported among various professional groups in Eastern Africa countries. It also implies that the problem of lower back pain is not only limited to certain professions, as a high prevalence rate of LBP exists for different professions across East African region. This argument is supported by Alsiddiky, Hanan, Elaf, Haneen and Jenan (2014) who stated that a high prevalence of lower back pain exists in Asia, a specific region of the world.

The prevalence rate of LBP in the current study is also higher when compared to the other professions from Western countries. In Turkey a LBP prevalence of 61.3% for the rural hospital workers was reported (Karahan, Kav, Abbasoglu, & Dogan, 2009), while lower rates of 49.0% amongst Swedish music teachers within the past year (Edling & Fjellman-Wiklund, 2009) and 28.5% in non-teaching professions in Thailand (Tomita et al., 2010).
With regards to referred pain, the current study found a 43.9% prevalence of referred pain to the thigh/hip, and 26.2% and 15.1% for the knee and ankle respectively. The finding from the current study differs from previous research. A study conducted amongst primary school teachers in Saudi Arabia reported higher rates of referred pain to the knee (26.3%); followed by the hip (16.5%) and the ankle (12.3%) respectively (Alsiddiky et al., 2014). Korkmaz et al., (2011) reported a very low rate of 8.4% for referred pain to the hip among primary school teachers, while the knee and ankle accounted for 32.0% and 21.8% respectively.

Overall, the results of physical education and music teachers showed lower rates of referred pain, although maintaining similar trends regarding the specific area of pain. A study of physical education teachers in Estonia, reported a prevalence of 14.0% of referred pain to the knee and 2.3% to the hip (Pihl, Matsin, & Jurimae, 2002), while Swedish music teachers reported 16% of referred pain to the knees and 12% to the hips respectively (Fjellman-Wiklund, Brulin, & Sundelin, 2003).

The present study reported high prevalence rates of referred pain to both the knee and hip/thigh area, which could be attributed to the prolonged standing and sitting positions when teaching and marking of students’ work. The lower rates of referred pain among the special education teachers, e.g. physical education teachers as compared to the primary school teachers, suggest that the former engage more in physical exercises that could prepare their bodies to cope with the daily strains at work. In addition, the difference in prevalence could also be because of physical education teachers spend less time standing in classes and sitting in offices than the primary school teachers due to the practical nature of their work.
5.2.1 Lower back pain and gender

The current study had a sample of 286 primary school teachers working in Dar-es-Salaam city, Tanzania, of which 78.7% were females. This higher tendency of females in the current study is not unexpected as most of the primary school teachers globally are female. The representation of female participants in the current study sample is less than in studies conducted amongst school teachers in Bahia (92.0%) (Cardoso et al., 2009) and in Germany, (86.8%) (Claus et al., 2014), higher than a Chinese study with a female representation of 67.0% (Yue et al., 2012).

The current study recorded a prevalence rate of 66.8% for LBP during the past year for women compared to only 16.1% for men. These results are in line with a study conducted amongst female teachers in Saudi Arabia, where a prevalence of 63.8% for LBP was noted (Darwish & Al-Zuhair, 2013). However, the prevalence rate for the female teachers in the current study was lower when compared to the 75.9% reported for female teachers in Ethiopia (Beyen, Mengestu, & Zele, 2013). The difference could be attributed to methodological difference between the current study and the Ethiopian, as the latter included teachers from primary and secondary schools, college and university. A higher prevalence rate was reported in Sweden for females (55%) of different working groups that suffer from LBP compared to 45% of for men (Dijken, Fjellman-Wiklund, & Hildingsson, 2008). Likewise, the study conducted in Hong Kong by Chong and Chan (2010) revealed a prevalence rate of 52.6% for female primary school teachers, whereas only 18% of female school teachers in Norway complained of the same problem (Ihlebaek, Eriksen, & Ursin, 2002). On the contrary, a Nigerian study reported a slightly higher prevalence rate for men (50.3%) with LBP than women (Ogunbote et al., 2013). This difference was ascribed to men being more involved in physical activities, lifting and heavy work than women.
Although the data shows that, female teachers were mostly affected by LBP, it cannot be concluded that the majority of the primary school teachers suffering from LBP in the African setting, are female. The sample of the current study was only representative of the three districts of Dar-es-Salaam where the data was collected. The current study could not suggest that gender per se could be a contributing factor to lower back pain as no significant relationship was found for gender and lower back pain. Yue et al. (2012) also suggested that the female gender was not significantly related with lower back pain. The higher prevalence rate of LBP for female teachers compared to male teachers in the current and across the previous studies could be explained under two basic strands. Firstly, such a difference may be influenced by the varying proportion of study samples since both the current and the previous studies had higher number of females than males. Secondly, females were likely to sustain lower back pain than males because they bear more responsibility for household task than males in everyday life.

5.2.2 Lower back pain and Body Mass Index (BMI)

Body mass index (BMI), as the ratio of weight to height squared, was identified as a contributing factor for lower back pain (Bernard, 1997). The study by (Biglarian et al., 2012a), reported that obesity is related to LBP in Iran. The researchers found a 29.3% prevalence of LBP among obese workers in Iran (Biglarian et al., 2012a). However, a study previously conducted in Amol, Iran (Nia et al., 2011) and Nigeria (Ogunbode, 2013) found no significant relationship between lower back pain and BMI. This is in line with the current study where no significant relationship between lower back pain and body mass index (BMI) was found.

The majority of participants in the current study (82.52%) had a normal BMI category, according to the (Centers for Disease Control and Prevention, 2011) classification of the BMI. Only 2.45% of the primary school teachers, of which 71.43% were female and 28.57% male, were categorised as obese. The finding of the current study is in stark contrast with results from a study conducted
in Nigeria where 45.2% of the participants had a normal BMI. The mean BMI of the participants in the current study was 22.58 (normal BMI). This finding is slightly lower than the mean BMI of 24.6 of German school teachers (Claus et al., 2014); and much lower than the mean BMI of 27.6 (overweight category) of school teachers from Saudi Arabia (Alsiddiky et al., 2014). This finding also corroborates the previous studies in other countries.

The fact that primary school teachers in Dar es Salaam Tanzania, in the current study, were not obese could imply that they live a healthy lifestyle. In addition, an absence of empirical evidence to suggest a relationship between lower back pain and BMI could emphasize that work-related activities are the main contributing factor to their LBP.

