

Factors contributing to high blood pressure
among adults at Folovhodwe village in
Mutale Municipality, Vhembe District in
Limpopo Province, South Africa

By

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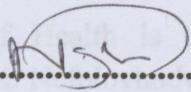
Submitted in the partial fulfilment of the requirement for the Degree of
Master of Public Health at the University of Venda

Supervisor: Prof H.A Akinsola

Co-supervisor: A Tugli



I Ntovholeni Sylvia Ramaano hereby declare that the dissertation of Master of Public Health degree at University of Venda hereby submitted by me, has not been submitted previously for a degree at this or any other university, that it is my own work in design and execution, and that all reference material contained has been duly acknowledged.

Signature..........**Date**.....26.02.2013.....

In addition, I would like to especially thank Mrs L. V Ramaano for assisting in data collection. Special thanks also go to Mr K Gyekye for assisting in data analysis.

ACKNOWLEDGEMENT



In the compilation of this report, a number of people have made useful contributions for which the author would like to sincerely thank them all.

I would like to specially acknowledge the invaluable contribution of my supervisors Professor H.A Akinsola and Mr A Tugli whose support, suggestions and comments on every stage of the study allowed me to produce something meaningful.

Department of Health is acknowledged for the permission granted. Folovhodwe headman, Mr H. Nefolovhodwe is also acknowledged for the permission granted to carry out the study. All participants are acknowledged for the participation, for without them the study would not have been possible.

In addition, I would like to especially thank Mrs L V Ramaano for assisting in data collection. Special thanks also go to Mr K Gyekye for assisting in data analysis.

I dedicate this report to God Almighty for the wisdom and guidance through all stages of this research project. I give all thanks, glory and praises to Him.

I also dedicate the report to my parents Mr A S Ramaano and Mrs A M Ramaano for encouraging me to be educated. I really appreciate you and may the good God bless you abundantly.

I dedicate the report to my kids Vanessa, Zwivhuya and Zwonaka Thomu, and my loving husband Mr M.C Thomu who helped me in editing and taking care of the family while I had meetings with the supervisors.

All this was possible through the Grace and Mercy of God, the Almighty.

PHC: Primary Health Care

SAMM: Severe Acute Maternal Morbidity

SBP: Systolic Blood Pressure

SPSS: Statistical Package for Social Sciences

WC: Waist Circumference

WHD: World Hypertension Day

WHL: World Hypertension League

WHO: World Health Organisation



ACE: Angiotensin Converting Enzyme

BMI: Body Mass Index

BP: Blood Pressure

CDL: Chronic Disease of Life Style

CHD: Chronic Heart Disease

CVD: Cardio Vascular Diseases

DBP: Diastolic Blood Pressure

DHS: Demographic Health Survey

NIHPA: National Institute Health Public Access

OSA: Obstructive Sleeping Apnoea

PHC: Primary Health Care

SAMM: Severe Acute Maternal Morbidity

SBP: Systolic Blood Pressure

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Page

<u>Contents</u>	<u>Page</u>
Chapter 1	
Introduction.....	1
1.1. Background of the study.....	1
1.2. Statement of the problem.....	2
1.3. Significance of the study.....	3
1.4. Purpose of the study.....	3
1.5. Study objectives.....	3
1.6. Operational definition.....	3
Chapter 2	
Literature review.....	4
2.1. The concepts of hypertension.....	4
2.2. Contributory factors to hypertension.....	4
2.2.1 Psychological factors contributing to hypertension.....	4
2.2.2. Socio-economic factors contributing to hypertension.....	6
2.2.3. Physical factors contributing to hypertension.....	9
2.2.4. Environmental factors contributing to hypertension.....	12
2.3. Impact of hypertension.....	12
2.4. Compliance to antihypertensive treatment.....	12
Chapter 3	
Methodology.....	14
3.1. Study design.....	14

3.2. Study setting.....	14
3.3. Study population and sample size.....	14
3.4. Measurement instrument.....	15
3.4.1. Validity.....	15
3.4.2. Reliability.....	15
3.5. Data collection.....	15
3.6. Data analysis.....	16
3.7. Ethical consideration.....	16
3.7.1. Permission.....	16
3.7.2. Informed consent.....	16
3.8. Limitation of the study.....	16
3.9. Delimitation of the study.....	17
3.10. Plan for dissemination and implementation of results.....	17
Chapter 4	
Results.....	18
4.1. Demography including Socio-economic factors	18
4.2. Genetic and other factors contributing to hypertension among the participants.....	23
Chapter 5	
Discussion, conclusion and recommendations.....	27
5.1. Discussion.....	27
5.2. Conclusion.....	34
5.3. Recommendations.....	34
References.....	36

Appendices.....41



Appendix 1: Questionnaire (English version).....41

Appendix 2: Questionnaire (Venda version).....45

Appendix 3: Cover letter.....49

Appendix 4: Permission to conduct study (Headman).....50

Appendix 5: Permission to conduct study (Department of Health).....51

Appendix 6: Ethical clearance.....52

Appendix 7: Department of health permission letter.....53

Table 6: Distribution of participants' weight when they diagnosed with high blood pressure. .25

Table 7: Nature of problem when diagnosed with high blood pressure.26

LIST OF FIGURES

Figure 1: Distribution of participants according to whether smoking cigarette before being diagnosed with high blood pressure 19

Figure 2: Distribution of participants according to whether or not they were drinking alcohol before being diagnosed with high blood pressure 20

Figure 3: Distribution of participants according to whether or not they were using salt when diagnosed with high blood pressure..... 20

Figure 4: Distribution of participants according to whether or not employed before being diagnosed with high blood pressure..... 21

Figure 5: Distribution of participants according to the rate of exercise..... 22

Figure 6: Family history with regard to high blood pressure..... 24

Figure 7: Distribution of participants according to whether or not having major problem before being diagnosed with high blood pressure..... 25

LIST OF TABLES



Table 1: Age and sex distribution.....	18
Table 2: Participants' distribution according to marital status, level of education and employment status.....	18
Table 3: If yes, how often were you exercising when diagnosed with high blood pressure?.....	22
Table 4: Distribution of participants according to their age.....	23
Table 5: Distribution of participants according to whether they used to snore when diagnosed with high blood pressure.....	24
Table 6: Distribution of participants' weight when they diagnosed with high blood pressure...	25
Table 7: Nature of problem when diagnosed with high blood pressure.....	26

LIST OF FIGURES

Figure 1: Distribution of participants according to whether smoking cigarette before being diagnosed with high blood pressure.....	19
Figure 2: Distribution of participants according to whether or not they were drinking alcohol before being diagnosed with high blood pressure.....	20
Figure 3: Distribution of participants according to whether or not they were using salt when diagnosed with high blood pressure.....	20
Figure 4: Distribution of participants according to whether or not employed before being diagnosed with high blood pressure.....	21
Figure 5: Distribution of participants according to the rate of exercise.....	22
Figure 6: Family history with regard to high blood pressure.....	24
Figure 7: Distribution of participants according to whether or not having major problem before being diagnosed with high blood pressure.....	25

Abstract



The aim of the study was to identify factors contributing to high blood pressure among adults at Folovhodwe village Mutale municipality, Vhembe district, Limpopo Province, South Africa.

