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# A disability profile of Impala Platinum Mine workers presenting with nonspecific lower back pain

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# A DISABILITY PROFILE OF IMPALA PLATINUM MINE WORKERS PRESENTING WITH NONSPECIFIC LOWER BACK PAIN




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**08 September 2017**

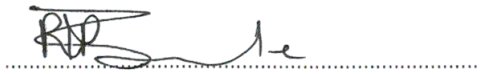
**A research report submitted to the Faculty of Health Sciences, University of Witwatersrand, in partial fulfilment of the requirements for the degree of Masters of Science in Physiotherapy.**

**Supervisor: Dr Lonwabo Godlwana**

**Co-supervisor: Prof Witness Mudzi**

DECLARATION

I, Rorisang Primrose Tsheole declare that this research report is my own work, which is being submitted for the Degree of Masters of Science in Physiotherapy at the University of Witwatersrand. I declare that this research report has not been submitted before for any degree at this or any other institution, and that all the sources I have used or quoted have been declared and acknowledged by means of complete references.



(Signature)

08 SEPTEMBER 2017

Date

**ABSTRACT**

**BACKGROUND:** Lower back pain (LBP) due to ergonomic exposure in a work environment is wide spread in most countries and is the leading cause of disability affecting quality of life and work performance of an individual suffering from it. LBP is the most common reason for repeated medical consultation and subsequent absenteeism. It is reported that LBP is responsible for a third of work related disability disorders and it is estimated to cause 21.7 million disability adjusted life years (DALY's). In addition to the physical impact, lower back pain can influence psychological issues such as anxiety, depression and fear of job loss.

Mining is an ancient occupation characterised by intense physical labour such as lifting, carrying, pulling and pushing heavy materials, operating heavy machinery and working in constricted environment. Despite the fact that ergonomics plays a major role in mining, the element of proper ergonomics is currently ignored or applied in a minimal scale in South African mining.LBP continues to have a high prevalence in mining industries.

**AIM:** To profile the disability level of Impala Mine workers presenting with nonspecific lower back pain.

**METHODS:** A cross-sectional quantitative study using a consecutive sampling method was conducted on mine workers employed at Impala platinum mine as rock drill operators (RDOs) and scraper winch operators (SWOs) aged between 20 and 60 years who had been employed in the current occupation for at least a period of one year. Interviews were conducted using the questionnaires based on Oswestry Disability Index (ODI) assessing disability levels, Who Disability Assessment Schedule II (WHODAS II) for activity limitation and participation restriction and Who Quality of life-Bref (WHOQOL-BREF) to measure quality of life. The study received ethical approval from the University of the Witwatersrand Human Research Ethics Committee: (Medical) (Ethical clearance no.M140813). Consent was sort from participants and Impala hospitals granted permission for the study. Data was analysed using Statistica version12.5. Descriptive data was presented as frequencies expressed in percentages. The Spearman correlation test was applied to establish the association among variables. Further analysis was done by fitting bivariate and multivariate linear regression models to quantify the magnitude of relationship between age, job category, disability, activity limitation, participation restriction and quality of life. Finally data was illustrated by means of tables and a scatter graph.

**RESULTS:** From the study sample, 44% (n=151) of the SWOs reported moderate disability while 36% (n=132) of the RDOs reported moderate disability. Results revealed that disability level was significantly associated with job category (*p-value 0.04)*. Activity limitation level was adversely affected and showed a positive correlation with disability*(r=0.831)*. Only a small proportion of participants reported severe participation restrictions RDOs (0. 76%) and SWOs (1. 99%). Majority of participants reported moderate to good Quality of life (QoL) with only a small proportion reporting poor QoL RDOs (4.55%) and SWOs(3.31%).The findings of the study showed no statistical difference between the two job categories in terms of activity limitation (*p=0.20*), participation restriction (*p=0.31*) and QoL *(p=0.56*). There was a negative correlation between QoL and disability *(r=-0.536)*.The result of the bi-variate linear regression showed a statistical significance between age and years of service with disability *(P=0.001)*.

**DISCUSSIONS**: Disability due to nonspecific lower back pain (NSLBP) was significantly associated with job category, suggesting that SWOs were the category mostly affected than the RDOs. The results revealed no statistical difference between two job categories in relation to activity limitation, participation restrictions and QoL. Furthermore, the results showed a strong positive correlation between disability and activity limitation and a moderate positive correlation between disability and participation restriction while a moderate negative correlation between disability and QoL was noted. The results of the linear regression highlighted that increased age and long years of service predisposes the miners to higher levels of disability and activity limitation, resulting in difficulties with participation in work related or societal activities which subsequently leads to poor QoL.

**CONCLUSION:** Results of the current study revealed that the majority of RDOs and SWOs presented with moderate disability due to NSLBP. This study identified that age, job category and length of service were significantly associated with the severity and functional disability of LBP among RDO's and SWO's.Activity limitation level was adversely affected among RDO's and SWO's whereas participation restriction levels and QoL levels were less affected.

**KEYWORDS:** Nonspecific lower back pain, Disability, Mine workers, South Africa.

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**LIST OF ABBREVIATIONS**

aLBP – Acute lower back pain

cLBP – Chronic lower back pain

LBP – Lower back pain

DALY – Disability adjusted life years

ICF -- International Classification of function, disability and health

NRC – National Research Council

NSLBP – Nonspecific lower back pain

ODI - Oswestry Disability Index

QoL – Quality of life

RDO – Rock Drill Operator

RTW – Return to work

SS – Segmental Stabilization

ST – Stretching

SWO – Scraper Winch Operator

TSK – Tempa- Scale for Kinesiophobia

U-RTW – Unsuccessful Return to work

WBV – Whole body vibrations

WMSD – Work related musculoskeletal disorders

WHO – World Health Organization

WHODAS II - WHO Disability Assessment Schedule II

WHOQOL-BREF – WHO Quality of life- Bref

# CHAPTER ONE

## 1. Background and need

### 1.1 Introduction

Low back pain (LBP) is a common health condition among the working population world- wide (Murtezani et al., 2012). It is a leading cause of work absenteeism, health care consultations, incapacitation and overall poor quality of life among the working population (Helfenstein et al.,2010). According to Hoy et al. (2013), LBP constitute the highest financial burden to the individual, community, organisation and the country. Hoy et al (2013)'s study showed that LBP ranked first in work related musculoskeletal illnesses resulting in disability and sixth in terms of overall health conditions causing disability adjusted life years (DALY's)

Lower back pain (LBP) is defined as muscle soreness, tension or spasm localised inferior to the costal margins and superior to the inferior gluteal folds (Kachanathu et al.,2014). Pain is generally categorised as acute, chronic, mild, moderate or severe. Mild pain is regarded as an irritation and does not affect function; moderate pain may cause marked difficulties in activity performance while severe pain may result in serious handicap or hinder performance of an activity (Gallagher, 2008).

Nonspecific lower back pain (NSLBP) is pain not associated with a recognised pathology, e.g. infection, tumour, osteoporosis, arthritis, fracture and inflammation (Balague et al.,2012). Nonspecific LBP primarily affects workers doing physical labour such as lifting, pulling, pushing, carrying heavy objects, operating heavy machinery and working in constricted environments which requires one to assume poor and awkward postures (Effendi et al., 2011). NSLBP can be classified into the acute and chronic phase pain. Acute pain refers to pain that subsides within three months while chronic pain persist beyond a period three months (Ehrlich. 2003).

Mining is an ancient occupation, long recognised as laborious and liable to injury and diseases (Bandyopadhyay et al., 2012). Historically the mining industry continues to be affected by high prevalence of LBP amongst the workers (Gallagher,2008). Lower back pain is wide spread in many countries and is one of the most frequently reported musculoskeletal disorders (Gallagher,2008). In 2012, it was reported to have a prevalence of 83.4% among blue collar workers and 61.6% among white collar workers at the Kosovo Power plant (Murtezani et al.,2012) and about 64% in Chinese coal miners (Xu et al., 2012).

The high incidence of LBP in most industries is attributed to a number of risk factors as outlined by the National Research Council (NRC) in 2001. The NRC identified six major risk factors which showed

consistency and positive association with the occurrence of back conditions. These constitutes lifting, carrying heavy loads, repeated bending, twisting, poor posture including whole body vibrations (WBV). The latter is also supported by a study on human vibration levels in the South African Mining Industry done by (Van Niekerk et al.,2000) which concluded that WBV has a high influence on the occurrence of LBP in mine workers.

Work related musculoskeletal disorders affect mine workers to a greater degree resulting largely in disabilities being influenced by knee and back pain, osteoarthritis and disc degeneration in comparison to workers in other industries (Bandyopadhyay et al., 2012).

According to Driscoll et al. (2014) lower back pain because of ergonomic exposure at a work environment is accountable for 33% of work related disability, which approximately results in 21.7 million disability-adjusted life years (DALYs). Persistent lower back pain is associated with substantial financial costs to the employer and loss of quality of life to the worker (Punnett et al., 2004). LBP can influence other psychological issues such as depression, fear of job loss and can affect the individual's work performance (Bandyopadhyay et al., 2012). Bio et al. (2007) suggest that chronic disability due to LBP generates most of the growing cost of occupational ailment.

Rock drill operators (RDO's) are a category of employees responsible for extraction of ore in the mining industry. Their duties includes driving and operating tractor- mounted rock drill machine which are (hydraulic, electrical, pneumatic and rotary) to drill explosive charged holes through hard materials in order to facilitate blasting (Chaudhary et al., 2015).

Scraper winch operators (SWO's) are responsible for cleaning the rock from underground stopes and gullies after blasting using machinery operated by levers and gears and where necessary they use shovel to remove the soil Moseme et al. (2003). Both job categories requires carrying of heavy equipment such as emergency oxygen bottles, batteries and other tools suspended at the waist level, and the machinery they operates exposes them to high levels of whole body vibrations and noise pollution. In most instances they have to perform their respective duties in confined spaces resulting in poor posture assumption. High demand of mineral extraction results in high work load done under pressure over long hour shifts. All these factors results in a high incident rate of lower back pain (Schutte, 2005).

Impala platinum mine is one of the largest mining industries in South Africa, employing thousands of mine workers which include RDOs and scraper SWOs. A reviewed record on ergonomics in South Africa mining industry revealed that among work related musculoskeletal disorders (WMSD), lower back pain was the leading disorder resulting in high absenteeism amongst mine workers. It was also

discovered that rock drill operators are the most affected work category, followed by scraper winch operators in different mining sectors in South Africa (Schutte, 2005).

## 1.2 Problem statement

From the researcher's experience working at Impala platinum mine hospital, there is a high number of mine workers employed as either rock drill operators or scraper winch operators who consult health care practitioners for nonspecific lower back pain (NSLBP), which then progress to chronic LBP (cLBP) and eventually may lead to surgical interventions. However, the level of disability has not been investigated. This study therefore hopes to shed light on the level of disability and how it impacts on participation in basic daily activities and quality of life of the affected individuals.

## 1.3 Research question

What is the level of disability amongst mine workers employed at Impala platinum mine working as rock drill operators and scraper winch operators presenting with nonspecific lower back pain?

## 1.4 Aim of the Study

The aim of the study was to profile the level of disability, activity limitation, participation restriction and quality of life (QoL) as a result of nonspecific lower back pain among mine workers employed at Impala platinum mine working as rock drill operators and scraper winch operators.

### 1.4.1 Objectives of the Study

- To determine the level of disability among rock drill operators and scraper winch operators presenting with nonspecific lower back pain at Impala Platinum mine health facilities.
- To establish level of activity limitation among rock drill operators and scraper winch operators with nonspecific lower back pain employed at Impala Platinum mine.
- To establish the level of participation restriction of mine workers working as rock drill operators and scraper winch operators with nonspecific lower back pain employed at Impala Platinum mine.
- To determine the quality of life (QoL) among rock drill operators and scraper winch operators presenting with nonspecific lower back pain at Impala Platinum mine.

- To establish the relationship between participation, activity limitation, disability, QoL and demographic factors amongst rock drill operators and scraper winch operators with nonspecific lower back pain.

### 1.5 Significance of the Study

Mining is an industry known to be characterised by intense physical labour. The rock drill operators (RDOs) and scraper winch operators (SWOs) are mine workers working in stopes and gullies which are constricted in diameter and height. They spend most of their working shift in confined spaces exposing them to accumulative strain in their lower back. The mining industry employs labourers aged between 18 years and 62 years and the majority of the underground mining work force is between the age of 20 years and 60 years. From the researcher's experience working at Impala platinum mine hospital, there is a high number of RDOs and SWOs seeking health care interventions for nonspecific lower back pain (NSLBP), which then progress to chronic LBP (cLBP) and eventually may lead to surgical interventions

By profiling the levels of disability, activity limitation, participation restriction and quality of life of RDOs and SWOs with nonspecific lower back pain, the researcher aims to highlight the impact of nonspecific low back pain amongst RDOs and SWOs and hopefully lead to greater awareness and the need for education to mitigate against its adverse effect within the South African Platinum mining industry.

### 1.6 Overview of research report

The research report is outlined as follows:

- Chapter two : Literature Review
- Chapter three: Methodology
- Chapter four :Results
- Chapter five : Discussion
- Chapter six : Conclusions, limitations and recommendations

## CHAPTER TWO

### 2.1 Introduction

In this chapter relevant literature on disability and factors associated with nonspecific lower back pain are reviewed. Articles published between the years 2003-2016 were accessed from the search engines namely; PubMed (Mesh), Pedro and EBSCO Host. The key words/phrases used to source out articles were as follows; nonspecific lower back pain, lower back pain in mine workers, epidemiology of lower back pain and disability due to lower back pain.

The literature review will provide the definition, aetiology and epidemiology of NSLBP. The effects of NSLBP among miner's psychological aspect (anxiety and depression) are discussed. The functional impact of NSLBP on miners' activity limitation and participation restriction are reviewed, including the disability and quality of life associated with NSLBP. The outcome measures used in the current study, namely: the Oswestry Disability Index, the WHO Disability Assessment Schedule II and the WHO quality of life-BREF are also discussed.

### 2.2 Definition of Nonspecific Lower Back Pain (NSLPB)

Nonspecific lower back pain (NSLBP) refers to pain of variable duration not associated with a recognised pathology, e.g. infection, tumour, osteoporosis, arthritis, fracture and inflammation (Balague et al.,2012). NSLBP can be classified as either acute pain or chronic pain. Acute pain refers to pain that subsides within three months while chronic pain persist beyond a period three months (Ehrlich. 2003). Nonspecific LBP primarily affects workers doing physical labour such as lifting, pulling, pushing, carrying heavy objects, operating heavy machinery and working in constricted environments which requires one to assume poor and awkward postures (Effendi et al., 2011).

Nonspecific lower back pain (NSLBP) is of somatic origin influenced by biomechanical factors whereby signs differ according to the type of physical exertion (Kachanathu et al., 2014). Symptoms includes tenderness, muscle soreness and spasm localised inferior to the costophrenic margin and superior to the inferior gluteal fold and is not associated to a particular condition (Kachanathu et al., 2014). Kent et al. (2012) cited that a precise pathology of pain specific diagnosis cannot be achieved for most lower back pain (LBP) due to diagnostic inaccuracy and common false positive patho-anatomic findings and is therefore referred to as non-specific lower back pain.

## 2.3 Aetiology and Epidemiology of NSLBP

Lower back pain is regarded as complex and encompass individuals' psycho-social and physical factors which influence the onset and recurrence of lower back condition (Janwantanakul et al., 2012) and is viewed as contributing to health care problems in industrialized countries (Louw et al., 2007).

The life time prevalence of LBP among African adults is 62% (Louw et al.,2007). A study conducted in the same year by Bio et al (2007) on Ghanaian underground Gold mine workers found a twelve months prevalence of 67% among their participants. Another study conducted in Russia on mineworkers by Skandfer et al. (2014) found a one year prevalence of 51%. Louw et al.(2007) states that LBP incidents in developing countries, and in particular in Africa, is on the rise and this is concerning.

Skandfer et al. (2014) followed miners employed as drivers exposed to cold working areas and poor ergonomics, indicated biomechanical demands of a job to be the major contributing factors of acquiring occupational LBP. They recruited 3530 workers employed at Kola Peninsula mine. They found that more than half of the workers (51%) suffered from LBP symptoms which were attributed to poor ergonomics, laborious job, whole body vibration (WBV) and poor work stations. Although they had a representative study sample size (n= 96%), their participants were not clinically diagnosed with NSLBP by a medical professional at the time of data collection. Based on the aforementioned information bias could exist because perception of LBP was primarily used meaning that the miners had an opportunity to falsely report experiencing LBP symptoms with a hope of gaining secondary rewards. Findings of the above study support previous results of the study conducted by Bio et al. (2007) who found high incidence of LBP among their participants and majority of them (95%) believed their pain to be work-related. Bio et al (2007) results satisfied their hypothesis that heavy physical work demands accounts for majority of reported cases of LBP (77%) among mine workers.

However, study done by Janwantanakul et al.(2012) pointed out that profession considered as passive like administrative work are also associated with NSLBP. Their findings on different causes linked to the development of NLSBP among office workers implicated sustained position such as standing and sitting, poor work station, poor ergonomics and psychosocial factors such as poor family and employer's support including poor job gratification.

Graup et al. (2014) concur with the concept that sedentary life style can lead to the development LBP. They carried out a research to determine the prevalence and inherent factors attributed to the development of NSLBP among adolescents in Uruguaiana. The adolescents in their study who led a sedentary lifestyle experienced high incidences of LBP as compared to those leading an active lifestyle. Both studies identified increased body weight as being statistically correlated to the onset of LBP

(Graup et al., 2014, Janwantanakul et al., 2012), further more prolonged sitting periods were common among participant in both Graup et al., 2014 and Janwantanakul et al.(2012) studies and it is presumed by both researchers that prolonged sitting causes accumulative overload on the spine. In addition, Graup et al. (2014) found that increased body weight was associated with the least physical activity levels amongst their participants.

Although both Graup et al. (2014) and Janwantanakul et al. (2012) studies had good statistical evidence, both study methods had compelling limitations making it impossible to reach concrete inference. Graup et al. (2014)'s study was conducted in a single school in Uruguaiana whereas Janwantanakul et al. (2012) reviewed only three publications in their systemic review indicating poor or lack of extensive article search.

The aetiology of LBP is intricate and the clinical causes are not clearly known (Cho et al. 2014). According to Effendi et al. (2011) some risk factors are identified which include amongst others high job demand, lifting heavy objects, carrying, pushing and working in confined spaces, however Cho et al. (2014) suggest that weakness and poor trunk motor control play a significant role as a causal factor of LBP. Cho et al. (2014) conducted a prospective study on 60 healthy participants without a history of LBP over a period of two years. The results of their study indicated that isometric trunk extensor and flexor muscle power together with isokinetic trunk extensor and flexor muscle power showed a significant and negative association with the incident of LBP ($p=0.001$; $r=-0.659$). Similar results were found by Koley et al. (2010) which postulates that trunk muscle strength weakness in asymptomatic subjects is significantly associated with LBP.

Hicks et al. (2005) stipulates that the above findings are not surprising; they reasoned that without muscle assistance, the lumbar spine collapses under loads less than 90N whereas a spine with good musculature can withstand loads of up to 18000N. This according to Hicks et al. (2005) explains why trunk muscle attenuation is associated with the onset and severity of NSLBP and this is based on the concept that loss of trunk muscle control leads to muscle fatigue which subsequently leads to LBP.

Balague et al. (2012) identified different concepts associated with the development of NSLBP. Balague et al. (2012) proposed that patho-physiological factors such as pain receptors, nerve regeneration, genetic factors including increased body mass index (BMI) are associated with LBP and reject biophysical factors as being directly linked to the occurrence of LBP as suggested in other studies. Balague et al. (2012) conclude that mechanical factors such as heavy workloads, prolonged sitting, bending and twisting, pushing and pulling, and lifting heavy materials cannot independently result in the development of LBP.

Other potential individual risk factors that are associated with LBP proposed by Carlisle et al. (2014), Bio et al. (2007) and Tella et al. (2013) are age and length of service. Study done by Bio et al.(2007) on underground Gold mine workers in Ghana found LBP to be significantly associated with increasing age ($p=0.05$). Tella et al. (2013) also found a significant relationship between LBP and age ($p<0.05$) and years in service were also significantly associated with LBP ($p<0.05$), Tella et al. (2013) states that long exposure to manual farming predisposed their participants to the onset of LBP according to them this could be attributed to physiological changes associated with aging, overuse syndrome, normal wear and tear or repetitive strains.

According to Driscoll et al. (2014) LBP is considered as an elusive disorder and it accounts for 33% of work related disability and it is estimated that LBP disabilities accounted for almost 21.7 million disability-adjusted life years globally. Deyo et al. (2009) reported that in 2005 the American Social Security Disability Insurance statistics revealed that disability due to LBP among American population had increased by 4.2% within a period of ten years.

It is evident that the aetiology of NSLBP is still unknown, although extensive research have been conducted, only hypotheses on the contributing factors of NSLBP exist thus Young et al. (2011) summarized the aetiology of NSLBP as a complicated and diverse health disorder that should be viewed within the context of the patient, considering personal background of the individual, their coping mechanism and adjustment, participation aspirations and availability of basic social services.

### 2.4 Psychological aspect of NSLBP

#### 2.4.1 Mental functioning

According to the WHO classification of function, Health and disability ICF (WHO 2001) global mental functions directly affects recovery in an individual with a medical condition. According to the WHO (2001) temperament and personality functions such as extraversion, psychic-stability, optimism, energy and drive amongst others directly influence participation restriction and activity limitation levels. When looking at the ICF model, it can be deduced from the interaction of the components that individuals with poor psychic-stability or poor perception regarding the outcome of their condition experience high levels of participation restriction and activity limitation. This is in contrast to individuals with good psychic-stability who might portray a persistent attitude irrespective of the severity of their medical condition.

### 2.4.2 Anxiety in people with NSLBP

Swinkels-Meewisse et al. (2006) discovered that development of disability in patients suffering from aLBP is primarily influenced by fear. However, Astfalck et al. (2010) pointed out that major difference between their participants was mostly biophysical factors rather than kinesiophobia. Their study evaluated bio- psychological aspect in adolescent with NSLBP (pain group) and those without (control group), and found no statistical significance between the two groups in terms of participating in vigorous physical activities ($p>0.3$). They concluded that level the of stressful events experienced by the pain group may have neuro-physiological influence, arguing that life stress event leaves the central nervous system sensitive to mechanical stress and associated motor control changes thus leaving the spine vulnerable to mechanical strain.

Although Astfalck et al. (2010)'s study participants were pooled out of an ongoing longitudinal cohort, their sample size selection of 28 participants was somewhat insufficient. They based their sample size selection argument on a single study done by Dankaerts et al. (2006b) who stated that 28 participants have sufficient power to delineate differences between sitting posture and trunk extensor endurance but did not include other objectives such as psychological factors and physical factors. This together with their cross-sectional study design does not allow inference to a larger population.

Jensen et al.(2012)'s study revealed that unlike males health anxiety was proxy to health care seeking in females presenting with LBP whereas somatisation was predominantly a predictor for health care seeking in males, this suggest that gender play a role in the perception of health anxiety. Although they did not explain the gender differences, literature suggest that this could be attributed to innate differences in somatic and visceral perception and historical differences between males and females. Milani et al. (2004) further elaborate this concept stating that males have lower levels of negative affectivity than females.

