



**THE RELATIONSHIP BETWEEN THE LEVEL OF HEALTH LITERACY AND THE
LEVEL OF COMPLIANCE TO THE MANAGEMENT PROGRAMME OF
HYPERTENSION FOR EMPLOYEES WORKING AT A COAL MINE IN
MPUMALANGA.**

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Declaration

I Nomthetho Gladys Mpepe do hereby declare that this dissertation is the result of my own investigation and research and that it has not been submitted in part or full for any other degree or to any other University.

N G Mpepe

Date

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Abstract

Work place health programs are designed to help the employees manage their illnesses, prevent disease and promote health. Anecdotal evidence indicates that poorly educated people lack the potential to understand and use all the information that is made available to them in order to have healthy outcomes. The objective of this study was to determine whether there is any relationship between the level of health literacy and the level of compliance to the management programme of hypertension for employees working at a coal mine in Mpumalanga. A descriptive correlation design was used in this study. The population of this study was a purposively selected number of employees suffering from hypertension that were working at a coal mine and treated at the mine occupational health centre (N = 140.) Data collection was done through interviewer-administered questionnaires. Participants were recruited during the yearly chronic disease awareness programme. The Rapid Estimate of Adult Literacy in Medicine Revised tool (REALM-R) was used to test the level of health literacy and measurement of their blood pressure was taken and compared to the baseline blood pressure measurement (taken before commencement of therapy) as a proxy measurement to determine the compliance level to management of hypertension. This study showed no evidence of relationship between level of health literacy and level compliance to management programme of hypertension for employees working at a coal mine in Mpumalanga. It is then suggested that further research studies be conducted to determine the reasons for non-compliance to management programme of hypertension.

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CHAPTER 1 INTRODUCTION TO THE STUDY

1.1 Overview

In the past years an increase in the absenteeism rate amongst the workers at the mine has been noted which led to low production levels. A study was conducted to identify the reasons for this (Maku 2011) which showed that the majority of employees who were absent were suffering from chronic illnesses. This resulted in the mine not meeting its targets as a business unit. Whilst the focus and practise in the mining industry is primarily on reportable occupational disease, there was a concern that chronic diseases of lifestyle had a major impact on the health of employees. Although chronic diseases are among the most common and costly health problems, they are also among the most preventable and can be effectively controlled. According to the World Health Organisation (WHO 2009), more than 36 million people die annually worldwide from non-communicable diseases. Deaths caused by non-communicable diseases account for a 63% of all global deaths, making the prevention and management of these diseases one of the most important health challenges in the world (Maku 2011; WHO 2009).

Maku (2011) conducted further studies to determine the degree to which chronic diseases impacted on workers at the coal mine and the results showed that the majority of those employees who suffered from chronic disease had diabetes or hypertension or both, with hypertension being the most prevalent. The data collected was further analysed to determine the relationship between age and chronic disease. Hypertension was found to be higher in the age group between 51 and 60 years of age. When comparing different occupations against hypertension it was evident that the lower categories of workers i.e. the semi-skilled and unskilled workers were mostly affected by hypertension.

It was interesting to note that although many of members of the middle and upper management also suffered from chronic illnesses, the rate of absenteeism was very low. Under normal circumstances one does not have to be absent from work when collecting chronic medication from ones family doctor. It was therefore assumed that

the lower category workers with chronic diseases were struggling to manage their chronic diseases effectively and were taking time off because they were ill.

Work place health programmes are designed to help employees manage their illnesses, prevent disease and promote health. Anecdotal evidence indicates that poorly educated people lack the potential to understand and use all the information that was made available to them in order to have healthy outcomes. Despite the presence of posters all over the mine walls and corridors, audio-visual screens in all public areas within the mine and the occupational health practitioners conducting health education on continuous basis, low compliance amongst lower categories of workers remains a concern. These educational materials were all written in the English Language. It could therefore be assumed this may be the contributing factor to non-compliance amongst the lower categories of employees. Even the cell phone messages they get to remind them to collect their chronic medication from the clinic (which come from their individual medical aid's medicine depots) are sent in English. These programmes were designed to help the employees to manage their health issues better and to improve their health outcomes, but if they are unable to understand the health education from various sources, they will have little effect.

The Rapid Estimate of Adult Literacy in Medicine Revised tool (REALM-R) was used to test the level of health literacy. This instrument was developed by (Bass, Wilson, and Griffith 2003) and is available only in Spanish and English. It tests the understanding of health information and terminology in these two languages. As the health education in the mine is in English, it was appropriate to use the English version of the tool. It seeks only to determine if the participants understood the English terms and is not designed to test English literacy as such. If it is found that the participants do not understand the terms, it could assist to explain why the health education used on the mine is not always effective.

Brown, Bartholomey & Naik. (2007) indicated that in hypertension, limited health literacy has been found to be associated with poor management of disease due to poor disease related knowledge and discrepancies in medication use compared to their medical record. They further stated that in United States of America (USA). it was estimated that only 25% of patients with hypertension had their blood pressure adequately controlled.

There is a relationship between health literacy and literacy. This link comprises: cognition, motivation and ability to retrieve, comprehend, evaluate and utilize health information in decision making with regards to healthcare, prevention of disease and health promotion (Kickbusch, Pelikan & Apfel 2013). Health Literacy is a central concept in health promotion. Health literate settings therefore inculcate the consciousness of health literacy and take actions to strengthen health literacy through policies, procedures and practices (WHO 1986).

The education systems have not met their roles in providing the community with enough skills to access, comprehend, appraise and utilize information in improving their health status (Kickbusch et al. 2013). In addition, modern societies continually advertise unhealthy lifestyles whereas the health system is getting more complex and difficult for the community to navigate (Kickbusch et al. 2013).

“Health education programmes should be literacy sensitive and aim to enhance patient health knowledge and self-efficacy to promote self –care behaviour and desirable health outcomes”. (Osborn, Paarsche -Orlow, Bailey & Wolf 2011)

. One needs to have some skill of reading and understanding about health to be able to make sound decisions about their health and health related issues. Health literacy can never be separated from the management of non-communicable diseases like hypertension, the more one understood the disease the more they easily managed them.

1.2 Statement of the problem

Chronically ill patients being managed at an occupational health centre of a coal mine in Mpumalanga do not comply with prescribed regimen due to their high level of functional illiteracy. Consequently, this noncompliance to medical intervention has an adverse impact on the profit margins of the company and the well-being of affected employees.

1.3 Research question

What is the association between health literacy and the level of compliance to the management programme for hypertension?

1.4 Purpose of the study

The purpose of this study is to determine whether:

- there is a relationship between the level of health literacy and the level of compliance to the management programme of hypertension for employees working at a coal mine in Mpumalanga
- the level of health literacy influences the level of compliance to the management programme of hypertension for employees working at a coal mine in Mpumalanga

Objectives of the study

- a. To measure the level of health literacy using the REALM-R instrument to assess the ability to read common medical terms (Davis, Mayeaux, Fredrickson, Bocchini, Jackson & Murphy 1994)
- b. To measure the level of compliance to the management of hypertension programme as measured by blood pressure which is used as proxy for compliance in this study.
- c. To compare the level of health literacy and level of compliance to the management of hypertension programme.

1.5 Hypotheses

- 1) The null hypothesis (H_0) states that 'There is no correlation between the level of health literacy and level of compliance to the management programme for hypertension'.
- 2) The alternative hypothesis (H_a), therefore, states that there is correlation between health literacy and the level of compliance to the management programme for hypertension.

1.6 Operational definitions

The following conceptual definitions are used in this study.

1.6.1 Health Literacy

"Health literacy is: an ability to read, understand, and act on health care information."
(Kickbusch et al. 2013)

1.6.2 Management Programme

Management programme for hypertension: A programme for the management of hypertension which includes administration of and compliance to the taking of the prescribed medication, and living a healthy lifestyle.

1.6.3 REALM-R

REALM is a Rapid Estimate of Adult Literacy in Medicine Revised tool will be used to test the level of health literacy.

1.6.4 Compliance

Compliance in this study refers to change in behaviour by following the advice of health care providers, taking prescribed antihypertensive medication as prescribed, eating a healthy diet that promotes normal blood pressure and keeping scheduled appointments for blood pressure management. It is known that there are many variables that can influence the compliance level of hypertension management but in this study blood pressure will be used as proxy for compliance.

1.7 Significance of the study

The main purpose of this study is to determine whether there is a relationship between level of health literacy and the level of compliance in management of hypertension and to determine whether, the level of health literacy influences the compliance in management of hypertension.

The findings will assist the health care practitioners to design an effective health education programme that will aim at improving employee understanding of hypertension management and be able to use the information for better health outcome. This will be done after completion of the research study.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

The main goal of all organisations is to have high productivity. However, there are often impediments encountered in the pursuit of such an ideal. Maku (2009) found that employees in the company are often absent from work for illness and medical appointments more commonly associated with chronic medical conditions. Furthermore, most of these employees were found to be from the lower categories of work, with limited literacy and often not compliant to their chronic disease regimen.

The literature review has been divided into several themes as expanded in the subsections below.

2.2 Impact of absenteeism on the organization

A survey conducted by Maku (2011) revealed that most of the absenteeism amongst employees with chronic diseases in this coal mine was found in the lower categories of workers (unskilled workers). It was observed that these employees were taking time off to go and collect their chronic medication and that they did not understand the instructions from their health professionals as to how to take their chronic medication resulting in adverse outcomes. The above resulted in having many days away from work which affected the production levels of the company. Some were absent because they could not understand the instructions given to them on how and when to take their medication and would end up being hospitalised time and again.

2.3 Impact of absenteeism on production

According to The Boston Consulting Group (2010) absenteeism can interrupt production leading to decrease in company productivity. It has been reported that chronic diseases put a strain on companies and it takes the larger amount of health expenditure. However, less is said about the great impact of chronic diseases have on employee productivity in form of absenteeism which is underperformance caused

by sickness. Employees keep on taking time off to collect their chronic medication. Sometimes they are absent because they cannot manage their disease well because they lack knowledge about the disease even though information was given to them. They fail to understand the information given to them.

There is evidence that in (USA) alone an annual shortfall of US\$ 1 trillion in production has been reported and it is due to chronic illnesses(The Boston Consulting Group 2010). In most cases organisations do not get profits from savings but they get them from production performance. Companies have now to include chronic illnesses in their employee wellness programmes. It is assumed that these employees will be able to comprehend the health education information given to them and be able to act on it for better health outcomes. (The Boston Consulting Group 2010)

2.4 Cost to company

The company loses more than the employees wage when there is absenteeism; because the company has to pay the employee overheads and at the same time must get replacement for significant posts. Replacement involves advertisement of post, recruitment and training which come at company cost. If the employee is not easily replaceable due to scarce skill that is not transferable within the team members the cost becomes escalated. It was discovered that in France, 88% of the absenteeism cost is carried by employers.(Lacroix& Brouard 2011). In the United States of America (USA) absenteeism due to chronic conditions alone cost a chemical company more than \$100 million a year. Apart from decreased productivity and cost of replacement, the company also incurs the cost of employee's medical care (Carls, Roebuck & Brennan. 2012; Collins, Baase, Sharda, Ozminkowski,Nicholson, Billitti, Turpin, Olson & Berger. 2005; Godet-Cayré, Pelletier, Fleury & Valliant. 2006; Howard & Potter 2014; Lacroix et al. 2011).

2.5 Compliance differences amongst skilled and unskilled workers

Individual health behaviour is influenced by social factors (De Gaudemaris, Lang &Chatellier. 2002) such as low social class, low literacy, alcohol abuse and obesity

have an influence in managing hypertension. The prevalence of chronic diseases has been seen to be high in women and men with a low level of education and mostly unskilled manual workers. It is also reported amongst men with a high educational level who are mostly executives of organizations but the highly educated group seem to be managing their hypertension as the rate of absenteeism is very low amongst this category, whereas the rate of absenteeism among unskilled workers has been proven to be high.

Being a skilled or unskilled worker poses a risk of chronic disease mismanagement. Unskilled manual workers are generally low educated and the poorer in society. It is common cause that the unskilled workers have limited literacy which makes understanding of the disease process and its management highly difficult for them. They are unable to make sound decisions about their health or to find their way around the complex processes of the health care systems. Health education given to these workers is supposed to help them to better manage their disease but if they have limited health literacy due to the fact that they cannot read or write then self care becomes impossible (De Gaudemaris et al. 2002; Kerins, McKee, and Bennett 2011).