A cross-sectional descriptive study design was used. From the clinic register, 91 patients who were hypertensive in the year 2010 were identified. Of those 76 were females and 15 were males. All patients were included since the number was not big. Self administered questionnaires were used to collect data. All were followed from their place and complete the questionnaires. They were requested to give consent before participating in the study.

Descriptive statistics were used to analyse data. Data were entered into SPSS. Frequency tables were used. The findings indicate that majority of participants do not have enough knowledge on factors contributing to high blood pressure. The results show that the followings contribute to high blood pressure: smoking cigarette, alcohol drinking, social problems, and family history, snoring and overweight.

The researcher recommends that awareness campaign and researches on high blood pressure should be conducted on a regular basis including factors contributing to high blood pressure to add knowledge that can help in prevention and good management of high blood pressure. Females should be encouraged to empower themselves in order to live better lives and not depend on their partner for daily living as low socioeconomic contribute to high blood pressure. Community health involvement programmes should be encouraged with regards to how to live good lives including physical fitness.

Chapter 1: Introduction

1.1. Background of the study

Hypertension is responsible for more deaths worldwide than any other cardiovascular disease (CVD). It causes about 5 million deaths a year worldwide. According to the World Health Organization (WHO, 2006), statistics show that 73.6 million people in the US aged 20 years and older have hypertension. In addition, 78.1% were aware of the condition and 69.1% are under treatment, while in 54.6% of the cases, their blood pressures are not controlled. In 90-95% of hypertension cases, the cause is unknown. Within the African American community, those with the highest rates of hypertension are more likely to be the middle aged or older, less educated, obese, physically inactive and diabetic (WHO, 2006).

In Africa, the prevalence of hypertension is estimated at 20 million. Hypertension in Sub-Saharan Africa is a wide spread problem of immense economic importance because of its high prevalence in rural and urban areas. Mass migration from rural to urban areas probably accounts, at least in part, for high incidence of hypertension in urban black Africans. In the remaining semirural areas, inroads in life style changes associated with Western lifestyle may explain the apparently rising prevalence of hypertension (Lionel & Yackoob, 2005). The impact of hypertension on mortality in an African population was assessed and reported that the risk of death increased by 60%, with an increase of 20mmhg in diastolic blood pressure in rural Nigeria (Steyn, 2005).

According to Steyn (2005), the most comprehensive estimates of the prevalence of hypertension in South Africa are provided by the first Demographic and Health Survey (DHS). Hypertension was found to be the commonest of the CVD risk factors among the study participants, but stood out as the risk factor with the highest prevalence in the black African community. After age and gender standardisation, the overall hypertension prevalence rate was 55%. Fifty nine percent of black African people, fifty five of Indian and coloured people and 50% of white people aged 49-52 were diagnosed with the condition. Hypertension frequently co-exists with other risk factors for Chronic Disease of Lifestyle (CDL), such as diabetes and obesity (Steyn, 2005).

Complications due to hypertensive disease in pregnancy are the most common direct cause of maternal death and neonatal death due to low birth weight in South Africa. In 1997, the Pretoria Academic complex (Pretoria academy and Kalafong hospital) initiated the use of severe acute maternal morbidity (SAMM) and routine collection of data. Protocols were reviewed and a new approach of managing hypertension in women was introduced (Lombard, Pattinson, Backer & Macdonald, 2005).

Clinical experiences and some research findings indicate that traditional and spiritual healers respectively play an important role in the management of hypertension in Africa. A study was conducted in Limpopo under the topic: Concepts and treatment modalities for hypertension by traditional and faith healers in the Northern Province, South Africa. The perceived causes by both traditional and faith healers could be divided into diet, heredity, supernatural and psychological (Peltzer, 2001).

1.2. Statement of the problem.

A situational analysis in Limpopo province about the hypertension management and surveillance at Primary health care level shows that there were several problems which were categorized into three, namely patient, staff and administration related issues. The findings shows that most of the health workers in all the facilities complained about the patient related problems, such as non compliance to treatment and patients not following lifestyle modification and advices given to them (Sekokotla, 2003).

Despite the fact that awareness campaigns are always conducted and availability of antihypertensive treatment, hypertension remains a silent killer even in the villages. Folovhodwe village is a large community that also encounters the challenges of hypertension. The clinic data shows that several adults are on antihypertensive treatment and of these, the blood pressures of some are not under control while some patients have either developed stroke or renal failure due to late diagnosis and poor use of health services. These people end up being the problem to the community and their family because they cannot take care of themselves. Some patients are neither complying with their treatment nor changing lifestyle.

1.3. Significance of the study.

This study will be the first to be conducted at Folovhodwe village about the factors contributing to hypertension among adults in the village. The results of the study may help in informing decision in the review of the policies by the Department of Health on the management of hypertension. The results of this study may also contribute to the knowledge needed in health promotion and prevention of hypertension in the community. The results can also form the basis for developing a health education intervention by the primary health care nurses on the factors contributing to high blood pressure occurrence in the community where the study took place.

1.4. Purpose of the study.

The purpose of this study is to identify the factors contributing to high blood pressure among adults at Folovhodwe village, Mutale municipality of Limpopo province South Africa

1.5. Study objectives.

-To assess the demographic factors contributing to high blood pressure among adults at Folovhodwe village, Mutale municipality of Limpopo province.

- To discuss the genetic and others factors contributing to high blood pressure among the study group.

1.6. Operational definitions.

Contributory factors: Any agent, situation or condition which may increase an individual's chances of developing hypertension in the village. These include physical, environmental or biological agents; and demographic factors, which can be psychosocial or socio-economic.

An adult: A male or female who is above 18 years and lives permanently in the village.

Hypertension: Diagnosed high blood pressure where the systolic is above 140 and diastolic is 100 and above.

Compliance: Extent in which a patient behaviour conforms to medical care and advice.