Anxiety, depression, catastrophising and kinesiophobia are no longer considered as determinants of primary care seeking in LBP patients according to (Foster et al., 2010). Foster et al. (2010) investigated hindrances due to psychological factors in the recovery of patients with LBP and clarified that self-perceived outcome and pain self-efficacy influenced LBP disability. They evaluated five psychological variables which were (illness perception, fear avoidance, anxiety and depression, coping and self-efficacy) and found illness perception accounting for 56.6% of variation and statistical significant difference with LBP disability ($p=0.001$) anxiety was not statistically associated to LBP disability ($p=0.03$). They found poor association between anxiety, depression and fear avoidance with LBP outcome, and they supported the concept of self-efficacy and self-regulation, elaborating that LBP

prognosis depends on the individual. According to Foster et al. (2010) patients with positive attitude and confidence in the ability to contain and control their LBP have better chance of good health outcome.

Swinkels-Meewisse et al. (2006)'s findings differ from those of Foster et al. (2010) as cited above. Swinkels-Meewisse et al. (2006) acknowledge that anxiety is a disorder that contributes to the outcome of aLBP. Swinkels-Meewisse et al. (2006) evaluated the influence of pain-related-fear and pain catastrophizing on activity performance and disability among participants with aLBP. Their study suggest that perceived disability due to aLBP is predicted by pain-related-fear ($\beta$= *-0.35, p=0.003).* They stated that anxiety plays a significant part in the occurrence of disability and activity avoidance exacerbates the disability.

Nonetheless, Young et al. (2011) concurs with Swinkels-Meewisse et al. (2006) findings which showed a direct correlation between LBP and psychological influence. It should however be noted that the main thrust of Swinkels-Meewisse et al. (2006) study was to determine participants perception on LBP and not necessarily factors that influence LBP, nonetheless the results of their study showed moderate correlation between anxiety and LBP across their three LBP state categorized into (normal, flared-up and attack). Although pain was a central finding in their study Swinkels-Meewisse et al. (2006), they observed that their participants continued suffering in the absence of pain and this was largely attributed to anxiety and phobia regarding possible worsening of their condition. Young et al. (2011) further discovered that living with LBP is not entirely about structural pain but also has psychological effects that can adversely affect the individual living with LBP to an extent that certain aspects of their wellbeing become challenged.

Literature clearly shows that there is conflicting results regarding anxiety in lower back. As reported by Ramond et al. (2011) publications on psychological risk indicators of LBP hardly produced evidence of significant association between psychological factor and LBP. Furthermore, they express that psychological factors should not be considered as co-morbidities of LBP.

### 2.4.3 Depression and NSLBP

"Knowledge about depression as disorder linked to LBP is important" (Melloh et al.,2013). According to Melloh et al. (2013) depression symptoms in most cases preceded the onset of LBP, they further pointed out that the outcome of recovery in newly diagnosed patients with LBP can be negatively influenced by pre-existing depression symptoms. Furthermore they indicated that a tendency such as magnification and rumination interferes with the outcome of recovery among LBP patients. Melloh et al. (2013) studied 151 participants with LBP and found variations between depressed and non- depressed LBP patients in terms of recovery. They established that decreased function, increased pain severity

and job-stressors were prognostic factors of development of depression found in 51 (18%) of their participants.

Depression symptoms and LBP are generally acknowledged by several studies that they reinforce one another (Licciardone et al., 2012; Tetsunaga et al., 2013 and Elfering et al., 2014), and it is recommended that a multidisciplinary approach interventions including psychological counselling for patients suffering from LBP is imperative. Tetsunaga et al. (2013) revealed that most of their participants(77%) with chronic low back pain (cLBP) were clinically depressed and that 39% had major depression, their results depicted existence of a strong positive correlation between depression and LBP *(r=0.485, p<0.01).* Depression and somatisation are attributed to the progression of aNSLBP to cNSLBP and are implicated in disability among patients with LBP (Licciardone et al., 2012).

Elfering et al. (2014) compared inter-relationship between pain and depression using an assessment tool sensitive to cross-lagged relationship and found pain intensity to be a key constituent of severe depression, and that the relationship transforms with time. They suggested that at the beginning, depression is a risk factor for pain severity, whereas over time pain leads to major depression symptoms. Their results indicated that LBP indicators and depression across time are positive and significant *(r=0.21, p<0.1)*.

Although the above studies provided good statistical correlation between depression and LBP, the possibility of bias could not be overlooked. The study by Licciardone et al. (2012) administered the Modified Zung Depression Index (MZDI) prior to participants' randomisation, while Elfering et al. (2014) rewarded their participants with gift vouchers in the form of money for completing the questionnaires. It is however also important to note that both these studies used the MZDI to collect data which allowed distinction between depressed and non-depressed patients, and this could be indicative of the fact that the tool had good internal consistency Cronbach α=0.832 (Campo-Arias et al.,2006).

### 2.5 Functional impact of NSLBP

#### 2.5.1 Overview of International Classification of Function, Disability and Health (ICF) in NSLBP

The International Classification of Function, Disability and Health (ICF) model was initiated by the World Health Organization (WHO 2001) to provide a framework for comprehension of the functioning and disability associated with health disorders (Ocarino et al., 2009). The ICF framework conceptualise function as a dynamic interaction between a person's health condition, environmental factors and personal factors (WHO 2001). According to Stucki et al. (2007) the ICF is a cross-cutting and universal framework which can be used not only in the medical setting but also in other sectors outside health

such as scientific, administrative and social sectors, which deals with optimising function of an individual with a health condition.

Ocarino et al. (2009) utilised the ICF among their patients with LBP to identify the association between activity limitation and participation restriction. Their findings concur with the ICF classification which consists of two concepts: health condition (body function and structure, activity and participation) and contextual factors (environmental factors and personal factors). They drew a conclusion that there is a need for using evaluation tools that recognise and assess functional capacity and performance as an entity in LBP patients within their actual environment since performance can be directly affected by environmental and personal factors.

The ICF has a crucial purpose as a measure expounding and assessing the impact of different settings and personal factors hindering people with disability and activity limitation from participating in work and community. Svestkova (2008) further elaborated that without accessibility of such outcome measures, it is impossible to fully understand and evaluate the disable's situation holistically.

### 2.5.2 Activity limitation in people with NSLBP

Activity limitation is defined in the WHO classification of Function, Disability and Health as any difficulties an individual may have in executing activities (WHO, 2007, p.12). Presumptions exists that pain and activity limitation influence each other, where an individual living with LBP could present with poor activity performance levels. However, Lin et al. (2011) did not find a significant correlation between activity limitation and acute or sub-acute LBP amongst their patients but a moderate association existed between activity limitation and cLBP. According to Lin et al. (2011) this could be attributed to wide variations in levels of physical activities and also taking into cognisance that certain factors other than health issues such as barriers and personal preferences might influence the level of activity limitation.

Hasenbring et al. (2010) and Leeuw et al. (2007) cited by Lin et al. (2011) suggest that patients showed variation in behaviours when exposed to pain, and classified types of attitude as either avoidance behaviour or endurance behaviour. Individuals classified as avoidance behaviour group refrain from participating in activities as an attempt to reduce the possibilities of flare-ups whereas the endurance behaviour group depict a relentless attitude in performing functional activities irrespective of pain and remain physically capable. However as pain persist and increases, patients who portrayed endurance behaviour eventually reduce their physical activity levels.

Lin et al. (2011) states that cLBP patients with increased pain, patients are susceptible to experience activity limitations. However they suggest that aLBP does not affect the level of participating in

activities, yet aLBP does not necessarily imply that the pain experienced by the individual is mild. In contrast, Swinkels-Meewisse et al. (2006) established that during acute phase of LBP, avoidance behaviour primarily influenced by pain related fear and catastrophising is recognised as a useful indicator for perceived activity limitation.

Hendrick et al. (2013) explored the concept that physical activity levels could influence the recovery from an acute episode of LBP, and their findings showed no significant variation in their participants 's activity levels at first consultation and three months at follow-up, hence physical activity levels were not considered factors predicting outcome of recovery. Their findings are in contradiction with assumptions that increased levels of physical activity have a potential role in LBP recovery, highlighting that returning to normal life activities would improve function and hence re-educating an individual's normal patterns of performing task rather than increasing their endurance is of great significance. Hence Lin et al. (2011) concluded that extensive research should be conducted to establish the role that physical activity levels play in the outcome of pain.

### 2.5.3 Participation restriction in people with NSLBP

Participation restriction is defined in WHO classification of Function, Disability and Health as "problems an individual may experience in involvement in life situations" (WHO, 2007, p.12). Lower back pain constitutes a substantial fraction of participation restriction regarding work and social reintegration ($p<0.001$) (Lin et al., 2014). Adding to the above statement is Tella et al. (2013)' study which revealed that majority of their participants (65.9%) suffering from LBP could no longer continue participating in most sport and leisure activities they once enjoyed due to LBP.

A very weak negative linear relationship$(r=-0.083, p<0.01)$ existed between pain and social functioning (Guclu et al., 2012). In their study, they found that more than a third (43.8%) of participants experienced difficulties in occupation related activities due to cLBP, and almost half (49.5%) had hindrances in their social lives. Guclu et al.(2012) 's study states that pain intensity and kinesiophobia has a detrimental effect on physical function and individuals facing difficulties completing daily chores and professional responsibilities are inclined to distance themselves from social participation and leisure activities. This pain related movement avoidance reduces self-efficacy (Salvetti et al., 2012).

Koen et al. (2014) indicated that social functioning significantly predicts pain self-efficacy $(p=0.002)$. Pain self-efficacy refers to the ability to perform the task despite the presence of pain by an individual (Baird et al.,2016). The process explained by Baird et al. (2016) sheds light on the relevance of pain self-efficacy in participation restriction. They stated that pain fear belief gives rise to avoidance behavior which in turn leads to decreased levels of social functioning.

A review done by Wynne-Jones et al. (2014) revealed that 20% of workers with LBP are most likely to take sick leave depending on their occupational setting and risks associated with their work. Individual's expectation of their recuperation after an episode of alp proved to be a vital indicator of participation

and return to work (Hallegraeff et al., 2012). Their study pointed out that patients with poor expectations regarding their prognosis at an initial stage of their LBP were most probable to be away from work for a prolonged period of time after the onset of their pain.

Chimenti et al. (2013) conducted a case controlled study to determine activity characteristics and movement pattern in athletes with LBP comparing them to athletes without LBP who played rotation-related sport (RRS). Their results showed that athletes with LBP had a low sporting sub-score2.64$\pm$0.54 as compared to 3.55 $\pm$ 0.61 for athletes without LBP and a low Work-Leisure score 2.33$\pm$0.30 compared to that for athletes without LBP which was 3.68$\pm$0.55.Their results confirmed existing assumptions that people presenting with LBP have higher participation restrictions compared to those without. Although their study was conducted on people who played RRS it supports the statement that activities performed repeatedly in a given period whether occupational task, activities of daily living or sport activities may exacerbated the effects of LBP which in turn will result in increased participation restrictions. However their results cannot be generalized to different population with LBP due to the nature of their study which was a cross-sectional case-controlled study.

### 2.5.4 Disability in NSLBP

Disability is defined as any restriction or inability to perform an activity within a considered range deemed normal for a human being (Lin et al., 2011). However, the WHO classification of Function, Disability and Health (ICF) (WHO 2007) defines disability as an interaction between a person with a health condition and that person's contextual factors which are environmental factors and personal factors. The ICF conceptual framework further elaborates that disability covers a spectrum of various levels of functioning at body level, personal level and societal level and emphasized that disability is not merely the individual's intrinsic features but a contextual variable which is in relation to the individual's circumstances.

Indirect costs incurred by industries as a result of temporary or permanent work incapacitation due to LBP are prevalent in developing countries (Soer et al., 2012). Salvetti et al. (2012) who conducted a study on 177 adults presenting with cLBP found that LBP was statistically significant (p=0.002) with 80.7% of the participants among their groups categories experiencing moderate to severe disability due to cLBP and that pain-related disability interfere with different areas of their lives and provoked psychological suffering. Wong et al. (2014) found lifetime prevalence of LBP to be estimated at 80% and although there is high incidence of LBP recovery within two to six weeks almost 86% relapses leading to recurrence of aNSLBP which subsequently progresses to cNSLBP.

## 2.6 Quality of life of people with NSLBP

Vahedi, (2010) states that Health-Related quality of life (HRQoL) refers to an individual's believe of their current situation, in respect to their cultural and value system, their goals, expectations, standards and concerns. The HRQoL is scaled in a positive linear direction where a higher score indicates good HRQoL whereas a lower score denotes poor HRQoL (Vahedi, 2010). Chronic LBP is the root source of poor quality of life (QoL) particularly in patients with musculoskeletal and psychological concomitant (Klemenc-Ketis et al., 2011). Klemenc-Ketis et al. (2011) further states that disability and QoL were affected by the level of pain and concluded that the higher levels of cNSLB were independent factor associated with disability and QoL amongst their participants.

A study by Stefane et al. (2013) invited 97 participants living with LBP with the aim of assessing pain perception, disability and QoL. They found the physical quality of life domain to be mostly affected with a score of 44.1 depicting poor QoL. Stefane et al. (2013) discovered poor relationship between pain intensity and disability ($r=0.35$, $p<0.01$) and QoL *($r= -0.29$, $p<0.01$)* which showed that pain severity is poorly related to the degree of disability and QoL. Despite the fact that their study had a poor level of evidence due to the study design and a small sample size, their results highlighted important concepts which were in agreement with the study conducted by Ongunlana et al. (2012). Stefane et al. (2013) concluded that LBP has an impact on the physical health component more than the mental health component, resulting in physical QoL domain being the most affected.

This is further strengthened by Tuzun (2007) who states that physical, mental and social health of an individual are interdependent hence adverse physical health can interfere with mental health. Tuzun (2007) goes further to say disorders such as depression and anxiety can contribute to poor physical health, eventually leading to poor QoL. This statement is in line with the WHO definition of health which state that; health is a state of complete physical, mental and social well-being and not merely the absence of disease (WHO, 2007, p.12).

## 2.7 Return to work in NSLBP

Besen et al. (2015) conducted a study investigating factors influencing successful return to work following the onset of work-related LBP, they used a secondary analysis from a main study done on adults seeking treatment for work-related LBP. They used an AB (B) C model of work disability showing a conceptual model of constructs and pathways, which measured action- reaction concepts and belief systems. The results of their study showed a significant direct association between fear-avoidance

beliefs *(-0.76, p<0.001*) with return to work (RTW) confidence (*0.24, p<0.001*) meaning that the greater the fear-avoidance believe the lesser the likelihood of RTW.

Besen et al. (2015) suggest that once an individual is off work, returning to work requires adequate support from the organisation and colleagues such as duties modification and restriction, empathy and team work. Besen et al. (2015) further pointed out that pain levels does not necessarily result in poor RTW outcome but rather individual with high fear-avoidance believe and catastrophising about pain have a poor RTW expectation. They also indicated that most individuals acknowledge the significance of RTW, but they are at the same time apprehensive about the implications thereof.

Also implicated in poor RTW outcome is the treatment intervention offered and time lapse between onset of LBP and RTW. Vora et al. (2012) discovered through their study that LBP patients who received basic hospital treatment had better RTW outcomes as compared to patients receiving comprehensive treatment at a pain and spinal clinics (PTC/SC). They further indicated that there is a significant statistical association between pain intensity level and RTW ($p<0.0001$) showing that the higher the level of pain the lesser the RTW outcome. Furthermore they established a positive relationship between time since injury (TSI), pain and RTW which is supported by Lavin et al. (2013) who observed that the shorter the interval between first intervention and the onset of LBP the lesser the period of absence from work.

In contrast to Vora et al. (2012) is the study by Van Staden et al. (2011) who found that patients who underwent spinal operation and received a broad-based therapeutic intervention including vocational rehabilitation programmes that constitute individually designed work hardening and simulation programmes had a positive RTW rate. Majority of their patients (73%) as compared to only 55% in the single intervention group (physiotherapy only) returned to work.

Jensen et al. (2013) followed 325 sick listed LBP patients for a period of twelve months using a prediction model for U-RTW and found that it succeeded in identifying patients with high and intermediate risk of U-RTW. Their study showed that both clinical (pain and restricted flexion) and psychological (low expectation of recovery and blaming work for pain) contributed to the risk of U-RTW. Although the purpose of their research was to determine the risk factors associated with U-RTW. Their study focused mostly on developing a prediction model tool to evaluate LBP patients with high risk of U-RTW and they concluded that the discrepancy between patients with minimal pain levels and good mobility who have a high risk of U-RTW and patients with severe pain levels and poor mobility have low risk of U-RTW could be explained by a prediction model for unsuccessful (U-RTW).

According to Carlisle et al. (2014) presenteeism is another problematic factor alongside absenteeism among Australian coal miners whereby they develop a habitual behaviour to continue to attend work in order to avoid absenteeism. In their study most of the participants reported attending work even in the presence of pain. This suggests a high prevalence of presenteeism among workers which is considered to be costly to the industry because of low or poor production levels. According to Carlisle et al. (2014), workers opt for presenteeism in order to curb the adverse effects of economic and social hardship experienced with lost work days, thus reducing remuneration losses.

### 2.8 Impact of occupation on NSLBP

Skandfer et al. (2014) and Bio et al. (2007) identified biomechanical demands of a job as major risk factors associated with NSLBP. Similar causes are reported by Yilmaz et al. (2012) who suggest that psychosocial factors such as work task demand and work place environment have shown to play a significant part in development of NSLBP. The current study investigated the impact of NSLBP among rock drill operators and scraper winch operators.

These occupational categories are directly related to the production and removal of ore and rocks and are therefore exposed to hard physical work in unpleasant working environment such as excessive noise, inadequate ventilation and limited visibility with obstruction of visual field (Chaudhary et al., 2015, Steward P. 2013 and Moseme et al., 2003). Rock drill operators are a responsible for extraction of ore in the mining industry. Their operation includes driving and operating tractor- mounted rock drill machine which are (hydraulic, electrical, pneumatic and rotary) to drill explosive charged holes through hard materials in order to facilitate blasting Chaudhary et al. (2015).

Scraper winch operators are responsible for cleaning the rock from underground stopes and gullies after blasting using machinery operated by levers and gears and where necessary uses shovel to remove the soil Moseme et al. (2003). Both job categories requires them to carry heavy equipment such as emergency oxygen bottles, batteries and other tools suspended at their waist level, and the machinery they operates exposes them to high levels of whole body vibrations and noise pollution ( Steward. 2013 and Moseme et al.,2003).

In most instances they have to perform their respective duties in stopes and gullies which are confined spaces resulting in poor posture assumption. High work load and production pressure leads to fatigue and stress symptoms (Yilmaz et al., 2012). All these factors results in a high incident rate of lower back pain (Schutte, 2005).

According to Ovayolu et al. (2014) workers in the same occupational class might present with different degrees of disability due to LBP. They observed differences in disability among their participants exposed to poor ergonomics as compared to the less exposed participants. They found nurses working in the internal medicine and paediatric intensive care units (ICU) to be mostly affected than the orthopaedic and adult ICU nurses. They attributed the contrast to intervention requiring bending forward, prolonged standing, pulling and pushing heavy trolley and lifting patients, which was mostly prevalent in the paediatric ICU and internal medicine units. Supporting these findings, is a study by Savikaya et al. (2007) who found that there was a statistical difference between underground miners with LBP 78% as compared to only 32.4% miners working in surface plants among Turkish coal miners.

The type of work demands of RDOs and SWOs influence the persistence and recurrence of their back pain, although research shows that most acute LBP improves over a short period of time other patients proceed to chronic and or recurrent LBP (Tella et al.,2013; Kim et al., 2014 and Besen et al., 2015). This in turn has a poor prognosis resulting in work related disability according to Driscoll et al. (2014) who states that LBP due to occupational exposure accounts for a third of work related disabilities.

### 2.9 Research tools

A regular use of outcome measures evaluating pain and disability in the management of LBP is required in order to combine pertinent information and evaluate treatment efficacy (Vincent et al., 2014), they further explained that to facilitate patient self-assessment of disability, a reliable, valid and responsive outcome measure invaluable.

This section discusses the three research tools used in the current study. These are namely the Oswestry Disability Index (ODI), the WHO Disability assessment schedule II (WHODAS II) and WHO Quality of Life Bref (WHOQoL-BREF)

#### 2.9.1 The Oswestry Disability Index (ODI)

The ODI is a condition-specific health questionnaire developed by Fairbank and was first published in 1980 (Vigatto et al., 2007). Lauridsen et al. (2006) vouch that disease-specific outcome measures are more responsive to target the condition than generic outcome measures. The ODI has been translated into several languages and has been validated in LBP patients and is considered reliable (test-re-test intraclass correlation coefficient [ICC] = *0.99* and Cronbach *α=0.87)* (Vigatto et al., 2007). The Oswestry questionnaire describes a patient's perceived disability based on 10 domains, using a scale of 0%-100% with lowest score indicating mild disability. The tool could either be administered by means of interviews or self-administered (Hoffman et al., 2010).

Ferrari (2007) recruited 30 participants presenting with LBP and lower limb pain treated with a standardised orthotics made with foot-max premium with the aim to evaluated the responsiveness of both Short-form 36 (SF-36) and ODI. Their study showed that the ODI had the greatest responsiveness largely because its emphasis is on the pain problem Ferrari (2007).They found ODI appropriate for research studies evaluating the appropriateness of customised foot orthotics in the management of LBP and lower limb pain, and further indicated that the tool is user friendly.

Several studies that translated the ODI indicated that the tool have excellent internal consistency with Cronbach alpha that is greater than 0.8 (Vigatto et al., 2007; Vincent et al., 2014 and Sinha et al., 2014). For cross- cultural adaptation Vincent et al. (2014) and Sinha et al. (2014) made amendments in sections four, changing measurement unit used for distance from miles to kilometres. Vincent et al., 2014 further changed section five, domain two and converted a phrase 'favourite chair' into comfortable chair. According to Vincent et al. (2014), the high internal consistency value of the ODI-T (0.92) was consistent with the English and other translated versions.

Dawson et al. (2010) evaluated the use of the ODI for back pain related disability in nurses. They recruited 373 nursing students. Their discussion pointed out that ODI was a reliable instrument that differentiated back pain (BP) severity levels but further illustrate some of its measurement properties were inappropriate. Their results showed an ODI cluster score at low range scale of 13% which reflected a borderline floor effect of ≥15%. The low score of the ODI obtained was, according to Dawson et al. (2010) attributed to the fact that the participants were from a non-patient based population and concluded that ODI is not responsive on non-patient based population.