2.6 Level of education and Health Literacy

Many authors listed below state categorically that poor health outcomes associated with patients with chronic diseases are related to their limited literacy. In a study conducted to determine the association between literacy and blood pressure in primary care patients with hypertension, it was discovered that limited literacy is common among patients with chronic diseases and it is associated with poor health outcomes (Dewalt, Berkman & Sheridanl. 2004). The results also showed that the attributes of the healthcare delivery system may influence the relationship between literacy and health outcome as the relationship between patient literacy and systolic blood pressure varied significantly across different models of health care delivery. (Chen,Yehle, Albert, Ferraro, Mason, Murawiski & Plake. 2012; Harrington 2015; Kim et al. 2004; Kirk, Grzywacz, Arcury, Ip, Nguyen, Bell, Saldana &Quandt. 2012; Nath 2007; Powers, Olsen, Oddone, Thorpe &Bosworth. 2008)

A systematic literature review on health literacy and health outcomes conducted by Dewalt et al. (2004), showed that 60.3% of the articles included in the study indicated a positive correlation between low literacy and several adverse health outcomes. These adverse health outcomes keep the employees away from work as they go about seeking medical help.

In a literature review conducted to identify the evidence available for overcoming challenges caused by limited literacy level in diabetes self-management. There was evidence that there is an association between inadequate reading skills, and several adverse health outcomes, including increased incidence of chronic illness, relatively poor intermediate disease markers and suboptimal use of preventative health services. It was also stressed that health professionals and policymakers lack understanding about barriers posed by inadequate health literacy. Furthermore in an investigation of the performance of health literacy tests among older adults with diabetes, it was discovered that there is a strong association between health literacy and educational level. Participants who had less than high school education had lower health literacy scores and these individuals were found to be living below poverty level.

Health literacy enables the patient to understand the disease process but it does not predict positive self-care or self-efficacy. The idea that higher education is associated with high functional health knowledge was supported but there is no evidence of association and self-care.

There was also a confirmation that lower literacy is associated with being older, receiving lower income, having less formal education, and more self-reported diabetes. Surprisingly, it was discovered that three (3) months after the study was conducted, an adequate health literacy group performed worse in certain self-management behaviours compared to the limited literacy group which supported the idea that adequate level of health literacy does not mean one will have better self-care. (Chen et al. 2012; Dewalt et al. 2004; Harrington 2015; Kim et al. 2004; Kirk et al. 2012; Nath 2007; Powers et al. 2008).

With all that has been said above, Cabe (2013) differ in her findings. Cabe (2013) stated that health literacy is not having much information on the disease process but

it's rather behaviour. She supported the argument with the observation that highly literate people like medical practitioners smoke knowing very well the consequences of nicotine consumption in their lungs and blood circulation and yet low literate individuals can live a long, healthy life. Cabe therefore concluded that there is no relationship between literacy and health outcomes. This means that even though people have the knowledge about health matters they still make bad choices when it comes to their health. Thus, the health professionals must work on changing people's behaviour rather than making them understand the disease processes(Cabe 2013).

2.7 Health Literacy and Compliance

Many authors (Bohanny, Liu, Tsay, Yeh & Wul. 2013; Boren 2009; Jones, Mawani, King, Allu, Smith, Mohan & Campbell. 2011; White, Wolff, Cavanaugh & Rothman. 2010) believe that there is an association between health literacy, self management and compliance. In a descriptive correlation study, it was found that there is a strong relationship between self care and self efficacy, but they found no direct link between health literacy and self care behaviours. A literature review on the opportunities for technology in health literacy and diabetes done in 2009 showed relationship between health literacy, self-care and compliance but emphasises the association between health literacy and diabetic outcomes. The above authors emphasised the facts that limited health literacy may lead to difficulty in analysing glucose levels and treatment adjustment according to glucose reading. They found that poor health literacy is related to minimal diabetic knowledge and awareness of adverse outcomes or complications. There was also an observation that patients with high literacy level are more confident in their ability to perform self-care behaviours. Patients with limited knowledge about their disease could not recognise symptoms of the disease, and are more likely to have poor glycaemia control and they also lack confidence to in managing the disease. Another factor was the inability of some community members to speak or read English or their native language; the high volume of information presented in the pamphlet and the high technical level of information, and lack of cultural appropriateness (particularly of the lifestyle advice provided) were potential barriers to the general community members' comprehension of health

information. Because they did not understand the complex information given to them, they were found non-compliant to their chronic disease regimen (Bohanny et al. 2013; Boren 2009; Jones et al. 2011; White et al. 2010).

2.8 Health literacy and adherence

It was discovered in a study conducted by Harrington (2015) that poorly managed co-morbidities associated with paediatric Chronic Kidney Disease (CKD) may be associated with low caregiver and child health literacy skills. He further stated that low health literacy is associated with long hospital stay, increased emergency department visits, poor adherence to health care instructions, poor compliance with preventative medical appointments and overall health inequities. Health literacy is associated with a large number of unreconciled hypertension medication and suggested that further research on how the barriers to medication reconciliation in out-patients can influence a better management of hypertension (Persell, Osborn, Richard, Skripkauskas & Wolf. 2007).

Pawlak (2005) listed the adverse effects of low health literacy on health outcomes including: poor health status, a lack of knowledge of health, a poor use and understanding of health care services, poor compliance to medication and treatment, increased hospitalization and increased health care cost. Andrus et al. (2002) concluded that the mechanisms behind the relationship between limited health literacy and poorer health outcomes such as limited understanding of disease process, poor comprehension of medical orders, non-compliance, non-involvement of patient in their care, and ignorance on health promotion services all lead to poor health outcomes.

Some authors such as (Campbell and Duddle 2010) had similar findings that limited health literacy is associated with an increased risk of hypertension, lower levels of physical function and activity, and worse subjective health status. In their literature review they found that health literacy has a direct effect on social support but there was no direct correlation between health literacy and diabetes self-care or glycaemia control. They however stated that patients with limited health literacy but enhanced social support could improve diabetes self-care and improve glycaemia control.

Limited health literacy is a contributor to poorer health outcomes (Campbell and Duddle 2010).

Eadie (2014) in her term paper found health literacy to have direct relationship with a patient's health status and health experience. Eadie also explained that higher readmission rates and poor outcomes are more common in patients with low health literacy than patients with higher literacy level.

(Ingram and Ivanov 2008; Navarra et al. 2013) found no direct correlation between health literacy and adherence to treatment even though their study showed that participants with high education level were more literate about health issues, they also found that the level of health literacy did not predict level self-reported treatment adherence among their participants. It was also evident that patients between the ages (50 to 60 yrs old) were more non-adherent than those above 60 years of age, may be because of the fact that they did not understand the seriousness of the disease.

2.9 Intervention for low health literates

Ingram & Ivanov (2008) believe that there should be an intervention programme that is effective and tailored towards the peculiar needs of the patients with limited literacy levels. This could help the patients to better understand their chronic diseases and manage them effectively. There is a need to design health education material that can be easily understood by the patients involved to improve their health outcomes. Use Information and communication technology opportunities to mediate the effect that limited health literacy has on diabetes-related health outcomes (Boren 2009).

Jones et al. (2011) conducted a study in Canada to tackle health literacy and adapt public hypertension educational materials for an Indo-Asian population in Canada because community members with low understanding of the English language could not understand the health education materials and the lifestyle advice hence struggle.

Diabetes education material that requires a lower literacy level may be needed for older or unemployed adult populations. In a busy clinic health providers often rely on pamphlets or written materials to provide patient education (Bohanny et al. 2013).

Health literacy is positively associated with proficiency in metered dose inhaler usage , asthma knowledge, attitudes and medical decision-making but no association with medical care use and self management (Wang, Chu, Lin, Chiang, Perng & Lail. 2014), Whereas people with hypertension were challenged by the fact that they are supposed to translate dietary guidelines for their disease like what food to eat, proper portion sizes and to confirm information provided in food labels (Hutchison and Carolina 2014). In helping patients on continuous basis, Eadie (2014) believes that nurses have to identify patients with low literacy for health education to be effectively assisting patients to self-manage their disease. She further said “Health literacy is a concept that has a direct relationship with a patient’s health status and health experience. In this article it was also emphasized that nurses need to understand the concept of health literacy, clarify its meaning and must develop strategies to assess and evaluate a person’s health literacy level, these are key factors in addressing health care disparities and providing holistic health care for their patients.

2.10 Marital status, age and compliance

Even though some authors found no association between health literacy and adherence to antihypertensive regimen instead higher self-efficacy and being married had better self-care behaviours and the lower categories of mine workers that struggles with compliance to their chronic disease regimen stay in hostels far from home without support from their spouses (Bohanny et al. 2013).

Age has also been raised as having influence in managing chronic diseases, with an assumption that the younger patients manage their illnesses better than their older counter parts (Levinthal, Morrow, Tu, Wu & Murray. 2008; Bohanny et al. 2013) , but other studies showed that participants who were younger and scored poorly and fairly were most likely not adherent to their regimen. They also found no significant association between health literacy and adherence to antihypertensive regimen

instead regression analysis showed age and health status predict adherence. Most of these patients were found to have limited health literacy. Ingram & Ivanov (2008) recommended that health practitioners should prepare health education formation at a sixth to eighth grade level of education so that they could also cater for the less literate people to improve their compliance to chronic disease they suffer.

2.11 Conclusion

This chapter highlighted the findings of deferent studies on health literacy and its influence on compliance of chronic disease management. It gave an overview of what has been researched about the health literacy and its relationship with management of chronic diseases. The following chapter will discuss the methodology used in this study.

CHAPTER 3 RESEARCH METHODOLOGY

3.1 Background

This chapter aims at describing the plan for getting answers to the research question and meeting the objectives of this study. The purpose of the study was to determine the relationship between level of health literacy and the level of compliance to management of hypertension among .employees suffering from hypertension.

This chapter deals with research design and methodology under the following headings:

- Research setting
- Sampling process
- Population
- Data collection
- Reliability and validity
- Ethical considerations
- Conclusion

3.2 Research setting

A descriptive correlative study design was used. It involved participants that were diagnosed with hypertension and were put on an antihypertensive regimen. It is known that there are many variables that can influence the compliance level to hypertension management but in this study, blood pressure measurement was used as proxy for compliance. The tool known as “A Rapid Estimate of Adult Literacy in Medicine Revised”(Davis et al. 1994; Bass, Wilson, and Griffith 2003) was used to test the level of health literacy.

3.2.1 The coal mine

This study was conducted at one of coal mine situated between Hendrina and Middelburg in Mpumalanga Province. This mine extracts the coal using both the underground and opencast mining methodologies. The mine has one thousand three hundred (1 300) employees of its own and a further 300 (three hundred) contractors deployed in the opencast operation. The study was, however, limited to the mine employees. The semi-skilled and unskilled employees constitute 61% of the workforce (n=793) and 39% of the workforce (n=507) were skilled workers, of which 10.8% of the total number of employees were suffering from hypertension at the time of the study.

A total of 140 employees suffering from hypertension were used in this study. Skilled, semi-skilled and non-skilled workers were used. All these participants were managed at the occupational health centre. Participants were recruited to participate in this study after the occupational health centre diagnosed and placed them on an antihypertensive regimen.

3.3 Study design

The researcher used a quantitative research approach with a descriptive correlation study design. A descriptive correlational design is a non-experimental design that seeks to determine the relationship between two variables. In this study the variables were health literacy and compliance to management of hypertension. A quantitative approach is a formal, objective and systematic process used to describe and test relationships and evaluates cause- and-effect interactions among variables. (Burns & Grove.2005)

3.4 Population

The population of this study was a purposively selected number of employees suffering from hypertension that were working at a coal mine in Mpumalanga and treated at the mine occupational health centre (N = 140.)

3.5 Sampling

Sampling as defined by (Burns & Grove 2005) is the process for selecting a group of people, events, behaviour or other elements with which to conduct a study. The authors further defined the sampling technique as a method to select a sample from the study population.

3.5.1 Sample

The total sample included all skilled, semi-skilled and unskilled employees employed prior to June 2014 as per available information from the clinic register and identified as suffering from hypertension. These recruits have their baseline measurements recorded in the clinic data base.

A total sample approach was used (n=140)

3.5.2 Inclusion criteria

All skilled, semi-skilled and unskilled employees identified as suffering from hypertension, employed prior to June 2014 whose baseline measurements were recorded in the clinic data base were included.

3.6 Data collection

3.6.1 Preparation for data collection

Two field workers were used to collect data in order to reduce researcher bias. They were trained on how to administer the REALM-R instrument. Informed consent was sought from all the relevant participants, prior to administration of the research instruments by the two trained field workers. The blood pressure of each consenting participant was measured first after which the literacy test which consisted of administration of REALM-R was conducted.