5.2.3 Lower back pain and age

Lower back pain affects the majority of the working age group globally and Tanzania is not exempted from this tendency. Lower back pain continues to be among one of the leading occupational musculoskeletal disorders among the working age group in the United States of America and Great Britain (Palmer et al., 2001).

The current study also found the highest prevalence rate between the age group 30-39 years (36.0%). Similarly to the current study, the results from a Chinese study documented the highest lower back pain prevalence amongst the same age group (Jin et al., 2004). Teachers aged 40 or above were found to be less likely to report neck and lower back pain in a Turkish study (Başkurt, Baškurt, & Gelecek, 2011). However, this prevalence in the current study was different to a study conducted in Sweden where the highest prevalence rate was in the age group 55–64 years (Dijken, Fjellman-Wiklund, Hildingsson, 2008). Higher prevalence rates in the age group 40 years and older were also reported in a Bahian (47.9%) (Cardoso et al., 2009) and German study (48.7%) (Claus at el., 2014). This is lower than the prevalence rate for the same age group.
in the current study, where more than half (52.3\%) of the school teachers complained of LBP during the past year.

What is alarming, is the young age group (22 - 29 years old) of school teachers that are not exempted from lower back pain disability, with a prevalence of 47.5\% of primary school teachers in the young age group complaining of LBP during the past year. Although this result is in contrast to that of a German study (31.1\%) (Claus et al., 2014), literature revealed that the young age group are vulnerable to the development of LBP due to greater work demand and their exposure to the risk factors by doing more physical activity at work than their seniors colleagues (Cardoso et al., 2009).

5.2.4 Lower back pain and marital status

Lower back pain has an impact on the married life. Although both married, divorced and teachers who are not married complained of lower back pain, literature has shown significant differences among the groups (Darwish & Al-Zuhair, 2013). In Saudi Arabia and Germany, 64.1\% and 63.0\% of the school teachers respectively that complained of LBP were married (Darwish, 2013; Claus et al., 2014). In another study, married people with LBP accounted for 83.4\% (Alsiddiky et al., 2014). Similarly to the current study, 74.1\% of the primary school teachers were married that complained of lower back pain. The higher prevalence rate of LBP amongst married teachers could be due to extra family responsibilities compared to single persons.

5.3 Work-related factors contributing to Lower Back Pain

5.3.1 Work experience

In the current study a high number of participants with lower back pain had less than 20 years of work experience, whereas 37.4\% had 10 to 19 years work experience. Thus, Tanzanian primary
school teachers working for less than 20 years accounted for the majority (65.7%) who had lower back pain. This is higher than the results of Cardoso et al. (2009) who reported that 47.9% of school teachers who had working experience of less than 20 years had LBP. Similarly, in Saudi Arabia, more than half (56.9%) of the school teachers were teaching for more than 10 years (Alsiddiky et al., 2014). Results of the current study are similar to that of a German study where teachers with 18 years or more working experience complained of LBP (Claus et al., 2014). This could be attributed to the fact that persons with less work experience is from the younger age group, hence participating in more physical activities at school than their older colleagues. The reason for LBP disability in the younger age group as well as those with less work experience, especially in Africa, are not well defined and established. More studies are needed to fill this gap, especially in less resourced countries.

5.3.2 Workload

The current study shows high prevalence of lower back pain (72.7%) among the teachers with higher number of class periods (four to six teaching periods per day), specifically in females (55.2%). Likewise, higher prevalence of lower back pain (69.2%) was among the teachers with many working hours (7 to 9 hours per day), of which 65.4% were female. In addition, the current study reported a higher prevalence of lower back pain (58.0%) among the teachers with a higher number of students (45 to 50 students per class), of which 50.0% were female.

Literature has shown that more than two thirds (68.3%) of primary schools teachers with an average of 2.1 classes per day teaching, marking and guiding up to 31.2 per classroom, are suffering from the LBP (Cardoso et al., 2009). Yue et al. (2012) shown that teaching in a standing position, static posture or sitting with the neck bent forward for more than 14 hours a week were all associated with LBP. The researcher also reported that working for more than 40 hours per week was associated with LBP among male and female primary school teachers. It is
also reported that the average number of 4.5 teaching hours per day (SD=2.9) are associated with LBP (Alsiddiky et al., 2014). This finding is similar to primary school teachers in Germany who teach more than 5 hours a day (Claus et al., 2014).

Another study found that, 76.7% of school teachers teaching 1 to 4 classes per day, complained of LBP (Darwish & Al-Zuhair, 2013). The author also revealed that only 23.3% of school teachers with LBP had 5-7 classes per day. The results are in contrast to the current study which recorded 72.7% of the school teachers with LBP taught for 4 – 6 periods per day. Although our study found that higher number of students in a class was associated to LBP; Darwish and Al-Zuhair (2013) reported no association between higher number of students in a class and LBP disability. Darwish and Al-Zuhair (2013) further noted that, 62.9% of teachers in their study sample with 20 to 34 students in a class, suffered from LBP while only 30.4% of school teachers with LBP were those who had 35 to 50 students in the class (Darwish & Al-Zuhair, 2013). The higher prevalence rate of LBP among primary school teachers with a high volume of work can be ascribed to the physical exertion and strains caused by such a heavy workload. Both the current and previous studies, proved that an increased workload contribute to lower back pain among primary school teachers.

### 5.3.3 Work-related physical activities

Primary school teachers engage in numerous and repetitive work-related physical activity when performing their work duties. The current study found that that less than a third of the participants (26.9%) could not sit for more than an hour while teaching, due to LBP. In addition, 39.5% of the teachers were able to stand during teaching while experiencing LBP. Furthermore, almost half of the teachers (47.6%) were able to walk with a painful lower back. It is also noted
that 39.9% of the participants were capable of lifting things at work despite having LBP. The study also found that half of the teachers (50.3%) were capable of continuing their daily routine at work although they had LBP. This kind of musculoskeletal disorders found among the teachers might result from their prolonged standing, repeated walking in the classroom and frequent lifting of hands when writing on the blackboard.