Although there is a high trend of use of outcome measures in clinical settings there are still inconsistencies in the scoring process of the ODI (Mehra et al., 2008). Mehra et al. (2008) reviewed 100 ODI forms used in a clinical setting and found that a third of the forms were incorrectly scored. According to Mehra et al. (2008) the inconsistency resulted because domains that were not completed or marked as not applicable by the patients were still included in the collective score, and this was in contradiction to what Fairbank et al. (2000) recommended that "for every section/ domain unanswered the denominator should be decreased by five". Mehra et al. (2008) concluded that following detailed in-service training regarding proper ODI scoring and adaptation of the ODI scoring chart could reduce the margins of error profoundly. According to reviewed studies it takes five minutes to complete the ODI questionnaire (Vigatto et al., 2007; Vincent et al., 2014 and Sinha et al., 2014).

Table 2.1 below shows the summary characteristics of the Oswestry disability Index (ODI)

**Table 2.1 Summary of characteristics of the Oswestry Disability Index (ODI)**

| | |
|---|---|
| Content | Pain intensity, personal care, lifting,<br>walking, sitting, standing, sleeping, sex life, social life, travelling |
| Number of Items | 10 |
| Time to complete | 4-5 min |
| Method of scaling | 1=minimal disability<br>2=moderate disability<br>3=severe disability<br>4=crippled<br>5=bed bound |
| Method of scoring | Single check box for each item. Scored on a vertical scale of 0-5. Total score divided by 50 and multiplied by 100 =disability percentage, with 0 indicating minimal disability and 100 indicating being bed bound. |
| Translated versions | 4 English versions<br>38 Other languages |

### 2.9.2 The WHO Disability Assessment Schedule II (WHODAS II)

Information about disability is a pivotal aspect of an individual's health status, because it reveals how an individual can perform in general activities of life (Ustun et al., 2010). Disability evaluation in clinical settings is used to determine patient outcome and in addition identify possible poor outcomes (de Pedro-Cuesta et al., 2013).

The WHODAS II is an instrument developed by the World Health Organisation in order to assess behavioural limitation and restriction to participation perceived by an individual in a month prior to its application (Federici et al., 2009; Baron et al., 2008). The WHODASII is a generic instrument not targeting a specific health disorder or population (Kutlay et al., 2011). The instrument has three versions differing in length (there is a 36 items version, 12 items version and a 12 &24 items version) and the tool can either be self-administered or be administered by means of an interview (Kutlay et al., 2011).

The WHODAS II assesses perceived restrictions associated with the health condition. It is classified into six domains: cognition, mobility, self-care, interpersonal relationship, activity of daily living and participation (Federici et al., 2010). This instrument enables an individual's perception of their own disability to be evaluated.

According to Ustun et al. (2010) rigorous tests performed during the construction WHODAS II and extensive processes involving accurate reviews and field testing proved that the instrument can be administered across cultures, gender and age groups as well as for different types of illnesses and health disorders, this is supported by Garin et al. (2010) who administered the tool in 1.119 patients with a vast range of both physical and mental disorders including LBP with the aim of evaluating its responsiveness and reliability. Garin et al. (2010) found WHODAS II to be a reliable tool to evaluate daily activities and social participation restrictions amongst patients with LBP. The instrument covers main life activities accurately and the 36 item version can be administered in less than 15 minutes by means of an interview Garin et al. (2010).

Several studies have translated the original English version of WHODASII into different languages and its responsiveness extensively evaluated (Silva et al., 2013; Lee et al., 2011). Silva et al. (2013) indicated that their European Portuguese version's result of psychometric properties proved to have good internal consistency *(ICC=0.95)* and was easy to administer in the form of an interview. They indicated that the result of the showed that the instrument had good statistical significance *(r=0.04, p<0.01*) and ODI Portuguese's standard was equivalent to the original English.

Table 2.2 below shows the summary characteristics of the WHODAS II.

**Table 2.2 Summary of characteristics of WHODAS II**

| | Participation restriction | Activity limitation |
|---|---|---|
| Contents | Comprehension and communication, getting along with people and participation in society Domain 1,4,6 | Getting around, self- care life activities(self- care) life activities ( work) Domain 2,3,5 |
| Number of items | 19 | 17 |
| Time to complete | 5-10min (self admin-Interview) | 5-10min |
| Method of scaling | Numeric score allocated per each check box.<br>1= none<br>2=mild<br>3=moderate<br>4=severe<br>5=extreme | Numeric score allocated per each check box<br>1= none<br>2=mild<br>3=moderate<br>4=severe<br>5=extreme |
| Method of scoring | The score assigned to each item are summed and total score of 3 domains added and summary score is converted into a metric ranging from 0-100.<br>With 0 indicating no participation restriction and 100 indicating extreme participation restriction | The score assigned to each item are summed and total score of 3 domains added and summary score is converted into a metric ranging from 0-100.<br>With 0 indicating no activity limitation and 100 indicating extreme activity limitation |
| Translated versions | 27 Languages | |

### 2.9.3 The WHO Quality-of-life scale (WHOQoL-BREF)

Quality of life instruments are considered essential in the assessment of health disorders (Aydin et al, 2005). The World Health Organisation developed a quality of life instrument, the WHOQoL 100, with the aim of developing an internationally cross-cultural comparable quality of life instrument. A short version, the WHOQoL-BREF was initiated for use in setting where time is restricted and where facet-level detail is unnecessary (Skevington et al, 2004).This instrument measure four broad domains of QoL which are physical health, psychological health, social relationship and environment. The instrument is scaled in a positive linear direction with a score of zero representing poor QoL and QoL is deemed good when a score of 100 is obtained. The tool can be computed or calculated manually. Each facet within the tool has four items with numeric score of one to five. The raw score of each facet has a minimum value of four and a maximum value of twenty. The raw score is then transformed into a scale of 0-100 (Vahedi et al., 2010), using the following formula:

Scale= [actual raw score- lowest raw score/possible raw score]

Whereby the possible raw score is the difference between the maximum facet value and the minimum facet value which is always sixteen.

The WHOQoL-BREF instrument is widely used in both clinical trials and settings; it has been translated into several languages and is used extensively in different countries (Vahedi 2010; Rocha et al., 2009; Reychler et al., 2013). Vahedi (2010)'s analysis of WHOQoL-BREF provided significant information on reliability of the tool across the range of latent-trait scores. Their analysis further indicated that WHOQoL-BREF could still be improved, even though it showed substantial psychometric properties it failed to produce good discrimination parameters of items in all four domains.

A study done by Pieber et al.(2012) on determinants of satisfaction with individual health in patients with cLBP found the WHOQoL-BREF to be a comprehensive tool to assess individuals' perception regarding health satisfaction in the context of their culture, value system, personal goals, standards and concerns. Furthermore, they attributed the strength of their study to the use of the WHOQoL-BREF mentioning that, items of the Comprehensive ICF Core Set for LBP are covered by the WHOQoL-BREF making it a good tool to assess QoL in many dimensions.

In their study to validate the Spanish version of the WHOQoL-BREF for use in the Chilean elderly people, Osorio et al. (2011) confirmed that the WHOQoL-BREF is a valid generic QoL tool which can be utilised to evaluate the QoL of the elderly people in Chile. Their results indicated that the WHOQoL-BREF tool had internal consistency with a Cronbach $\alpha$-score of 0.88 for the entire scale. They found that all four domains covered by the tool met the Rasch requirements. Osorio et al. (2011)'s findings are supported by Reychler et al. (2013) who did a similar study to validate the French version of WHOQoL-BREF for use in HIV related disorders. Reychler et al. (2013) reported that the tool showed good internal consistency for all facets in the scale with Cronbach α-score ranging from 0.937to 0.944.They concluded that the tool was valid and reliable to be used among patients living with HIV related disorders.

Table 2.3 below shows a summary of the characteristics of the WHOQoL – BREF.

**Table 2.3 Summary of characteristics of the WHOQoL - BREF**

| | |
|---|---|
| Content | Physical health, psychological health, social relationship and environmental factors |
| Number of items | 26 |
| Time to complete | 5-10min (self admin-Interview) |
| Method of scaling | Domain scores are scaled in a positive direction (higher score represent higher quality of life) |
| Method of scoring | Item 1 & 2 are examined separately and do not form part of overall score, mean score of item within each domain is used to calculate the domain score. The score is transformed by taking actual raw score and subtracting the lowest possible score which is then divided by the possible raw score range. Finally, the score is transformed into a percentage |
| Translated versions | 40 languages |

## 2.10 Chapter summary

The prevalence of NSLBP remains exceptionally high in industrialised communities and continues to inflict high economic burden on the society and the industry. The literature review showed that NSLBP is not an illness but accumulation of symptoms whose source remains vague, fortunately contributing factors such as biomechanical demands of the job and certain pathogenesis have been identified.

The review showed psychological factors such as depression and NSLBP are interrelated. There is evidence showing the influence between the two is in a linear form, when depression level rises LBP severity increases and adversely affects the QoL. There is however a weak correlation between anxiety and LBP and some literature suggest that health anxiety is influenced by gender indicating that females are most likely to seek health care services for their LBP primarily because of anxiety unlike males.

Literature has shown that LBP at a minimal scale does not necessarily affect physical activity. However, as pain severity intensifies the functional abilities of an individual declines. There is a strong association between participation restrictions and NSLBP. Reviewed studies have shown that RTW and pain severity are interdependent. The research tools used in the current study were discussed and found applicable for use in this study. The ODI is a condition specific questionnaire widely used in the assessment of disability due to LBP. The WHODAS II is a generic health questionnaire evaluating activity limitation and participation restriction experienced by an individual. The WHOQoL–BREF is a generic health questionnaire measuring individual's perceived QoL.

# CHAPTER 3

# METHODOLOGY

## 3.1 Introduction

This chapter outlines the methodology that was used in this study. The study design, ethical considerations, sampling and sample size calculations are also explained. The data collection instrument, translation process of the instrument, the procedure followed in data collection and data analyses are described.

## 3.2 Study design

This study utilised a cross-sectional quantitative design.

## 3.3 Study period

A pilot study was conducted from December 2014 to March 2015. Data collection for the main study was done from April 2015 to November 2015.

## 3.4 Study Participants

### 3.4.1 Source of Participants

Participants were sourced from Impala platinum mine hospital and four Impala primary health clinics situated in Rustenburg in the Northwest Province. Impala Platinum mine is the second largest Platinum mine in South Africa.

### 3.4.2 Sampling

#### 3.4.2.1 Sample selection

Consecutive sampling method was used. This comprised of all Impala platinum mine workers employed as rock drill operators (RDO) and scraper winch operators (SWO) who sought physiotherapy treatment presenting with nonspecific lower back pain at Impala platinum hospital and four Impala primary health care clinics in Rustenburg situated in the Northwest Province.

### 3.4.2.2 Sample size

The sample size calculation was based on the study design and the study aims. According to Pourhoseingholi et al.(2013), for cross-sectional studies whose aim is to estimate a proportion of unknown parameter from a targeted population, a formula $n=Z^2 P(1-P)/ d^2$ is used, this is supported by (Nainget al., 2006) who confirms that this formula yields an adequate sample size with good precision.

A total of 10 967 RDOs and SWOs are employed at Impala platinum mine, of these, it was calculated that a total of 371 participants were required for this study using Macorr sample size calculation with 95% confidence interval and a significance level of 5% (http://www.macorr.com//ss_calculator.htm) : (See Appendix B).

#### a) Inclusion criteria

Participants were included in the study, if they met the following criteria:

- Employed as rock drill and scraper winch operators at Impala platinum mine.
- Presenting with nonspecific lower back pain.
- Should have been employed for at least one year in current occupation.
- Should be of male gender.
- Should be aged between 20 years and 60 years.

#### b) Exclusion criteria

Participants were excluded from the study if they were

- Employed at Impala platinum mine in other categories of mine workers other than rock drill and scraper winch operators.
- Diagnosed with lower back pain from a known cause.

### 3.5 Outcome Measures

The Oswestry disability Index (ODI), WHODAS II and WHOQoL - BREF (appendix F, G, H) were used in this study. The questionnaires were translated into three languages predominantly spoken at the mine which are: Setswana, IsiXhosa and XiShangaan.

In addition to the three standardised questionnaires it was necessary to include a brief demographic questionnaire (Appendix E), which included most important personal data namely age, job category and years in service as differences in sample characteristics may account for different results.

The translation of the questionnaire was not done in accordance with published guidelines (Hunt et al., 2004), since the aim of the study was not to validate and test the reliability of translated questionnaires, but rather considered during translation were semantic and conceptual equivalence across the languages and cultures as recommended by the study done by (Behling et al., 2000). A more detailed description of the tools can be found in the literature review (Chapter 2) and translation of the questionnaire is explained under translation of questionnaires (Section 3.10).

### 3.5.1 Demographic Questionnaire (APPENDIX E)

A brief demographic questionnaire was developed covering the most important information relating to age, years of service and job category which is not covered by the disability assessment tools. The literature reveals that there was still controversy on the causal factors associated with the onset of NSLBP (Young et al.,2011) and age, length of service and job category were found to be possible independent factors predisposing individuals to NSLBP (Bio et al 2007; Tella et al 2013)

### 3.5.2 The Oswestry Disability Index (Appendix F)

The motivation for its use in this study was based on the fact that literature supports the use of condition specific questionnaires to determine the level of disability (Lauridsen et al., 2006) and also because the ODI has been widely used in research and clinical setting. Several studies have added to the homogeneity and reproducibility of the ODI. Sinha et al. (2014) found internal consistency reliability to be 0.947 when using the Cronbach α coefficient.

### 3.5.3 The WHODAS II (Appendix G)

The WHODAS II was used primarily because it has been extensively recommended as a reliable tool used in the assessment of activity limitation and participation restriction experienced by an individual independently from medical diagnosis (Federici et al., 2009). Numerous studies from literature reviewed by Federici et al (2009) provided evidence that the WHODAS II correlates significantly with other measures of disability. Ustun et al., (2010) found that the scale highly correlates with LHS (r= 0.75) WHOQoL BREF (r=0.68) and the FIM (r=0.68). According to Ustun et al., (2010) the results obtained showed that the WHODAS II is a reliable and valid tool for measuring activity limitation and participation restriction.

### 3.5.4 The WHOQoL-BREF (Appendix H)

The WHOQoL-BREF is one of the most extensively used instruments that has been translated into more than 40 languages and adopted in several countries (Vahedi 2010, Rocha et al., 2009). The wide

use of the WHOQoL- BREF and its validation and reliability properties in assessing quality of life in relation to individuals' value system, goals, expectations and standards were the motivational factors for its inclusion in this study. Rocha et al. (2009) found that all items of WHOQoL - BREF fitted the Rasch model (*P= 0.57)* and the p-value (Independent t-test) ranged between 0.02 and 0.04 indicating the validity of the scale as a generic subjective QoL outcome measure.

### 3.6 Variables

#### 3.6.1 Independent variables

The independent variables in this study were:

- Age
- Length of service
- Occupation

#### 3.6.2 Dependent variables

The dependent variables were:

- Activity limitation
- Participation restriction
- Level of disability
- Quality of life

### 3.7 Procedure of the Pilot Study

#### 3.7.1 Introduction

The pilot study for this study followed the study design of the main study as outlined in Chapter 3:3.2. The pilot study was done on 37 participants which was 10% of the participants for the main study. These participants presented with nonspecific lower back pain (NSLBP).

The interview method was chosen as the mode of administering the questionnaires. The aim of the pilot study was to:

- To establish the time required to conduct the interview and complete the questionnaire booklet.
- To establish the feasibility of the study. The practical arrangement such as administration of the questionnaire, the easiness to complete, participants' understanding of questions during the interview as well as applicability of the questionnaire to address the objectives of the main study.

- To establish any unforeseen circumstances that may negatively influence the success of the main study.

The pilot study was conducted from December 2014 – February 2015 after ethical clearance was granted for the study.

### 3.7.2 Methodology of the Pilot Study

Based on the sampling method (consecutive sampling) used, the data collection of the current study did not require the assistance of a research assistant. The interview administered method was chosen as a preferred mode of administration to evade issues pertaining to literacy level among RDO's and SWO's. According to Alshenqeeti (2014) structured interview administration method based on a questionnaire guarantee that data required for the survey will be obtained and possibilities of missing data due to incomplete answers is unlikely. The researcher used the same questionnaire booklet used in the main study, based on the ODI, WHODAS II and WHOQoL BREF, which were translated into three languages predominantly spoken at Impala platinum mine which are Setswana, IsiXhosa and XiShangaan. (See 3.8). The researcher was proficient enough to enable data collection in the three languages into which the questionnaires were translated. These allowed participants the opportunity to have four questionnaire booklets to choose from according to the language of their preference. Patients referred for physiotherapy treatment diagnosed with lower back pain (confirmed through reporting of no abnormalities on X-rays) were informed about the study and asked about their willingness to participate in the study. A signed consent form was sought from participants who agreed to participate in the study and they were requested to sit in an interview.

The interview was conducted in the Physiotherapy department behind closed treatment cubicles to maintain privacy and confidentiality. The researcher read and explained the instructions for each questionnaire before commencing with the interview and verified that the participant understood. The researcher read (not explain) each question statement and the available answer options. The participants were asked to choose only one answer item which mostly described their problem.

### 3.7.3 Results of the Pilot Study

Data was analysed using Statistica version 12.5, non-parametric descriptive data was analysed and presented as frequencies expressed in percentages. Data was illustrated by means of tables.

The pilot study achieved the desired results. There were no unclear or ambiguous items identified in the research booklet both original English version and the three translated versions. No wording was

changed in all the translated version of the tools. The time required to conduct the interview was established to between 25-30 min.

Participants responded to all questions within the questionnaire booklet during the pilot study. The interview administered method chosen for this study proved beneficial because it afforded the researcher the opportunity to observe the participants' nonverbal cues and attitude towards certain questions regarded as impermissible according to culture and religious believes, such as issues pertaining to sexual activities. From the researcher's observation the participants did not portray any inhibition or discomfort when answering questions within the questionnaire booklet. The participants were conversant with the terminology used in the questionnaires and they did not have difficulties answering any of the questions. There were no changes made after the pilot study.

### 3.8 Translation process of outcome measures

The translation of the questionnaires did not follow strict guidelines of translation and cross cultural adaptation which states that five steps of translation should be adhered to which are forward translation, synthesis, backward translation, the expert committee review and finally pilot testing (Hunt et al., 2004). Instead, interpretation was based on factors such as semantic and conceptual equivalence (Behling et al., 2000). Although the purpose of this current study was not to validate the translated version of the original English questionnaire into the three vernacular languages, the process followed purely served the purpose of allowing the participants to be interviewed with a questionnaire in their preferred language. To ensure content validity of the translated questionnaire, direct backward translation criteria was followed to make certain that the content and construct of the questionnaire would not lose its intended meaning.

The ODI, WHODAS II and WHOQoL -BREF were translated into Setswana, IsiXhosa and XiShangaan respectively (See Appendix I, J&K). Independent people who speak these respective languages, and who have a medical background (a Physiotherapist and two professional nurses), conducted the translation. Back translation was done by similar other independent people who speak these languages and also have a medical background (a speech therapist, a Medical Officer and an auxiliary nurse).The language they translate the English version to had to be their home language and they were required to have a good command of the English language.

Lastly, the translated questionnaires and the back-translated questionnaires were perused by the researcher to identify any discrepancy between the original English version and the back translated versions. The back translated versions of the three vernacular versions assured similarity and accuracy in terms of appropriateness of terminology.

### 3.9 Procedure of the Main Study

The data was collected over a period of nine months, from March to November 2015. Participants who consented to participate in the study were asked to sit in an interview conducted by the researcher. The questionnaire booklet used in the interview contained a demographic questionnaire, the Oswestry disability questionnaire, the WHODAS II and the WHOQoL-BREF.

The interview took approximately 25-30 minutes to complete. The participants had a choice of getting the questionnaires in Setswana, IsiXhosa, XiShangaan or English. The researcher was proficient enough to enable data collection in the three languages into which the questionnaires were translated. The interviews were conducted in treatment cubicles which allowed privacy and comfort. To ensure anonymity consent forms were kept separately from the questionnaire booklet to maintain confidentiality. The questionnaire booklets were coded and a master list corresponding to the booklet code was kept separately by the researcher in a private file. Once data collection was completed the master list with real names was destroyed.

Patients referred for physiotherapy treatment diagnosed with lower back pain (X-ray investigation report stating no abnormalities noted) were informed about the study and asked about their willingness to participate in the study. The questionnaires were interviewer administered. The participants chose a questionnaire booklet in the language of their preference. The researcher read and explained the instructions for each questionnaire before commencing with the interview and verified that the participant understood. The researcher read (not explain) each question statement and the available answer options. The participants were asked to choose only one answer item which mostly described their problem.

To ensure validity of the responses provided by the participants, the participants were assured that all their responses were completely confidential and the researcher further explained to them that there were no direct or secondary benefits.

### 3.10 Ethical considerations

Ethical clearance was obtained from the Human Research Ethics Committee of the University of the Witwatersrand, Clearance certificate No. M140813 (Appendix A). In addition, participants were invited to participate in the study and were free to decline without being disadvantaged in anyway.

An information sheet (Appendix C) of the study, and consent form (Appendix D) were provided. Consent was sort from participants who agreed to take part in the study before commencing with the interview.

### 3.11 Data management and analysis for the main study

Data collected was entered and stored into Microsoft Excel and then exported to Statistica version 12.5 for analysis. Descriptive ordinal analysis was done for objective one, two, three and four respectively to reduce the categorical data to frequencies expressed in percentages. Medians and interquartile ranges (IQR) were determined, starting with demographic characteristics of study participants.

The Spearman correlation test was applied to establish the association among variables of interest. Further analysis was done by fitting bivariate and multivariate linear regression models to quantify the magnitude of relationship between age, job category, disability, activity limitation, participation restriction and quality of life. Finally data was illustrated by means of tables and scatter graphs.

Table 3.1 below illustrates data management **Table 3.1 Illustration of data management**

| Objective | Instrument | Type of data | Statistics |
|---|---|---|---|
| 1.To determine the level of disability in mine workers employed at Impala Platinum mine presenting with nonspecific LBP | Oswestry Disability Index | Categorical | Descriptive: Expressed as frequency and percentage |
| 2.To establish level of activity limitation in mine workers with nonspecific LBP employed at Impala Platinum mine | WHODAS II | Categorical | Descriptive: Expressed as frequency and percentage |
| 3.To establish the level of participation of mine workers with nonspecific LBP employed at Impala Platinum mine | WHODAS II | categorical | Descriptive Expressed as frequency and percentage |
| 4.To establish the QOL of mine workers employed at Impala Platinum mine presenting with nonspecific LBP | WHOQol -Bref | Categorical | Descriptive Expressed as frequency and percentage |
| 5.To establish the relationship between participation, activity limitation, disability and QOL amongst mine workers with nonspecific LBP | Variable and predictors | Non-parametric ordinal data | The Spearman correlation test was applied to establish the association among variables of interest. Further analysis was done by fitting bivariate and multivariate linear regression models |

# CHAPTER FOUR

# RESULTS

## 4.1 Introduction

This chapter presents the results of the study. The tables are used to present the demographic characteristics, disability level, participation restriction, activity limitation and quality of life study outcomes for this cohort.

## 4.2 Demographic Details of Participants with NSLBP

This study sought to describe the disability profile of Impala mine workers presenting with non-specific lower back pain employed as rock drill operators and scraper winch operators, whose objectives were to determine the level of disability, establish the level of activity limitation and participation restriction, and to establish their level of QoL.