3.6.2 REALM-R instrument

A Rapid Estimate of Adult Literacy in Medicine Revised tool was used to test the level of health literacy. REALM-R is a brief screening instrument used to assess an

adult patient's ability to read common medical words and it is not meant to test reading comprehension (understand and act on health care information). This instrument is a word recognition test and not meant to test reading comprehension or English. The REALM consists of 11 items; the first three items were not allocated points. The total score of the test was 8 (eight) and anyone who scored 6 (six) or less was considered as having low health literacy (See annexure 1).

Data collection was done through interviewer-administered questionnaires. After consent forms were signed eligible participants were given the test. All participants that could not read were given a total score of zero.

3.6.3 Blood Pressure Measurement

The same person who measured the baseline blood pressure prior June 2014 reading was used to measure the latest reading starting from July 2015 to ensure consistency. It is known that there are many variables that can influence the compliance level to hypertension management but in this study blood pressure measurements were used as a proxy for compliance.

A measurement of their blood pressure was taken and compared to the baseline blood pressure measurement (taken before commencement of treatment) to determine the compliance level to management of hypertension. Calibrated blood pressure electronic monitors were used to reduce error.

Participants were graded in terms of high, normal and low blood pressures and whether they have improved, deteriorated or stayed the same since commencing treatment. All employees included in the sample were allocated an identification number in a consecutive manner to ensure anonymity.

3.7 Reliability and Validity

3.7.1 Reliability

Reliability determines whether there was consistency in test administration and scoring (Creswell 2014).

According to authors (Brink, van Rensburg, and van der Walt 2011) reliability refers to the degree to which the instrument can be depended upon to yield consistent results if used repeatedly over time on the same person, or by two researchers.

A test retest reliability check was conducted by the researchers who developed the tool on 100 adult inmates and all were given a retest with the REALM one week apart. (Iii et al. 2003)

Results were:

Test-Retest (n = 100) .99

Two field workers were used to collect data in order to reduce researcher bias. They were trained on how to administer the REALM-R instrument and to screen participants.

3.7.2 Validity

The REALM-R instrument that was used in this study was previously validated and used in other studies. Criterion validity was established by correlation of REALM raw scores with raw scores of three standardised reading tests: SORT-R, PIAT-R and WRAT-R and the Pearson correlation coefficient was .82($p < .0001$). it has a concurrent validity with TOFHLA producing a correlation coefficient of .84 ($p < .001$). (Davis et al. 1994)

With regard to the validity of the blood pressure measurement, the same electronic BP machine that measured the baseline blood pressure was used to measure the post- management blood pressures. All the blood pressure monitors that were used for the study were calibrated every three months according to the manufacturer's guide to prevent any errors.

3.8 Ethical considerations

In all research studies, the rights of the participants and that of the institution should be protected. This should be practised throughout the whole research process. In this study, the researcher sought a written permission from the following institutions:

- Faculty of Health Science (department) post graduate committee.
- University of Witwatersrand's Human Research ethics committee.
- The coal mine management.

At the beginning of the study, all the participants were contacted and informed about the purpose of the study. An informed consent from all willing participants was sought. All participants were notified about their right to leave the research study process at any given time if they did not wish to continue with the study.

Before the data was collected, participants were notified on how the data would be collected. The identity of participants was protected by allocating code numbers to each participant.

A small token of appreciation was given to field workers as per permission from The Human Research Ethics Committee of the University of Witwatersrand.

3.9 Conclusion

This chapter described the research methodology including research setting, sample and sampling process, study population, data collection, reliability, validity and ethical considerations. Chapter 4 will be discussing data analysis and results.

CHAPTER 4 DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

This chapter deals with data analysis which entails categorising, ordering, manipulating, and summarizing the data and describing them in meaningful terms (Brink, van Rensburg, and van der Walt 2011). Descriptive statistical methods of analysing data were used to describe and summarize the data that was obtained regarding the relationship between the level of health literacy and the level of compliance to management programme of hypertension. Data has been presented in graphs to effectively convey information related to the collected data and also to make it visually appealing for close analysis by the reader (Brink, van Rensburg, and van der Walt 2011). Apart from the demographic profile the results will be presented according to the objectives of the study.

4.2 Socio-Demographic Profile of participants

The population of this study was 140 participants. From the overall sample in the survey, there were 16 (11.4%) females and 124 (88.6%) males. The average age of females in the survey was 40 years and that of males was 53 years. The mode was 60 years and the mean was 51 years. The youngest participant was 30 years old. From these statistics it is evident that the workers are mainly from the older age group.

There were only 16 female workers compared to 124 male workers. This might be due to the fact that historically the mining industry was male dominated and women have only relatively recently entered the workforce.

Table 1: Socio demographic profile in terms of age groups and gender

	Age	Gender		
Minimum	30		Number	Percentage
Mean	51	Male	124	88.6
Maximum	63	Female	16	11.4
Mode	60			
Standard Deviation	8.8			

4.3 Profile of health literacy of participants

4.3.1 Measurement of health literacy of participants

The first objective was to measure the level of health literacy using the REALM-R instrument to assess the ability to read common medical terms.

The levels of literacy were measured using the REALM-R literacy tool.

The lowest literacy score that can be obtained by the participants is zero with the maximum being 8. On average, the literacy score of workers who took part in the survey was 5 with 8 being the most commonly occurring marking the mode. According to the REALM-R literacy tool, a score of 6 and below is classified as limited literacy and above 7 to 8 is classified as literate. Participants were asked to say the words from the word list *“It would be helpful for us to get an idea of what medical words you are familiar with. What I need you to do is look at this list of words, beginning here [point the first word with pencil]. Say all of the words you know. If you come to a word you don’t know, you can sound it out or just skip it and go on.”*(Bass, Wilson, and Griffith 2003)

In this study, a total of 63 (45%) workers had limited literacy and 77 (55%) were literate. Figure 1 below demonstrates the distribution of the literacy scores. While the minority of workers have limited literacy, many of these 26 %) of those with limited literacy scored zero, this category could not read or write and this implies that they

could not read all the written information given to them about their disease. See figure 1 below.

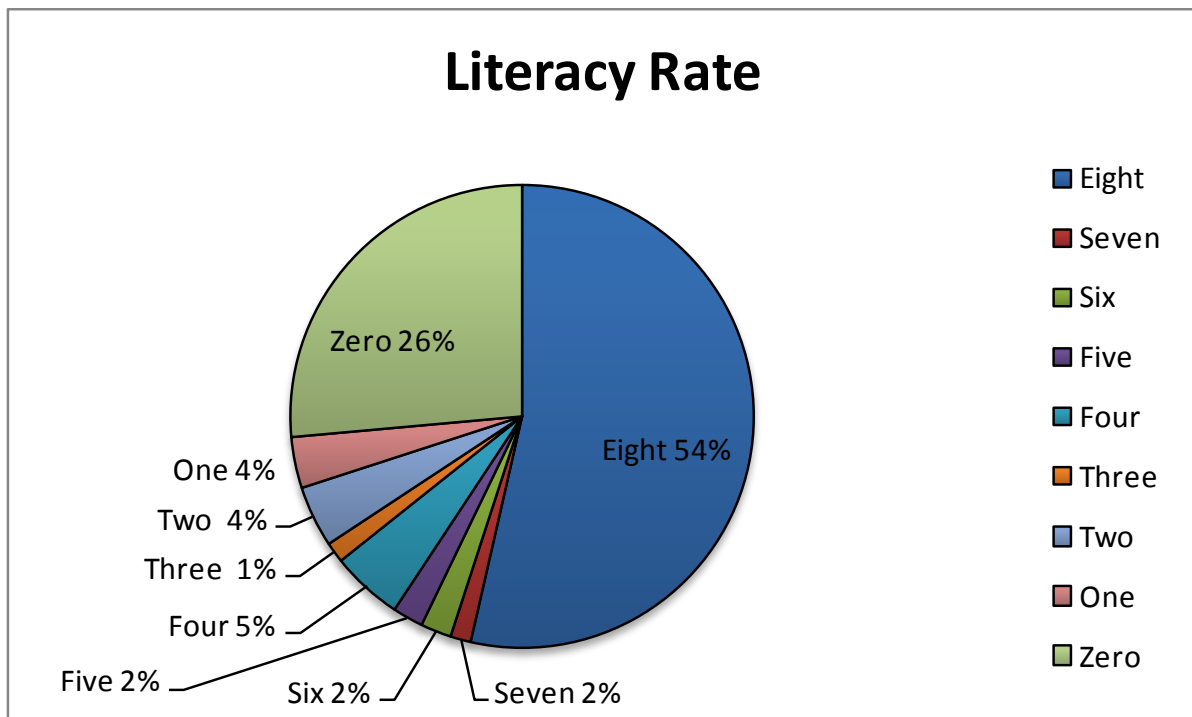


Figure 4.1: Frequency of literacy scores

4.3.2 The distribution of literacy by gender.

When the literacy scores were calculated per gender, it was evident that the female workers had higher literacy scores than the male workers. The mean literacy rate for women is 7.6 while the mean literacy rate for men is 4.6. This is demonstrated in figure 2 below.

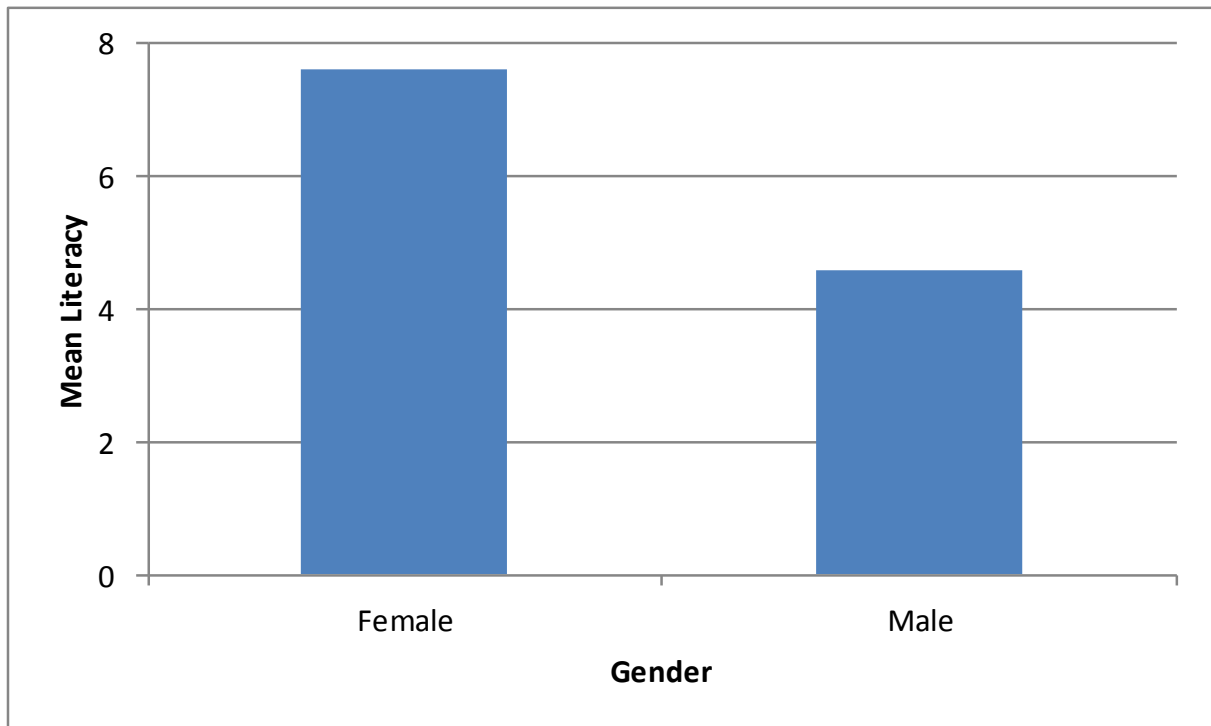


Figure 2: The distribution of mean literacy by gender

4.3.3 Correlation of age and literacy

When correlating the literacy scores with the ages of the participants; it was evident that there is a moderate negative correlation between age and literacy scores as demonstrated in figure 3 below. Correlation coefficient between age and literacy score is -0.53 and the p –value of 0.000 which is highly significant leading to the conclusion that there is a moderate negative relationship between the age of workers and their literacy score.