Chapter 2: Literature review

2.1. The concept of hypertension.

Hypertension is a risk factor for heart attack, stroke, renal disease and blindness. It is referred to as a silent killer because one may have it and may not be aware of it. Hypertension is too costly in treatment in developed and developing countries. The disease is classified into two, essential hypertension and secondary hypertension. Essential or primary hypertension accounts for 95% of all cases and although the exact cause is unknown, several contributing factors have been identified. This type of blood pressure occurs more in older children and adolescents. Secondary hypertension is elevated blood pressure with a specific cause that can be identified or corrected (Dirksen, O'Brian, Lewis, Heitkemper & Bucher, 2007). Clinical and statistical studies have identified several factors that increase a person's risk of having heart disease. Major risk factors are those that research has shown to significantly increase the risk of heart disease. Other factors are associated with increased risk of cardiovascular disease, but their significance and prevalence haven't yet been precisely determined. They are called contributing factors (Morenoff, Hansen, House, Williams, Kaplan & Hunte, 2007)

2.2. Contributory factors to hypertension.

2.2.1. Psychological factors contributing to hypertension

The key factors underlying the elevated rates of hypertension among the black are not clearly understood. They are linked more to psychological factors than genetic factors. There is some evidence that continuous stress can trigger biochemical changes within the body that raise the blood pressure and keep it high (Morenoff et al,2007). Chronic stress can be linked to the larger social environment to hypertension risk. People exposed to repeated stress may develop hypertension more frequently than others (Dirksen et al, 2007). An early study in Detroit found that both blacks and white who reside in a low stress areas (based on areas measures of economic deprivation, crime and marital instability) had lower level of blood pressure than those in high stress areas (Morenoff et al, 2007). According to Smith (2003) emotional stress in short term can elevate the blood pressure; however it does not cause a persistent elevation of blood pressure and therefore does not cause true hypertension with its associated consequences (Smith, 2003). Being in a stressful situation can cause temporarily increase blood pressure, but science has not proven that stress causes high blood pressure.

Some scientists have noted a relationship between coronary heart disease risk and stress in person's life, health behaviours and socio economic status. How an individual manage stress may affect others, establish risk factor for high blood pressure or heart disease. For example people under stress may overeat or eat less healthy diet, put off physical activity, drink, smoke or misuse drugs (Coetzee, 2010).

The health-related consequences of unemployment are a central subject of medical sociology.

The study conducted by Atallah et al (2007) in the Caribbean, indicate that the high prevalence and poor control of hypertension have been observed in populations with low-socioeconomic status. Comparing an unemployed population with another employed population sharing the same culture, and another employed population living in another environment might enlighten the effects of factors accessible to primary prevention on the one hand and access to health care on the other hand. Prevalence of hypertension was higher among the unemployed and employed Caribbean population, than among an employed metropolitan French population. Higher prevalence of hypertension and poorer therapeutic control has been observed in lower social classes (Atallah, Inamo, Larabi, Chatellier, Rozet, Machuron, De Gaudemaris & Lang, 2007).

In 2009, the United States faced its highest unemployment rates since 1982-1983 with rates reaching or exceeding ten percent in the last three months. From January to December 2009, national unemployment rates increased from 7.7% to 10.0%. During this same time period unemployment rates in Nevada increased from 9.6% to 13.0%, which were the highest in the nation. The relationship between unemployment and poor health has been well documented. The unemployed tend to have higher levels of impaired mental health including depression, anxiety, and stress, as well as higher levels of mental health hospital admissions, chronic disease (cardiovascular disease, hypertension, and musculoskeletal disorders), and premature mortality. Additionally, unemployment is associated with unhealthy behaviors such as increased alcohol and tobacco consumption and decreased physical activity which lead to development of high blood pressure. Studies have also demonstrated a positive correlation between employment and better health, improved self-confidence, self-esteem, and happiness (Pharr, Moonnie, & Bungum, 2011)

The GEDA (*Gesundheit in Deutschland Aktuell* [Current Health in Germany]) study was conducted in 2008/09 by the Robert Koch Institute, the nationwide governmental public health agency in Germany. The result showed that unemployed persons aged 30 to 59 years

suffer physical, emotional, and functional impairment more commonly than employed persons. Men and women with little social support are more likely to be impaired in these three areas whether they are employed or not. Regression analysis reveals that unemployment and social support have significant, independent effects on both the incidence of such impairments and on their duration after age, income, and education have been controlled for. The health-related consequences of unemployment are a central subject of medical sociology, health psychology and social medicine and are regularly addressed by federal and regional health reporting bodies in Germany. Many studies have shown clearly that unemployed men and women suffer from more health problems and more frequently behave in ways that pose risks to their health than those who are employed. Unemployed men and women's increased consumption of medical and psychotherapeutic resources are also relevant to health services research. Unemployed people use health services more often, are more affected by sleep disorders, depression, anxiety disorders, and addictions, and commit suicide more frequently. Health-related consequences of unemployment manifest as psychosocial health problems due to loss of income, job-related social contact, or social prestige. Social resources have a particularly marked effect on how well individuals cope with unemployment: the person affected copes with the loss of his/her job more successfully if he/she has a social support network and does not feel alone. This article describes the relationship between unemployment; social support; and physical, emotional, and functional complaints in the German population of working age (whether employed or unemployed), on the basis of representative data for 2009. As yet there are no representative analyses in Germany of the association between unemployment, social support, and health which examine both the probability of impairments of various kinds and their duration (Kroll & Lampert, 2009).

2.2.2. Socio-economic factors contributing to hypertension.

The Social context in which people live is increasingly being recognised as additional potential determinants of health and factors contributing to health disparities, over and above the effect of individual and household risk factors. Different socio-economic groups may be linked to hypertension for example, spatial location and segregation may differentially expose members of affected groups to sources of chronic stress and social support in their residential environments, which could in term, generate group disparities in blood pressure levels (Morenoff et al, 2007).

Excessive salt intake is considered to be responsible for initiation of hypertension in some people. Studies on populations with a low sodium intake (usually the primitive hunter-gatherer societies) show that when people from these societies adopt modern lifestyles, the prevalence of hypertension increases. Furthermore, when sodium is restricted in some hypertensive people, their blood pressure is controlled. A sodium intake may activate a number of presser mechanisms and cause water retention. In western countries, even though almost everyone consumes high sodium diet, only about 20% develop hypertension. This indicates that some degree of sodium sensitivity must be present for high sodium intake to trigger development of hypertension (Lewis, 2006).

It has been known for a long time that societies with diets high in salt experience more hypertension and the associated complications of heart attack, stroke, and organ damage, it is not known, however, if increased salt is itself responsible for elevated blood pressure. It might be, for example, that people from societies with increased salt intake may also have some other dietary factors or an inherited factor that is responsible for their hypertension. Most physicians do not believe that it plays an important role. The most likely explanation is that there are other environmental and genetic factors that along with high salt intake all work together to cause hypertension. More salt you take, your kidneys will retain more water inside the body, resulting in increased blood pressure (Smith, 2003). The Institute of Medicine of the National Academies reported that the healthy 19 to 50 year- old adults consume a maximum of 3.8 grams of salt each day. Because of the role of sodium in the body, excessive salt intake causes a variety of physiological reactions that range from vasoconstriction (constriction of the blood vessels) to kidney stress and dehydration. The levels of urinary sodium excretion varied in different Egypt regions. These correlated positively with the prevalence of hypertension (Ibrahim, 1999). According to National Institutes of Health Public Access author manuscript (NIHPA), excessive dietary sodium is common in subjects with resistance hypertension and may directly increase blood pressure and/or blunt the antihypertensive effects of most agents including diuretics, angiotensin-converting enzyme inhibitors (Pisoni ,Ahmed & Calhoun, 2009). Potassium helps balance the amount of sodium in your cells. Too little potassium in the diet accumulates too much sodium in the blood. It's uncertain that too little vitamin D in the diet can lead to high blood pressure. Vitamin D may affect an enzyme produced by the kidneys that affects blood pressure (Coetzee, 2010).