Impala platinum mine is the second largest mining company in South Africa with employees from all over South Africa and neighbouring states such as Botswana, Lesotho and Zimbabwe to name the few, with about 10 967 (N=10 967) RDO and SWO employed during the year 2014.

In this study, data collection commenced in March 2015 to November 2015, and had to be stopped due to lack of patients within the study period. The final sample consisted of (n=283) workers who visited the primary health care centres of Impala platinum mine and the outpatient department of Impala mine hospital, employed as either RDO or SWO presenting with nonspecific lower back pain.

Table 4.1 below presents the demographic characteristics of the study participants in terms of age, years of service and their job categories.

**Table 4.1: Demographic characteristics of the study participants (n= 283)**

| **Variable** | **Frequency (%)/ Median(IQR)** | | |
|---|---|---|---|
| **Age (median, IQR)** | 46 (35 - 53) | | |
| **Years of Service (median, IQR)** | 12 (5 - 17) | | |
| **Job Category (median, IQR)** | n (%) | | |
| Rock Drill Operator | 132 (46.64) | | |
| Scrap Winch Operator | 151 (53.36) | | |
| **Variable** | **Job Category** | | **p-value** |
| | **Rock Drill Operators(n=132)** | **Scrap Winch Operators (n=151)** | |
| Age (median, IQR) | 46 (35.5 – 53) | 46 (35 – 52) | 0.62 |
| Years of Service (median, IQR) | 12 (7 – 17) | 12 (5 – 17) | 0.45 |

Table 4.1 shows that RDOs and SWOs were comparable by age *(p=0.62)* and length of service *(p=0.45) (Mann Whitney)*

### 4.3 Disability level among workers with NSLBP

Table 4.2(a) below shows the distribution of disability level among RDOs and SWOs

**Table 4.2(a): The level of disability among RDOs and SWOs.**

| Variable | | Job Category | | p-value |
|---|---|---|---|---|
| | | Rock Drill (n=132) | Scrap Winch(n=151) | |
| **Disability Level** | | n (%) | n (%) | **p-value** |
| Minimal | (0% – 20%) | 32 (24.24) | 16 (10.60) | |
| Moderate | (21% – 40%) | 47 (35.61) | 67 (44.37) | |
| Severe | (41% – 60%) | 29 (21.29) | 38 (25.17) | 0.04 |
| Extreme | (61% – 80%) | 22 (16.67) | 26 (17.22) | |
| Crippled | (81% – 100%) | 2 (1.52) | 4 (2.65) | |

Table 4.2(a) above shows statistical significant association between disability and job category. The distribution of participants within the disability level was statistically significant between RDOs and SWOs *(p=0.04*).There were more participants with moderate NSLBP among the SWOs 44.37% *(n=67)* than among the RDOs 35.61% *(n=47).*There was 24.24% *(n=32)* minimal disability among RDOs with only 10.60% *(n=16)* among SWOs falling into that category. The proportion of minimal disability was relatively higher (2:1) among RDOs than among SWOs.

Table 4.2(b) below shows Disability distribution among participants according to age group

**Table 4.2(b): Disability distribution according to age group (Crosstab)**

| | | DISABILITY LEVEL-OSWESTRY | | | | | |
|---|---|---|---|---|---|---|---|
| | | Minimum n (%) | Moderate n (%) | Severe n (%) | Extreme n (%) | Crippled n (%) | Total n (%) |
| Age Group | 20-35 | 27(36.48) | 33(44.59) | 9(12.16) | 5(6.75) | 0(0) | 74(26.14) |
| | 36-45 | 11(18.33) | 35(58.33) | 10(16.66) | 4(6.66) | 0(0) | 60(21.20) |
| | 46-60 | 9(6.04) | 46(30.87) | 45(30.20) | 42(28.18) | 7(4.69) | 149(52.65) |
| Total | | 47(16.49) | 114(40.28) | 64(22.61) | 51(18.02) | 7(2.47) | 283(100) |

Table 4.2(b) shows that the majority (58.33%) of the participants within the age of 36 years and 45 years reported moderate disability while participants in the 46 years to 60 years age category (4.69%) were the only ones that reported experiencing crippling disability due to NSLBP.

### 4.4 Activity limitation level among workers with NSLBP

Table 4.3(a) below shows the activity level limitation distribution among the participants.

**Table 4.3(a)**: **Activity limitation levels among the RDOs and SWOs.**

| **Variable** | | **Job Category** | | **p-value** |
|---|---|---|---|---|
| | | **Rock Drill (n=132)** | **Scrap Winch (n=151)** | |
| **Activity Limitation Level** | | **n (%)** | **n (%)** | |
| None | (0% – 20%) | 0 (0.00) | 0 (0.00) | |
| Mild | (21% – 40%) | 34 (25.76) | 25 (16.56) | |
| Moderate | (41% – 60%) | 61 (46.21) | 71 (47.02) | 0.20 |
| Severe | (61% – 80%) | 31 (23.48) | 48 (31.79) | |
| Extreme | (81% – 100%) | 6 (4.55) | 7 (4.64) | |

Table 4.3(a) shows that most of the study participants reported moderate activity limitations of which 46.21% *(n= 61*) were RDOs and 47.02% *(n=71)* were SWOs followed by severe activity limitation with 23.48% *(n=31)* RDOs and 31.79% *(n=48)* SWOs. None of the workers reported not having difficulties with activity limitations due to nonspecific lower back pain. The distribution of participants within the activity limitation levels was not statistically significant between the RDOs and SWOs *(p = 0.20)*.

Table 4.3(b) below show activity limitation among age groups

**Table 4.3(b): Activity limitation distribution according to age groups (Crosstab)**

| | | LEVEL OF A LIMITATION | | | | |
|---|---|---|---|---|---|---|
| | | Mild n (%) | Moderate n (%) | Severe n (%) | Extreme n (%) | Total n (%) |
| Age Group | 20-35 | 31(41.89) | 33(44.59) | 9(12.16) | 1(1.35) | 74(26.14) |
| | 36-45 | 16(26.66) | 31(51.66) | 13(21.66) | 0(0) | 60(21.20) |
| | 46-60 | 12(8.05) | 68(45.63) | 57(38.25) | 12(8.05) | 149(52.65) |
| Total | | 59(20.14) | 132(45.93) | 79(28.62) | 13(5.3) | 283(100) |

Table 4.3(b) shows that 45.63% *(n=68)* of the participants aged between 46-60 years reported moderate activity limitations and within the same age category 38.25% *(n=57)* reported severe activity limitation due to NSLBP.

### 4.5 Level of participation restriction among workers with NSLBP

Table 4.4(a) below shows the distribution of participation restrictions levels among RDOs and SWOs.

**Table 4.4(a): The distribution of participation restrictions level among RDOs and SWOs**

| **Variable** | | **Job Category** | | **p-value** |
|---|---|---|---|---|
| | | **Rock Drill (n=132)** | **Scrap Winch (n=151)** | |
| **Participation Restriction Level** | | **n (%)** | **n (%)** | |
| None | (0% – 20%) | 1 (0.76) | 0 (0.00) | |
| Mild | (21% – 40%) | 111 (84.09) | 125 (82.78) | |
| Moderate | (41% – 60%) | 19 (14.39) | 23 (15.23) | 0.31 |
| Severe | (61% – 80%) | 0 (0.00) | 3 (1.99) | |
| Extreme | (81% – 100%) | 1 (0.76) | 0 (0.00) | |

Table 4.4(a) shows that the majority of participants were in the mild participation restriction level. Of the 283 study participants, only 0.76% *(n=1)* had extreme participation restriction among the RDOs and about 1.99% *(n=3)* had severe participation restriction among the SWOs. The distribution of participants between the participation restriction levels was not statistically different between the RDOs and SWOs (*p= 0.31*).

Table 4.4(b) below show the distribution of Participation restrictions according to age group

**Table 4.4(b): Participation restriction distribution according to age groups (Crosstab)**

| | | LEVEL OF P RESTRICTION | | | | | |
|---|---|---|---|---|---|---|---|
| | | None n (%) | Mild n (%) | Moderate n (%) | Severe n (%) | Extreme n (%) | Total n (%) |
| Age Group | 20-35 | 1(1.35) | 71(95.94) | 2(2.70) | 0(0) | 0(0) | 74(26.14) |
| | 36-45 | 0(0) | 56(93.33) | 4(6.66) | 0(0) | 0(0) | 60(21.20) |
| | 46-60 | 0(0) | 109(73.15) | 36(24.16) | 3(2.01) | 1(0.67) | 149(52.65) |
| Total | | 1(0.35) | 236(83.39) | 42(14.84) | 3(1.06) | 1(0.35) | 283(100) |

Table 4.4(b) shows that 83.39% (n=236) of the participants reported mild participation restrictions due to NSLBP and the majority of the participants within the age group of 46 years to 60 years 73.15% (n-109) reported mild participation restrictions.

### 4.6 Quality of life among workers with NSLBP

Table 4.5(a) below portrays the quality of life levels distribution of the RDOs and SWOs.

**Table 4.5(a): The quality of life levels distribution among the RODs and the SWOs.**

| **Variable** | | **Job Category** | | **p-value** |
|---|---|---|---|---|
| | | **Rock Drill n=132** | **Scrap Winch n=151** | |
| **Quality of Life** | | **n (%)** | **n (%)** | |
| Very Poor | (0% – 20%) | 0 (0.00) | 0 (0.00) | |
| Poor | (21% – 40%) | 6 (4.55) | 5 (3.31) | |
| Moderate | (41% – 60%) | 16 (12.12) | 26 (17.22) | 0.56 |
| Good | (61% – 80%) | 65 (49.24) | 67 (44.37) | |
| Very Good | (81% – 100%) | 45 (34.09) | 53 (35.10) | |

Table 4.5(a) shows that 49.24% *(n = 65)* of the RODs and 44.37% *(n = 67)* of the SWOs reported good quality of life. A small proportion of the participants 4.55% *(n=6)* among RDOs and 3.31% *(n=5)* among SWOs reported poor quality of life. RDOs and SWOs were comparable by QoL (*p = 0.56)*.

Table 4.5(b) below show the distribution of quality of life according to age groups.

**Table 4.5(b): Quality of life distribution according to age groups (Crosstab).**

| | | QOL LEVEL | | | | |
|---|---|---|---|---|---|---|
| | | Poor n (%) | Moderate n (%) | Good n (%) | Very Good n (%) | Total n (%) |
| Age Group n (%) | 20-35 | 1(1.35) | 2(2.70) | 29(39.18) | 42(56.75) | 74(26.14) |
| | 36-45 | 0(0) | 5(8.33) | 35(58.33) | 20(33.33) | 60(21.20) |
| | 46-60 | 10(6.71) | 35(23.48) | 68(49.63) | 36(24.16) | 149(52.65) |
| Total | | 11(3.88) | 42(14.84) | 132(46.64) | 98(34.62) | 283(100) |

Table 4.5(b) shows that the majority of the participants 56.75% *(n=42)* who reported very good QoL were aged between 20 years and 35 years and most of the participants 49.63% (*n=68)* within the age group of 46 years to 60 years reported good QoL.

### 4.7. The association between disability level, participation restriction, activity limitation, quality of life scale and demographic details of the study participants.

A crude analysis ignoring any stratification can be misleading. From this data we further investigated the relationship between the four scales namely: disability level, participation restriction, activity limitations and quality of life.

Table 4.6 below shows the correlation between the variables and predictors.

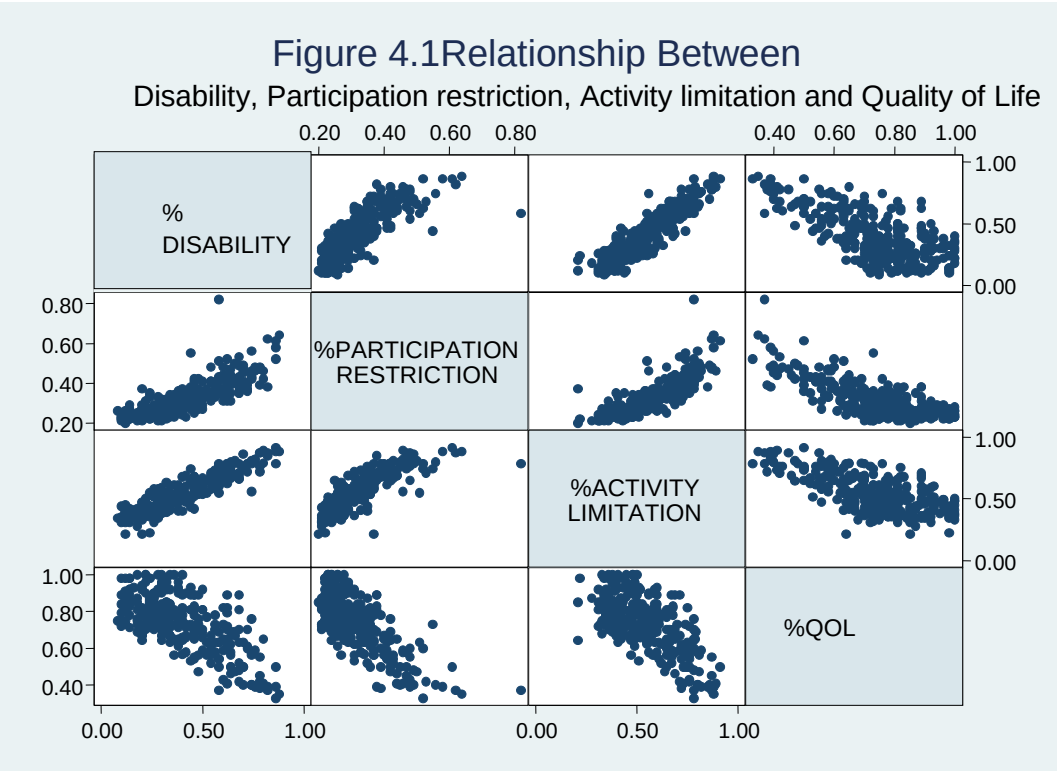
**Table 4.6: The relationship between disability, activity limitation, participation restriction and quality of life (n=283)**

| Variable | Predictor | r-value | p-value |
|---|---|---|---|
| **Disability** | Activity Limitation | 0.831 | <0.01 |
| | Participation Restriction | 0.574 | <0.01 |
| | QoL | -0.536 | <0.01 |
| **Activity Limitation** | Participation Restriction | 0.583 | <0.01 |
| | QoL | -0.562 | <0.01 |
| **Participation Restriction** | QoL | -0.558 | <0.01 |

Table 4.6 shows a positive correlation between disability, participation restriction and activity limitations and there was negative correlation between disability, participation restriction and activity limitation with QoL.

Figure 4.1 below, shows that between disability, participation restriction and activity limitation there was a positive relationship. However QoL was negatively related to disability, participation restriction and activity limitation.

**Figure 4.1 Relationship between Disability, Participation restriction, Activity limitation, and QoL**




### 4.7.1 Quantifying the relationship between disability, participation restriction, activity limitations, quality of life and demographic factors.

Although we have seen significant association between disability, participation restriction, activity limitations levels and QoL; an important step forward was to quantify the magnitude of such an association.

This analysis was done by fitting a linear regression model using the score of QoL as the dependent variable and disability scores, participation restriction scores, activity limitation score, job categories and age as predictors (independent variables).

Table 4.7(a) below present results of the bivariate and multivariate linear regression models with QoL as the dependent variable.

**Table 4.7(a): Bivariate and multivariate linear regression model for QoL (n= 283)**

| Variable | Panel B: Bivariate Linear Regression | | | Panel B: Multivariate Linear Regression | | |
|---|---|---|---|---|---|---|
| | Coef. | 95% C.I. | p-value | Coef. | 95% C.I. | p-value |
| Age | -0.006 | -0.007 – (-0.004) | 0.001 | - | - | - |
| Years of service | -0.006 | -0.008 – (-0.004) | 0.001 | - | - | - |
| **Job Category** | | | | | | |
| Rock Drill Operator | Ref | | | | | |
| Scrap Winch Operator | -0.009 | -0.045 – (-0.026) | 0.608 | - | - | - |
| Disability Score | -0.528 | -0.595 – (-0.461) | 0.001 | - | - | - |
| Participation restriction score | -1.218 | -1.351 – (-1.084) | 0.001 | -0.876 | -1.351 – (-1.084) | 0.001 |
| Activity Limitation score | -0.655 | -0.742 – (0.568) | 0.001 | - | - | - |

Table 4.7(a) shows a negative linear relationship between all the factors (age, years in service, increased disability score, increased participation restriction and activity limitation) and quality of life. For instance, 1% increase in disability score will decrease the quality of life score by 0.53% in the bivariate model. Moreover, a 1% increase in participation restriction score was associated with a 1.22% decrease in quality of life scores in the bivariate regression model and by 0,87% in the multivariate regression model.

Although the coefficient displayed significant relationship with quality of life, it should be noticed that such a relationship was not very strong since, only 46% of variance in quality of life score could be explained by disability score.

Table 4.7(b) below shows the results of the bi-variate and multi-variate linear regression models with disability as the dependent variable.

**Table 4.7(b): Bivariate and multivariate linear regression model for the disability score**

| | **Panel B: Bivariate Linear Regression** | | | **Panel B: Multivariate Linear Regression** | | |
|---|---|---|---|---|---|---|
| | **Coef.** | **95% C.I.** | **p-value** | **Coef.** | **95% C.I.** | **p-value** |
| **Age** | 0.01 | (0.01 – 0.012) | 0.001 | 0.002 | 0.001 – 0.003 | 0.001 |
| **Years of service** | 0.01 | (0.01 – 0.012) | 0.001 | - | - | - |
| **Job Category** | | | | | | |
| **Rock Drill Operator** | Ref | | | | | |
| **Scrap Winch Operator** | 0.03 | -0.01 – 0.08 | 0.15 | - | - | - |
| **Participation Restriction score** | 1.73 | 1.58 – 1.88 | 0.001 | 0.36 | 0.19 – 0.54 | 0.001 |
| **Activity Limitation score** | 1.15 | 1.10 – 1.22 | 0.001 | 0.92 | 0.81 – 1.03 | 0.001 |

The linear regression model showed that increased limitation in activities was associated with high disabilities as portrayed in Table 4.7(b) above. Results of the linear regression model suggest that as disability scores increased by one unit (1%), activity limitation increased by 1.15% in the bivariate regression and by 1% in the multivariate regression model.

# CHAPTER 5

# DISCUSSION

## 5.1 Introduction

This chapter aims to discuss the main findings from the results of the study which were outlined in chapter four and relates them to the relevant literature. The discussion will cover the demographic characteristics and describes effects of NSLBP on disability level, activity limitation, participation restriction and the QoL of mine workers.

## 5.2 Sample profile and demographics

The participants used in this study were categorised into two occupational groups namely rock drill operators (RDOs) and scraper winch operators (SWOs). The majority of the participants were the SWOs (53.36%) as compared to RDOs (46.64%). The median age among the employees' was 46 years with an interquartile range of 35 to 53 years. The interquartile range indicated that the majority of the Impala Platinum mine workers (RDO's and SWO's) fall within the young and middle adult age groups. It could be postulated that reported cases in this age group 35-54 years could either be influenced by concentration of mining workforce in this age interval or that the NSLBP cases and mine workforce age interval show similar distribution. Regarding work experience, the results showed that the participants had been working for Impala Platinum mine for an average period of 12 years with an interquartile range of 5 to 17 years. The majority of the participants had been working for over a decade which showed that they were well experienced in their occupation. The RDOs and SWOs were comparable by age and length of service. These demographic findings are comparable to the findings reported in similar studies (Bio et al., 2007, Skandfer et al., 2014, Carlisle et al., 2014). Bio et al. (2007) and Skandfer et al. (2014) reported mean ages of 40 and 38.9 years and they also reported work experience mean duration of 15 and 10 years respectively.

All the participants in our study were males, a finding similar to that from other studies (Bio et al., 2007; Skandfer et al., 2014; Carlisle et al., 2014). This finding shows that work environment in which the study was done is dominated by male employees. The non- variance in other studies were not explained but one can assume that it was prompted by the fact that the mining industry was previously regarded as a male dominant industry.

### 5.3 Level of disability among RDOs and SWOs with NSLBP

In the current study, the proportion of disability levels were higher and differently distributed among the workers with NSLBP, with the SWO's mostly affected as compared to RDO's *(p=0.04).* The results of this study and other studies indicate that there is variation in the level of disability due to LBP amongst workers in different occupational class or setting (Schutte.2005, Salvetti et al., 2012, Ovayolu et al., 2014). Ovayolu et al. (2014) suggests that the difference between any two occupational groups might be attributed to the variation in job demand. In the current study, unlike RDO's whose job constitute operating either hydraulic, electrical or pneumatic drilling machines to drill explosive charged holes to facilitate blasting (Chaudhary et al.,2015), SWOs are on the other side exposed to high physical intensity work (Moseme et al., 2003). SWOs remove tons of ore, rocks and soils using heavy winch machinery, and perform their duties in confined spaces and in most cases where the space is more restricted in height and diameter uses shovels to remove the ore. It was determined in the study done by Ovayolu et al. (2014) that nurses exposed to frequent poor ergonomics such as bending, lifting and carrying patient are susceptible to episodes of LBP as compared to nurses exposed to less physical work. Nonetheless this does not mean RDOs are not exposed to hard physical labour but could merely be due to the differences in the type of their job and variation in the degree of mechanisation.

The current study revealed that 44.37% of SWOs reported moderate disability due to NSLBP whereas only 35.61% of RDOs reported moderate disability due to NSLBP. The results of the current study differ with those by Schutte (2005), who found that RDOs were an occupational group mostly affected as compared to SWO (18% and 5% respectively). The discrepancies between the current study result and Schutte (2005) could be influence by differences between the two studies' objectives. Schutte (2005) study's focus was on effects of ergonomics on general work-related musculoskeletal disorders (WMSD) among different categories of mine workers whereas the main thrust of the current study was to profile effects of NSLBP among RDO's and SWO's. Schutte (2005) findings show that the ergonomic risk factors associated with WMSD in the mining industry mostly affect the upper limbs 62% hence RDO's are greatly affected because of the nature of their job, whereas SWO's are affected to a lesser extend because their job constitute mostly of frequent bending, pushing and pulling which put more strain on the lower back (Skandfer et al., 2014).

Among the participants who reported minimal disability, the majority were RDOs n=32(24%) and SWOs n=16 (11%). The results of the current study indicated that SWOs were mostly affected than RDOs. The above statement is supported by the significant association found in this study (p=0.04) between

job category and the level of disability. Salvetti et al. (2012) also found significant association (p=0.002) between their two groups (high and low self-efficacy).