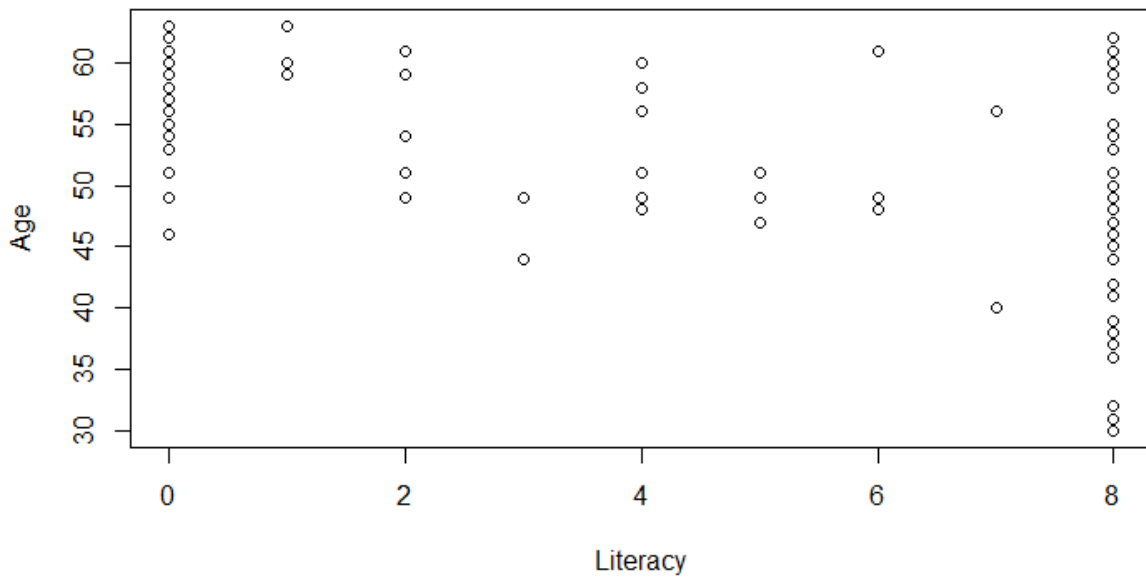


Figure 3: Correlation between age and literacy

4.3.4 Highest grade compared to lower school grades

When reviewing the level of schooling of participants, indicated by the highest grade passed at school, 40 (28.6%) had passed grade 12 and 100 (71.4%) had achieved grades lower than grade 12. The lowest level achieved was grade 0 indicating the participant had not attended school, and the highest 12 with a mean of 8 and a mode of 12. Out of the 40(28%) that had grade 12, two (2) participants scored lower than 6 and were considered to have low literacy level in this study. The pie chart below illustrates the above.

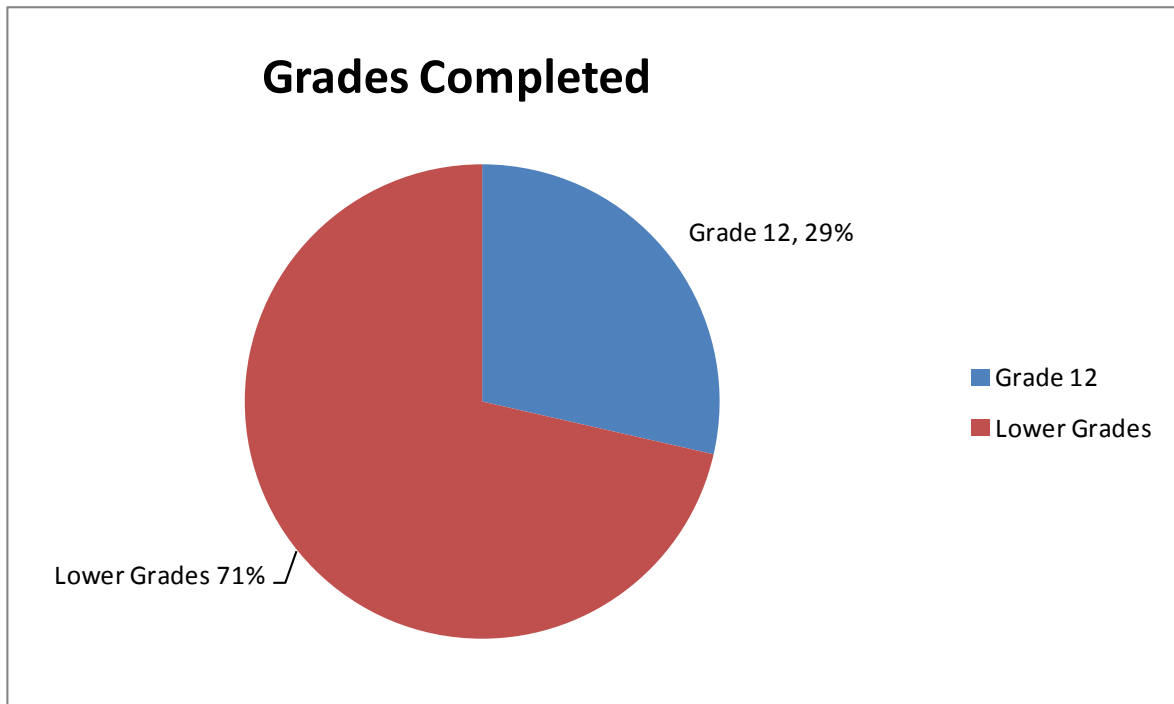


Figure 4: Grade 12 vs. Lower grades

4.4 Profile of compliance with blood pressure management programme

The second objective in this study was to measure the level of compliance to the management of hypertension programme as measured by blood pressure which is used as proxy for compliance in this study.

4.4.1 Descriptive statistics of blood pressure measurement

Key: SBP1=Systolic Blood Pressure before management programme

SBP2=Systolic Blood Pressure after management programme

DBP1=Diastolic Blood Pressure before management programme

DBP2= Diastolic Blood Pressure after management programme

Table 2: Descriptive Statistics of age, school grade and health literacy

	Age	Grade	Literacy	SBP1	SBP2	DBP1	DBP2
Minimum	30	0	0	120	102	84	60
Mean	51	8	5	173	145.2	109.4	92.68
Maximum	63	12	8	229	202	188	117
Mode	60	12	8	159	140	110	100
Standard Deviation	8.8	3.9	3.6	20.1	17.1	16.5	12.3

Compliance to the programme was measured by, firstly taking the blood pressure readings of the workers prior to commencing the management programme and comparing them to the blood pressure readings after they had been on the management programme for a minimum of twelve (12) months.

The systolic and diastolic blood pressure were analysed separately and collectively to assess whether the blood pressures had improved. In the event of their being a drop in the systolic and diastolic blood pressure or both, the participant was deemed as having been compliant for the purpose of this study if they had an improvement of more than 1mmHg (1mmHg) from the baseline measurement.

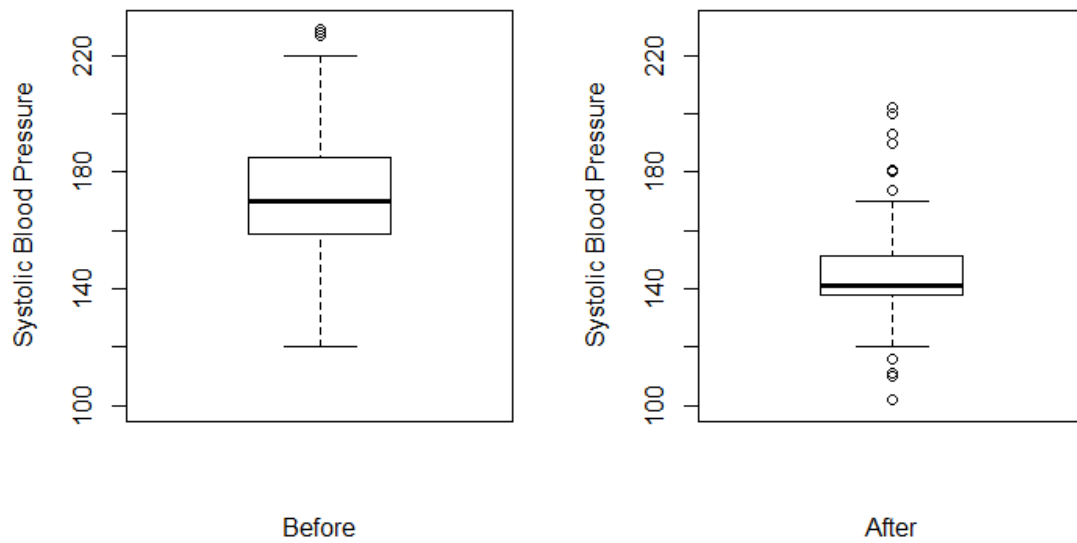


Figure 5: SBP after treatment

From the boxplot diagram above, it is evident that there was a change in the systolic blood pressure of the workers after the treatment. The mean systolic blood pressure after management program indicates an improvement from 173 to 145mmHg.

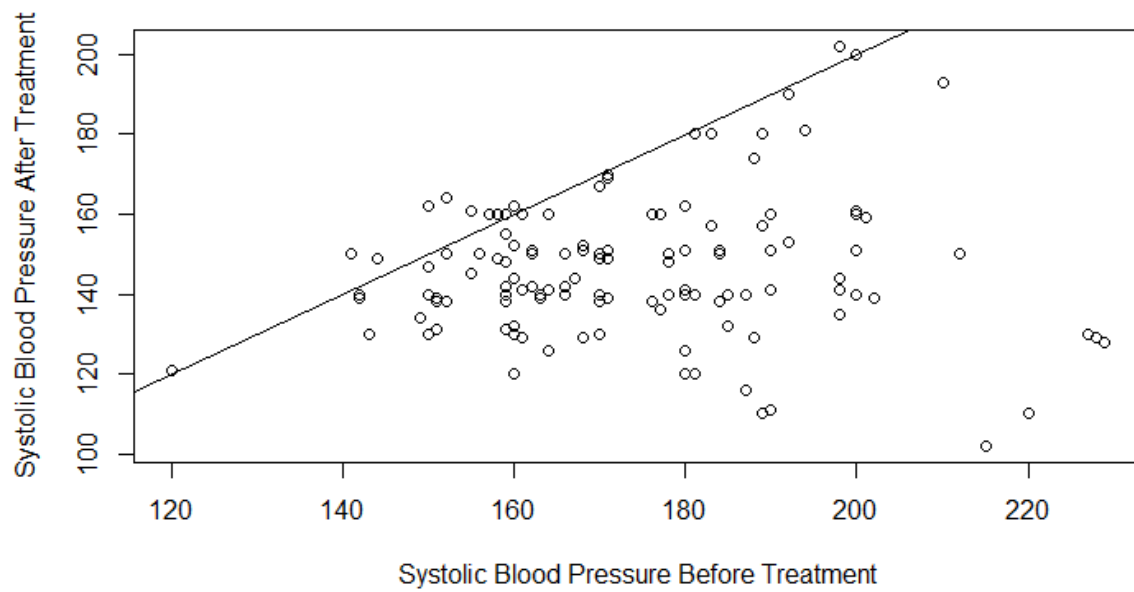


Figure 6: SBP before and after management program

From the scatter plot of the SBP before and after management program, most of the points lie below the 45 degree line which is an indication that there was a decrease in SBP after the management program was given to the workers.