Dietary factors that contributed significantly to the blood pressure of hypertensive children are remarkably similar to those indicated as deficiencies in primary school children in South Africa. Schutte et al (2003) observed iron, vitamin A, folic Acid and calcium deficiencies in preschoolers and primary school children. It was also evident that much less research has been done on the adolescents, but iron and folic Acid were common and black children seem to have low vitamin A, E, B6 and also calcium status. According to the study energy, biotin, folic acid, pantothenic acid, magnesium, zinc, iron and vitamin A, intakes are the strongest markers for systolic blood pressure (SBP) and diastolic blood pressure (DBP) in black hypertensive children. Although all markers were not applicable to each blood pressure parameter, all of these nutrients were indicated as deficient in these children. Some of the most profound results in the study were the associations of blood pressure with folic acid and biotin. The relationships of SBP and DBP of hypertensive males with folic acid are in accordance with previous studies. Folic acid has been shown to be beneficial and very effective in reducing plasma homocysteine levels. By reducing this factor for cardiovascular disease, folic acid intake contributes to the lowering of blood pressure (Schutte , Van Rooyen , Huisman, Kruger, Malan,& De Ridder, 2003).

Cigarette smoking is regarded as a risk factor for overall cardiovascular diseases however it remains a significant risk for respiratory diseases and cardiovascular mortality (Miller, 1999). Not only does smoking or chewing tobacco immediately raise blood pressure temporarily, but the chemicals in tobacco can damage the lining of the artery walls. This can cause arteries to narrow, increasing your blood pressure. Second-hand smoke can also increase blood pressure (Coetzee, 2010).

Although the media has widely publicized the beneficial effects of alcohol on the heart, it must be remembered that this applies only to moderate alcohol intake. People who have more than two drinks per day are much more likely to have sustained elevation in blood pressure than non-drinkers. Alcohol may, therefore, be an unrecognized cause of hypertension in a large number of moderate to heavy drinkers. In many hypertension cases, elimination of alcohol lowers their blood pressure sometimes even into a normal range without medication (Smith, 2003). The study conducted in the University of Alabama at Birmingham in 2009 showed that heavy consumption of alcohol is associated with increase BP and increase risk of uncontrolled BP due to its physiologic effects. In a small prospective study, cessation of

heavy alcohol consumption led to a reduction in 24 hour ambulatory systolic blood pressure and diastolic blood pressure of 7.2 and 6,6mmhg, respectively (Pisoni et al,2009)

2.2.3. Physical factors contributing to hypertension.

Overweight and hypertension are common conditions in the South African black adult population. Overweight has been reported to be 34% in urban black women in Cape Town, and 28-33% in rural women obesity is known to be one of the most important risk factors contributing to hypertension, which has been reported in 19-35% of black men studied in Durban and Cape Town. It has been recognized that overweight which starts early in life and persists into adulthood, increases the risk of overweight related conditions, such as hypertension later in life. Adolescence is also known to be an important stage to develop central pattern of body fat, which predisposes to CHD at a later age. Furthermore, essential hypertension may have its inception in childhood (Monyeki, Kemper & Makgae, 2007). The cross sectional study conducted in Khayelitsha in 2008 indicate that the prevalence of overweight /obesity was 53.4% and 18.7%,and that of abdominal obesity was 71.5% and 23.4%,among women and men respectively. However, more women (21.3%) than (11.2%) reported walking more than 45 minutes per day. Female gender and being married were associated with high body mass index (BMI) and large waist circumference (WC). Recent migration was associated with smaller WC. The findings suggest that physical activity may pay less of role in obesity control, or more than 45 minutes of physical activity required reducing the risk of obesity, especially in women. At least among South African women, obesity control focused on nutritional interventions may be more beneficial than increasing the intensity or duration of physical activity (Malhotra, Hoyo, Ostbye, Hughes, Schwartz, Tsolekile, Zulu & Puoane, 2008)

The typical female body shape that distresses many women is associated with lower risk in premenopausal women. Called ‘pear-shaped’, it means that extra weight is carried around the hips and thighs. Men tend to be ‘apple-shaped, caring excess fat around the belly and this can make them more prone to high blood pressure and many more heart disease (Coetzee, 2010) Blood pressure increases for any people of any age with the increase of weight and rise gradually with age. Coetzee (2010) concurs that an individuals are at greater risk after age 35, although a healthy lifestyle can minimise the effects. This increase in risk with age is much more pronounced in Western society. The main culprit is thought to be arteriosclerosis. This is the hardening and narrowing of the arteries, due to fatty deposits in the inner layer, is

attributable to our diet and lifestyle habits (Coetzee, 2010). Gerontology considerations are vital. The following age related physical changes play a role in the pathophysiology of hypertension in elderly people.

- Loss of tissue elasticity.
- Increased collagen content and stiffness of the myocardium.
- Increased peripheral vascular resistance due to atherosclerosis.
- Decrease rennin response to sodium and water depletion.
- Decreased renal function (Lewis, Collier & Heitkemper, 1996)

The level of blood pressure is strongly familial, although it is not known exactly what is inherited that leads to high blood pressure. The estimation of the genetic factors of hypertension ranges from 25-65%. The study shows that some alteration in renal function may be implicated in the development of hypertension and this may be inherited (Lewis et al, 1996). History of close blood relative .e.g. parents or sibling, with hypertension is associated with an increased risk for developing hypertension (Dirksen et al, 2007).

Severe mutation, including the deletion of entire portions of DNA within the gene for one of the proteins, often results in the development of hypertension at a young age. Subtle mutation in single or a few bases of the genetic code, which are inherited over generations, takes decades to manifest into a disorder. Overtime, incremental increases in blood pressure due to the production of extra proteins or receptors will weaken the body's feedback system more than it will normally keep any such aberrations in check and this will result in hypertension (Prater, 2007).

About 50% of patients with essential hypertension have obstructive sleeping apnoea (OSA), and another 40% of essential hypertension patients are habitual snores, but without OSA. There is now convincing evidence that habitual snoring and OSA are independent risk factors for essential hypertension, and that the treatment of OSA and habitual snoring will reduce blood pressure (Silverberg & Oksenberg, 2001). The data suggest that the high prevalence of hypertension in OSA is primarily related to age and excess obesity seen in these patients. In morbidity obese young patients with OSA, factors directly to OSA may be also contributing to the development of hypertension. With increasing age, other competitive risks may obscure any independent effect that OSA may exert (Millman, Redline, Carlisie, Assaff & Levinson, 2011).