In the current study, the majority of the participants reported experiencing moderate to extreme disability due to NSLBP for instance if tallied, RDOs experiencing moderate to severe pain were 73% and SWOs in the same category range were 86%. The results of the current study agrees with those reported by Salvetti et al. (2012) which stated that 80.7% of their participants experienced moderate to severe disability due to LBP. Although similar statistical comparable values were obtained by Salvetti et al. (2012) and the current study, needless to say Salvetti et al. (2012) study participants were of different characteristic distribution. They recruited adults from three health care service centres with cLBP who were either employed or not and were either of male or female gender, whereas in the current study 100% of our study participants were actively employed and exposed to a high physical demanding job, and were of male gender. Although Salvetti et al. (2012) did not explore the differences between males and females regarding pain perception, literature reviewed indicated that females have higher negative affectivity than males, and that health anxiety is a factor determining pain reporting in females Jensen et al., (2012). Melani et al. (2004) attributes this to the innate sensory perception differences between males and females. Although Salvetti et al., (2012)'s result highlighted the impact of disability due to LBP they could have been influence by gender differences in their study since 72.3% of their participants were females. Nonetheless their results indicating that LBP is one of the major causes of disability among different populations and that its impact is devastating, and is associated with substantial financial loss to both the employer and the employee (Vora et al., 2012).

The bivariate and multivariate linear regression results of the current study showed a statistical significant association *(p=0.001*) between disability and age. The findings of the current study indicated that RDOs and SWOs who were within the age range of 46-60 years (28.18%) reported experiencing extreme disabilities due to NSLBP as compared to only 6.66% of RDOs and SWOs who are aged between 36-45 years. Several authors also reported significant association between age and LBP among their participants (Bio et al., 2007, Carlisle et al., 2014, Tella et al., 2013). Bio et al. (2007) found age to be significantly associated *(p=0.05)* with LBP among underground Gold mine workers in Ghana while Tella et al. (2013) found a significant relationship ($p<0.05$) among manual farmers in Nigeria. These findings show that older workers are more susceptible to the onset of NSLBP. It means that developing a NSLBP is more probable with aging, the current study support the finding that age is a factor influencing the occurrence of NSLBP. The results of the bivariate linear regression model also showed a good statistical association *(p=0.001; CI: 0.01-0.012*) between disability and work experience. This finding is consistent with those reported by (Bio et al., 2007, Tella et al., 2013). The

results agree with the concept that the longer a worker is exposed to physical labour the higher the chances of NSLBP. The results of the current study revealed that RDOs and SWOs with longer years of service are at a risk of developing NSLBP.

Another point to consider in terms of nonspecific LBP is the possibility of over-reporting by the workers with the purpose of gaining secondary rewards such as compensation or work absence days. Although the possibility of bias in this study was curbed by explaining to the participants that there was no direct reward in participation and their honest reporting would assist in unearthing the health problem, one should not ignore the possibility of over-reporting (Bio et al., 2007).

### 5.4 Activity limitation in RDOs and SWOs with NSLBP

The activity limitation component among RDOs and SWOs was found to be adversely affected by NSLBP. A larger proportion of participants reported some form of activity limitation within the mild to extreme category. It is noteworthy to recognise that neither of the participants reported not experiencing activity limitation in both job categories. As reported by Cho et al. (2014) and Hicks et al. (2005) the reason could be associated with muscle fatigue. Hicks et al. (2005) states that muscle fatigue leads to loss of muscle control which leads to LBP, it could therefore be postulated that based on the job demands of both SWO's and RDO's (Moseme et al., 2003, Schutte et al., 2005 and Chaudhary et al., 2015) workers are likely to develop muscle fatigue. Clinical observations suggest that patients with higher levels of pain are most likely to experience limitations in activities (Lin et al., 2011).

There was no significant difference between job categories, although the study by Lin et al. (2011) suggests that patients show different behaviours when confronted with pain in terms of activity limitations. The results of the current study pointed out that there is no difference between different job categories presenting with NSLBP ($p=0.20$). Research shows that activity limitation is not entirely associated with the type of occupation but rather with pain-related fear (Swinkels-Meewisse et al., 2006, Lin et al., 2011, Young et al., 2011). Swinkels-Meewisse et al. (2006) states that; "activity avoidance is more proxy to actual performance". In concord with the above statement is the study by Young et al. (2011) which found that even in the absence of pain their participants continued avoiding activities largely due to anxiety and fear of possible exacerbation of their condition.

The current study cannot confirm or refute the above statements because the psychological aspects related to NSLBP were beyond the remit of this study. Hendrick et al. (2013) rejects the assumption that LBP is associated with decreased activity limitation, they observed that physical activity levels remains the same throughout the course of LBP. The current study was cross-sectional and therefore no comparison can be made to that of Hendrick et al. (2013) 's study as no follow-ups were conducted.

The demographic distribution of the current study participants in terms of age ranged between 35 years and 53 years. It could be presumed that the older the participant, the lesser the physical strength they possess (Bio et al., 2007; Tella et al., 2013). However, the study done by Carlisle et al. (2014) found that older workers are experienced and hence they show lesser activity limitation explaining that a survivor effect might be attributed to their positive results.

The activity limitation tool used in this study evaluated aspects such as the ability to perform daily house hold chores and the ability to carry out work responsibilities effectively and efficiently. As outlined in Section2.8 both categories are exposed to strenuous work which requires them to assume poor posture and demand physical strength during work time. Their high level of activity limitation might be attributed to a cause-effect concept meaning NSLBP prevents or restricts their ability to perform certain activities (Bio et al., 2007, Skandfer et al., 2014, Ovayolu et al., 2014). It is evident that NSLBP is a factor influencing levels of activity limitation, whether pain perceived or fear-avoidance is the causal factor for activity limitation among NSLBP patient is a phenomenon that still requires extensive research.

### 5.5 Participation Restriction in RDOs and SWOs with NSLBP

Participation restriction in this study was based on participants' perception on both interpersonal relationship and participation in community and work activities. The results revealed that this component was not adversely affected among miners presenting with NSLBP. A larger proportion of participants reported mild restriction in terms of participating in community activities and relating to community members and or family members RDOs n=111 (84.09%) and SWOs n=125 (82.78%) whereas only a small proportion of the workers, RDOs n=1 (0.76%) reported severe participation restriction and SWOs n=0 (0%).

In the current study a generic participation restriction tool was used and it was observed that few participants reported severe and extreme participation restriction levels. Various studies have reported the use of the WHODAS II as a responsive, reliable tool which can effectively discriminate between social participation among patients with LBP and other wide ranges of physical and mental disorders (Baron et al., 2008, Ustun et al., 2010, Silva et al., 2013, Garin et al., 2010). In contrast Kutley et al. (2011) and Lauridsenet al. (2006) both argued that generic questionnaires are poorly responsive as compared to condition specific questionnaires. Taking into consideration the items included in the WHODAS II tool which focused on mental capacity and comprehension, it could be suggested that the tool did not relate to the current psychological status of participants in this study, pointing out that the participants ' physical condition did not affect their mental capacity and or comprehension.

It could also be argued that the small proportion that reported severe participation restriction could be attributable to age. The results of the current study revealed that the a larger proportion (24.16%) of the participants in the age group 46 years to 60 years reported experiencing moderate difficulties in participating in work and societal activities whereas only a small proportion of participants in the age group 20 years to 35 years (2.70%) and 36 years to 45 years (6.66%) reported similar levels of participation restriction. However it should be noted that a larger proportion (73.15%) of the same age group 46 years and 60 years reported mild participation restriction. The results of the current study evidently indicated that age alone is not the predictor of participation restriction but age and pain severity could be the key factors influencing the level of participation restriction. Although Guclu et al. (2012) reported that participants in their study who were in the age category of 31 years and 66 years experienced profound participation restrictions as compared to the 18 years to 30 years old, they found no significant correlation between age and pain ($p>0.05$). However Guclu et al. (2012) established a weak-moderate negative linear relationship between pain and participation restriction. Consistent with Guclu et al. (2012)'s hypothesis is the study by Chimenti et al. (2013) who found that athletes in their study with LBP reported lower participation levels in sports and social or daily activities as compared to athletes without LBP. Contrary to Guclu et al (2012) and Chementi et al (2013), Lin et al. (2011) states that lack of physical and social participation might be influenced by factors other than health related such as personal preference. Lin et al. (2011) attributes the freedom of choice the participant could exercise on refraining from participating in social activities as a factor that might result in decreased levels of participation and not necessarily presence or severity of pain.

The results of the current study yielded no significant difference between the two job categories in terms of participation restriction ($p=0.31$). The similarity between the two groups could mean that the workers portrayed good health perceptions, several studies reviewed revealed that self-efficacy is directly associated with social functioning (Astfalck et al., 2010, Foster et al., 2010, Salvetti et al., 2012, Koen et al.,2014, Baird et al.,2016). These findings were consistent with presumptions that patients' expectation of outcome of their condition is a significant predictor of participation and return to work (Hallegraeff et al., 2012).

Equally, it might be that workers perceived their participation in social activities as mildly affected RDOs 84.09% and SWOs 82.78% respectively because of the limited exposure as a result of residing within the mine's accommodation. Although the issue of migrant labourer was not explored in the current study, the majority of mineworkers are from different provinces within South Africa and other neighbouring countries. While they are in Rustenburg they reside in mine accommodation which afford them free and easily accessible extra-mural activities such as different sporting codes and cultural

festivities, hence they might not necessarily associate their back pain with lack of social participation. Nonetheless the researcher cannot confirm the impact that residing in a foreign region or country might pose on participation restriction since it was not the remit of this study and also none of the author's reviewed dealt with the issue of migrant labourers in their studies.

Tella et al. (2013) found significant association ($p<0.001$) between LBP and participation restriction. The difference noted could be because their study was conducted in a single farming community in South- West region of Nigeria, unlike the current study sample which included migrant labourers. Chimenti et al. (2013) agrees with the findings of Tella et al. (2013), they showed that people with LBP reported considerable difficulties in sport activity participation and in majority of daily functions (work and non-sport leisure). It has been shown that people suffering from NSLBP tend to experience higher degrees of participation restriction (Tella et al., 2013; Guclu et al., 2012; Wynne-Jones et al.,2014).Guclu et al.(2012) found a poor negative linear relationship ($r=-0.083$) between LBP and social participation. In the current study a moderate positive linear relationship was established between disability due to NSLBP and participation restriction ($r=0.574$) indicating that participants with high disability levels were most likely to experience increased participation restrictions.

The findings of this study are not in agreement with postulations made by other authors (Guclu et al., 2012, Wynne-Jones et al., 2014, Lin et al., 2014 and Chimenti et al., 2013) who found that patients with LBP tend to distance themselves from social contact and leisure activities. Whereas the results of the current study revealed that NSLBP did not adversely affect the participants' participation in social activities. Chimenti et al. (2013) and Guclu et al. (2012) findings are different from that of this study in that both studies reported a significant association between pain severity and participation. Unlike in the current study Chimenti et al. (2013)'s study focused on rotation related sport players with or without LBP and Guclu et al. (2012)'s participants had different socio-demographic characteristics to the participants in the current study. They included all patients aged between 18-66 years either employed or unemployed, of female or male gender with cLBP and excluded only patients with mental disorders.

### 5.6 Quality of life in RDOs and SWOs with NSLBP

The current study showed QoL to be less affected among miners presenting with NSLBP. The majority of participants reported good QoL despite experiencing some form of disability, activity limitation and participation restrictions in both social and work activities. Only a small proportion of participants reported poor QoL RDOs (5%) and SWOs (3%).The findings of this study are in agreement with those by Klemenc-ketis et al. (2011) who found a strong significant association between pain and QoL. They stated that high pain levels were strongly associated with poor QoL. It could be that the fewer

participants in this study who reported poor QoL fall under the lower tertiles (crippled disability levels) in the current study results. The current study results showed a moderate negative correlation between disability and QoL(r= -0.536).

Nonetheless the majority of the participants in this study reported good QoL. This could be attributed to the living arrangement and social benefits received by miners from the company such as free accommodation and meals, easy and free access of comprehensive health care services and free transportation within the mine premises. All these factors could possible contribute towards the high QoL scores which were obtained in this study. The QoL tool used in the current study asked questions on general living conditions, health care services and personal relationships among others. It is therefore presumed that the high scores were based on participants' perception of their QoL regarding their current living conditions. Although we are unable to confirm the above, other studies have established that HRQoL refers to an individual's perception of their position in life in the context of culture, values, living conditions and goals (Vahedi et al., 2010, Pieber et al., 2012, Hallegraeff et al., 2012). It is therefore possible that this concept could have influenced the QoL outcome amongst the miners.

### 5.7 Relationship between disability, activity limitation, participation restriction, QoL and the demographic factors.

Job category was significantly associated with disability due to NSLBP with (*p=0.04*) showing SWOs to be mostly affected by NSLBP as compared to RDOs. The results revealed no statistical differences between the two job categories in relation to activity limitation, participation restriction and QoL, suggesting that the workers portrayed similar characteristics where those variables were concerned.

The majority of the participants who experienced some form of disability also had difficulties with performing activities be it work-related or daily household activities. A strong positive correlation between the disability and activity limitation levels existed (r=0.831).According to Svestkova (2008) and Ocarino et al. (2009), disability is a decrement in body function hence the strong correlation between disability and activity limitation is not surprising. Furthermore a revised definition of disability in the WHO classification of function (WHO, 2007, p12) used disability as an umbrella term which covers three broad aspects of health which are: body function and structure, activity limitation and participation restriction hence the three factors covered in this study: disability, activity limitation and participation restriction were found to be interrelated.

Job category was the only parameter evaluated in the current study which showed a significant association. SWOs were mostly affected as compared to RDOs and this elucidated the fact that

occupation has a direct impact on NSLPB and that bio-physical factors may be strong predictors of NSLBP (Skandfer et al., 2014). Demographic factors such as age and years of service predisposed the workers to the onset of NSLBP. It was highlighted in the linear regression model performed in the current study that increased age and prolonged exposure to hard labour influenced the effects on NSLBP. The older the participant and the more the years of service the higher the level of disability, the more difficulties the individual experiences in terms of participating in work related physical activities and or societal activities which in turn results in poorer QoL. Our study findings are in agreement with those of other studies (Bio et al., 2007, Lin et al., 2011, Salvetti et al., 2012). This might be attributed to physiological changes associated with aging, the overuse syndrome, normal wear and tear or repetitive strains including prolonged poor and uncorrected ergonomics which is possibly accelerated in this population when factoring age and length of service. Moreover, a study by Tella et al. (2013) suggests that long exposure to manual work predisposes the workers to the onset of NSLBP. Bio et al. (2007) also found the association of age with LBP to be attributed to the ideology that once LBP occurs it is most likely to become recurrent even on a minimal scale hence the increasing prevalence with age and length of service is expected. Yilmaz et al. (2012) found that physical factors such as work task and work place environment play a major role in developing NSLBP.

The majority of mine employees are migrant labourers, they migrate to the mining cities with one aim which is to make a living and provide for their families at home. A moderate positive correlation between disability and participation restriction (r=0.574) and a moderate negative correlation between disability and QoL (r= -0.536) could be explained by the afore mentioned statement, (Vahedi, 2010) states that Health-Related quality of life (HRQoL) refers to an individual's perception of their position in life, in the context of the culture and value system in which they currently live in and in relation to their goals, expectations, standards and concerns. It was noted in the current study that even with the conducive living conditions, workers with severe disabilities presented with increased participation restrictions and very poor QoL, they could be experiencing this based on the notion of avoidance behaviour. They refrain from participating in societal and work activities due to fear of re-injuring or exacerbating their condition hence they do not appreciate their QoL.

# CHAPTER 6

# CONCLUSIONS AND RECOMMENDATIONS

## 6.1 Introduction

This chapter gives the conclusions derived from the results of the study, outlines the limitations encountered and gives recommendations for clinical and future research studies.

## 6.2 Conclusions

Although extensive research have been conducted on aetiology and management of this intricate condition, NLBP continues to be the most common occupational health problem world-wide especially in industrialised countries (Balague et al.,2012). NSLBP is assumed to be of multi-factorial origin (Janwantanakul et al., 2012) and the causes of the onset of NSLBP remains obscure making diagnosis and treatment efficacy difficult.

The level of disability due to NSLBP among RDOs and SWOs is high with 81% of participants reporting moderate to severe disability due to NSLBP. A strong association was observed between disability and activity limitation. Furthermore, it was noted that disability and participation restriction accounted for 85% of activity limitation. Disability was significantly associated with job category and the proportion of moderate disability was higher among SWOs than among RDOs while on the other hand the proportion of minimal disability was higher among RDOs than SWOs.

Activity limitation was adversely affected among participants. A larger proportion of participants reported moderate activity limitation and none of the participants reported not experiencing any form of activity limitations. The majority of participants in this study had mild participation restrictions despite living with NSLBP. The results suggest that NSLBP might on its own not be a determining factor for participation restriction.

The current study showed QoL to be less affected among miners presenting with NSLBP. The majority of participants reported good QoL despite experiencing some form of disability, activity limitation and participation restrictions in both social and work activities. Only a small proportion of participants reported poor QoL.

The correlation test done in the present study showed a strong positive correlation between demographic factors and disability, activity limitation, participation restriction and a negative linear relation between all the co-variants and demographic factors with QoL, implying that the older the worker gets and the more the number of years they spend in a particular occupation the worse the disabling effects of NSLBP they would experience.

### 6.3 Study Limitation

The study was conducted in one mining sector, hence the findings of the study cannot be generalised to all RDOs and SWOs from other mining sectors since not all sectors have similar characteristics. The cross sectional nature of the study does not allow causal inferences regarding the association of covariates.

Information regarding previous employment history was not captured; this might pose as a limitation because some of employees might have worked as either RDOs or SWOs from other mines.

The outcome measures used to assess activity limitation, participation restriction and QoL were not condition specific tools but rather generic tools, which might pose as a limitation because generic questionnaires are regarded as being poorly responsive, compared to condition specific questionnaires.

The semantic proximity of items in the outcome measures used in the current study might pose as a limitation due to redundancy.

### 6.4 Recommendations

#### 6.4.1 Clinical Practice

A holistic multi-disciplinary team approach during intervention of NSLBP which includes psychotherapy in the mining health sector is necessary.

Awareness and continuous education programmes, including information about prevention, healthy ergonomics and life styles should be available and be conducted at the employee induction centres to equip employees with knowledge and curb the risk factors (biomechanical and psychological factors) associated with NSLBP.

### 6.4.2 Research

A prospective study following patients diagnosed with NSLBP for a period of five years which would investigate possible causal factors of NSLBP and preventative strategies.

Randomised controlled studies investigating effective treatment approaches in NSLBP among the mining population should be instituted.

Anthropometry should be considered when doing studies on occupation acquired LBP particularly in underground mining where work space (surface height and width) is constricted.

Research studies that investigate modified equipment used in underground mining to reduce the adverse effects of hard labour will be beneficial.

Further prospective studies should be conducted on the effect of NSLBP and work re-integration.

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## APPENDIX A

R14/49 Ms Rorisang Primrose Tsheole

### HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

### CLEARANCE CERTIFICATE NO. M140813

| | |
|---|---|
| **NAME: (Principal Investigator)** | Ms Rorisang Primrose Tsheole |
| **DEPARTMENT:** | Physiotherapy<br>Impala Platinum Mine Hospital and Primary Health Clinics<br>Rusternburg, Northwest Province |
| **PROJECT TITLE:** | A Disability Profile of Impala Platinum Mine Workers Presenting with Nonspecific Lower Back Pain |
| **DATE CONSIDERED:** | 29/08/2014 |
| **DECISION:** | Approved unconditionally |
| **CONDITIONS:** | |
| **SUPERVISOR:** | Mr Lonwabo Godlwana |
| **APPROVED BY:** | Professor Cleaton-Jones, Chairperson, HREC (Medical) |
| **DATE OF APPROVAL:** | 19/11/2014 |

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

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature Date

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**

**APPENDIX B**

SAMPLE SIZE CALCULATION

The required sample size was calculated using MACORR sample size calculation

(http://www.macorr.com//ss_calculator.htm)

SS=sample size

Z= Z value 1.96 for 95% confidence level

P= percentage picked, expressed as decimal (0.41 used for sample size needed)

C= confidence interval at 5% (0.05)

$$SS = \frac{Z^2 x\ p\ (1-p)}{C^2}$$

$$SS = 1{,}96^2 x\ 0.41(1 - 0.41)/0.05^2$$

$$= 371$$

*This is based on a total population of 10 967 RDO and SWO

## APPENDIX C

### Information Document

Good day

My name is Rorisang Tsheole, a student at The University of the Witwatersrand currently studying for my Master's Degree in Physiotherapy. As part of my studies I am doing research on the Disability Profile of Impala Platinum Mine workers presenting with nonspecific lower back pain. Research is a process to gather information that can be used in addressing issues of concern. I am inviting you to take part in this research study.

This is a cross-sectional quantitative study in which demographic and standardised disability index questionnaires based on the Oswestry Disability Index, WHO DAS II and WHOQoL-BREF will be administered by means of an interview. It will take approximately +/- 25min to complete the questionnaire. The questionnaires will also be available in Setswana, IsiXhosa and XiShangaan languages.

There is no risk involved and no experiments will be conducted on the participants. All the information collected will be kept confidentially. There are no direct benefits, but the result of the study might lead to greater awareness about lower back pain and how to mitigate against its adverse effects among employees.

Confidentiality will be maintained on all questionnaire booklets, numbers will be used instead of participant names or personal information.

Should you have any questions or need more information, please do not hesitate to contact me on 014 569 4080, 083 925 2864 e-mail rorisang.tsheole@implats.co.za

For any complaints please contact the chairperson of the ethics committee at the University of the Witwatersrand; Professor Cleaton-Jones on 011 717 1234

If you are willing to participate in the study, please read and sign the attached consent form.

Thank you

Rorisang Tsheole

**APPENDIX D**

**Consent form**

I..... (Full names)

Hereby agree to participate in the study conducted by Rorisang Tsheole as outlined in the information document which was read and explained to me.