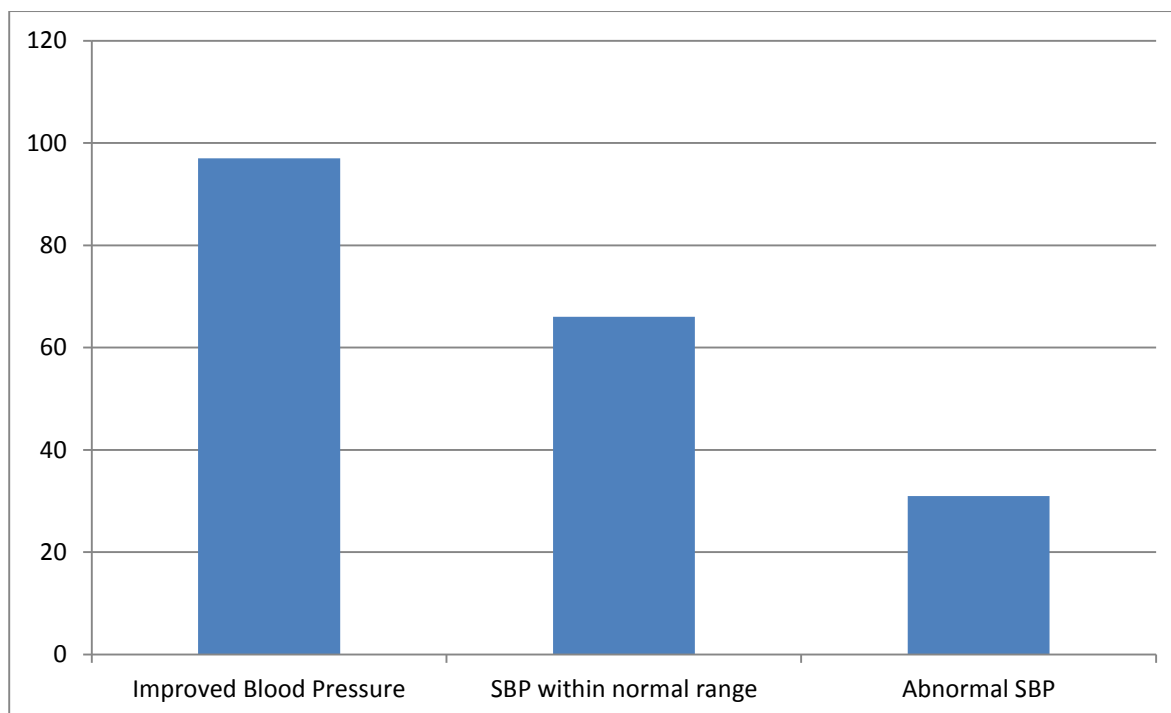


Figure 7: Distribution of improved blood pressure

From the bar graph above, a total of 97 employees showed an improvement in their blood pressures (i.e. a decrease of the systolic blood pressure) within a year after being on the management programme. Of this total number with improved conditions, 66 of them had a SBP within normal range. Thirty one (31) however, although their blood pressures were decreased, still had blood pressures which were considered too high or abnormal (SBP=140 and above). Where the systolic blood pressure is higher than 140, those workers were considered as having risk of developing co- co morbidities or complications of high blood pressure.

4.4.2 Paired samples t-test-SBP before and after the management

The dependent sample t-test also known as paired samples t-test is used to compare the means between two related groups on the same continuous dependent variable. In this study, the blood pressure of the participants was measured before and after a treatment which is meant to lower their blood pressure. By comparing the measurements on the same participant before and after the treatment, each participant serves as his or her control. To be able to use the paired samples t-test, the following assumptions must be met.

- The dependent variable should be measured on a continuous scale.
- The data should be fairly normally distributed.
- The variances between the two groups should be equal.

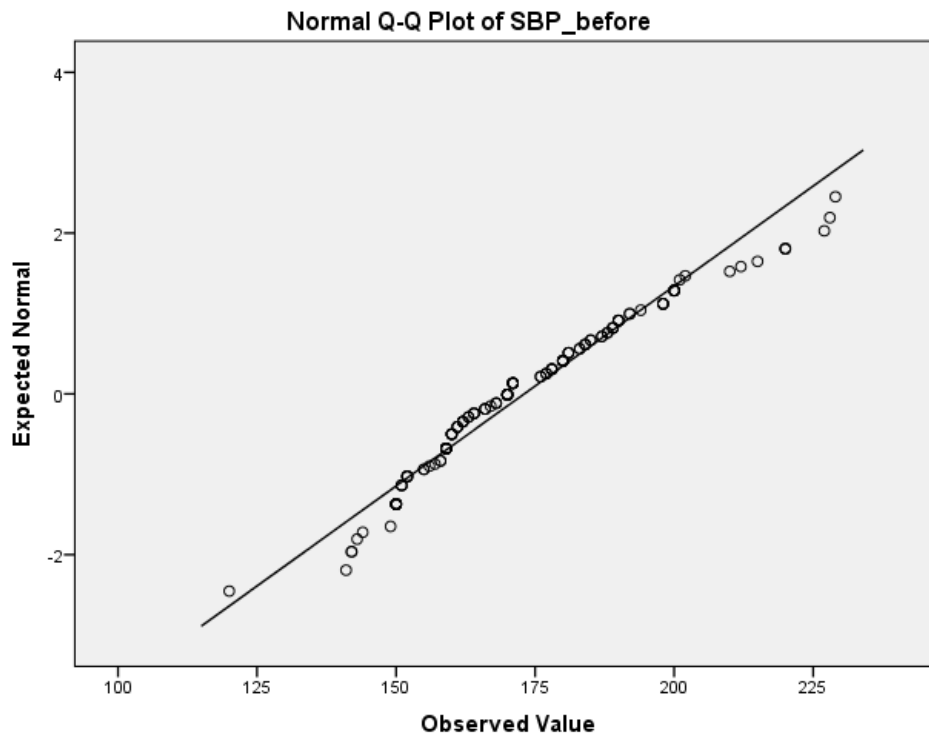


Figure 8: Normal Q-Q Plot of SBP

From the normal Q-Q plot above, the distribution of the SBP before treatment is fairly normal.

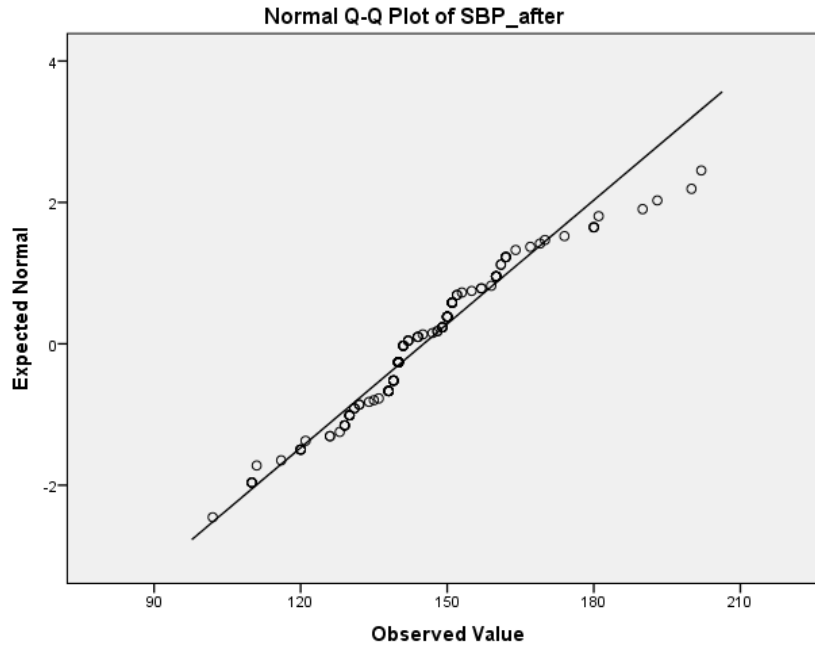


Figure 9: Normal Q-Q Plot of SBP_after

From the normal Q-Q plots above, the distribution of the SBP before and after treatment are fairly normally distributed.

Table 3: Paired Samples Test

	Paired Differences					t	df	Sig.(2-tailed)
	Mean	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
SBP1-SBP2	27.857	26.490	2.239	23.43	32.284	12.433	139	.000

The test statistics, $t(139) = 12.443$ and the p-value is 0.000. The mean difference between the systolic blood pressure before treatment and systolic blood pressure after treatment is 27.857 which is an indication that the average systolic blood pressure after treatment is lower. From the confidence interval value, we are 95% confident that the mean difference in systolic blood pressure before and after the treatment is between 23.43 and 32.28. Based on this 95% confidence interval, we

can conclude that there is a statistically significant difference in SBP after the intervention programme since the confidence interval for the mean difference does not include zero.

4.5 Diastolic blood pressure

4.5.1 The comparison of diastolic blood pressure after management programme

Table 4: Improvement of DBP after the management programme

DBP(Improved)		
	Number	Percentage
Improved and normal	84	87
Improved but abnormal	13	13
Total	97	100

Of the 97 who had an improved diastolic blood pressure, 84 of them were within the normal DBP range (60-99 mmHg) (86.6%) while 13 of them had an improved diastolic blood pressure but still within the abnormal range.

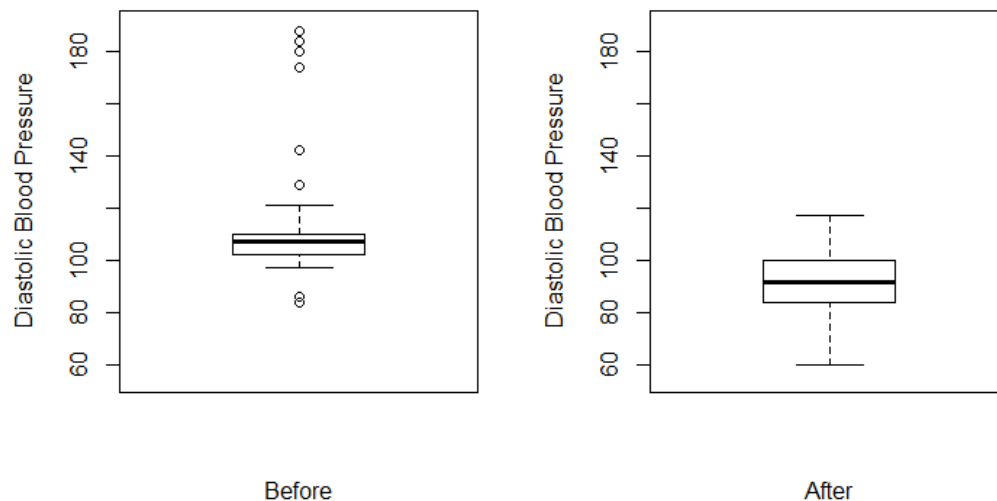


Figure 10: Comparison of DBP before and after treatment

From the boxplot diagram above, it is evident that there was a change in the diastolic blood pressure of the employees after the treatment. The mean diastolic blood pressure before the treatment was given was above 110mmHg it dropped below 100mmHg after treatment was commenced. This meant that their diastolic blood pressure has improved after the participants were put on management for high blood pressure.

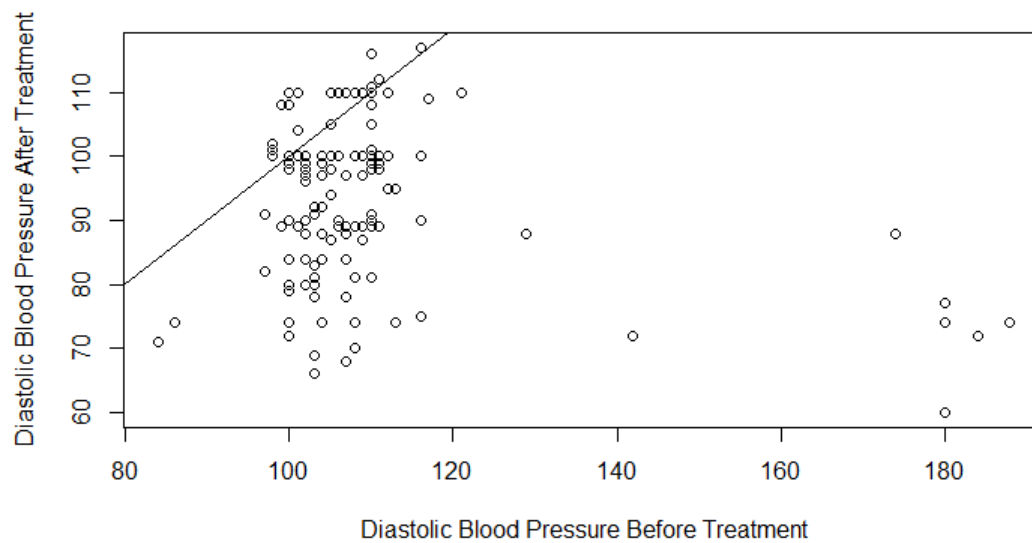


Figure 11: Scatter plot of DBP before and after treatment

From the scatter plot of the DBP before and after treatment, most of the points lie below the 45 degree line which is an indication that there was a decrease in DBP after the workers had been on the management programme.