Gender has got its related risk patterns. A higher percentage of men than women have high blood pressure until 45 years of age. From 45-54 and 55 -64, the percentage of men and women with blood pressure are similar. After that a much higher percentage of women have high blood pressure than men. Risk for women increases during pregnancy and after reaching menopause (Coetzee, 2010)

There are Ethnicity-related causes of hypertension. Being black is associated with a higher risk of developing high blood pressure. New studies are inconclusive on whether the risk is equivalent between African Americans and people of African heritage who have never left the African continent (Weber, 2007). In considering sub-Saharan Africa, undoubtedly the vast majority of the population can be defined as black. Proposals about hypertension in black Americans may not relate to Africans living in Africa who have never emigrated, nor need these proposals apply to other Africans of different tribal or genetic origins living elsewhere in Africa: e.g., West Africa may differ from South Africa, Zimbabwe, or Kenya. Thus, any statements about the origins of hypertension in relation to one group of Africans may not apply to any other. Although black Americans or other black populations may be more vulnerable to hypertension and may even have different causative factors or different degree of the same causative factors, such as obesity, “their genetic predisposition may be permissive rather than determinative, “requiring biosocial factors such as weight gain, high salt intake, or anxiety and psychosocial stress or excess alcohol consumption to precipitate the disease (Lionel et al, 2005).

Type 2 diabetes mellitus and hypertension are closely associated and contribute to micro vascular and macro vascular end-organ damage. Prevalence of hypertension is increased even in the pre diabetic state. However, there is little information available about the relationship between incidence of hypertension and a deterioration of glucose tolerance from impaired glucose tolerance (IGT) to diabetes. The study conclude that a significant relationship was found between the development of type 2 diabetes and hypertension in patients with IGT, and treatment with acarbose, which primarily improve postprandial hyperglycaemia, reduce the incidence of hypertension as well as diabetes. This suggest that the two entities shared the common soil (Hanefeld, Pistrosch, Koehler & Chiasson, 2012)

Compliance can be defined as the degree to which the patient conforms to medical advice about lifestyle and dietary changes or as well as to keep appointment follow up and taking of treatment as prescribed. Non compliance to blood pressure-lowering treatment is a major reason for poor control of high blood pressure worldwide. Although safe and effective drugs

2.2.4. Environmental factors contributing to hypertension.

Chronic stress linked to the larger social environment is widely regarded as an important contributor to hypertension risk and there is a long history of interest in the ways in which the residential environment can contribute to cardiovascular risk, including hypertension. In addition, specific stressors in residential environments, such as industrial noise, airport noise traffic noise, overcrowding, violence, cold indoor temperatures, show positive association with blood pressure. Economic deprivation in the neighbourhood, as well as neighbourhood influences on physical activity and access to nutritious foods have also been identified as potential pathways (Morenoff et al, 2007)

2.3. Impact of hypertension.

Hypertension is the primary and most common risk factor for heart diseases, stroke, and renal disease. It is estimated that one in six people worldwide or nearly one billion are affected by high blood pressure and it is estimated that the number will increase to 1.5 billion by 2025. The world hypertension league (WHL) initiates the World Hypertension Day (WHD) in order to heighten the awareness in all spheres among public, families, professionals, policy makers and politicians. Consequences of high blood pressure are far reaching, leading to extensive end –organ damage (Chockalingam, 2007).

In Sub-Saharan Africa, the increasing prevalence of CVD, especially in the upper socioeconomic population results in greater demand for high cost of health services in countries where the need for health services to deal with the problems of infectious disease, malnutrition, pregnancies outcomes are in short supply. These high cost health services for vascular disease shift badly needed limited health resources from lower to upper socioeconomic groups. Increase in stroke, renal disease has a devastating impact on the better educated and potential national leaders and on the evolving political structures in these countries (Kuller, 2007).

2.4. Compliance to anti-hypertensive treatment

Compliance can be defined as the degree to which the patient conforms to medical advice about lifestyle and dietary changes or as well as to keep appointment follow up and taking of treatment as prescribed. Non compliance to blood pressure-lowering treatment is a major reason for poor control of high blood pressure worldwide. Although safe and effective drugs

are available, the management of high blood pressure is still far from optimal especially in developing countries. A major factor accounting for inadequate treatment of hypertension is poor compliance (Kabir, Illiyasu, Abubakar & Jibril, 2004).

The rates of non-compliance may be as high as 50% in chronic conditions. Patients who are not taking their medication as ordered may be doing so intentionally or unintentionally. Many patients who are partially compliant are making rational choices over their medication. This point is worthy of consideration given that doctors generally regard non-compliance as the results of forgetfulness, carelessness on the part of the patient (Ross, Walker & MacLeod, 2004).

The complexity of the drug regimen affects compliance. Compliance among hypertensive patients improve considerable when drugs are prescribed just once a day. In addition, many patients experience uncomfortable side effects from their medication that may be unacceptable in a largely asymptomatic disease. This is the main reason for non-or partial compliance (Thrall, Lip & Lane, 2004).

Many patients express general concerns about taking medication, previous bad experiences, and perceptions that drugs are unnatural or unsafe and are best avoided, and that drug signify ill health. With regard to antihypertensive specifically, concern relate to lifelong need for medication and the possible side effects or risks. Patients also comply with the medication regimen for a variety of reasons, including perceived benefits of medication, fear of complications associated with high blood pressure, and desire to control their blood pressure and feeling better on medication (Thrall et al, 2004).

Compliance can be improved by good communication between patient and health care professionals. Encouraging the patients to remember information by asking them to repeat back the most important component and reinforcing verbal instruction with written information will help to educate the patients about their disease. Social support either from the family and friends, the physician or other health professionals has also been shown to enhance medication compliance (Thrall et al, 2004).

Chapter 3: Methodology

3.1. Study design

Research design represents the major methodological thrust of the study, being the distinctive and specific research approach which is best suited to answering the research questions (Cormack, 2001). The research was quantitative. The study took a form of survey research and used a cross-sectional descriptive study design as defined by Graziano and Raulin (1997). According to Graziano and Raulin (1997) survey research seeks to determine the current status of population characteristics whilst also attempting to discover the relationships among variables. Cross-sectional survey design involves one-shot or once off administration of the survey instrument to a sample thereby yielding data on the desired variables as they exist at the time of the survey.