……

Signature

……

Date

**APPENDIX E**

**Demographic Questionnaire**

Make a tick on the appropriate box

Male ☐

**Age**

20 – 35 ☐ 36 – 45 ☐ 46 – 60 ☐

**Year in service**

1 – 5 yrs. ☐ 6 – 15 yrs. ☐ 16 – 30 yrs. ☐

**Job category**

Rock Drill Operator ☐ Scrap Winch Operator ☐

**APPENDIX F**

**Oswestry Low Back Pain Disability Questionnaire**

**Instructions**

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking ONE Box in each section for the statement which best applies to you. We realise 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
- ☐ The pain is very mild at the moment
- ☐ The pain is moderate at the moment
- ☐ The pain is fairly severe at the moment
- ☐ The pain is very severe at the moment
- ☐ The pain is the worst imaginable at the moment

**Section 2 – Personal care [washing, dressing etc.]**

- ☐ I can look after normally without causing extra pain
- ☐ I can look after myself normally but it causes extra pain
- ☐ It is painful to look after myself and I am slow and careful
- ☐ I need some help but manage most of my personal care
- ☐ I need help every day in most aspects of self-care
- ☐ I do not get dressed; I wash with difficulty and stay in bed

**Section 3 – Lifting**

- ☐ I can lift heavy weight without extra pain
- ☐ I can lift heavy weight but it gives extra pain
- ☐ Pain prevents me from lifting heavy weight off the floor, but I can manage if they are conveniently placed e.g. on a table
- ☐ Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned
- ☐ I can lift light weights
- ☐ I cannot lift or carry anything at all

**Section 4 – Walking***

- ☐ Pain does not prevent me walking any distance
- ☐ Pain prevents me from walking more than 1 mile
- ☐ Pain prevents me from walking more than ½ mile
- ☐ Pain prevents me from walking more than 100 yards
- ☐ I can only walk using a stick or crutches
- ☐ I am in bed most of the time

**Section 5 – Sitting**

- ☐ I can sit in any chair as long as I like
- ☐ I can only sit in my favourite chair as long as I like
- ☐ Pain prevent me from sitting more than one hour
- ☐ Pain prevents me from sitting more than 30 minutes
- ☐ Pain prevents me from sitting more than 10 minutes
- ☐ Pain prevents me from sitting at all

**Section 6 – Standing**

- ☐ I can stand as long as I want without extra pain
- ☐ I can stand as long as I want but it gives me extra pain
- ☐ Pain prevents me from standing for more than 1 hour
- ☐ Pain prevent me from standing for more than 30 minutes
- ☐ Pain prevents me from standing more than 10 minutes
- ☐ Pain prevents me from standing at all

**Section 7 Sleeping**

- ☐ My sleep is never disturbed by pain
- ☐ My sleep is occasionally disturbed by pain
- ☐ Because of pain I have less than 6 hours sleep
- ☐ Because of pain I have less than 4 hours sleep
- ☐ Because of pain I have more than 2 hours sleep
- ☐ Pain prevents me from sleeping at all

**Section 8 – Sex life [if applicable]**

- ☐ My sex life is normal and causes no extra pain
- ☐ My sex life is normal but causes some extra pain
- ☐ My sex life is nearly normal but is very painful

☐ My sex life is severely restricted by pain

☐ My sex life is nearly absent because Of pain

☐ Pain prevents any sex life at all

**Section- 9 Social life**

☐ My social life is normal and gives me no extra pain

☐ My social life is normal but increases the degree of pain

☐ Pain has no significant effect on my social life apart from limiting my more energetic Interests e.g. Sport

☐ Pain has restricted my social life and I do not go out as often

☐ Pain has restricted my social life to my home

☐ I have no social life because of pain

**Section 10 Travelling**

☐ I can travel anywhere without pain

☐ I can travel anywhere but it gives me extra pain

☐ Pain is bad but I manage journeys over two hours

☐ Pain restricts me to journey of less than one hour

☐ Pain restricts me to short necessary journeys under 30 minutes

☐ Pain prevents me from traveling except to receive treatment

**APPENDIX G**

**WHODAS 2.0**

**World Health Organization Disability Assessment Schedule 2.0**

**36-item version, self- administered**

This questionnaire asks about difficulties due to health/mental health conditions. Health conditions include **diseases or illnesses,**

**Other health problems that may be short or long lasting, injuries, mental or emotional problems, and problems with alcohol or**

**drugs.** Think back over the **past30 days** and answer these questions thinking about how much difficulty you had doing the following

Activities. For each question, please circle only **one** response

| | | | | | | | ***Clinician Use Only*** | | |
|---|---|---|---|---|---|---|---|---|---|
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | Raw Item score | Domain | Average domain score |
| In the last 30 days, how much difficulty did you have in: | | | | | | | | | |
| **Understanding and communicating** | | | | | | | | | |
| D1.1 | Concentrate on doing something for ten minutes? | None | Mild | Moderate | Severe | Extreme or cannot do | | ----30 | ----5 |
| D1.2 | Remembering to do important things? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D1.3 | Analysing and finding solutions to problems in day-to-day life? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D1.4 | Learning a new task, for example, learning how to get a new place? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D1.5 | Generally understanding what people say? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D1.6 | Starting and maintaining a conversation? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| **Getting around** | | | | | | | | | |
| D2.1 | Standing for long periods, such as 30 minutes? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D2.2 | Standing up from sitting down? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D2.3 | Moving around inside your home? | None | Mild | Moderate | Severe | Extreme or cannot do | | ----25 | ----5 |
| D2.4 | Getting out of your home? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D2.5 | Walking a long distance, such as a kilometre (or equivalent)? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| **Self-care** | | | | | | | | | |
| D3.1 | Washing your whole body? | None | Mild | Moderate | Severe | Extreme or cannot do | | ----20 | ----5 |
| D3.2 | Getting dressed? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D3.3 | Eating? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D3.4 | Staying by yourself for a few days? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| **Getting along with people** | | | | | | | | | |
| D4.1 | Dealing with people you do not know? | None | Mild | Moderate | Severe | Extreme or cannot do | | ---- | ---- |
| D4.2 | Maintaining a friendship? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D4.3 | Getting along with people who are close to you? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D4.4 | Making new friends? | None | Mild | Moderate | Severe | Extreme or cannot do | | 25 | 5 |
| D4.5 | Sexual activities? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |

| | | | | | | | ***Clinician Use Only*** | | |
|---|---|---|---|---|---|---|---|---|---|
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | Raw Item score | Domain | domain |
| In the last 30 days, how much difficulty did you have in: | | | | | | | | | |
| **Life activities---Household** | | | | | | | | | |
| D5.1 | Taking care of your household responsibilities? | None | Mild | Moderate | Severe | Extreme or cannot do | | ----20 | ----5 |
| D5.2 | Doing most important household tasks well? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D5.3 | Getting all of the household work done that you needed to do? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D5.4 | Getting your household work done as quickly as needed? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| **Life activities---School/Work** | | | | | | | | | |
| If you work (paid, non-paid, self-employed) or go to school, complete question D5.5—D5.8, below.<br>Otherwise, skip to D6.1. | | | | | | | | | |
| Because of your health condition, in the past 30days, how much difficulty did you have in: | | | | | | | | | |
| D5.5 | Your day-to-day work/school? | None | Mild | Moderate | Severe | Extreme or cannot do | | ----20 | ----5 |
| D5.6 | Doing your most important work/school tasks well? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D5.7 | Getting all of the work done that you need to do? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D5.8 | Getting your work done as quickly as needed? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| **Participation in society** | | | | | | | | | |
| In the past 30 days: | | | | | | | | | |
| D6.1 | How much of a problem did you have in joining in community activities (for example, festivities, religious, or other activities) in the same way as anyone else can? | None | Mild | Moderate | Severe | Extreme or cannot do | | ----40 | ----5 |
| D6.2 | How much of a problem did you have because of barriers or hindrances around you? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D6.3 | How much of a problem did you have living with dignity because of the attitudes and actions of others? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D6.4 | How much time did you spend on your health condition or its consequences? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D6.5 | How much have you been emotionally affected by your health condition? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D6.6 | How much has your health been a drain on the financial resources of you or your family? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D6.7 | How much of a problem did your family have because of your health problems? | None | Mild | Moderate | Severe | Extreme or cannot do | | | |
| D6. | How much of a problem did you have | None | Mild | Modera | Seve | Extreme | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8 | in doing things by yourself for relaxation or pleasure? | | | te | re | or cannot do | | | |
| | General Disability Score (Total): | | | | | | | ---- 180 | ---- 5 |

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**APPENDIX H**

**WHOQOL-BREF**

The following questions ask how you feel about your quality of life, health, or other areas of your life. I will read out each question to you, along with the response options. **Please choose the answer that appears most appropriate.** If you are unsure about which response to give to a question, the first response you think of is often the best one.

Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last four weeks.**

| | | Very poor | Poor | Neither poor nor good | Good | Very good |
|---|---|---|---|---|---|---|
| 1. | How would you rate your quality of life? | 1 | 2 | 3 | 4 | 5 |

| | | Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Satisfied | Very satisfied |
|---|---|---|---|---|---|---|
| 2. | How satisfied are you with your health? | 1 | 2 | 3 | 4 | 5 |

The following questions ask about **how much** you have experienced certain things in the last four weeks.

| | | Not at all | A little | A moderate amount | Very much | An extreme amount |
|---|---|---|---|---|---|---|
| 3. | To what extent do you feel that physical pain prevents you from doing what you need to do? | 5 | 4 | 3 | 2 | 1 |
| 4. | How much do you need any medical treatment to function in | 5 | 4 | 3 | 2 | 1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | your daily life? | | | | | |
| 5. | How much do you enjoy life? | 1 | 2 | 3 | 4 | 5 |
| 6. | To what extent do you feel your life to be meaningful? | 1 | 2 | 3 | 4 | 5 |

| | | Not at all | A little | A moderate amount | Very much | Extremely |
|---|---|---|---|---|---|---|
| 7. | How well are you able to concentrate? | 1 | 2 | 3 | 4 | 5 |
| 8. | How safe do you feel in your daily life? | 1 | 2 | 3 | 4 | 5 |
| 9. | How healthy is your physical environment? | 1 | 2 | 3 | 4 | 5 |

The following questions ask about how completely you experience or were able to do certain things in the last four weeks.

| | | Not at all | A little | Moderately | Mostly | Completely |
|---|---|---|---|---|---|---|
| 10. | Do you have enough energy for everyday life? | 1 | 2 | 3 | 4 | 5 |
| 11. | Are you able to accept your bodily appearance? | 1 | 2 | 3 | 4 | 5 |
| 12. | Have you enough money to meet your needs? | 1 | 2 | 3 | 4 | 5 |
| 13. | How available to you is the information that you need in your day-to-day life? | 1 | 2 | 3 | 4 | 5 |
| 14. | To what extent do you have the opportunity for leisure activities? | 1 | 2 | 3 | 4 | 5 |

| | | Very poor | Poor | Neither poor nor good | Good | Very good |
|---|---|---|---|---|---|---|
| 15. | How well are you able to get around? | 1 | 2 | 3 | 4 | 5 |

| | | Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Satisfied | Very satisfied |
|---|---|---|---|---|---|---|
| 16. | How satisfied are you with your sleep? | 1 | 2 | 3 | 4 | 5 |
| 17. | How satisfied are you with your ability to perform your daily living activities? | 1 | 2 | 3 | 4 | 5 |
| 18. | How satisfied are you with your capacity for work? | 1 | 2 | 3 | 4 | 5 |
| 19. | How satisfied are you with yourself? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20. | How satisfied are you with your personal relationships? | 1 | 2 | 3 | 4 | 5 |
| 21. | How satisfied are you with your sex life? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22. | How satisfied are you with the support you get from your friends? | 1 | 2 | 3 | 4 | 5 |
| 23. | How satisfied are you with the conditions of your living place? | 1 | 2 | 3 | 4 | 5 |
| 24. | How satisfied are you with your access to health services? | 1 | 2 | 3 | 4 | 5 |
| 25. | How satisfied are you with your transport? | 1 | 2 | 3 | 4 | 5 |

The following question refers to how often you have felt or experienced certain things in the last four weeks.

| | | Never | Seldom | Quite often | Very often | Always |
|---|---|---|---|---|---|---|
| 26. | How often do you have negative feelings such as blue moods, despair, anxiety, depression? | 5 | 4 | 3 | 2 | 1 |

**Do you have any comments about the assessment?**

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**APPENDIX I**

Lokwalo lwa kitsiso

Ke nna Rorisang Tsheole, ke moritwana wa thutokgolo ya Witwatersrand ko ke ithutelang lokwalo la Masters ya tshidillo ya mmele. Jaaka karolo ya dithuto tsame ke dira diphitlelelo tsa bogole mo badiring ba moepo wa Impala Platinum ba ba nang le botlhoko jwa mokokotlo. Diphitlelelo ke go kgobokanya kitso go fitlhelela le go araba dipotso. Ke a go mema go tsaya karolo mo thutong ya diphitlelelo.

E na ke thuto ya cross-sectional ya quantitative, mo dipotso ts dipalo palo ta batho go ya ka lefelo le tsa index ya bogole e ikaegileng ka index ya bogole ya Oswestry, WHODAS II le WHOQol- Bref tseo di tla dirwang ka mokgwa wa interview. Go tla tsaya metsotso e +/- 25, dipotso di tla botswa ka maleme a a lateng Setwana, IsiXhosa le XiShangaan.

Ga go kotsi kgotsa diteko tse di tla dirwang mo ba tsaya karolong. Diphitlelelo tsotlhe tse di phutiwang e tla nna khupamarama. Ga go moputso ope oo maleba, mme dipholo tsa thuto di tla dira gore kitso ya botlhoko ba mokotla le kitso ya phemelo kgatlanong le ditlamorago tse dikgolo magareng ga badiri.

Khupamarama e tla nna teng mo dibukaneng tsa dipotso, dinomore di tla dirisiwa mo boemong jwa maina kgotsa kitso ka batsaya karolo.

Ga o na le dipotso gongwe o tlhoka kitso e e tseneletseng ka projeke e ya diphitlelelo, o seke wa okaoka go ntletsa mogala mo go 014 569 4808, 083 925 2864 kgotsa 0 ka kwalela go rorisang.tsheole@implats.co.za

Ga o ka nna le dingongorego, ka tsweetswee ikopanye le modula setilo wa komiti ya ethics ya sekolo sa thuto kgolo sa Witwatersrand, Profesa Cleaton-jones mo go 011 717 2301 kgotsa o mo kwalele mo go peter.cleaton-jones@wits.ac.za gongwe mokwaledipharephare Ms Zanele Ndlovu 011 717 1234 kgotsa mo kwalele mo go zanele.ndlovu@wits.ac.za

Ga o na le keletso ya go tsaya karolo mo thutong e, tsweetswee buisa mme o saene foromo ya tetlelelo

Ke a leboga

Rorisang Tsheole

Foromo ya tetlelelo

Nna ..... (maina ka botlalo)

Ke dumela go tsaya karolo mo thutong ya diphitlelelo e e dirwang ke Rorisang Tsheole jaaka e tlhalositswe mo lokwalo lwa kitsiso, lo ke le baletsweng ka be ka le tlhalosetswa.

..... .....

Tshaeno

.....

Letlha

**Demographic Questionnaire**

Dira letshwao mo lebokosong le le maleba.

Monna ☐

**Dingwaga**

20 – 35 ☐ 36 – 45 ☐ 46 – 60 ☐

**Dingwaga mo tirong**

1 – 5 yrs. ☐ 6 – 15 yrs. ☐ 16 – 30 yrs. ☐

**Tiro**

Rock Drill Operator ☐ Scrap Winch Operator ☐

**Oswestry Low Back Pain Disability Questionnaire**

**Ditaelo**

Lekwalo potso le, le diretswe go neela ka kitso ka moo botlhoko ba mokokotlo kgotsa leoto bo go kgoreletsang ka gone mo ditirong tsa gago tsa letsatsi. Ka kopo araba ka go dira letshwao mo bokising e le NNGWE mo karolwaneng engwe le ngwe. Re lemoga gore kgonagalo ya gore dintlha tse di tsamaisanang le maikutlo a gago di ka feta e lengwe, fela re kopa gore o tlhope ntlha ee tlhalosang bothata ba gago go fetisisa.

**Karolo 1 – Go tsenelela ga botlhoko**

- ☐ Ga kena setlhabi mo motsotsong o
- ☐ Setlhabi se kwa tlase mo motsotsong o
- ☐ Setlhabi se mo magareng mo motsotsong o
- ☐ Setlhabi ga se a tsenellang thata
- ☐ Setlhabi se se tseneletseng mo motsotsong o
- ☐ Setlhabi se se feteletseng mo o ka naganang ka teng mo motsotsong o

**Karolo 2 – Go itlhokomela [go tlhapa, jalojalo]**

- ☐ Ke kgona go otlhokomela sentle ke sa tsose ditlhabi
- ☐ Ke kgona go itlhokomela fela ke tsogelwa ke ditlhabi
- ☐ Go itirela go ntsosetsa ditlhabi gape ke bonya
- ☐ Ke kgona go itlhokomela fela ke tlhoka thuso
- ☐ Ke tlhoka thuso ka malatsi otlhe go itlhokomela
- ☐ Ga ke kgone go ikapesa, ke tlhapa ka boima ke le mo bolaong

**Karolo 3 – Go kuka**

- ☐ Ke kgona go kuka boima gontle le setlhabi sepe
- ☐ Ke kgona go kuka boima fela go ntsosetsa ditlhabi
- ☐ Setlhabi se nkgoreletsa go kuka dilo tse boima go tswa fatshe, go botoka fa di beilwe sentle, jaaka fa godimo ga tafole
- ☐ Setlhabi se nkgoreletsa go kuka boima, ke kgona fela fa boima bo le botlhofo e bile di beilwe sentle

☐ Ke kgona go kuka dilo tse di botlhofo fela

☐ Gake kgone go kuka sepe gotlhelele

**Karolo 4 – Go tsamaya***

☐ Setlhabi ga se nkgoreletse go tsamaya sekgala

☐ Setlhabi se nkgoreletsa go tsamaya go feta sekgala sa 1 maele

☐ Setlhabi se nkgoreletsa go tsamaya ½ maele

☐ Setlhabi se nkgoreletsa go tsamaya sekgala sa 1maele

☐ Ke kgona go tsamaya ka thuso ya di ikokotlelo

☐ Ke fetsa nako e ntsi ke le mo bolaong

**Karolo 5 – Go nna**

☐ Ke kgona go nna fatshe mo setulong nako e telele

☐ Ke kgona go nna fatshe sebaka se ke se ratana

☐ Setlhabi se nkgoreletsa go nna go feta ura

☐ Setlhabi se nkgoreletsa go nna go feta 30min

☐ Setlhabi se nkgoreletsa go nna go feta 10min

☐ Setlhabi se nkgoreletsa go nna fstshe gotlhelele

**Karolo 6 – Go ema**

☐ Ke kgona go ema sebaka gontle le go itsosetsaditlhabi

☐ Ke kgona go ema sebaka se ke se batlang fela ke tsogelwa ke ditlhabi

☐ Setlhabi se nkgoreletsa go ema go feta ura

☐ Setlhabi se nkgoreletsa go ema go feta metsotso ele 30

☐ Setlhabi se nkgoreletsa go ema go feta metsotso ele 10

☐ Setlhabi se nkgoreletsa go ema gotlhelele

**Karolo 7 Go robala**

☐ Boroko ba me ga bo nke bo kgoreletswa Ke ditlhabi

☐ Boroko ba me bo a tle bo kgoreletswe ke ditlhabi

☐ Ka ntlha ya setlhabi ke robala diura tse disa feteng 6

☐ Ka ntlha ya setlhabi ke kgona go robala fela go feta ura tse pedi

☐ Setlhabi se nkgoreletsa go robala gotlhelele

**Karolo 8 – Tsa thobalano [if applicable]**

- ☐ Thobalano ya me e siame, ga e ntsosetse ditlhabi
- ☐ Thobalano ya me e siame fela e ntsosetsa ditlhabi
- ☐ Thobalano e batla di siame fela e le botlhoko
- ☐ Thobalano e kgoreletswa ke ditlhabi tse di tseneletseng
- ☐ Thobalano ga e diragale ka ntlha ya ditlhabi
- ☐ Ditlhabi di kgoreletsa thobalano gotlhelele

**Karolo 9 – Boitapoloso**

- ☐ Tsa boitapoloso di siame ga di tsose ditlhabi
- ☐ Tsa boitapoloso di siame fela di nkokeletsa ditlhabi
- ☐ Ditlhabi ga dina tshusumetso epe mo tsa boitapoloso kwantle ga go fokotsa kgatlego le maatla [metshamekong]
- ☐ Setlhabi se kgoreletsa tsa boitapoloso, ga ke kgone go ikentsha
- ☐ Setlhabi se dira gore tsa boitapoloso ke di direle fela kwa lapeng
- ☐ Ga kena boitapoloso ka ntlha ya setlhabi

**Karolo 10 Tsa maeto**

- ☐ Ke kgona go tsaya leeto gotlhe gontle le ditlhabi
- ☐ Ke kgona go tsaya leeto gongwe le gongwe fela go ntsosetsa ditlhabi
- ☐ Setlhabi se masisi fela ke kgona go tsaya leeto mo ureng tse pedi
- ☐ Ka ntlha ya setlhabi ke kgona maeto a ka fa tlase ga ura fela
- ☐ Ka ntlha ya setlhabi ke kgona maeto a ka fa tlase ga metsotso ele 30

**WHODAS 2.0**

**World Health Organization Disability Assessment Schedule 2.0**

**36-item version, self- administered**

Lekwalo potso le,le botsa ka mathata ya pholo le botekanelo ba tlhaloganyo. Pholo e akareletsa bolwetsi kgotsa bothata bongwe ba pholo bo ka nna bokhutswane kgotsa boleele, dikgobalo, bokoa ba tlhaloganyo kgotsa maikutlo,bothata ba nnotagi kgotsa diritibatsi. Nagana mo malatsing a le 30 aa fetileng, o arabe dipotso o nagana ka boima bo o nnileng le bone go dita ditiro tse di latelang. Ka kopo tshwanya ntlha e le ngwe.

| | | | | | | | ***Clinician Use Only*** | | |
|---|---|---|---|---|---|---|---|---|---|
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | | | |
| Mo malatsing a 30 a fetileng, go nnile boimama bo bo kae mo go: | | | | | | | | | |
| **Go utlwisisa le go tsaya motlotlo** | | | | | | | score | Domain | score |
| D1.1 | Concentrate on doing something for ten minutes? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | ----<br>30 | ----<br>5 |
| D1.2 | Go gakologelwa go dira tsedi botlhoka? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D1.3 | Go sedidisa le go rarabolola mathata a letsatsi le letsatsi? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D1.4 | Go ithuta dilo tse dintsha, jaaka go ya lifelong le le ntsha? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D1.5 | Go tlhaloganya se se buiwang ka kakaretso? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D1.6 | Go simolola le go tsweletsa motlotlo? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| **Go fitlhelela tikologo** | | | | | | | | | |
| D2.1 | Go emelela sebaka se ka nna30 minutes? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D2.2 | Go emelela go tswa mo fatshe? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D2.3 | Go tsamaya-tsamaya mo ntlung? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D2.4 | Go tswela kwa ntle ga ntlu? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | ----25 | ----5 |
| D2.5 | Go tsamakya sekgala se se kana ka 1kilometara? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| **Go ltirela** | | | | | | | | | |
| D3.1 | Go tlhapa mmele otlhe? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D3.2 | Go apara? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D3.3 | Go ja? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | ----20 | ----5 |
| D3.4 | Go nna o le nosi malatsinyana? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| **Tirisano mmogo le batho** | | | | | | | | | |
| D4.1 | Go dirisana le batho o sa ba itse? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D4.2 | Go tsweletsa botsalano? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D4.3 | Go dirisana mmogo le ba losika? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D4.4 | Go dira setswalle se sentsha? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | ----25 | ----5 |
| D4.5 | Tsa thobalano? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |

| | | | | | | | ***Clinician Use Only*** | | |
|---|---|---|---|---|---|---|---|---|---|
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | score | Domain | domain |
| Mo malatsing a 30 a fetileng, go nnile boimama bo bo kae mo go: | | | | | | | | | |
| **Ditiro---tsa fa lapeng** | | | | | | | | | |
| D5.1 | Go dira ditiro tsa fa lapeng? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D5.2 | Go dira ditiro tsotlhe tse di botlhokwa tsa fa lapeng sentle? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D5.3 | Go dira ditiro tsotlhe tsa fa lapeng tse ditshwanetseng go dirwa? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D5.4 | Go dira ditiro tsa fa lapeng ka bonako jo bo tlhokegang? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | ----<br>20 | ----<br>5 |
| **ditiro--- tsa sekolo/mmereko** | | | | | | | | | |
| Fa o dira( o duelwa, o sa duelwe) kgotsa o tsena sekolo araba dipotso tsa d5.5-5.8 kgotsa tlolela go D6.1 | | | | | | | | | |
| Because of your health condition, in the past <u>30days</u>, how much <u>difficulty</u> did you have in: | | | | | | | | | |
| D5.5 | Tiro ya letsatsi le letsatsi kwa mmerekong/sekolong | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D5.6 | Go dira tiro e botlhokwa kwa mmerekong/sekolong sentle? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | | |
| D5.7 | Go dira ditiro tsotlhe tse o batlang go didira? | Sepe | Nya na | Goiteka netse | Thata | Gotsenel etse | | ----<br>20 | ----<br>5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D5.8 | Go dira ditiro ka bonako jo bo tlhokagalang? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| **Go tsaya karolo mo tsa semorafe** | | | | | | | | | |
| In the past 30 days: | | | | | | | | | |
| D6.1 | Ke mathata a le makae a o itemogetseng o ne fa o tshwanetse go tsaya karolo mo tsa tikologo e o nnang mo go yone ka tsela e botlhe ba kgonang jaaka tsa sedumedi le tse dingwe? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | ----<br>40 | ----<br>5 |
| D6.2 | Ke mathata a le makae a o nang le one ka ntlha ya dikgoreletsi tse di go dikaganyeditseng? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D6.3 | Ke mathata a makae a o nang le o ne,oa ikgatolosa ka ntlha ya mekgwa le dikarolo tse batho ba ditsayang? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D6.4 | O tsaya nako e kae mo boitekanelong bag ago kgotsa ditlamorago tsa bone? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D6.5 | Keg a kae o sa tsege sentle mo maikutlong ka ntlha ya boitekanelo bag ago? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D6.6 | Ke ga kae boitekanelo ba gag obo go senyetsa madi otlhe kapo a ba losika? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| D6.7 | Ke mathata a ma kae a balosika la gago ba itemogetseng o ne ka ntlha ya bokoa ba gago? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D6.8 | Ke mathata a makae a o itemogetseng one fa o tshwanetse o dire dilo ka bowena go iketla kgotsa go ijesa monate? | Sepe | Nyana | Goitekanetse | Thata | Gotseneletse | | | |
| | General Disability Score (Total): | | | | | | | ---- 180 | ---- 5 |

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**WHOQOL-BREF**

Dipotso tse di latelang di botsaka boleng jwa bophelo ba gago, boitekanelo, le dikarolo dingwe tsa botshelo bagago.Ke tla buisa dipotso le di karabo. Ka kopa tlhopa karabo e e tlhalosang bothata ba gago, fa o sa itse gore o tlhope e fe, itse gore karabo ya nltha go tla mo tlhaloganyong keyone ee nepagetseng.