Previous studies also found that some work-related activities such as prolonged sitting, prolonged standing, long working hours in teaching and correcting examination papers were associated with increased risk of developing LBP among teachers (Atlas, 2007; Cardoso et al., 2009; Samad et al., 2010; Korkomaz et al., 2011; Bandpei, Ehsani, Behtash, & Ghanipour, 2014). Bernade (1997) reported heavy physical work, lifting and forceful movements, bending and twisting (awkward postures), whole-body vibration and static work postures to be the five major physical factors contributing to lower back pain in the workplace. The study by Korkmaz et al., (2011) found that while 71.1% of teachers who had MSDs complained of experiencing pain when standing for a long time, similar complaints were raised by 23.8% of the teachers while lifting, 18.8% while bending and 16.0% while sitting respectively. Contrary to the finding by Korkmaz et al., (2011) which shows a higher prevalence of LBP in a sitting position than standing, the current study found higher prevalence rates of LBP in the standing position than sitting. This variation can be explained by the fact that teachers in the current study spend more time in the standing position because of the high teaching workload in classes. Since schools in the study area have an acute shortage of staff, the few teachers carry a high number of class periods; hence spending more time in the standing position while delivering lessons.

An alarming research finding is that sitting itself does not increase the risk of LBP, except when it is for more than half a workday and combined with awkward postures (Lis, Black, Korn, & Nordin, 2007). This remark is in stark contrast with another study that reported that sitting for
more than three hours daily could be a predisposing factor for lower back pain (Yue et al., 2012). The result of a study conducted in Iran Bandpei (2014) confirmed that prolonged hours of sitting, standing and working in class and office could be potential risk factors for LBP among teachers. Results from previous studies concur with that of the current study and demonstrated that static posture and prolonged sitting could be risk factors for LBP (Bandpei et al., 2014; Punnett & Wegman, 2004). Research reported that working environment conducive of poor conditions and the static postures arising from these conditions, may contribute to the development of LBP among teachers (Jin, Sorock & Courtney, 2004; Antonelli et al., 2012).

Lack of suitable chairs and tables exposed teachers to the development of unfavourable postures that negatively influence the musculoskeletal system (Cardoso, 2009). Studies on epidemiology also confirmed a positive relationship between uncomfortable back support and LBP (Spyropoulos et al., 2007; Alperovitch-Najenson et al., 2010). The same scenario was found by Yue and colleagues (2012) in China. The researchers confirmed a positive association between LBP and risk factors such as prolonged sitting, static posture and uncomfortable back support (Yue et al., 2012a). The results of the current study concur with studies conducted globally. Both the quantitative and qualitative data indicated the presence of poor working environment in primary schools in the research setting and that such environment are conducive to the development of poor postures in sitting, standing, bending and lifting which contribute to the teachers’ lower back pain.

5.4 Application of kinetic handling principles at work

Proper sitting posture has long been recommended as one of the best practices a person can implement in order to prevent back problems (Saunders 2003, 26). Studies have shown a correlation between daily activities and the work environment (Cardoso, 2009). Alsiddiky et al., (2014) noted that inadequate office facilities and poor working environment are contributing
factors to the prevalence of low back pain among teachers in Iran. Work-related physical activity may predispose teachers to LBP especially when such activity becomes more demanding, uncontrolled and exhausting (Dankaerts et al., 2006).

Physical exertion during teaching and prolonged standing in an inappropriate way for several hours in the classroom resulted in back pain and musculoskeletal pain among teachers (Cardoso et al., 2009). Standing up is not the only factor contributing to LBP, but activities such as carrying books or stationary to school or to the classroom, installation of equipment/teaching resources, walking inside and outside the school may further aggravate the occurrence of pain (Mariammal, Jaisheeba, & Sornaraj, 2012). The study by Mariammal and others (2012) raised an accusation that Indian class rooms remain out of date, as teachers still use blackboard and chalk. The use of the blackboard for long hours created inappropriate posture to teachers which in return contributed to developing lower back pain (Mariammal et al. 2012). The qualitative results in the current study underline this finding. Our study found that in many schools in Dar es Salaam, classrooms do not have adequate student desks; offices do not have proper chairs and tables for teachers, and the blackboard is still in use for teaching.

5.5 Summary of the chapter

This chapter discussed the results of the study in relation to the research objectives and existing literature. The main aim of the chapter was to provide a broader understanding of the study findings in the context of specific aims of the study and in the context of previous studies. The following chapter will provide the conclusions and recommendations.
CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter outlines the summary, conclusion and recommendations of the study. The summary recalls in a nutshell the aim, methodology and discussions of the study. Moreover, details of the major findings of the study are highlighted in the conclusion. Finally, recommendations emanating from the study are proposed as well.

6.2 Summary

Lower back pain is amongst the leading global musculoskeletal condition affecting difference people from all works of life. Primary school teachers are vulnerable to LBP due to the routine nature of their work. The aim of this study was to determine the role of work-related activities in the prevalence of LBP amongst primary school teachers in the Dar-es-Salaam region of Tanzania. More specifically, the study intended to determine: the prevalence of LBP among primary school teachers; work-related physical activities contributing to LBP among primary school teachers; and finally, to observe and explore primary school teachers’ application of kinetic handling in the prevention of work-related LBP in the Dar es Salaam region of Tanzania.

The study setting constituted eighty selected primary schools in the Dar es Salaam region of the United Republic of Tanzania. These included twenty five primary schools in Temeke district; twenty three and thirty two schools in Ilala and Kinondoni districts respectively. A descriptive quantitative research design was applied. Two hundred and eighty six (286) government school teachers, 78.7% female and 21.3% male teachers voluntarily participated in the study. A developed self-administered questionnaire was used to collect data that addressed the first two objectives of the study. Observation of the application of kinetic handling principles in the school
environment was recorded on a developed check list, followed by participation in one of three FGDs.

6.3 Conclusion

The results of the current study demonstrated a high prevalence (82.9%) of lower back pain in the past year among primary school teachers with a history of previous LBP in the Dar es Salaam region of Tanzania. The LBP prevalence was much lower during the last seven days (17.1%). Gender was significantly related to lower back pain in last seven days (p=0.008). With regard to pain severity according to Visual analogy scale (VAS), severe pain, ranging from 76 – 100mm, were most prominent in all categories, namely 43.5% for sitting; 38.9% for standing; 43.0% for walking and 37.8% for lifting/bending respectively.