3.2. Study setting

The study was conducted at Folovhodwe village. Folovhodwe is a rural area situated in Mutale district, far north of Limpopo Province, South Africa. It is adjacent to the Zimbabwean border and the Limpopo River that demarcates South Africa and Zimbabwe. Most of the households are headed by women as their husbands are in the other provinces due to employment. The nearest mines, i.e. Tshikondeni coal mine, Folovhodwe Geocapro mine and De Beers mine in Musina serve as sources of income for many of the residents in this village, even though a large part of the population depends on subsistence farming and cattle rearing for living. Folovhodwe clinic serve 8000 population which is composed of six sub-villages namely: Maswangaduvha, Tanda, Thondoni, Tshaluwi, Tshapinda and Tshikwarakwara. It is 95 kilometre to the referral hospital which is Donald Fraser hospital.

3.3. Study population and sample size

Study population is the entire group of people or objects that are of interest to the researcher that meet the criteria the researcher is interested in the study (Brink, 2006). From the clinic register, 91 people who are diagnosed with high blood pressure and are taking antihypertensive treatment at Folovhodwe clinic in 2010 were identified as the study population. The population consisted of 15 males and 76 females. Since the target population was not large (91), the entire population was included in the study. In other words, there was no need for sampling.

3.4. Measurement instrument.

A questionnaire was used for data collection which composed of two sections, namely: demographic information including socio-economic factors, genetic and other factors contributing to hypertension. The questionnaire consisted of structured and semi structure questions and it was a self administered questionnaire (appendix 1&2). Appendix 1 consists of English version of the questionnaire while appendix 2 was the Venda version.

3.4.1. Validity.

The validity of an instrument is the ability of an instrument to measure what it is designed to measure (Kumar, 2005). In this study, concern has been given to face and content validity.

Face validity of an instrument is defined by Kumar (2005) as the judgement that an instrument is measuring what it is supposed to, based primarily on the logical link between the questions and study objectives. The supervisors were consulted for their opinion whether the instrument was able to measure the factors contributing to hypertension. The questions were restructured based on the feedback from the supervisors and the Higher Degree Committee members.

Content validity is an assessment of how well an instrument represents all the different components of the variable to be measured (Brink, 2006). Review of literature and instruments from similar studies will be conducted to help during the design process to provide some assurance of content validity.

3.4.2. Reliability.

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 if used by two different investigators (Polit, 1995). The reliability of the instrument was determined by the test re-test method. In addition, a pre-test was done through random selection of five respondents from similar setting using the same instrument at different times. The responses were compared in order to modify the instrument.

3.5. Data collection.

Data collection is the gathering of information needed to address a research problem (Polit, 1991). The researcher went to Folovhodwe clinic and identifies people with high blood

pressure from the clinic registers and followed them to their places and administer questionnaire personally.

3.6. Data analysis.

Data analysis is the systematic organisation and synthesis of research data (Polit, 1991). Data analysis was done by the researcher with the assistance of the supervisors. Data analysis thus entails categorising, ordering, manipulating and summarising the data and describing them in a meaningful way. Different kinds of analyses were done to answer the different research questions. The variables were analysed using STATA statistical software programmes. Frequencies of data elements were produced and outputs were exported to Microsoft Excel spreadsheet which was used to create graphs and tables to present data.

3.7. Ethical consideration.

3.7.1. Permission.

Permission to conduct the research was sorted from the Ethics Committee. The proposal was presented to the Higher Degree Committee of the School of Health Sciences at the University of Venda. A letter to Folvhodwe headman and Department of Health and Social Development was written to ask for their permission to conduct the study.

3.7.2. Informed consent.

Participation in this study was voluntary. All participants were requested to give informed consent before the study was conducted. Confidentiality was maintained for all participants. The questionnaire was having code and no space for names to ensure anonymity. The participants have the rights to withdraw from the study if they desire to and right of speech to ask any question about the study. No personal information was disclosed to any other person without the consent of the participant. The participant was allowed to be alone when completing the questionnaire.

3.8. Limitation of the study.

In Venda culture it is not easy to talk about personal issues and this could limit the quality of the information. The study was conducted at Folvhodwe village only and the sample was not too big to generalise the findings.

3.9. Delimitation of the study

The study was conducted at Folovhodwe village among the adults only. The study was limited to the total population of 91 people only who were diagnosed with high blood pressure and were taking treatment at Folovhodwe clinic. Questionnaire was used as the only instrument for data collection.

3.10. Plan for dissemination and implementation of results.

The report of the study will be sent to the Department of Health Polokwane and help in making decision regarding health condition. The report will be deposited at the University of Venda library as use by other students and as references. An article will be written on the study and published.

Table 1: Age and Sex Distribution

Age Group	Male		Female		Total
	N	%	N	%	
29-39	5	35.7	10	13.3	15(17%)
40-50	7	50.0	36	48	43(48%)
51-61	1	7.1	23	30.7	24(27%)
62+	1	7.1	6	8	7(8%)
Total	14	100	75	100	89

Table 2: Participants' distribution according to marital status, level of education and employment status

	N	%
N = 89		
Marital status		
Married	18	20.2
Divorced	70	78.7
Widow	1	1.1
Education		
No Schooling	23	25.8
Primary	18	20.2
Secondary	28	31.5
Tertiary	20	22.5
Employment Status		
Unemployed	40	44.9
Employed	28	31.5
Self-Employed	15	16.9
Pensioner	6	6.7

Table 2 shows that 18 (20.2%) of the respondents were married, 70 (78.7%) were divorced while only 1 (1.1%) was a widow. For the educational level of the respondents, 23 (25.8%) did not attend school, 18 (20.2%) attended primary school, 28 (31.5%) attended secondary

Chapter 4: Results



4. 1. Demography including socio-economic factors.

As shown in Table 1, the sample size was 89, out of which 75 were females and 14 were males. Fifteen (17%) were between ages 29-39 years, 43(48%) were between 40-50 years, 24 (27%) were between 51- 61years and 7(8%) were 62 years and above.

Table 1: Age and Sex Distribution.

Age Distribution	Sex Distribution				Total
	Male		Female		
	N	%	N	%	
29-39	5	35.7	10	13.3	15(17%)
40-50	7	50.0	36	48	43(48%)
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N = 89	N	%
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Widow	1	1.1
Education		
No Schooling	23	25.8
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Secondary	28	31.5
Tertiary	20	22.5
Employment Status		
Unemployed	40	44.9
Employed	28	31.5
Self- Employed	15	16.9
Pensioner	6	6.7

Table 2 shows that 18 (20.2%) of the respondents were married, 70 (78.7%) were divorced while only 1 (1.1%) was a widow. For the educational level of the respondents, 23 (25.8%) did not attend school, 18 (20.2%) attended primary school, 28 (31.5%) attended secondary

school while only 20 (22.5%) attended tertiary institutions. For their employment status, 40 (44.9%) were unemployed, 28 (31.5%) were employed, 15 (16.9%) were self employed and 6 (6.7%) were pensioners.