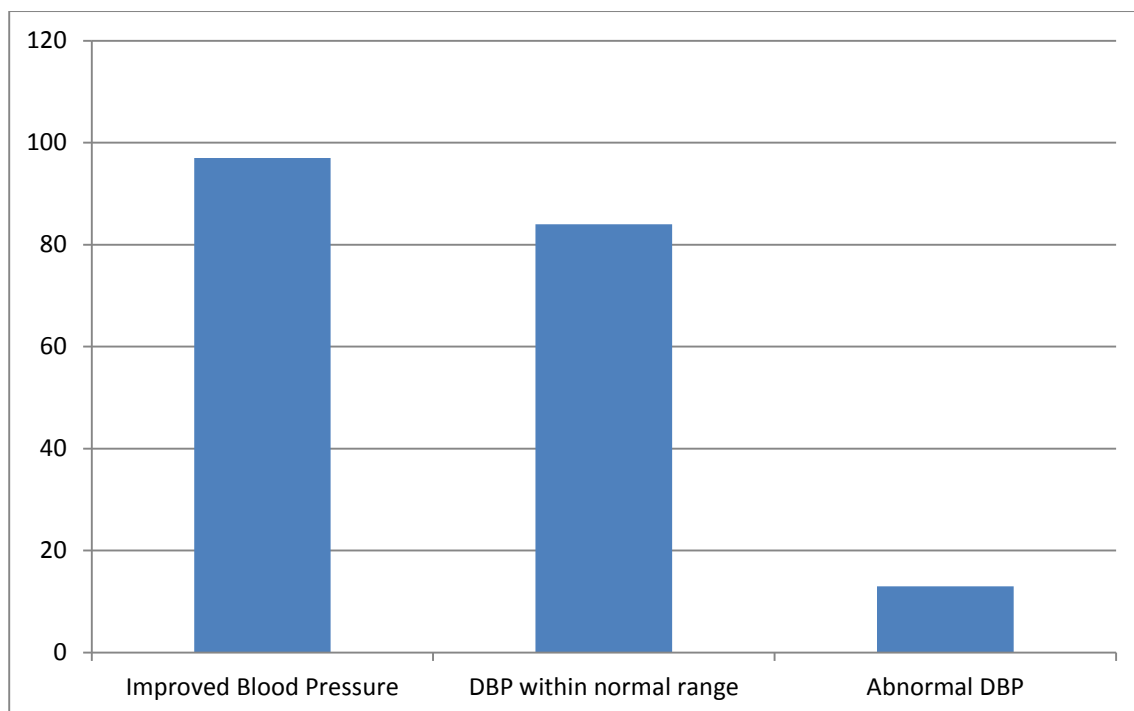


Figure 12: Normal vs. abnormal DBP

From the bar graph above, a total of 97 employees of the Mpumalanga coal mine had improved (or decreased) Diastolic blood pressures after they had been on the management programme. Of this total number with an improved condition, 84 of them had DBP's within the normal range (60mmHg-99mmHg). Thirteen (13), however, had an improved diastolic blood pressure condition, but the diastolic pressure remained abnormal. (>99mmHg) and they were considered to be at risk of developing co-morbidities or complications of high blood pressure.

4.5.2 Paired samples t-test -DBP

Table 5: Paired Samples Test for DBP

	Paired Differences					t	df	Sig.(2-tailed)
	Mean	Std Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
DBP1-DBP2	16.736	22.847	1.931	12.918	20.553	8.667	139	.000

The test statistics, $t(139) = 8.667$ and the p-value is 0.000. The mean difference between the diastolic blood pressure before treatment and diastolic blood pressure after treatment is 16.736 which is an indication that the average diastolic blood pressure after treatment is lower. From the confidence interval value, the researcher is 95% confident that the mean difference in diastolic blood pressure before and after the treatment is between 12.92 and 20.55. The researcher can conclude based on the 95% confidence interval that there is a statistically significant difference in DBP after the intervention programme since the confidence interval for the mean difference does not include zero.

4.5.3 The analysis of the collective blood pressure (both SBP / DBP)

There was a significant drop in both the systolic blood pressure (SBP) and the diastolic blood pressure (DBP) of the workers after the introduction of the management program. The average systolic blood pressure before the workers were put on a management program was 173 which dropped to 145.2 after the intervention and the average diastolic blood before being put on management was 109.4 and it dropped to 92.68.

4.5.4 Improved blood pressure by gender

These were the participants that showed improvement whether systolic, diastolic or both. See table 6 below for their distribution by gender.

Table 6: Not Improved BP vs. improved BP by gender (systolic, diastolic or both)

			Blood Pressure		
			Not Improved	Improved	Total
Gender	F	Count	5	11	16
		% within Gender	31.3%	68.8%	100%
	M	Count	38	86	124
		% within Gender	30.7%	69.3	100.0%
Total		Count	43	97	140
		% by Gender	30.7%	69.3%	100.0%

Out of the 16 females who took part in this study, 11 of them, representing 68.8%, had seen improvements in their blood pressure readings whether seen in systolic, diastolic or in both measurements with 31.3% of them showing no improvement in their blood pressures. The 86 total men had improved blood pressure readings which accounts for 69.3% with (38) 30.7% of them showing no improvement.

Both men and women therefore have a very similar improvement in their blood pressure after the management programme. They are therefore deemed similarly compliant. A total of 97 participants had their blood pressure improved whether systolic, diastolic or both when compared to their baseline readings. This is shown on the table below.

Table 7: Blood Pressure after the management programme

Blood Pressure improve vs. not improve after treatment.		
	Number	Percentage
Improved	97	69
Not Improved	43	31
Total	140	100

After the management programme, a total of 97 workers (69%) had improvement in their blood pressure while 43 (31%) of them did not show any improvement.

Table 8: The improved Blood pressure distribution

Total number of participants with improved blood pressure(collectively)		
	Number	Percentage
Normal SBP and DBP	62	63.9(64)
Improved but abnormal SBP and DBP	9	9.3(9)
Normal SBP and abnormal DBP	4	4.1(4)
Normal DBP and abnormal SBP	22	22.7(23)
Total	97	100

From the total number of participants whose blood pressure improved, 62 of them had both improved SBP and DBP and presented with blood pressures within the normal limits. Nine (9) had SBP's and DBP's outside of the normal limits even though their blood pressure improved generally. However, 4 of them had a normal SBP but an abnormal DBP and 23 had a normal DBP but abnormal SBP. This is also illustrated on the pie chart below.

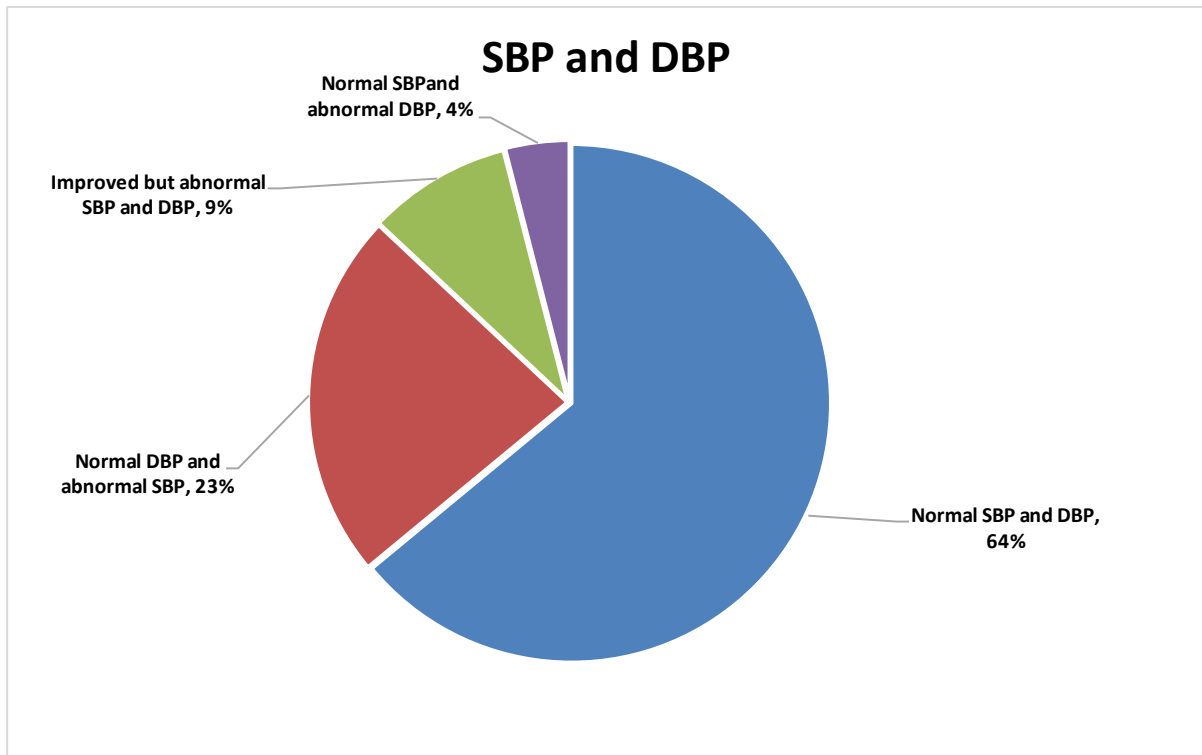


Figure 13: 14 Pie chart of SBP and DBP collectively

4.6 Comparison between literacy levels and compliance to management programme

The third objective of this study was to compare the level of health literacy and level of compliance to the management of hypertension programme.

This objective was met by using the Mann Whitney U test which is the non-parametric version of the independent samples T-test. It is used to compare the differences between two independent groups whenever the dependent variable is continuous or ordinal but is not from a normally distributed population. With non-parametric tests such as Mann-Whitney U tests, the assumptions of a parametric test are relaxed. (Rice 2006) The Mann-Whitney U test would be used to test if literacy rates measured on a continuous scale could be a contributing factor for workers having an improved condition in their blood pressure or not.

Since the literacy rates in this study were not normally distributed, the non-parametric version of the independent samples t-test used to test the hypothesis. In order to use the Mann-Whitney test, the following assumptions must be met.

- The dependent variable must be ordinal or continuous
- The independent variable should consist of two categorical independent groups.
- The observations in each group should be independent.
- The Mann-Whitney U test is used when the dependent variable is not normally distributed.(Rice 2006)

The null hypothesis (Ho) states that 'There is no correlation between health literacy and level of compliance to the management programme for hypertension'

Table 9: Ranks

	Blood Pressure	N	Mean Rank	Sum of Ranks
Literacy	0= Not Improved	43	68.08	2927.50
	1=Improved	97	71.57	6942.50
	Total	140		

From the table above, the group of workers at the coal mine in Mpumalanga with improved blood pressure conditions have a higher mean rank literacy score than the workers whose blood pressure did not improve. However, the difference between the mean rank health literacy score between the two groups is very small.

Table 10: Test Statistics

	Literacy
Mann-Whitney U	1981.500
Wilcoxon W	2927.500
Z	-.516
Asymp. Sig. (2-tailed)	.606

a. Grouping Variable: Blood Pressure

Since the p-value of 0.606 is greater than 0.05, we therefore accept the null hypothesis. From the data collected, it can be concluded that literacy score between the workers with improved blood pressure and those with uncontrolled blood pressure are not statistically different.

4.7 Comparison of health literacy and compliance to hypertension management program.

The highest level of education of the sample in the survey was grade 12 with some participants not having any formal education. The mean literacy score for participants whose blood pressure improved is 5.09 while that for those whose blood pressure did not improve is 4.7 suggesting that literacy score has little or no effect on their compliance to the programme for managing hypertension.

From the data collected, it can be concluded that literacy score between the workers with improved blood and those with uncontrolled blood conditions are not statistically different. From the data collected, 40 participants representing 28.6% had Grade 12 certificate with 100 representing 71.4% spread across the lower grades. However, those who had grade 12 and considered as literate (scored 7 or 8), 10 of them representing 25% had uncontrolled blood pressure after taking the treatment. Also, 63 of the participants had limited literacy with 42 of them recording an improvement in their blood pressure conditions which is 66.7% of the total number of participants with limited literacy.

4.8 Discussion

4.8.1 Health literacy levels

While the minority of workers (45%) had limited literacy, those with low literacy scores had very limited literacy with 26% of them scoring zero which meant that they were not able to read any English words used in the test. It is of note that these participants with zero literacy scores were the older male workers in the sample. Many years ago mine workers who were employed as labourers were not required to have had any schooling and were employed without any minimum educational requirement. This group of miners were recruited predominantly from rural areas as migrant workers. Female workers in this study were more health literate than men. This is contrary to a study done on illiteracy statistics in South Africa (Aitchison and Harley 2006) where the results showed more women were illiterate than men. This can probably be explained by the fact that women have only recently been employed in the mines and since the practice of recruiting women commenced, employment requirements were introduced.

Even though the illiterate miners were in the minority, just less than half (45%) had limited literacy and would therefore struggle to read the health education pamphlets and posters. Conventional practice has been to print these posters and pamphlets in English due to the multi-lingual nature of the workforce but this practice is clearly not helpful to many of the miners.

4.8.2 Gender

Male workers constituted a large number (88.6%) in this sample and the majority were older than the female workers. While it has not been possible to access data from the Human Resource section to verify the fact, anecdotally it would appear that this is due to the practice of exclusively employing men until fairly recently and it will take a while for the employment figures to be equitable. The study sample size is not sufficiently large to generalize these findings.