The study further revealed that teachers in Dar es Salaam carried heavy workload because of the high number of students per class and few teachers employed in the primary schools. Several risk factors for LBP in the work environment were identified, namely: physical exhaustion due to sustained mechanical load and constant trunk flexion; prolonged sitting to prepare for lessons and marking; as well as bending to assist pupils with lessons. Poor posture during prolonged sitting, standing, bending and lifting observed in the present study could be attributed to low knowledge of kinetic handling principles as well as lack of ergonomically appropriate office furniture (including chairs and tables) for the teachers. In addition, in most primary schools in Dar es Salaam, teachers still use the blackboard and chalk during teaching in classrooms. The prolonged use of the blackboard contributed to the incorrect posture of teachers that could led to the development of lower back pain. Moreover, the prolonged standing while teaching also resulted in lower back pain among teachers as well.
The current study, however, revealed that despite having severe disability (n=192; 67%) and moderate disability (n=82; 28.7%) the majority of primary school teachers were capable of continuing with their daily routine at work. This could be attributed to the diligence of the primary school teachers that participated in the study.

6.4 Strength and Limitations of the Study

6.4.1 Strength of the Study

- A high response rate of 77.5% was obtained in the present study. This indicates that the teachers were most willing to participate in the study.
- A rigorous sampling method was employed in the study.

6.4.2 Limitation of the study

- Although a rigorous sampling method was employed in the study, the required sample, as calculated using the Yamane formulae was not obtained. This could potentially limit generalisation of findings to all primary school teachers in Dar es Salaam.
- Cross-sectional data collection may consistently describe patterns of association but not causality. Thus caution should be employed when interpreting the results of a cross-sectional study when longitudinal data is not present.
- The majority of the data of the present study was based on self-reported data and is therefore subject to several sources of error. Teachers who intentionally or unintentionally distorted their answers may represent a source of bias.
Moreover, a recall bias on teachers’ lower back pain experiences may have potentially affected the study, especially when teachers were asked to state whether they had any lower back pain during the last twelve months.

6.5 Recommendations

Based on the given results of this study the following recommendations are made:

The work environment of primary school teachers should be improved. This includes:

- A proper workstation assessment should be done for every teacher.
- Teachers should be provided with suitable office chairs and other furniture that support appropriate posture which could reduce the occurrence and intensity of muscular skeletal disorders.
- The local governments (employers) should assess the workload of individual teachers, especially in the schools with acute shortage of teachers and employ more teachers.
- In addition, more classes should be built and more teachers should be employed to address the problem of overcrowded class rooms.
- Due to the observation of a number of pupils sitting on the ground (shortage of desks), teachers were more prone to the development of LBP from prolonged and repetitive bending when assisting these pupils. It is recommended that municipalities should ensure that adequate desks are made available to pupils.
- Employers (local governments) should develop and provide training to promote teachers awareness on kinetic handling for the prevention of lower back pain.
- Although the government of Tanzania has a sound education policy, and set standards on the students-to-class ratio, students-to-desk ratio and staffing level for government schools, these standards merely exist on paper. It should be practically implemented in all schools. This study thus recommends to the Ministry of Education and
Vocational Training a thorough assessment of the practicality and implementation of the recommended standards to ensure that all municipalities and schools adhere to it. This could help to reduce the prevalence of LBP among primary school teachers since most of these indicators were identified as contributing factors for work-related LBP.

- This study further recommends that teachers should be responsible for their own health by adopting preventive measures and coping strategies. Maintaining a healthy lifestyle in terms of physical fitness is highly recommended to the teachers.

### 6.6 Summary of the chapter

This final chapter summarised and outlined relevant points of the current study. It made recommendations for future actions.
REFERENCES


Low Back Pain. (n.d.).


Professional Provident Society. (1998). Statistics for Spinal Pathology, courtesy of Dr. James Goodwin, Chief Medical Officer of PPS.


KARATASI YA MAELEZO

Mada ya utafiti: Mahusiano kati ya Maumivu ya Mgongo na Mazingira ya kazi wa Waalimu wa shule za msingi, Tanzania.

Je, utafiti huu unahusu nini?

Huu ni utafiti unaofanywa na CRESE DAMAS NILAHI, mwanafunzi wa uzamili katika Chuo Kikuu cha Western Cape. Tunakuomba ushiriki katika utafiti huu kwa sababu wewe kwa wadhifa wako ni Mwalimu unayefundisha katika shule ya Msingi na maelezo utakayota ni ya muhimu sana katika utafiti huu. Lengo la utafiti huu ni kuchunguza uhusiano uliopo kati ya kazi na maumivu ya mgongo.

Nitaulizwa maswali gani iwapo nitakubali kushiriki katika utafiti huu?

Utaombwa kujaza dodoso la utafiti ambalo litakuwa na sehemu tatu (A, B na C). Zoezi hili litakuwa na muda usiozidi dakika 15-20 tu katika kujiwa maswali yaliyopo katika sehemu zote tatu. Dodoso za utafiti zitaletwa kazini kwako na kukusanywa tena hapo tena kazini.

Je, ushiriki wangu katika utafiti huu utatunzwa kwa siri?

Tutafanyi kilwa lyepo katika taarifa zako kwa siri. Ili kusaidia kudumisha usiri wa taarifa zako, dodoso letu halitakutaka kuandika jina lako au kutoa taarifa zozote zitakazokutambulisha wewe binafsi. Endapo kuna tutaandika ripoti au nakala yoyote kutoa utafiti huu, taarifa zinazokutambulisha zitalindwa kwa usiri wa kiwango cha juu.

Kulingana na matakwa ya kisheria na / au viwango vya weledi, tutatoa taarifa kwa watu husika na/ au mamali husika kuhusu taarifa zozote zitakazo katufikia kuhusiana na unyanyasaji wa watoto au dhara au madhara yoyote yatakatokupata wewe au wengine.
Madhara ya kushiriki katika utafiti huu ni nini?

Hakuna madhara yanayoweza kutokea kutokana na kushiriki katika utafiti huu.

Je, nini faida za utafiti huu?

Faida kwa upande wako ni kukutia moyo kwamba mazoezi ya viungo ni muhimu kwa afya ya mwili sit u kwa wagonjwa unaowatibu bali pia kwako mwenyewe.

Matooke ya utafiti huu pia yatamsaidia mtafiti kujifunza zaidi kuhusu uhusiano uliopo kati ya kati na maumivu ya mgongo. Taarifa zitakakusanywa zitasaidia katika kuwaonekana namna bora ya kufanya kazi kwa vitendo ikiwemo kuinama na kunyanyua vitu ili kuboresha afya zenu.

Je, ninaweza kushiriki katika utafiti huu na nikaamua kuacha muda wowote?


Inakuwaje kama nina maswali?