Figure 1 shows that among the participants 5.5% of the females were smoking before being diagnosed with high blood pressure compared to 50% of males. Figure 2 (a) shows that among the female respondents 88% were not drinking alcohol before being diagnosed with high blood pressure compared to 35.7% of the males. On the question of the number of bottles per day among those who drink, the females said that they drink five bottles per day while the males on the average drink 7. Figure 3(a & b) shows that only 11% of the females and 7% of the males used to take a lot of salt before being diagnosed with high blood pressure. As shown in figure 4, of the 73 females, 67% were not employed before being diagnosed with high blood pressure while of the 14 males, 29% were also not employed. Figure 4(c) shows that among those who were working, 25% were unskilled, 38.9% were semi-skilled, 33.3% were skilled while 2.8% were pensioners when diagnosed with high blood pressure. Figure 5. (a) shows that among the female respondents 84% were not exercising when diagnosed with high blood pressure. Figure 5 (b) shows that among the males respondents only 50% were exercising when diagnosed with high blood pressure. Table 3 shows that among those who were exercising, three (9.7%) were exercising daily, one (3.2%) exercised weekly and 27(87%) exercised occasionally when diagnosed with high blood pressure.

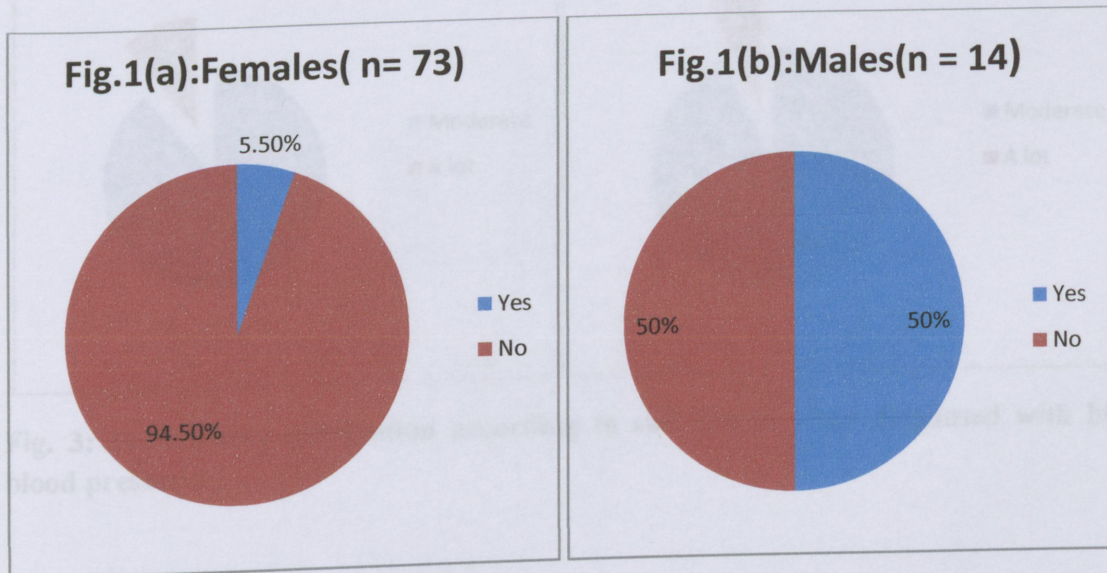


Figure 1: Distribution of the participants according to whether or not they were smoking cigarettes before being diagnosed with high blood pressure.

Fig 4(a):Females(n= 73)

Fig 4(b):males(n=14)

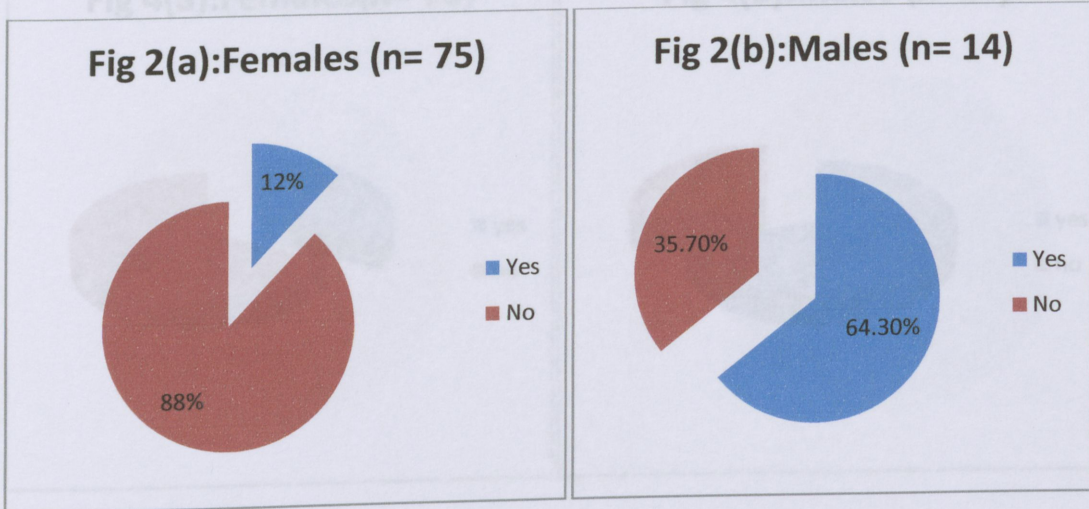


Figure 2: Distribution of the participants according to whether or not they were drinking alcohol before being diagnosed with high blood pressure.

Fig. 4: Participants distribution according to whether or not they were employed when diagnosed with high blood pressure

Fig 3(a):Females (n= 73)

Fig 3(b):Males(n=14)

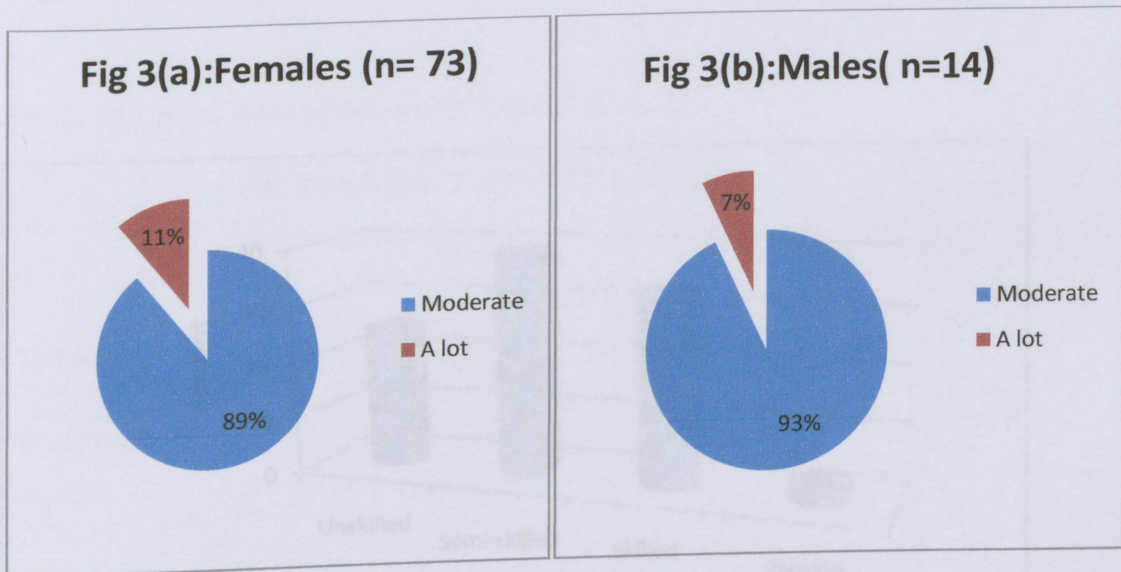


Fig. 3: Participants distribution according to salt intake when diagnosed with high blood pressure.