Ka kopo bay a mo kelellong maemo a gago,, ditsholofelo, lethabo le matshweyego . Re kopa o nagane ka botshelo bagago **mo bekeng tse nne tse di fitileng.**

| | | Bokoa tota | Bokoa | Magareng | Bontle | Bontle tota |
|---|---|---|---|---|---|---|
| 1. | O kaatlhola yang boleng jwa boitekanelo ba gago? | 1 | 2 | 3 | 4 | 5 |

| | | Go bosula | Ga go kgotsofatse | Magareng | Go a kgotsofatsa | Go kgotsofatsa thata |
|---|---|---|---|---|---|---|
| 2. | O kgotsofetse go le go kae ka boitekanelo ba gago? | 1 | 2 | 3 | 4 | 5 |

Dipotso tse di latelang di botsa ka maitemogelo a gago mo dilo dingwe bekeng tse nne tse di fetilemg.

| | | E seng jalo | Go le gonnye | Bogareng | Thata | Mo go tseneletseng |
|---|---|---|---|---|---|---|
| 3. | Setlhabi se go kgoreletsa go le go kae go dira ditiro tse o tshwanetseng go di dira? | 5 | 4 | 3 | 2 | 1 |
| 4. | O tlhoka dipilisi/ ditlhare tse di kae go kgona ditiro tsa gago tsa letsatsi? | 5 | 4 | 3 | 2 | 1 |
| 5. | A o itumeletse bophelo ba gago? | 1 | 2 | 3 | 4 | 5 |
| 6. | A bo phelo bag ago bon a le boleng? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | E seng jalo | Go le gonnye | Bogareng | Thata | Mo go tseneletseng |
| 7. | O kgona go reetsa sentle ka tlhwafalo? | 1 | 2 | 3 | 4 | 5 |
| 8. | O itekanetse go le go kae ka bo wena? | 1 | 2 | 3 | 4 | 5 |
| 9. | Tikologo ya gago e itekenetse go le go kae? | 1 | 2 | 3 | 4 | 5 |

Dipotso tse di latelang di botsa dipotso maitemogelo a gago, kgotsa bokgoni bag ago mo ditiron gingwe mo bekeng tse nne tse di fitileng.

| | | E seng jalo | Bonnye | Magareng | Nako tsotlhe | Gotlhelele |
|---|---|---|---|---|---|---|
| 10. | O na le mafolofolo a thokagalang go tsamaisa bophelo tsatsi le letsatsi? | 1 | 2 | 3 | 4 | 5 |
| 11. | O amogetse ka moo o lebegang ka teng? | 1 | 2 | 3 | 4 | 5 |
| 12. | O na le madi a ka go kgontsang go fitlhelela ditlhokego tsa gago? | 1 | 2 | 3 | 4 | 5 |
| 13. | O kgona go fitlhelela yang e o e tlhokang tsatsi le letsatsi? | 1 | 2 | 3 | 4 | 5 |
| 14. | O kgonayang go fitlhelela monyetla wa go iketla? | 1 | 2 | 3 | 4 | 5 |

| | | Bokoa tota | Bokoa | Magareng | Bontle | Bontle tota |
|---|---|---|---|---|---|---|
| 15. | O kgona yang go fitlhelela tikologo? | 1 | 2 | 3 | 4 | 5 |

| | | Go bosula | Ga go kgotsofatse | Magareng | Go a kgotsofatsa | Go kgotsofatsa thata |
|---|---|---|---|---|---|---|
| 16. | A o kgotsofalela boroko ba gago? | 1 | 2 | 3 | 4 | 5 |
| 17. | A o kgotsofalela bokgoni ba go dira ditiro tsa letsatsi le letsatsi? | 1 | 2 | 3 | 4 | 5 |
| 18. | A o kgotsofalela bokgoni ba go dira tiro? | 1 | 2 | 3 | 4 | 5 |
| 19. | A o kgotsofalela bo wena? | 1 | 2 | 3 | 4 | 5 |
| 20. | A o kgotsofalela tsa dikamano ysa gago ka nosi? | 1 | 2 | 3 | 4 | 5 |
| 21. | O kgotsofetse ga kae ka tsa thobalano? | 1 | 2 | 3 | 4 | 5 |
| 22. | A o kgotsofalela tshegetso e ditsala tsa gago di go nayang yone? | 1 | 2 | 3 | 4 | 5 |
| 23. | O kgotsofetse go le go kae ka tikologo e o nnang mo go yona? | 1 | 2 | 3 | 4 | 5 |
| 24. | O kgotsofetse go le go kae ka phitlelelo ya tsa lefapha la pholo? | 1 | 2 | 3 | 4 | 5 |
| 25. | A o kgotsofalela tsa dipalangwa? | 1 | 2 | 3 | 4 | 5 |

Dipotso tse di latelang di botsa dipotso maitemogelo a gago go dilo dingwe mo bekeng tse nne tse di fitileng.

| | | Sepe | Sewelo | Dinako dingwe | Dinako tsotlhe | Malatsi o tlhe |
|---|---|---|---|---|---|---|
| 26. | Go a tle go diragale gore o nne le maikutlo a sa siamang, jaaka go tenega fela, go nyatsa, letshogo, go tlalelana kapo maikutlo a ritibetseng? | 5 | 4 | 3 | 2 | 1 |

**A o na le ditshwaelo ka tlhatlhobo e?**

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**APPENDIX J**

Isaziso

Molweni

Igama lam ndingu Rorisang Tsheole, ndingumfundi wesidanga seMaster's kwi Physiotherapy kwi Dyunivesithi yase Witwatersrand. Kwisidanga endisifundelayo, ndenza uphando ngokukhubazeka okubangwa ziintlungu zomqolo, kubasebenzi base Impala Platinum Mine. Oluphando luzakunceda ekuqokeleleni ulwazi olugcweleyo ngalengxaki, ngoko ke ndicela inxaxheba yakho.

Oluphando lusebenzisa imibuzo ecatshulwe nesekelwe kwi Oswestry Disability Index, WHO DAS II ne WHOQol-BREF. Lemibuzo yenzelwe nabanye abathetha iilwimi neSetswana,ne IsiXhosa zesi Shangaan . Kuya kukuthabatha imizuzu engamashumi amabini kuphela ukuphendula.

Akukho bungozi ngoluphando, kwaye ulwazi oluthe lwaqokelelwa lwakugcinwa ngokukhuselekileyo.Akukho nzuzo iyimali, kodwa inxaxheba yakho iyakunceda abaninzi bafunde lukhulu ngengxaki yomqolo, ukuyinonophela nokuziphilisa xa uthe wanayo.

Amagama abantu abathathe inxaxheba akayi kupapashwa.

Xa ungabanemibuzo okanye izikhalazo, unganditsalela umnxeba ku 014 569 4080 okanye 0839252864. Ungandithumela ne email ku rorisang.tsheole@implats.co.za

Izikhalazo ungasidlulisela kuSihlao wekomiti ye Ethics kwi Dyunivesithi ye Witwatersrand, u Professor Cleaton-Jones on (011) 71702301, email peter.cleaton-jones@wits.ac.za, okanye uAdministrator ongu Ms Zanele Ndlovu ku (011) 71701234, email zanele.ndlovu@wits.ac.za

Ubangaba unomdla wokuthatha inxaxheba, sicela utyikitye iphepha lemvume kuqala.

Enkosi

Rorisang Tsheole

Iphepha lemvume

Mna..... (amagama apheleleyo)

Ndenza isivumelwano sokuthatha inxaxheba kuphando luka Rorisang Tsheole, ngokubhaliweyo kwacaciswa kwisazizo andifundele sona.

.....

Signature

.....

Date

**Demographic Questionnaire**

Kheta ibhokisi efanelekileyo

Indoda ☐

**Iminyaka**

20 – 35 ☐ 36 – 45 ☐ 46 – 60 ☐

**Iminyaka emsebenzi**

1 – 5 yrs. ☐ 6 – 15 yrs. ☐ 16 – 30 yrs. ☐

**Umsebenzi**

Rock Drill Operator ☐ Scrap Winch Operator ☐

**Oswestry Low Back Pain Disability Questionnaire**

**Imiyalelo**

Lemibuzo yenzelwe ukuqokelela ulwazi, ngendlela iintlungu zomqolo/ zomleze ezichaphazela ngayo impilo yakho yonke imihla.Phendula ngokukhetha umqolo ochaza kakuhle imeko yakho.Kungenzeka imbemini imiqolo ekuchaza kakuhle, kodwa sicela ukhethe lowo ukuchaza ngqo.

**Section 1 – Izinqa leentungu**

- ☐ Andina ntlungu ngoku
- ☐ Intlungu zithoka incinci ngoku
- ☐ Lintlungu zikhona kodwa hayi kakhulu
- ☐ Lintlungu zivakala kakhulu
- ☐ Ndiqaqanjelwa kakhulu ngoku
- ☐ Intlungu e qaqamba ka khulu manje

**Section 2 – Ukunakekela [Ukuhlamba, ukunxiba etc.]**

- ☐ Ndingazi nakekela ngaphandle kwe ntlungu
- ☐ Ndinga zinakekela kodwa kundenzela intlungu imile
- ☐ Ku buhlungu ukuzinakekela kodwa ndiya coselela ½ imile
- ☐ Ndi dinga uncedoyonke lemihla 1e 100yard
- ☐ Ndi dinga uncedo yonke lemihla u kuzi nakekela
- ☐ Andi nxiba ndivesa nzima ndihlale e bhedini

**Section 3 – Ukuphakamisa**

- ☐ Ndinga phakamisa into enzima ngaphanle kwe ntlungu
- ☐ Ndingaphakamisa into enzima kodwandine ntlungu
- ☐ Intluku zenza ndiga kwazi ukuphakamisa into enzima Phantsi kodwa ndiga kwazi xazibekwe kakuhle e tafileni
- ☐ Intlungu yenza ndi ngakwazi u phakamisa into enzima kodwa ndingaphakamisa elula nxa ibekwe ka kuhle
- ☐ Ndinga phakamisa into elula
- ☐ Andikwazi uphakamisa kwa nto

**Section 4 – Ukuhamba***

- ☐ Intlungu a yenzi ndingakwazi uko hambha
- ☐ Intlungu yenza ndingakwazi uhambha umgema o dlula
- ☐ Intlungu yenza ndingakwazi uhamba umgema o dlula
- ☐ Intlungu yenza ndingakwazi uhamba umgema o dlula

☐ Ndi hamba nge ntonga

☐ Ndi hlala ebhedini

**Section 5 – Ukuhlala**

☐ Ndinga hlala kwi situlo endisi thandayo

☐ ndingamhlala kwi situlo endisi thandayo kakhulu

☐ Intlungu indeza ndinga kwazi uhlala u udlula 1 yure

☐ Intlungu indenza ndikwa kwazi uhlala udlula imizuzu e lishome nantathu

☐ Intlungu indeza ndinaga kwazi uhlala udlula imizuzu e lishume

☐ Intungu indenza ndika kwazi uhlala konke konke

**Section 6 – Ukuma Ngenyao**

☐ Ndingema ngo hlobo endithandayo

☐ Ndingema nge hlobo endithandayo kodwa ndi ne ntlungu ka khulu

☐ Intlungu yenza ndinga kwazi ukuma Udlula 1yure

☐ Intlungu yenza ndinga kwazi u kuma nga phezu kwe mizuzu e lishume nantathu

☐ Intlungu yenza ndinga kwazi ukuma nga phezu kwe mizuzu e lishumi

☐ Intlungu yenza ndinga kwazi ukuma konke konke

**Section 7 Ukulala**

☐ U ku lala ku phazamiswa ziintlungu

☐ U ku lala ku vomise ukuphazomiswa yi ntlungu

☐ Ngenxa ye ntlungu ndi lala nga phantsi kwe yure ezi ntandathu

☐ Ngenxa ye ntlungu ndi lala nga phantsi kwe yure e zine

☐ Ngenxa ye ntlungu ndi lala ngs phantsi kwe yure ezimbini

☐ Intlungu yenza ndinga kwazi u ku lala

**Section 8 – Ezesondo [if applicable]**

☐ Ezosondo zilungile kodwa

☐ Ezosondo zilungile kodwa zibakhona iintlungu

☐ Ndiyabelana ngesondo kodwa kababuhlungu

☐ Ezesondo ziphazanyiswa zintlungu

☐ Andifane ndabelane ngesondo ngenxa yeentlungu

☐ Intlungu zenza ndingabelani ngesondo

**Section- 9 Ukuzikhupa**

☐ U bomi bam abundiniki buhlungu

☐ U bomi bam bulungile kodwa binenzela intlungu

☐ Intlungu azindi phazamisi ka ngaphandle kwaxandifuni

☐ Iintlungu ziyabuphazima ubomibam andikwazi nokuzikhupha nabahlobo

☐ Iintlungu zenza ndisoloko ndihleli endlini

☐ Andisaphumi ndibe phakathi kwabantu ngexa yeentungu

**Section 10 Ukuthatha uhambo**

☐ Ndiya apho ndithanda khona

☐ Ndiya apho ndithanda khona,kodwa ndiphazanyiswa ziintlungu

☐ Ndiyakwazi ukuthatha uhambo lwe yure ezimbi nangoma iintlungu zindibambile

☐ Ngenxa yeentlungu ndiyohluleka luhambo o luthatha nje iyure

☐ Ngenxa yeentlungu, ndihamba nje xa kunyanzelekile, nakhona ihambo yemizuzwana

☐ Iintlungu zenza ndingayi ndawe ngaphandla kwa xa ndiyolanda amayeza

**WHODAS 2.0**

**World Health Organization Disability Assessment Schedule 2.0**

**36-item version, self- administered**

Lemibuzo imalunga nobunzima obuhambisana nokugula/ukugula ngengqondo okubangelwa zizifo kukungaphili kwe thutyana

Okanye ixesha, ngenxa yokulimala iingxaki notywala/ iziyibisi nokungaphili engqondweni/emoyeni. Cinga mvaisithuba esingaka

Ngenyamana, uphendule ngokuchaza ubunzima othe wabanabo ekwenzeni okukha nkanyiweyo, khetha impendulo ibenye qwaba

| | | | | | | | ***Clinician Use Only*** | | |
|---|---|---|---|---|---|---|---|---|---|
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | Raw Item score | Domain | Average domain score |
| Kwintsuku eziyi 30 ezidlulileyo, bukhona ubunzimz obufumanayo | | | | | | | | | |
| **Ukuqonda xa kuthethwa nawe** | | | | | | | | | |
| D1.1 | Bhekisisa into kwimizuzu elishumi? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | ----<br>30 | ----<br>5 |
| D1.2 | Ukukhumbula izinto ezibalulekileyo? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D1.3 | Ukujongana nengxaki onazo qho kubomi? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D1.4 | Ukwenza izinto ezintsha kuwe? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D1.5 | Ukuqonda xa abantu bethetha? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D1.6 | Ukuqalisa ukuxoxa? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| **Uku hamba-hamba** | | | | | | | | | |
| D2.1 | Ukuma ixeshaelide ukuyika kwimizuzuengamashumi amathathu? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | ----<br>25 | ----<br>5 |
| D2.2 | Ukuphakama/ ukusukuma isitoleni? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D2.3 | Ukujikeleza endlini? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D2.4 | Ukuphumela ngaphandle endlini yakho? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D2.5 | Ukuhamba indlela ende? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| **Ukuzinzkekela** | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D3.1 | Ukuhlamba umzimba? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D3.2 | Ukunxiba? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D3.3 | Ukutya? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D3.4 | Ukuhlala wedwa amalanga? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | ----20 | ----5 |
| **Ukuphilisana nabantu** | | | | | | | | | |
| D4.1 | Ukuxhomana nabantu ongabazi? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D4.2 | Uyakwaziukuba nomgani? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D4.3 | Ukuphilisana nabantu ohlobene nabo? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D4.4 | Ukuba nabangani abatsha? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D4.5 | Ezothando? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | ----25 | ----5 |
| | | | | | | | ***Clinician Use Only*** | | |
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | Raw item score | Domain | domain |
| Kwintsuku eziyi 30 ezidlulileyo,bukhona ubunzima obufumanayo | | | | | | | | | |
| **Ukwenza ezinto endlini** | | | | | | | | | |
| D5.1 | Thatha inxaxheba kwimimba yomzi? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D5.2 | Thatha inxaxheba egqibeleleyo kwimimba yomzi? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |
| D5.3 | Ukwenza yonke imisebenzi yomzi efuna ukwenziwa? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqi beleleyo | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D5.4 | Ukwenza imisebenzi yomzi ngokukhawuleza? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | ----20 | ----5 |
| **Ukwenza izinto emsebenzini/esikolweni** | | | | | | | | | |
| Ubangaba uyasebenza ( uyarhola, awurholi,uziqeshile) phendula imibuzo D5.5-D5.8 kungenjalo, gqithela ku D6.1 | | | | | | | | | |
| Ngenxa ye impilo, kwintsuku eziyi 30 ezidlulile,bukhona ubunzimz obufumanayo | | | | | | | | | |
| D5.5 | Imesebenzi ya se msebenzini/yesikoloyemihla ngemihla? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | ----20 | ----5 |
| D5.6 | Ukwenza umsebenzi obalulekileng/wesikolo? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D5.7 | Ukwenza umsebenzi wonke okufanelwe wenziwe? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D5.8 | Ukwnza umsebenzi ngokukhawuleza? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| **Ukuphilisana na bantu emphakathini** | | | | | | | | | |
| Kwintsuku eziyi 30 ezidlulileyo | | | | | | | | | |
| D6.1 | Zeziphi ii gxaki obenazo ekungemeleleni imiba yentlalo (ezonkolo, iidlalo etc)? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D6.2 | Zeziphi iingxaki obenazo ngenxa yemiqathango? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D6.3 | Zeziphi iinxaki obenazo ekuphileni ngesidima ngenxa yokuziphata kwabantu o phila nabo? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D6.4 | Uchithe ixrsha elingakanani kwezempilo? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D6.5 | Uhlupheke kangakanani emoyeni ngenxa yengxaki yempilo yakho? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| D6.6 | Imeko yempilo yakho iyisebenzisekangakanani imali yakho | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | okanye yomzi wakho? | | | | | | | ---- | ---- |
| D6.7 | Usapho lwakho libe nengxaki engakanani ngenxa yengulo yakho? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | 40 | 5 |
| D6.8 | Ube nengxaki engakanani ekuzenzeleni ulonwabo lakho? | Akukho | Kancini | Phakathi | Kakhulu | Ngokugqibeleleyo | | | |
| | General Disability Score (Total): | | | | | | | ---- 180 | ---- 5 |

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**WHOQOL-BREF**

Lemibuzo ilandelayo ibuzisa ngezimvo zakho ngomgangatho wobomi bakho ezimpilo nokunye Ngobomi bakho.Ndizakuku fundela umbuzo ngamnye, kanye neempendulo ongakhetha kuzo. Ndizakucela ukhethe eyona empendulo ichasa kakuhle izimvo zakho. Xa ungaqninisekanga ngempendulo, biza leyo ifike kuqala engqondweni

Xa uphendula, ukhumbule oku xhalabisayo iminqwno yakho, umgangatho owufunayo, kanye nokuko nwabisayo ngobomi bakho. Cinga esingaka ngenyanga ukuya mva

| | | Imbii ka khulu | Imbii | Iphakathi | Ilungile | Ilungile ka khulu |
|---|---|---|---|---|---|---|
| 1. | Ungayiqikelela kanjani imeko yempilo yakho? | 1 | 2 | 3 | 4 | 5 |

| | | Andonelisekanga ka khulu | Andonelisekanga | Iphakathi | Ndonelisekile | Ndonelisekile ka khulu |
|---|---|---|---|---|---|---|
| 2. | Ukholiseke kanjani yimeko yempilo yakho? | 1 | 2 | 3 | 4 | 5 |

Lemibuzo ilandelayo imalungu nokuba okubaliweyo kukwehlela kanganani

| | | Konke-konke | Ka ncinci | Phakathi | Kakhulu | Ngokugqibeleleyo |
|---|---|---|---|---|---|---|
| 3. | Kukwesiphi isigaba apho iintlungu zikuthintela ukwenza imisebenzi yakho? | 5 | 4 | 3 | 2 | 1 |
| 4. | Ufuna amachizaakanani ukuze ukwazi ukwenza umsebenzi wakho? | 5 | 4 | 3 | 2 | 1 |
| 5. | Uchebeleza kangakanani empilweni yakho? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6. | Kukwesiphi isithuba apho una impilo yakho ixabisekile? | 1 | 2 | 3 | 4 | 5 |

| | | Konke-konke | Ka ncinci | Phakathi | Kakhulu | Ngokugqib eleleyo |
|---|---|---|---|---|---|---|
| 7. | Ukwazi kangakanani ukuikelela? | 1 | 2 | 3 | 4 | 5 |
| 4 | Uzivaukhuseleke kangakanani empilweni yakho? | 1 | 2 | 3 | | |
| 9. | Umzimba wakho uphile kangakanani? | 1 | 2 | 3 | 4 | 5 |