Utafiti huu unafanywa na Crese D. Nilahi mwanafunzi wa uzamili katika Chuo Kikuu cha Western Cape. Kama una swali lolote kuhusu utafiti wenyewe, tafadhali wasiliana na:-

Ms Crese Damas,

P.O Box 64574

Dar-es-salaam, Tanzania

Telephone number +255767983762

E-mail address: cresedamas@gmail.com

Ikiwa una maswali yoyote kuhusiana na utafiti huu na haki zako kwenye ushiriki katika utafiti huu au kama unataka kuripoti tatizo lolote ulilokumbana nalo kkuhusiana na utafiti, tafadhali wasiliana na:

Mkuu wa Idara: Prof A Rhoda

Mkuu wa Kitivo cha Sayansi za Afya na Jamii: Prof J Frantz

Chuo Kikuu cha Western Cape
Private Bag X17

Bellville 7535

Utafiti huu umeishinishwa na Kamati za Seneti, Kamati ya Utafiti na Kamati ya Maadili, za Chuo Kikuu cha Western Cape.
INFORMATION ABOUT THE STUDY

Project Title: Work-related lower back pain among school teachers in Dar-es-Salaam, Tanzania

What is the study about?

This is a research project being conducted by CRESE DAMAS NILAHI pursuing a Master degree in Physiotherapy at the University of the Western Cape. We are inviting you to participate in this research project because you are exposed to work-related activities that can lead to low back pain (LBP) and related problems. The purpose of this research project is to determine the role of work-related activities in the prevalence of LBP among primary school teachers. The information from this study could be used to make recommendations for ergonomic and lifestyle changes. Furthermore, the recommendations could contribute to a decrease in absenteeism from work and associated medical costs to manage the LBP, hence improving the teachers’ productivity and longevity.

What will I be asked to do if I agree to participate?

You will be asked to complete a self-administered questionnaire after informed, written consent to participate in this study was given. The questionnaire should not take longer than 20 minutes to complete.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality the following steps will be taken: the questionnaires are anonymous and will not contain information that may personally identify you. A code will be placed on the survey. Through the use of an identification key, the researcher will be able to link your survey to your identity. Only the researcher will have access to the identification key. To help protect your
confidentiality all information gathered will be stored in a locked filing cabinet. No unauthorised party will be able to access the information.

What are risks of this research?

There are minimal risks associated with participating in this study. In case of any issues arising from the questions asked in the interview, you will be referred for appropriate management of the problem.

What are the benefits of this research?

There are no direct benefits to you for participating in the study, but the results may help the researcher to learn more about work-related activities associated with LBP. We hope that in future other teachers might benefit from this study through improved knowledge of kinetic handling such as correct lifting and bending to improve their quality of life.

Do I have to be in this research and may I stop participating any time?

You participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this study or if you stop participating at any time, you will not penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Ms. Crese Damas Nilahi, a Master’s student in Physiotherapy at the University of the Western Cape. If you have any questions about the research study itself, Please contact

Ms Crese Damas,

P.O Box 64574 Dar-es-salaam, Tanzania.

Telephone number +255767983762

E-mail address: cresedamas@gmail.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problem you have experienced related to the study, please contact:
Head of Physiotherapy Department: Prof A Rhoda

Dean of the Faculty of Community and Health Sciences: Prof J Frantz

University of the Western Cape

Private Bag X17

Bellville 7535

This research has been approved by the University of Western Cape’s Senate Research and Ethics Committee.
FOMU YA UKUBALI

Mada ya utafiti: Mahusiano kati ya Maumivu ya Mgongo na Mazingira ya kazi wa shule za msingi, Tanzania.

Utafiti huu umeelezwa kwangu kwa lugha ninayoielewa na kwa hiari yangy, ninakubali kushiriki. Maswali yangu kuhusu utafiti huu yamejibiwa. Ninatambua kuwa taarifa zozote zinazonihusu mimi zitatunzwa kwa siri na kwamba ninaweza kuacha kuendelea kushiriki bila kulazimisha kutoa sababu yoyote na haitaniathiri mimi kwa namna yoyote ile.

Jina la Mshiriki............................................................

Sahihi ya Mshiriki......................................................

Shahidi.................................................................

Sahihi ya Shahidi......................................................

Tarehe.................................................................

Ikiwa una maswali yoyote kuhusiana na utafiti huu na haki zako za ushiriki katika utafiti huu au kama unataka kuripoti tatizo lolote ulilokumbana nalo kuhusiana na utafiti, tafadhali wasiliana na mratibu wa utafiti.

Dr Tania Steyl

University of the Western Cape; Private Bag X17, Bellville 7535;

Telephone: +27 21 959-2549; Email: tsteyl@uwc.ac.za
CONSENT FORM

Title of Research Project: Work-related lower back pain among school teachers in Dar-es-Salaam, Tanzania

The study has been described to me in a language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in anyway.

Participant’s name……………………………………

Participant’s signature……………………………..

Witness………………………………………………

Witness’s signature……………………………………

Date………………………………………………

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Dr Tania Steyl

University of the Western Cape; Private Bag X17, Bellville 7535

Telephone: +27 21 959-2549; Email: tsteyl@uwc.ac.za
Appendix 5

UNIVERSITY OF THE WESTERN CAPE
Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959 2549, Fax: 27 21-959 1217
E-mail: tateyl@uwc.ac.za

KIAPO CHA KUTUNZA SIRI

Kichwa cha Utafiti: Maumivu ya Mgongo yanayousiana na kazi kwa Walimuwa Shule za Msingi, Mkoa wa Dar es Salaam, Tanzania.

Utafiti huu umaferanuliwa kwangu katika lugha ninayoielewa. Maswali yangu yamejibiwa ipasavyo, na ninaelewa kile ambacho ushiriki wangu utahusisha na ninakubali kushiriki katika majadiliano kwa hiai yangu mwenyewe pasipo shuruti. Pia ninaelewa kwamba utambulisho wangu hautotolewa kwa mtu yoyote. Natambua pia kwamba naweza kujitaa katika kushiri wakati wowote bila kutoa sababu ya uamuzi wangu na pia pasipokuwa na madhara au hasara yoyote kwangu. Natambua usiri utategemaa namna ambavoyo shiriki wote, kila mmoja katika kikundi atakavyotunza siri, ha hivyo ninaaiki kufanya yafuatayo:

Naafiki kutunza siri ya majadiliano haya, kwa kutooa utambulisho wa shiriki wengine au aina yoyote ya michango yao kwa mtu yoyote asiyehusika.