4.8.3 Correlation of age and literacy

The fact that younger workers tended to obtain higher scores than their older counterparts could be due to improved access to basic education in recent years, or possibly because younger people tend to have better access to digital media and television which may improve their English literacy levels.

4.8.4 Blood pressure measurements

The blood pressure measurements were used as proxy to indicate compliance to a health care programme in this study as it is known that if one is not compliant with management programme the blood pressure will not improve. Compliance involves taking medication as prescribed and making lifestyle adjustments. In this study, the management programme was successful as a 69% of participants had lowered their blood pressure measurements since the baseline measurements were taken. A large number of participants had lowered diastolic blood pressure which is significant as the diastolic blood pressure is the better predictor of morbidity and mortality caused by hypertension. The systolic blood pressure is affected by many factors such as emotion and is therefore not sufficiently reliable as an indicator for compliance or a basis for making treatment decisions. Results relating to gender were not significant in predicting compliance. All workers are self-administering their treatment so the assumption is that men and women are equally compliant, although the sample was small and this assumption cannot be generalized. Most participants showed improvement after they were put on antihypertensive management, irrespective of whether they had limited literacy or not. This could be due to the fact that patients gain information verbally in their mother tongue from their health practitioners and are not reliant on the printed health education information. This does lead to a thought that the money spent in the mine on printed material could be better used.

4.9 Summary of the results

Findings showed that females scored better than their male counterparts in their health literacy questionnaire.

The management programme was a success based on the blood pressure results which were used as a proxy for compliance. There are, however, variables other than compliance that affect the success of a hypertension management programme.

There was no correlation found between the level of health literacy and the level of compliance. Improvement of compliance after the participants were put on antihypertensive management programme was seen across all fields of those who were found literate and those found with limited health literacy.

4.10 Conclusion

In this chapter the findings related to the objectives have been presented.

From the data collected, 40 participants representing 28.6% had Grade 12 certificate with 100 which represents 71.4% spread across the lower grades. However, those who had grade 12 and considered as literate (scored 7 or 8) 2 of them scored lower than 6 and 10 of them representing 25% had uncontrolled blood pressure. Also, 63 of the participants had limited literacy with 42 of them recording an improvement in their blood pressure conditions which is 66.7% of the total number of participants with limited literacy. When looking at the correlation of health literacy and gender, women scored higher than men on the REALM-R literacy tool.

The average age for the workers in this study was 60 years which is the mode. Ninety seven participants of the total number ($n = 140$) had their blood pressure improved and this number was spread over those found literate and those found to have limited literacy therefore it was concluded that this study found no correlation between level of health literacy and the level of compliance to the management of high blood pressure.

CHAPTER 5 THE LIMITATIONS OF THE STUDY, RECOMMENDATIONS, AND CONCLUSIONS OF THE STUDY

5.1 Introduction

In this chapter the researcher states the limitations of this study, makes recommendations, and conclusions of the study. This study showed no relationship between the level of literacy and that of compliance with the management programme of hypertension, and therefore raises questions about the wisdom of using printed material for health education. It does mean that health practitioners need to continue to communicate effectively with patients at the level that the patients understand and in a language that they can understand.

5.2 Limitations of this study

In this study participants were asked to state their level of education without showing proof of the level of education. This may have led to inaccurate information being given. The average age of those in the sample was (50-60) and were therefore not representative of the general population. The findings therefore cannot be generalized.

Blood pressure measurement was used as a proxy for compliance in this study but it is acknowledged that other variables can influence blood pressure and patients who were compliant may still not have responded to the programme of treatment. Equally compliance is not the only factor that determines success in managing hypertension.

Even though the researcher used a validated tool it had limitations such as its simplicity. While there are expanded tools available, this tool was chosen as the assumption was made that most of the participants would have limited literacy.

Only English literacy was measured in this study. The REALM-R tool is only available in English and Spanish languages. English version was chosen because

the health education material is written in English but it is clear that participants obtain health information from other sources.

5.3 Recommendations

5.3.1 Practice and education

In this mine, health education is conveyed through the use of posters and audiovisuals in English. It is recommended that the management of the mine divert the funding currently spent on printing to the development of videos produced in the vernacular and applications which miners could access on their phones to assist them to manage their hypertension.

It is further recommended that health practitioners continue with the practice of one-on-one health education using the patient's home language to address their health issues. Management should develop a separate method to identify and manage patients who are on treatment but not reaching or maintaining the recommended level of normal ranges of blood pressure and provide them with additional assistance due to the fact that they might have complications of hypertension from non compliance

5.3.2 Research

Studies are needed to look into other reasons for non-compliance other than compliance to medications.

Research is also required to find and use other methods of determining compliance other than blood pressure measurement as this method has its limitations.

Follow up studies should be done on larger samples using a more sophisticated tool for measuring health literacy levels.

It is recommended that where data is gathered relating to potentially emotive issues such as level of education, participants should be asked to provide evidence to prevent social desirability bias.

5.4 Conclusion

This study found no evidence of correlation or relationship between the level of health literacy and level of compliance to the management programme of hypertension for employees working at a coal mine in Mpumalanga. Though employees that were regarded as literate with a school grade 12 education, and many achieved relatively high scores on REALM-R test, there were still 25% of them who were found with uncontrolled Blood pressure. It is therefore suggested that further research is warranted on health literacy and compliance behaviours.

Nurses should play their role as patient advocates for all those patients who are at risk of having limited health literacy. Health education and information should be provided at an appropriate levels of health literacy to promote understanding and preferably be in visual and auditory formats.

Even though there was no significant association between health literacy and compliance to management programme of hypertension in this study, patients will always benefit from adequate health literacy in their daily lives.

REFERENCES

- Andrus, M.R. & Roth, M.T., 2002. Health Literacy : A Review. *Pharmacotherapy*, 22(3).
- Bass, P.F., Wilson, J.F. & Griffith, C.H. 2003. 'BRIEF REPORT: A Shortened Instrument for Literacy Screening'. *Journal of General Internal Medicine* 18 (12): 1036–38.
- Bohanny, W., Wu, S.V., Liu, C., Yeh, S., Tsay, S & Wang, T., 2013. Health literacy, self-efficacy, and self-care behaviors in patients with type 2 diabetes mellitus. *Journal of the American Association of Nurse Practitioners*, 25(9), pp.495–502. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/24170654>.
- Boren, S.A., 2009. A review of health literacy and diabetes: opportunities for technology. *Journal of diabetes science and technology (Online)*, 3(1), pp.202–209.
- Boston, T. & Group, C., 2010. The New Discipline of Workforce Wellness Enhancing Corporate Performance.
- Brink, H., van Rensburg, G. & van der Walt, C., 2011. *Fundamentals of Research Methodology for Health Care Professionals* 3rd Editio., Cape Town: Juta & Company LTD.
- Brown, V. A., Bartholomew, L.K. & Naik, A.D., 2007. Management of chronic hypertension in older men: An exploration of patient goal-setting. *Patient Education and Counseling*, 69(1-3), pp.93–99.
- Burns, N. & Grove, S., 2005. *The Practice of Nursing Research : Conduct , Critique , & Utilization by* 5th Editio., Amsterdam: Elsevier/Saunders.
- Cabe, J., 2013. Health Literacy , Public Health , and Chronic Disease Prevention. In I. of M. R. on H. Literacy & I. of H. L. for P. H. A. Workshop, eds. *The Power and Possibilities of a Healthy World*.
- Campbell, S. & Duddle, M., 2010. Health literacy in chronic kidney disease education. *Renal Society of Australasia Journal*, 6(March), pp.26–31.
- Carls, G.S., Roebuck, M.C., Brennan, T.A., Troyen, A., Slezak, J.A., Matlin, O.S. & Gibson, T.B., 2012. Impact of Medication Adherence on Absenteeism and Short-Term Disability for Five Chronic Diseases. *Journal of Occupational and Environmental Medicine*, 54(7), pp.792–805.

- Chen, A.M., Yehle, K.S., Albert, N.M., Ferraro, K.E., Mason, H.L., Murawski, M.M., & Plake, K.S., 2012. Abstract 58: Health Literacy Influences Knowledge Attainment but not Self-Care or Self-Efficacy Longitudinally in Heart Failure Patients. *Circ Cardiovasc Qual Outcomes*, 5(3_MeetingAbstracts2012), p.A58–. Available at: http://circoutcomes.ahajournals.org/cgi/content/meeting_abstract/5/3_MeetingAbstracts2012/A58 [Accessed August 31, 2015].
- Collins, J.J., Basse, C.M.J.J., Sharda, C.E., Ozminkowski, R.J., Nicholson, S., Billotti, G.M., Turpin, R.S., Olson, M. & Berger, M.L., 2005. The assessment of chronic health conditions on work performance, absence, and total economic impact for employers. *Journal of occupational and environmental medicine / American College of Occupational and Environmental Medicine*, 47(6), pp.547–557.
- Creswell, J.W., 2014. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* Fourth Edi., Lincoln, USA: SAGE Publications, Inc. Available at: <http://www.sagepub.com/booksProdDesc.nav?prodId=Book237357>.
- Davis, T.C., Mayeaux, E. J., Fredrickson, D, Bocchini, J. A., Jackson, R H, & Murphy, P. W., 1994. Reading ability of parents compared with reading level of pediatric patient education materials. *Pediatrics*, 93(3), pp.460–468.
- Dewalt, D.A., Berkman, N.D., Sheridan, S., Lohr, K.N. & Pignone, M.P., 2004. Literacy and health outcomes: a systematic review of the literature. *Journal of general internal medicine*, 19(12), pp.1228–39. Available at: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1492599&tool=pmcentrez&rendertype=abstract>.
- Eadie, C., 2014. Health Literacy: A Conceptual Review. *MedSurg Nursing*. Available at: <http://www.highbeam.com/doc/1G1-360608995.html#> [Accessed August 31, 2015].
- De Gaudemaris, R. Lang, T., Chatellier, G., Gilles, L., Larabi, L., Lauwers-Cances, V., Maitre, A. & Diene, E., 2002. Socioeconomic inequalities in hypertension prevalence and care: The IHPAF study. *Hypertension*, 39(6), pp.1119–1125.
- Godet-Cayré, V., Pelltier-Fleur, M., Le Valliant, J., Massuel, M. & Leger, D., 2006. Insomnia and absenteeism at work. Who pays the cost? *Sleep*, 29(2), pp.179–184.
- Harrington, M., 2015. Health Literacy in Children with Chronic Kidney Disease and Their Caregivers. *Nephrology nursing Journal*, 42(1).

- Howard, J.T. & Potter, L.B., 2014. An assessment of the relationships between overweight, obesity, related chronic health conditions and worker absenteeism. *Obesity Research and Clinical Practice*, 8(1), pp.e1–e15. Available at: <http://dx.doi.org/10.1016/j.orcp.2012.09.002>.
- Hutchison, J. & Carolina, N., 2014. The Association Between Health Literacy and Diet Adherence Among Primary Care Patients with Hypertension. *Journal of Health Disparities Research and Practice*, 7(2), pp.109–126.
- Ingram, R.R. & Ivanov, L.L., 2008. Does Health Literacy Affect Adherence to Antihypertensive Regimens? *Journal of Gerontological Nursing*, 39(3).
- Jones, C.A., Mawani, S., King, K.M., Smith, M., Mohan, S. & Campbell, N.R.C., 2011. Tackling health literacy: adaptation of public hypertension educational materials for an Indo-Asian population in Canada. *BMC public health*, 11, p.24.
- Kerins, M., McKee, G. & Bennett, K., 2011. Contributing factors to patient non-attendance at and non-completion of Phase III cardiac rehabilitation. *European Journal of Cardiovascular Nursing*, 10(1), pp.31–36. Available at: <http://dx.doi.org/10.1016/j.ejcnurse.2010.03.006>.
- Kickbusch, I., Pelikan, J.M., Apfel, F., & Tsouros, A., 2013. Health literacy: the solid facts. *Copenhagen: WHO Regional Office for ...*, pp.7–8. Available at: <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Health+literacy+The+solid+facts#1>
<http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Health+literacy:+the+solid+facts#1>.
- Kim, S., Love, F., Quistberg, D.A. & Shea, A.J., 2004. Association of Health Literacy With Self- Management Behavior in Patients With. *Diabetes Care*, 27(12), pp.2980–2982.
- Kirk, J.K., Grzywacz, J.G., Arcury, T.A., Ip, E.H., Nguyen, H.T., Bell, R.A., Saldana, S. & Quandt, S.A., 2012. Performance of health literacy tests among older adults with diabetes. *Journal of General Internal Medicine*, 27(5), pp.534–540.
- Lacroix, G., & Brouard, M., 2011. Work Absenteeism Due to a Chronic Disease Work Absenteeism Due to a Chronic Disease. , (5560).
- Levinthal, B.R., Morrow, D.G., Tu, W., Wu, W. & Murray, M.D., 2008. Cognition and health literacy in patients with hypertension. *Journal of General Internal Medicine*, 23(8), pp.1172–1176.
- Maku, N., 2011. *Exxaro Chronic Disease Survey 2011*, Arnot, Hendrina.