Lemibuzo ilandelayo imalungu

| | | Konke-konke | Ka ncinci | Phakathi | Kakhulu | Ngokugqib eleleyo |
|---|---|---|---|---|---|---|
| 10. | Unwo amandla okwenza umsebenzi wemini? | 1 | 2 | 3 | 4 | 5 |
| 11. | Uyayamnkela imeko yomzimba wakho? | 1 | 2 | 3 | 4 | 5 |
| 12. | Unemali eyaneleyo ukufeza iingxaki zakho? | 1 | 2 | 3 | 4 | 5 |
| 13. | Lukho kangakanani ulwazi lwempilo yakho yemihla ngemihla? | 1 | 2 | 3 | 4 | 5 |
| 14. | Ungcebeleka kangakanani empilweni yakho? | 1 | 2 | 3 | 4 | 5 |

| | | Imbii ka khulu | Imbii | Iphakathi | Ilungile | Ilungile ka khulu |
|---|---|---|---|---|---|---|
| 15. | Ukwazi kangakanani ukukhululeka? | 1 | 2 | 3 | 4 | 5 |

| | | Andonelisekanga ka khulu | Andonelisekanga | Iphakathi | Ndonelisekile | Ndonelisekile ka khulu |
|---|---|---|---|---|---|---|
| 16. | Uyonela na xa uleleebusuku? | 1 | 2 | 3 | 4 | 5 |
| 17. | Uyonelana ukwenzaiisebenzi yakho yemini? | 1 | 2 | 3 | 4 | 5 |
| 18. | Unawo na amandla okwenza umsebenzi wakho? | 1 | 2 | 3 | 4 | 5 |
| 19. | Womela kangakanani yimeko yempilo yakho? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 20. | Woneliseka kangakanani ngonxebelelano nabantu? | 1 | 2 | 3 | 4 | 5 |
| 21. | Woneliseka kangakanani ngezothando? | 1 | 2 | 3 | 4 | 5 |
| 22. | Woneliseka kangakanani ngenxaso oyifumanayo kubantu ophila nabo okanyeabangani? | 1 | 2 | 3 | 4 | 5 |
| 23. | Woneliseka kangakanani ngemekoyendawo ohlala kuyo? | 1 | 2 | 3 | 4 | 5 |
| 24. | Ufikella kanjani kunceto lezempilo? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

Lemibuzo ilandelayo imalungu

| | | Soze | Ngelinye ixesha | Gamanye amaxesha | amaxeshaathile | Ionke ixesha |
|---|---|---|---|---|---|---|
| 26. | Kukangakanani apho uzifumana udakumbile emphefumlweni? | 5 | 4 | 3 | 2 | 1 |

Ingaba unemibuzo ngoluvavanyo**?**

**----------**

**----------**

**APPENDIX: K**

**Papila ra vuxokoxoko**

Vita ra mina i Rorisang Tsheole ni mudyuondzi a xikolo nkulu xa Witwatersrand, sweswi ni endla degree nkulu ya vitioli ka leswi ni swi dyondzaka ni endla ndzovisiso hiku vaviseka/ ku lemala ka va tirhi va le mugodini wa Impala lava va kumeka ku va khomiwa hitwi tlhavi swa le nhlaneni. Ndzavisiso lowu iku lava xikongomelo naku hlengela vuxokoxoko lebyibyinga tirhisiwako ku minaka nkulu na mirhamba kurhi miva xiphemu eka ndzavisiso lowu

Lowu ndzavisiso lowu ngata endliwa hiswi phemu hiku hambana ka swilo kuya hi swivutiso leswi nga hlanganisiwa hi Oswestry Disability Index, WHO DAS II ne WHOQoL-BREF wuta endliwa hi swivutiso leswi swinga tekaka +/-25min ku heta swivutiso, sevutiso leswi switava hi tindzimi to nambana Setswana, IsiXhosa ne XiShangaan.

Ndzavisiso lowu awana mbuyelo lowuwunga maxaka kumbe vukamberi emirhini wa lava ngata va ha xiavi, vuxoko xoko hinkwabyo lebyingata hlengeletiwa ibya xihundla. A ku ngavi na hakelo ku endla leswi, mbuyelo wa ndzavisiso leyi wunga pfuna ku endla vanhu va va tiva hi switlhavi wa nhlane na ku kota ka hunguta nhlayo ya va khumbiwa.

Ka kota ku swi nga humeli rivaleni ka vanhu lavanga ta teka swivutiso leswi kuta tirhisiwa ti nomborho kahandle ka mavito

Loko miri naswi vutiso kumbe ku tiva vuxokoxolo hi ndzavisiso lowi fonelani 014 569 4080, 083 925 2864 kumbe e-mail rorisang.tsheole@implats.co.za

Loko miri naswi vilelo tihlanganiseni na mutshama xitulu xa xikolo nkulu xa Witwatersrand professor Cleaton-Jones (011) 7171 2301, e-mail peter.cleaton-jones@wits.ac.za or administrator Ms Zanele Ndlovu ku (011) 717 1234, e-mail zanele.ndlovu@wits.ac.za

Loko milava ku nghenela ndzavisiso lowu hayani ivi mi sayina ka papile leringa khomana na papilla leri.

Makhensa

Rorisang Tsheole

**Papile khomana**

Mina ..... (mavito)

Na pfumela kuva xiphemu xa ndzavisiso lowu endliwaka hi Rorisang Tsheole leswi swinga tsariwa eka papila leri ra vuxokoxoko leri ninga hlaya vatlhe vani hlamusela

.....

Ku siyiniwa

**Swivutiso**

Endla √ a bokisini

Wanuna ☐

**Malembe ya wena**

20 – 35 ☐ 36 – 45 ☐ 46 – 60 ☐

**Malembe lama unga matirha**

1 – 5 yrs. ☐ 6 – 15 yrs. ☐ 16 – 30 yrs. ☐

**Ntiro wa wena**

Rock Drill Operator ☐ Scrap Winch Operator ☐

**Oswestry Low Back Pain Disability Questionnaire**

**Maendlelo**

Swivutiso lei engilwe ko ko nyeka ndwodo yak o re mo kanye na nenge e nyenga kore e ka se kote ko tira e nkarene. Ne kombela ko re me tlhamola he ko cheka bokisi na nthamolo lei e me terelako. He bonile swa kore kona tentlhamolo tembere kanye le to tala le te welako ka ngwena, mara wena khetha nyengwe ntsena.

**Xiphemu 1 – Ko vava**

- ☐ Anitwi ko vava sweswi
- ☐ Ku vava ku twakalela hansi
- ☐ Ku vava ku kona mara ku betere
- ☐ Ku vava ku twakala ngopfu
- ☐ Ku vava ku twakala swinene ngopfu
- ☐ Ku vava ku twakala himatimba

**Xiphemu 2 – Kuti hlayisa [ku hlamba, kuabola etc.]**

- ☐ Na ti hlayisa a handle koti ne ko vavisa
- ☐ Na ti hlahisa mara kwa vava
- ☐ Kwa vava ko te hlogomela he ko ba ha ne hatlese
- ☐ Ni lava ko pfuniwa mara kuva ne endla swilo
- ☐ Ni lava ku pfuniwa masiku hi nkwawo
- ☐ Ni tsandeka ku ambala noti hlambis ni tshama ni etlele

**Xiphemu 3 – Ko tlakola**

- ☐ Ne tlakola swelo so teka kwa handle no ko twa ko baba
- ☐ Ne tlakola swelo so teka mara ne twa ko baba
- ☐ Ku vava ku endla ni tsandeka ka tlakula swilo no veka a hansi, mara nakota ku veka atafuleni
- ☐ Ko baba ko endla ko re ne tsanda he ko tlakola swelo so teka, kanye na swe kota ko tlakola le swe ngwa teka ngofhu lo swe bekenele katlhe
- ☐ Na swe kota ko tlakola swelo
- ☐ A ne swe kota ko tlakola ntshomo

**Xiphemu 4 – Ko famba**

- ☐ Ku vava ha ku ne tlhophe lo ku ne famba

☐ Ku vava ko endla ko re ne tlholeka famba ku henda 1 mile

☐ Ku vava ko endla ko re ne tlholeke ko famba ku henda ½ mile

☐ Ku vava ko endla ko re ne tlholeke ko famba ku henda 100 Yards

☐ Ni kota ku famba lo ko ne teresa nhonga

☐ Ni tshamani etlelelr nkavhi hinkwawo

**Xiphemu 5 – Ku tshama**

☐ Na se kota ko tshoma a shitolwene lo ko ne swe laba

☐ Na se kota ko tshama a shitolwene le she ne she radzako

☐ Ko baba ko ne tsandisa ko tshama ko henda hora

☐ Ko baba ko ne tsandisa ko tshama ko henda 30 timenete

☐ Ko baba ko ne tsandisa ko tshoma ko henda 10 timinete

☐ Ko baba ko ne tsandisa ko tshoma

**Xiphemu 6 – Ku nyima**

☐ Na sekota ku nyima ne ngatwe ku vava

☐ Na sekota ku nyima kanye ne twa ku vava

☐ Ko vava ku ne tsandisa ko nyima ko henda hora

☐ Ku vabu ku ne tsandisa ko nyima ko henda 30 timinete

☐ Ku vava ku ne tsandisa ko nyima ku henda 10 timinete

☐ Ku vava ku ne tsandisa ku nyima

**Xiphemu 7- Kuetlela**

☐ Na tlela na loko ko vava

☐ Na tlela kanye ko vava nkare o ngwanyane kwa wakala

☐ Ne tlela less 6 hours he rebanga ra ko vava

☐ Ne tlela less 4 hours he rebanga ra ko vava

☐ Ne tlela kohenda 2 hours he rebanga ra ko vava

☐ Ko vava ko ene tsandisa ko tlela

**Xiphemu 8 – Vutomi bya masangu**

☐ Ko tlela na mono ko baba ko naba

☐ Ko tlela na mono ko endla ko re netwa ko baba

☐ Ko tlela na mono ko endla ko re ne twa ko baba ngofhu

☐ Na thloleka ko tlelana mona he makene ya ko baba

☐ Ko baba ko endla ko re ne tsandeka ko tlela na mono

**Xiphemu 9- Ku hanyisana na vanwani**

- ☐ Ku hanya ka mina na bangwanyane ha ko endle ku vava
- ☐ Ku hanya ka mina na bangwanyane ko ndle ku re ne twe ko baba
- ☐ Ku vava ha ko endle ntshoma lo ko ne ka re ne hanya na bangwane kanye ne fanele lehongota metlango
- ☐ Ko vava ku endla ku re nenga hanye na bangwanyane
- ☐ Ku vava kuni tsandisa ku hanya newanwani
- ☐ Ha ne sekote ko hanya na bangwanyane e mmaka yako vava

**Xiphemu 10- Ku vhakela kule**

- ☐ Ne ye ko ngwane na ko ngwane kwa handla ha ku vava
- ☐ Ne ye ko ngwane na ko ngwane kanye kwa vava
- ☐ Ko vava kwa twakala kanye na swekota ko ya le na le ko henda 2 awara
- ☐ Ko vava ko endla ko re ne tsandeka ko ya le na le less na hora
- ☐ Ko vava ko endla ko re ne ngaye a kole less 30 watiminetse
- ☐ Ku vava ko endlako re ne nganye le ha le kanye ne fa nele le koma treatment

**WHODAS 2.0**

**World Health Organization Disability Assessment Schedule 2.0**

**36-item version, self- administered**

Swivutiso leswi swi vutisa hi rihanya ra nhloko na mihleketo ya nwina rihannwi swikatsa mavabyi na swi nwana leswi tsanisaka rihanyu nkarhi wu ntsongo kumbe wo leha, kuvaviseka, vuvabyi bya miehleketo vuvabyi bya moya, na ku karata hi swipyopyi kumbe swi dzidziharisi hleketa ndzhaku masiku ya 30 lamanga hinda iri hlamula swivutiso leswi ku vutomi byi kutikelo kwi.

| | | | | | | | ***Clinician Use Only*** | | |
|---|---|---|---|---|---|---|---|---|---|
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | Raw item score | Domain | Average domain score |
| Eka masiku ya 30 lamahindeke u ikeriwe ku fika kwi ka leswi landzelaka | | | | | | | | | |
| **Ku twisiso no hlamusela** | | | | | | | | | |
| D1.1 | Kuhleketa nkari woleha u endla swinwani? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | ---- 30 | ---- 5 |
| D1.2 | Kuhleketa ku endla swilo swa nkoka? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| D1.3 | Ku hlela no kuma nhlamulo va swimpiqo swa siko na siko? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| D1.4 | Ku ndonda swilo swi ntshwa,xikombiso-ku kuma dzawo yintshiwa yotshamo? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D1.5 | Ku twisisaleswi vanhu va swi vulaku? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D1.6 | Kusungula no yisa mahlweni mahungu ? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| **Ku famba famba** | | | | | | | | | |
| D2.1 | Kuyima nkari wo leha kumbe 30 wa timinetse? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | ----25 | ----5 |
| D2.2 | Ku yima loko awu tshame hansi? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D2.3 | Ku famba famba ndzeni ka yindlu? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D2.4 | Ku huma e ndlwini ya wena? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D2.5 | Ku famba nkari wo lela kumbe tikilometara (kumbe ku hindza))? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| **Ku ti hlayisa** | | | | | | | | | |
| D3.1 | Ku hlamba mirhi hinkwawo? | A swi tiki | swetika | swetikelela | switika | Natsandeka | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | nya na | | ngopfu | | | | |
| D3.2 | Ku ti ambexa? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | ---- 20 | ---- 5 |
| D3.3 | Ku dya? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| D3.4 | Ku tshama uri wexe masiku nyana? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| **Ku hanyisana ni vanwana vanhu** | | | | | | | | | |
| D4.1 | Ku hanyisana na vanhu lava unga vativeku? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | ---- 25 | ---- 5 |
| D4.2 | Ku hlayisa vunghana? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| D4.3 | Ku kwanana na vanhu lava ungava tolovela ngopfu? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| D4.4 | Ku endla vunghana? | A swi tiki | swet ika nya na | swetike lela | switik a ngopf u | Natsande ka | | | |
| D4.5 | Timhaka ta masangu? | A swi tiki | swet ika | swetike lela | switik a | Natsande ka | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | nya na | | ngopf u | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ***Clinician Use Only*** | | |
| Numeric scores assigned to each of the items: | | 1 | 2 | 3 | 4 | 5 | Raw Item score | Domain | domain |
| Maseko a 30 a o tsandeka njane: | | | | | | | | | |
| **Vutomi bya lekaya** | | | | | | | | | |
| D5.1 | Ku tlhongomela swilo meva muti wawena? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | ----20 | ----5 |
| D5.2 | Ku endla swa nkoka e baya kahle? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D5.3 | Ku endla mintirho hinkwayo yale kaya leyi yi faneleke ku edliwa? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D5.4 | Ku endla mitirho hinkwayo yale kaya hixi hatla? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| **Vutomi-swale xikolweni/ antirhweni** | | | | | | | | | |
| Lo ko e tirha (vaku nakela, ungahakeriwi, kumbe wati tirha,kumbe uya exikolweni) ta tesela kaD5.5—D5.8, a hanse<br>Kanye tlolela a ka D6.1. | | | | | | | | | |
| He ko sa ao babjwa a masekweni a30 la nga hundza, a sweteka na: | | | | | | | | | |
| D5.5 | Swasikuna siku a xikolweni/ antirhweni? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| D5.6 | Ku endla ntirho wankoka wa xikolweni/antirhweni? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | ----20 | ----5 |
| D5.7 | Ku endla ntirho wa wena wuhelela lowu ulavaku ku wuendla? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D5.8 | Ku endla tirho wa wena hinkarhi hixihatla? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| **Ku va xiphemu ka swilo swa muganga** | | | | | | | | | |
| A maseko a30 : | | | | | | | | | |
| D6.1 | Swi ku nyike xiphiqo kufika kwi kuva ungenele swilo swale mugageni (xikombiso swa kereke, mintlangu) ku fana niva nwana vanhu? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | ----40 | ----5 |
| D6.2 | U na swiphiqo ku fika kwi leswi swika tsandisaku/ kuku pfalelelaka? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D6.3 | U na swiphiqo ku fika ku hannya uri nadzuki hi maka ya mahanyelo kambe ma edlelo yava nwani? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D6.4 | U na nkarhi ku fika kwi u langutane nari hanyi ra wena kumbe I swi phiqo? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D6.5 | U na nkarhi ku fika kwi rihango ra wena ri khumba rihanyo ra moya? | A swi tiki | swetikanyan | swetikelela | switikangopf | Natsandeka | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | a | | u | | | | |
| D6.6 | Rihanyu ra wena ra khumba swati mali ta wena ku fika kwi? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D6.7 | Vandyangu wa wena vana swiphiqo hi rihanyo ra wena? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| D6.8 | U na xiphiqo ku fika kwi kuti endlela swakahe, ku wisa ku mbe kuti tsakisa? | A swi tiki | swetikanyana | swetikelela | switikangopfu | Natsandeka | | | |
| | General Disability Score (Total): | | | | | | | ---- 180 | ---- 5 |

**WHOQOL-BREF**

Swivutiso le swi landzelayo swi vutisa kore etetwa o re njane a rehanyene ra wena, kanye na swa rehanyo ra wena. Neta hlaya meboteso n ate nhlamolo. Ne kombela ko re e khetha nhlamolo wa wena. Lo ko a re a she kare, nhlamolo yo songola he yona ya kahle

He kombela kore e hleketa kahle. E hleketa he re hanyo ra wena a mawekene a mono leo a hendzako

| | | Ko biha ngopfu | Ko biha | A xikari | Ku lungile | Ku lungile ngopfu |
|---|---|---|---|---|---|---|
| 1. | E vona ri hayo ra wena ri ri njane? | 1 | 2 | 3 | 4 | 5 |

| | | A to khotsovhala ngofhu | Ha o khotsovhala | A xikare | Ko khotsovhala | Ko khotsovhala ngovhu |
|---|---|---|---|---|---|---|
| 2. | Wa tsakisiwa he re hanyo ra wena? | 1 | 2 | 3 | 4 | 5 |

Swivutiso le swi landelaku swi vutisa ku u tikwa njane hi swilo leswi unga swi dyondza a mavhikue lana mone la na hudzeka.

| | | Anitsandeki | Ka tsongonyana | Ka tsongo | Ngopfu | Ngopfu-ngopfu |
|---|---|---|---|---|---|---|
| 3. | Ku fikelwa kwi ku vava a mirhini kuku sivela ku endla leswi u swi lavaka? | 5 | 4 | 3 | 2 | 1 |
| 4. | U lava miri kumbe kupfuneka hi swarihanyu kuri u fikelele swa siku? | 5 | 4 | 3 | 2 | 1 |
| 5. | Re hanyo ra wena re kahle? | 1 | 2 | 3 | 4 | 5 |
| 6. | U takalarihanyo ra wena enehla | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | na? | | | | | |

| | | Anitsandeki | Ka tsongonyana | Ka tsongo | Ngopfu | Ngopfu-ngopfu |
|---|---|---|---|---|---|---|
| 7. | Wa swi kota ku hleketa no yindisela nkari wo leha? | 1 | 2 | 3 | 4 | 5 |
| 8. | U titwa uhlayisekile evutonwini bya wena hi masiku hi nkwawo? | 1 | 2 | 3 | 4 | 5 |
| 9. | Laha tshamaka kona u basile na ku fikela rihanyo rawena? | 1 | 2 | 3 | 4 | 5 |

Meboteso le e landzelako e botesa swa kore a me endla swelo swe ngwane ka njane a mavekeng a mone a hondzako.

| | | Anitsandeki | Ka tsongonyane | Ka tsongo | Ngopfu | Ngopfu-ngopfu |
|---|---|---|---|---|---|---|
| 10. | Una matimba yak u endla swilo swa masiku hikwawa? | 1 | 2 | 3 | 4 | 5 |
| 11. | Wa amukela leswi mirhi wa wena wunga xiswona? | 1 | 2 | 3 | 4 | 5 |
| 12. | Una mali yo ringanela kufikela swilo lesei u swilavaku? | 1 | 2 | 3 | 4 | 5 |
| 13. | Wa swi kota ku kuma vuxokoxoko byo ku hanyisa hi swa siku na siku? | 1 | 2 | 3 | 4 | 5 |
| 14. | Ku fikela kwi kumbe wa kuma nkarhi wo endla vuti ololi byo ti | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | tsakisa? | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Ko beha ngofhu | Ko beha | A shekare | Ko longa | Ko longa ngofhu |
| 15. | Wa swekota ko famba famba? | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Aswini tsakisa swinene | Aswini tsakisa | Aswini tsakisa kumbe swanitsakisa | Swanitsakisa | Swanitsakisa ngopfu |
| 16. | Wa kolwa hivurhongo loko u etlela? | 1 | 2 | 3 | 4 | 5 |
| 17. | Wa tsakisiwa hi leswi uswi endlaku masiku hinkwawo swa vutomi? | 1 | 2 | 3 | 4 | 5 |
| 18. | Wa tsakisiwa hi leswi u tirhisaku swona entirhweni? | 1 | 2 | 3 | 4 | 5 |
| 19. | Wa tsakisiwa hi leswi ungaxi swona? | 1 | 2 | 3 | 4 | 5 |
| 20. | Wa tsakisiwa hi vunghana bya wenabya xihundla? | 1 | 2 | 3 | 4 | 5 |
| 21. | Wa tsakisiwa hi vutomi bya wena bya masangu? | 1 | 2 | 3 | 4 | 5 |
| 22. | Wa tsakisiwa hi ku seketeriwa hi vanghana va wena xana? | 1 | 2 | 3 | 4 | 5 |
| 23. | Wa tsakisiwa hi leswi lo e hanyeka he ona? | 1 | 2 | 3 | 4 | 5 |
| 24. | Wa tsakisiwa hi lana ukumakaku pfuniwa eka swa rihangu? | 1 | 2 | 3 | 4 | 5 |
| 25 | Wa tsakkisiwa hi xifambo lexi uxi | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| . | tirisakaku famba famba? | | | | | |

Xvutiso lexi landzelaku xivutisa swa ku utiwanjani vumbe leswi unga swi dyondza eka mavhiki ya mune lamanga hinda.

| | | A nesetshama | He nkarenyana | Ngovhunyana | Ngovhu | Nkare he nkwawo |
|---|---|---|---|---|---|---|
| 26. | I ka ngani utitwa uri na moya wa lehansi, kuva unga lavi ku vulavula na munhu, ku kwata swankarinyana, kutisola, ku vaniri chuco ungativi ku rihuma kwihi, kumbe ku vaviseka kamoya? | 5 | 4 | 3 | 2 | 1 |

**Una swo swi vula hi swivutisoleswi?**

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