Endapo utakuwa na maswali kuhusu utafiti huu au pengine ungependa kutoa taarifa kuhusu tatizo lolote ulilokumbana nalo kuhusiana na utafiti huu, tafadhali wasiliiana na Mratibu wa Utafiti:

Jina la Mshiriki..................................................
Saini ya Mshiriki.............................................
Tarehe..........................................................
Appendix 6

UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21 959 2549, Fax: 27 21 959 1217
E-mail: tssteyl@uwc.ac.za

FOCUS GROUP CONFIDENTIALITY BINDING FORM

Title of Research Project: Work-related lower back pain among school teachers in Dar-es-Salaam, Tanzania

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits. I understand that confidentiality is dependent on participants’ in the Focus Group maintaining confidentiality. I hereby agree to the following:

I agree to uphold the confidentiality of the discussions in the focus group by not disclosing the identity of other participants or any aspects of their contributions to members outside of the group.

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

Participant’s name…………………………………….

Participant’s signature………………………………

Date………………………..
Appendix 7

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

1 April 2014

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:
Ms C Damas (Physiotherapy)


Registration no: 14/24

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape
The Permanent Secretary,
Ministry of Education and Vocational Training,
P. O. Box 35094,
Tanzania

Re: PERMISSION TO CONDUCT A RESEARCH STUDY AT PRIMARY SCHOOL
GOVERNMENT IN DAR ES SALAAM FROM APRIL TO MAY 2014

I, Crese Damas, a postgraduate physiotherapy student at the University of the Western Cape in South Africa, would like to request permission to conduct research study at the government schools in Dar es Salaam region. I would like to start in April through May 2014. The University’s Senate and Faculty’s Higher Degree committees have approved study details, contained in the attached proposal.

Thank you for anticipated cooperation.

Yours sincerely,

CRESE DAMAS,
Masters Student

c.c: Dr. Tania Steyl
Supervisor.
Appendix 9

The United Republic of Tanzania

MINISTRY OF EDUCATION AND VOCATIONAL TRAINING

Cable: ELIMU DAR ES SALAAM.

Telephone: 2120403/2120412/2120417

Fax: 255 22 2113271

P. O. Box 9121
DAR ES SALAAM
TANZANIA

Reply please quote:


To Whom It May Concern

RE: RESEARCH PROJECT OF MS. CRESE DAMAS

The above-named is a registered student in Faculty of Community and Health Sciences of the University of Western Cape who is undertaking the Masters of Science degree in Physiotherapy.

As part of her fulfilment of the requirements for the degree award she is required to carry out a study on work related low back pain amongst Primary School teachers in Dar es Salaam region.

We fully support the research and kindly request you to assist her in whichever way possible for her to complete her research.

Thanking you.

Dr. Laetitia Sayi
For: PERMANENT SECRETARY
Appendix 10

QUESTIONNAIRE

INSTRUCTIONS
1. Please answer all the questions
2. Select by putting a tick ( √ ) in the box next to the response that corresponds to your situation.

SECTION A: Demographic data
1. What is your gender?   Male           Female
2. Weight in kg …………….ii) Height ……….
3. How old are you……..
4. What is you are professional……………………
5. For how long have been to you are career……………..
6. What is your educational level…………………
   Primary school level (standard seven) (      )   Ordinary level (      )
   Advance level (      )   University level (      )
8. Marital status …….
   Not married/ single (      )      Married (      )
   Divorced (      )                    Window/widower (      )

Work
8.  How many hours a day do you work while standing?
   1 – 2 hr (      )   3 – 5 hrs (      )   6 and above (      )
2. How many classes do you teach a day?
   2 – 3 (      )   4 – 6 (      )   6 – 8 (      )
3. How many students a class are you teaching?
   45 – 50 (      )   51- 60 (      )   61 and above (      )
SECTION B: NORDIC LOW BACK PAIN QUESTIONNAIRES

8. Have you experience pain in your lower back pain for period of seven (7) days.
   Yes ( )     No ( )

2. Have you experience pain in you back for period of 12 months?
   Yes ( )     No ( )

The shaded part on the picture below shows the lower back pain of the human body from behind. **Answer the following question** by putting a tick (√)

![Diagram of the human body showing lower back pain]

3. In which part of the body do you feel pain/ trouble?
   Lower back pain ( )     Hips/thighs ( )
   Knees ( )     Ankle ( )

SECTION C VISUAL ANALOGUE SCALE

8. What is the average pain intensity of this pain?

   VAS scale   0-0.5 = no pain   1-4.5 = mild pain   4.5-7.5 = moderate pain   7.5-10 = severe pain

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
2. What is the worst fatigue level you have experienced at the end of the day?

<table>
<thead>
<tr>
<th>VAS scale</th>
<th>0-0.5</th>
<th>=no pain</th>
<th>1-4.5</th>
<th>=mild pain</th>
<th>4.5-7.5</th>
<th>=moderate pain</th>
<th>7.5-10</th>
<th>= severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

3. What is the worst pain intensity you have experienced in the last one year?

<table>
<thead>
<tr>
<th>VAS scale</th>
<th>0-0.5</th>
<th>=no pain</th>
<th>1-4.5</th>
<th>=mild pain</th>
<th>4.5-7.5</th>
<th>=moderate pain</th>
<th>7.5-10</th>
<th>= severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

4. How much is your pain intensity influenced by lifting.

<table>
<thead>
<tr>
<th>VAS scale</th>
<th>0-0.5</th>
<th>=no pain</th>
<th>1-4.5</th>
<th>=mild pain</th>
<th>4.5-7.5</th>
<th>=moderate pain</th>
<th>7.5-10</th>
<th>= severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

8. How much is your pain intensity influenced sitting during working.

<table>
<thead>
<tr>
<th>VAS scale</th>
<th>0-0.5</th>
<th>=no pain</th>
<th>1-4.5</th>
<th>=mild pain</th>
<th>4.5-7.5</th>
<th>=moderate pain</th>
<th>7.5-10</th>
<th>= severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

8. How much is your pain intensity influenced standing during teaching career.

<table>
<thead>
<tr>
<th>VAS scale</th>
<th>0-0.5</th>
<th>=no pain</th>
<th>1-4.5</th>
<th>=mild pain</th>
<th>4.5-7.5</th>
<th>=moderate pain</th>
<th>7.5-10</th>
<th>= severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

8. How much is your pain intensity influenced bending during teaching career.

<table>
<thead>
<tr>
<th>VAS scale</th>
<th>0-0.5</th>
<th>=no pain</th>
<th>1-4.5</th>
<th>=mild pain</th>
<th>4.5-7.5</th>
<th>=moderate pain</th>
<th>7.5-10</th>
<th>= severe pain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>
SECTION C OSWERTRY LOW BACK PAIN QUESTIONNAIRE

This questionnaire has been designed to give information how your back affecting your ability to manage in everyday life.