- Nath, C., 2007. Diabetes Self-Management Promoting and Diabetes Self-Management Literacy. *The American Journal of Nursing*, 107(6), pp.43–49.
- Navarra, A.M., Neu, N., Toussi, S., Nelson, J. & Larson, E.L., 2013. Health Literacy and Adherence to Antiretroviral Therapy Among HIV-Infected Youth. *The Journal of the Association of Nurses in AIDS Care : JANAC*, 25(3), pp.203–13. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/23433916>.
- Pawlak, R., 2005. Economic considerations of health literacy. *Nursing economic\$,* 23(4), pp.173–180, 147.
- Persell, S.D., Osborn, C.Y., Richard, R., Skripkauskas, S. & Wolf, M.S., 2007. Limited health literacy is a barrier to medication reconciliation in ambulatory care. *Journal of General Internal Medicine*, 22(11), pp.1523–1526.
- Powers, B.J., Olson, M.K., Oddone, E.Z., Thorpe, C.T. & Bosworth, H.B., 2008. Literacy and blood pressure--do healthcare systems influence this relationship? A cross-sectional study. *BMC health services research*, 8, p.219.
- Rice, J., 2006. *Mathematical Statistics and Data Analysis*, Cengage Learning. Available at: https://books.google.co.za/books?id=9_JsCgAAQBAJ.
- Wang, K., Chu, W.F., Lin, S., Chiang, I., Perng, W.C. & Lai, H., 2014. Examining the causal model linking health literacy to health outcomes of asthma patients. *Journal of clinical nursing*, 23(13-14), pp.2031–42. Available at: <http://europepmc.org/abstract/MED/24329740>.
- White, R.O. et al., 2010. Addressing Health Literacy and Numeracy to Improve Diabetes. *Diabetes Spectrum*, 23(4), pp.238–243.
- World Health Organization, 2009. *Interventions on diet and physical activity .What works?*, Geneva.
- World Health Organization, 1986. The Ottawa Charter for Health Promotion. In *First International Conference on Health Promotion, Ottawa, 21 November 1986*. Geneva: World Health Organization. Available at: <http://www.who.int/healthpromotion/conferences/previous/ottawa/en/> [Accessed August 17, 2015].

Annexures

Annexure 1: - REALM-R Examiner Record

REALM-R Examiner Record

Reading
Level _____
Grade
Completed

Participant code _____

Date _____ Clinic _____

Examiner _____

fat fatigue _____

flu directed _____

pill colitis _____

allergic _____ constipation _____

jaundice _____ osteoporosis _____

anemia _____

Fat, Flu, and Pill are not scored. We have previously used a score of 6 or less to identify patients at risk for poor literacy.

Score _____

Description of the Test

The REALM-R is a brief screening instrument used to assess an adult patient's ability to read common medical words. It is designed to assist medical professionals in identifying patients at risk for poor literacy skills. The REALM-R is a **word recognition** test – not a reading comprehension instrument. Adults are asked to de-code or pronounce words. The test takes less than 2 minutes to administer and score.

Preliminary data regarding the REALM-R has been published in the *Journal of General Internal Medicine* December 2003; 18:1036-1038.

Administration and Scoring:

1. Give the patient the laminated copy of the REALM-R word list. Attach the examiner record form to the clipboard. Hold the clipboard at an angle such that the patient is not distracted by your scoring procedure.

In your own words, introduce the REALM-R to the patient:

In a research setting or for research purposes:

"It would be helpful for us to get an idea of what medical words you are familiar with.

What I need you to do is look at this list of words, beginning here [point to first word with pencil] . Say all of the words you know. If you come to a word you don't know, you can sound it out or just skip it and go on."

If the patient stops, say, *"Look down this list [point] and say the other words you know."*

In a clinical setting:

"Sometimes in this office, we may use medical words that patients aren't familiar with.

We would like you to take a look at this list of words to help us get an idea of what medical words you are familiar with. It will help us know what kinds of patient education to give you. Start with the first word [point to 1st word with pencil], please say all of the words you know. If you come to a word you do not know, you can sound it out or just skip it and go on." If patient stops do as above.

****Special Note:** Do not use the words "read" and "test" when introducing and administering the REALM-R. These words may make patients feel uncomfortable and unwilling to participate.

"Please say these words for me?" 2. If the patient takes more than 5 seconds on a word, encourage the patient to move along by saying,

"Let's try the next word."

If the patient begins to miss every word or appears to be struggling or frustrated, tell the patient,

"Just look down the list and say the words you know."

3. Count as an error any word that is not attempted or mispronounced (see "Special Considerations" for pronunciation/scoring guidelines).

4. Scoring options:

1) Place a check mark on the line next to each word the patient pronounces correctly.

OR

2) Place an X on the line next to each word the patient does not attempt or mispronounces.

Scoring should be strict, but take into consideration any problems which could be related to dialect or articulation difficulties. Use the dictionary if in doubt. Count as correct any self-corrected word. ***In our study we chose to define 'at risk patients' as those with a score of six or less.***

Special Considerations for Administration and Scoring:

Examiner Sensitivity:

Many low literate patients will attempt to hide their deficiency. Ensure that you approach each patient with respect and compassion. You may need to provide encouragement and reassurance.

A positive, respectful attitude is essential for all examiners. (Remember, many people with low literacy feel ashamed.) Be sensitive.

Visual Acuity:

If the patient wears glasses, ask him/her to put them on for this test. The REALM-R is designed to be read by persons with 20/100 vision or better. For vision of 20/100 or better I have used a font size of 18. In my studies we have excluded patients with worse vision. The REALM has a visually impaired version using a font size of 28.

Pronunciation:

Dictionary pronunciation is the scoring standard.

Dialect, Accent or Articulation Problems:

Count a word as correct if the word is pronounced correctly and no additions or deletions have been made to the beginning or ending of the word. For example: A patient who says “jaundiced” would not receive credit for the word “jaundice”; “directs” would not receive credit for the word “directed”; “colon” would not receive credit for “colitis”. Words pronounced with a dialect or accent should be counted as correct provided there are no additions or deletions to the word. Particular attention should be paid for patients who use English as a second language.

Annexure 2: - Participant's consent form

THE RELATIONSHIP BETWEEN THE LEVEL OF HEALTH LITERACY AND THE
LEVEL OF COMPLIANCE TO THE MANAGEMENT PROGRAMME FOR
EMPLOYEES SUFFERING FROM HYPERTENSION AT A COALMINE IN
MPUMALANGA

PARTICIPANT'S CONSENT FORM

I hereby confirm that I have been informed by the researcher, Nomthetho Mpepe about the nature of study mentioned above. I have received, read and understood the written information sheet regarding the study.

I am also aware that the results of the study, including personal details and my level of knowledge and opinions about the study will be anonymously processed into a study report and all information will remain confidential and there will be no penalty or loss of benefits resulting from my response or participation.

I have been informed of the right to withdraw without prejudice, my consent and participation from the study at any stage of the study at any stage of the research process without penalty or loss of benefits due to my withdrawal.

I declare myself prepared to participate in the abovementioned study

Participant: Signature.....

Date.....

Annexure 3: - Manager's consent form

THE RELATIONSHIP BETWEEN THE LEVEL OF HEALTH LITERACY AND THE LEVEL OF COMPLIANCE TO THE MANAGEMENT PROGRAMME FOR EMPLOYEES SUFFERING FROM HYPERTENSION AT A COAL MINE IN MPUMALANGA.

Manager's consent form

I hereby confirm that I have been informed by the researcher, Nomthetho Mpepe about the nature of study mentioned above. I have received, read and understood the written information sheet regarding the study.

I am also aware that the results of the study, including personal details and my level of knowledge and opinions about the study will be anonymously processed into a study report and all information will remain confidential and there will be no penalty or loss of benefits resulting from my response or participation.

I have been informed of the right to withdraw without prejudice, my consent and participation from the study at any stage of the research process without penalty or loss of benefits due to my withdrawal.

I declare myself prepared to participate in the abovementioned study.

Participant:

Signature-----

Date -----

Annexure 4: - Information sheet

INFORMATION SHEET

TITLE: THE RELATIONSHIP BETWEEN THE LEVEL OF HEALTH LITERACY AND THE LEVEL OF COMPLIANCE TO THE MANAGEMENT PROGRAMME FOR EMPLOYEES SUFFERING FROM HYPERTENSION AT A COAL MINE IN MPUMALANGA.

LEAD INVESTIGATOR: NOMTHETHO MPEPE

CONTACT NUMBER: 013 297 8131

INSTITUTION: UNIVERSITY OF WITSWATERSRAND

Hello

My name is Nomthetho Mpepe and I am inviting you to take part in my study. Whether or not you take part is your choice. If you do not want to take part, you do not have to give a reason, and it will not affect the care you receive. If you do want to take part now, but change your mind later, you can pull out of the study at any time without any consequences to you.

This Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. I will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, friends, or other healthcare providers. Please feel free to do this.

If you agree to take part in this study, you will be asked to sign the Consent Form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

WHAT IS THE PURPOSE OF THE STUDY?

The purpose of the study is to get an idea of what medical words you are familiar with so that the current form of health education and communication can be modified to suit your needs if required. The results of the study will be used to improve employee understanding of medical terms commonly used on health education and communication at the clinic, increase compliance to management of hypertension, improve the health conditions of employees and consequently, reduce absenteeism among employees diagnosed with hypertension.

The study is conducted by the investigator in partial fulfilment of a Master of Science Degree in Nursing at the University of Witwatersrand and it has approval from the Ethics Committee of the same institution and from the Management of Arnot Colliery.

WHAT ARE THE POSSIBLE BENEFITS AND RISKS OF THE STUDY?

There will be no direct benefits to you as an individual. However, the results of the study will be used to recommend programmes that can help employees to understand the health information available to them i.e. improve the understanding of health education by employees, increase compliance to management of hypertension, improve the health conditions of employees and consequently, reduce absenteeism among employees diagnosed with hypertension.

This study does not have any risks and as such will not result in any physical, emotional or any other harm to any participant. Confidentiality will be adhered to all the time during the course of the study by keeping all information confidential and that no real names will be used only code no will be used.

WHO PAYS FOR THE STUDY?

You will not be expected to pay for anything and you also will not be paid for your participation.

WHAT PROCESSES WILL BE FOLLOWED?

You will be required to pronounce medical words from the list that you are familiar with. The completed questionnaire will be kept confidential and anonymous i.e. your names, company number and contact details will not be used during the course of the study.

The questionnaire will be completed during an interview with you and it is intended to take not more than 5(five) minutes of your time.

WHAT ARE MY RIGHTS?

Your participation in this study is solely voluntary and you are free to refuse to participate, or to withdraw from the study at any time you decide without experiencing any disadvantage.

You will have the right to access information collected about yourself as part of the study. A feedback about your participation will be given to you verbally on request at the end of the interview. The information you provide about yourself will be treated as private and confidential.

WHAT HAPPENS AFTER THE STUDY OR IF I CHANGE MY MIND?

The information from the questionnaire will be compiled into a report and no record of your details will be kept as the questionnaire is designed to be anonymous.

WHO DO I CONTACT IF I HAVE CONCERNS?

If you have any questions about your rights, concerns or complaints about the study at any stage, you can contact:

Name: Professor P Cleaton-Jones)

Position: HREC Chairperson

Telephone number: +27 11 717 1234

If you want to talk to someone who is not involved with the study, you can contact the Ethics Department at the University of Witwatersrand:

Phone: +27 11 717 1234

Thank you

Annexure 5:- Human Research Ethics Committee clearance certificate



R14/49 Mrs Nomthetho Gladys Mpepe

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M150605

NAME: Mrs Nomthetho Gladys Mpepe
(Principal Investigator)

DEPARTMENT: Nursing Education
Arnot Coal Mine Occupational Health Centre

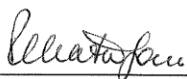
PROJECT TITLE: The Relationship between the Level of health Literacy and the Level of Compliance to the Management Programme of Hypertension for Employees Working at a Coal Mine in Mpumalanga

DATE CONSIDERED: 26/06/2015

DECISION: Approved unconditionally

CONDITIONS:

SUPERVISOR:

APPROVED BY: 
Professor P Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 17/07/2015

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