Please answer by Tick ( √ ) in each section for the statement, which best applies to you. We realize that you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement, which most clearly describes your problem.

Section 1 – Pain Intensity

| I have no pain at the moment.       | 1 |
| The pain is very mild at the moment | 2 |
| The pain is moderate at the moment  | 3 |
| The pain is fairly severe at the moment. | 4 |
| The pain is very severe at the moment. | 5 |

Section 2 - Sitting

| I can sit on any chair as long as I like | 1 |
| I can only sit on my favourite chair as long as I like | 2 |
| Pain prevents me from sitting more than one hour | 3 |
| Pain prevents me from sitting more than 30 minutes | 4 |
| Pain prevents me from sitting | 5 |

Section 3 - Standing

| I can stand as long as I want without extra pain | 1 |
| I can stand as long as I want but it gives me extra pain | 2 |
| Pain prevents me from standing for more than one hour | 3 |
| Pain prevents me from standing for more than 10 minutes. | 4 |
| Pain prevents me from standing | 5 |

Section 4 - Walking

| Pain does not prevent me walking any distance. | 1 |
| Prevents me from walking more than 2 kilometre | 2 |
| Pain prevents me from walking more than 1 kilometre. | 3 |
| I can only walk using a stick or crutches. | 4 |
| I am on bed most of the time | 5 |
### Section 5 - Lifting

<table>
<thead>
<tr>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can lift heavy weight without extra pain</td>
<td>1</td>
</tr>
<tr>
<td>I can lift heavy weight but it gives extra pain</td>
<td>2</td>
</tr>
<tr>
<td>Pain prevents me from lifting heavy weight off the floor, but I can manage if they are conveniently placed say on a table.</td>
<td>3</td>
</tr>
<tr>
<td>I can lift very lightweights</td>
<td>4</td>
</tr>
<tr>
<td>I cannot lift or carry anything.</td>
<td>5</td>
</tr>
</tbody>
</table>

### Section 8 - Employment

<table>
<thead>
<tr>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>My normal job/ home making duties do not cause pain</td>
<td>1</td>
</tr>
<tr>
<td>My normal job/home making duties cause me extra pain, but I can still perform all is required of me.</td>
<td>2</td>
</tr>
<tr>
<td>Pain prevents me from doing anything but light duties.</td>
<td>3</td>
</tr>
<tr>
<td>Pain prevents me from doing even light duties</td>
<td>4</td>
</tr>
<tr>
<td>Pain prevents me from performing any job or home making chore</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix 11
DODOSO

Chagua jibu sahihi na kuweka alama ya vema (v) au weka alama ya mduara

SEHEMU A - Taarifa Binafsi.

1. Jinsia. Mme ( ) Mke ( )
2. Uzito wako? ( )
   ii). Urefu ( )
3. Umri wako ni miaka mingapi?
4. Unafanya Kazi gani? ……………………………
5. Je Unauzoefu wa miaka mingapi kazini? ……………………………
6. Ni kiwango gani cha elimu ulichonacho?……………………………………

<table>
<thead>
<tr>
<th>Elimu ya Msingi</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elimu Kidato cha Nne</td>
<td>2</td>
</tr>
<tr>
<td>Elimu kidato cha Sita</td>
<td>3</td>
</tr>
<tr>
<td>Elimu ya Chuo Kikuu</td>
<td>4</td>
</tr>
</tbody>
</table>

7. Taarifa ya Ndoa

<table>
<thead>
<tr>
<th>Sijaolewa/ Sijaoa</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nimeoa</td>
<td>2</td>
</tr>
<tr>
<td>Nimeacha/ Nimeachwa</td>
<td>3</td>
</tr>
<tr>
<td>Mjane</td>
<td>4</td>
</tr>
</tbody>
</table>

Kazi

10. Je ni kwa muda wa masaa mangapi kwa siku huwa unafanya kazi ukiwa umesimama wima?
   Saa 1- 2 ( ) Masaa 3-5 ( ) Masaa 6 na Zaidi ( )

2. Je unafundisha vipindi vingapi kwa siku?
   2 – 3 ( ) 4 – 6 ( ) 6 – 8 ( )

3. Je unafundisha wanafunzi wangapi katika darasa?
   45 – 50 ( ) 51 – 60 ( ) 61 na zaidi ( )
SEHEMU B. DODOSO LA MAUMIVU YA MGONGO LA NORDIC

1. Je umewahi kuumia au kupata maumivu ya mgongo kwa mfululizo kwa kipindi cha wiki moja, ukiwa kwenye fani yako ya ualimu?
Ndio ( ) Hapana ( )

2. Je umawahi kupata maumivu ya mgongo kwa muda wa mwaka mmoja?
Ndio ( ) Hapana ( )

Picha iliyo hapo chini inaonesha alama ya kivuli nyumaya mgongo wa mwanadamu. Jibu maswali yafuatayo kwa kuweka alama ya vema [✔] katika jibu sahihi.

13. Je ni sehemu gani ya mwili wako katika mchoro huo hapo juu unahisi maumivu zaidi?

<table>
<thead>
<tr>
<th>Mgongo wa chini</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nyonga</td>
<td>2</td>
</tr>
<tr>
<td>Goti</td>
<td>3</td>
</tr>
<tr>
<td>Kifundo cha mguu</td>
<td>4</td>
</tr>
</tbody>
</table>
KIWANGO CHA MAUMIVU [KWA KUTUMIA SKELI YA MUONEKANO WA ANALOGIA] VAS

0-0.5= Hakuna Maumivu, 1-4.5=Maumivu Kidogo, 4.5-7.5=Maumivu Makali, 7.5-10=Maumivu Makali Sana

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>16. Je ni nini wastani wa ukubwa wa hayo maumivu?</td>
<td></td>
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<td>17. Je ulishapata maumivu ya chini ya mgongo mara kwa mara?</td>
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<tr>
<td>18. Je umeshawahi kupata maumivu makali kwa kipindi cha mwaka mmoja?</td>
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<tr>
<td>19. Je maumivu unayopata wakati wa kunyanyua vitu vizito?</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>20. Je unayapata maumivu wakati wa kukaa kwa muda mrefu?</td>
<td></td>
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<tr>
<td>21. Je ni kiwango gani cha maumivu unayapata ukiwa umesimama wakati wa kufundisha?</td>
<td></td>
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<tr>
<td>22. Je ni kiwango gani cha maumivu unayapata wakati wa kuinama?</td>
<td></td>
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</tbody>
</table>

SEHEMU C. DODOSO LA MAUMIVU YA MGONGO LA OSWESTRY

Dodoso hil limetengenezwa madhubuti ili kuweza kuathiri uwezo wako. Tunatambua unaweza kufikiria kuwa taarifa mbili au zaidi ya mtu kati ya sehemu yoyote zilizoanishwa hapa lakini tafadhali hisika na ambayo inayoeleza kwa uwazi zaidi tatizo lako.

SEHEMU YA 1 - Ukubwa wa maumivu

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Nina maumivu kwa muda huu</td>
<td>1</td>
</tr>
<tr>
<td>Nina maumivu makali sana kwa wakati huu</td>
<td>2</td>
</tr>
<tr>
<td>Nina maumivu ya wastani kwa wakati huu</td>
<td>3</td>
</tr>
<tr>
<td>Maumivu ninayopata ni makali kiasi.</td>
<td>4</td>
</tr>
<tr>
<td>Maumivu yananzuia kusimama kabisa.</td>
<td>5</td>
</tr>
</tbody>
</table>

SEHEMU YA 2 - Kukaa

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Nina weza kukaa kwenye kiti choc;hote nitakacho</td>
<td>1</td>
</tr>
<tr>
<td>Ninaweza kukaa kwenye kiti kile tu kisichoniumiza nikikalia.</td>
<td>2</td>
</tr>
<tr>
<td>Maumivu yananzuia kukaa kwa muda mrefu</td>
<td>3</td>
</tr>
<tr>
<td>Maumivu yananzuia kukaa zaidi ya nusu saaa</td>
<td>4</td>
</tr>
<tr>
<td>Maumivu yananzuia kukaa kabisa.</td>
<td>5</td>
</tr>
</tbody>
</table>
**SEHEMU YA 3 - Kusimama**

| Naweza kusimama muda wakati wowote nitakao bila maumivu | 1 |
| Naweza kusimama muda wowote nitakao ila napata maumivu makali sana | 2 |
| Maumivu yananzuia kusimama zaidi ya saa moja | 3 |
| Maumivu yananzuia kusimama zaidi ya dakika kumi | 4 |
| Maumivu ni makali sana wakati huu | 5 |

**SEHEMU YA 4 - Kutembea**

| Maumivu yananzuia kutembea umbali wowote | 1 |
| Maumivu yananzuia kutembea umbali wa kilomita 2 | 2 |
| Maumivu yananzuia kutembea umbali wa kilomita 1. | 3 |
| Naweza kutembea tu kwa kutumia fimbo ya kutembelea. | 4 |
| Muda mwingi nakuwa kitandani. | 5 |

**SEHEMU YA 5 - Kuinua kitu**

| Naweza kuinua kitu kizito bila kupata maumivu | 1 |
| Naweza kuinua kitu kizito zaidi ila napata maumivu | 2 |
| Maumivu yananzuia kuinua kitu kizito toka sakafuni ila nawa kuinua iwapo vitu hivyo vipo mezani. | 3 |
| Ninaweza kuinua vitu vyenye uzito mdogo tu | 4 |
| Siwezi kuinua au kubeba kitu chochote kizito. | 5 |

**SEHEMU YA 8 - Ajira**

| Sipati mazumivu nikiwa nafanya kazi niliyoajiriwa au shughuli za nyumbani | 1 |
| Napata maumivu kiasi ingawa naweza kufanya majukumu yangu. | 2 |
| Maumivu yananzuia kufanya kazi nyepesi tu. | 3 |
| Maumivu hunizuia kufanya kazi nyepesi tu. | 4 |
| Maumivu hunizuia kufanya majukumu yangu yoyote yale. | 5 |

Shukrani kwa ushirikiano wako.
Appendix 12

A GUIDE FOR FOCUS GROUP DISCUSSION

Dear Participant

Before you decide to participate in the focus group discussion, it is important for you to understand the purpose of this discussion. This discussion will focus on your understanding and application of kinetic handling principles in the prevention of work-related lower back pain. Please note that your insightful response is crucial to my efforts in understanding the level of your knowledge of the kinetic handling principles and how you apply them in your daily activities at work. Any information that can connect the responses to an individual or organisation will remain confidential and your identity will not be disclosed and you may withdraw your consent at any time. You may also choose not to answer particular questions that are asked in the study. If there is anything that you would prefer not to discuss, please feel free to say so.

Question 1(a): What is the best way of sitting at work?

Question 1(b): Can you demonstrate by sitting on the chair in front of you?

Observation checklist:

i. Sitting with slump position (round back) Yes ( ) No ( )

ii. Sitting with back straight Yes ( ) No ( )

iii. Sitting close to the table with 90º hip and knee in 90º, with both feet on the floor

Yes ( ) No ( )

Question 2(a): What is the best way of standing when teaching in a class?

Question 2(b): Can you demonstrate by standing in front of us?

Observation checklist:

i. Sand with one foot ahead (uneven weight distribution) Yes ( ) No ( )

ii. Stand with feet apart (even weight distribution) Yes ( ) No ( )

Question 3(a): What is the best way of picking a chalk on the floor from starting position?
Question 3(b): Can you demonstrate by picking the chalk on the floor?

Observation checklist:

i. Picking chalk on the floor from starting position    Yes (  )    No (  )

ii. Picked by bending knees    Yes (  )    No (  )

Question 4(a): What is the best way of lifting a box of books on the floor?

Question 4(b): Can you demonstrate by lifting the box front of you?

Observation checklist:

i. Bending knees with head up    Yes (  )    No (  )

ii. Keep weight close to the body    Yes (  )    No (  )

iii. Back up with feet apart, one foot a head as he/ she lift up    Yes (  )    No (  )

Question 5: How do you protect your back during your teaching practice?

Question 6: Which barriers do you face in your efforts to prevent yourself from lower back pain?

Thank you for your participation