Fig-4(c) :If yes,what type of occupation?

Fig 4(a):Females(n= 73)

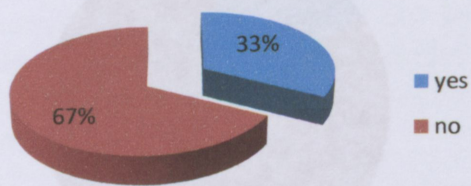


Fig 4(b):males (n=14)

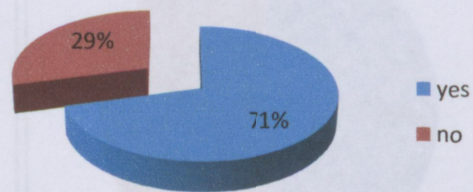


Fig. 5: Participants distribution according to their rate of exercise when diagnosed with high blood pressure

Fig. 4: Participants distribution according to whether or not they were employed when diagnosed with high blood pressure.

Table 3: if yes, how often were you exercising?

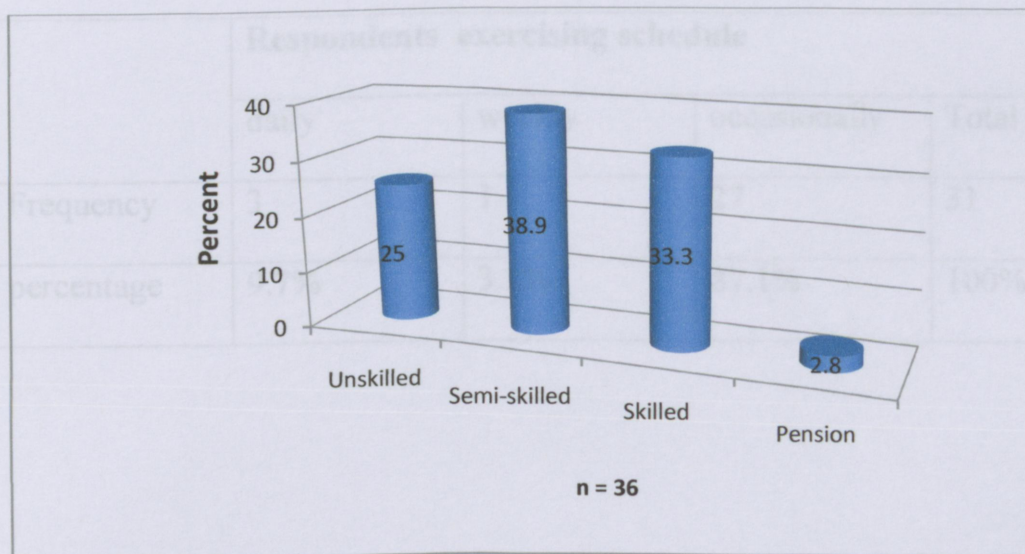
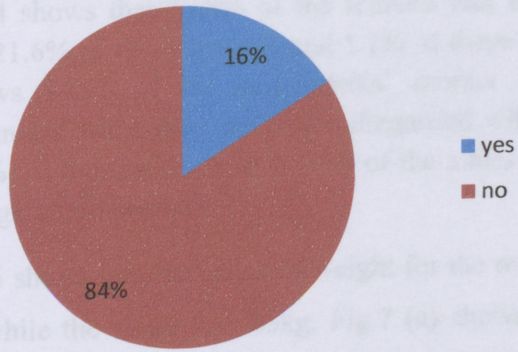
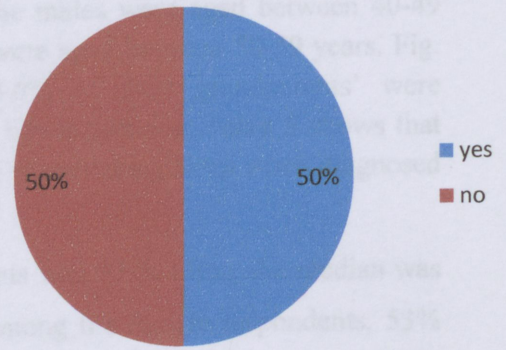


Fig.4(c) :If yes,what type of occupation?

Fig 5(a):Females (n=73)

Fig 5(b):males (n=14)

Fig. 5: Participants distribution according to their rate of exercise when diagnosed with high blood pressure
Table 3: if yes, how often were you exercising?

	Respondents exercising schedule			Total
	daily	weekly	occasionally	
Frequency	3	1	27	31
percentage	9.7%	3.2%	87.1%	100%

4. 2. Genetic and other factors contributing to high blood pressure among the participants



Table 4 shows that 39.8% of the females and 8% of the males were aged between 40-49 years, 21.6% of these females and 1.1% of these males were aged between 50-59 years. Fig. 6 shows 24.7% of the respondents' mother and 23.6% of their grandparents' were hypertensive when they were also diagnosed with high blood pressure. Table 5 shows that 26(36%) of the females and 8(57%) of the males used to snore during sleep when diagnosed with high blood pressure.

Table 6 shows that the range of weight for the respondents was 50 to 130kg the median was 90kg while the mean was 83kg. Fig.7 (a) shows that among the female respondents, 53% were having major problem when diagnosed with high blood pressure. Fig.7 (b) shows that among the male respondents, only 7% were having major problem when diagnosed with high blood pressure. Table 7 shows that 26(65%) of the respondents were unemployed and 10(25%) were having family problems when diagnosed with high blood pressure.

Table 4: Distribution of participants according to their age when diagnosed with high blood pressure

Age	Females		Males		Total
	No	%	No	%	
30-39	10	13.3	5	35.7	15(17%)
40-49	36	48	7	50.0	43(48%)
50-59	23	30.7	1	7.1	24(27%)
60+	6	8	1	7.1	7(8%)
Total	75	84.3	14	15.7	89(100%)

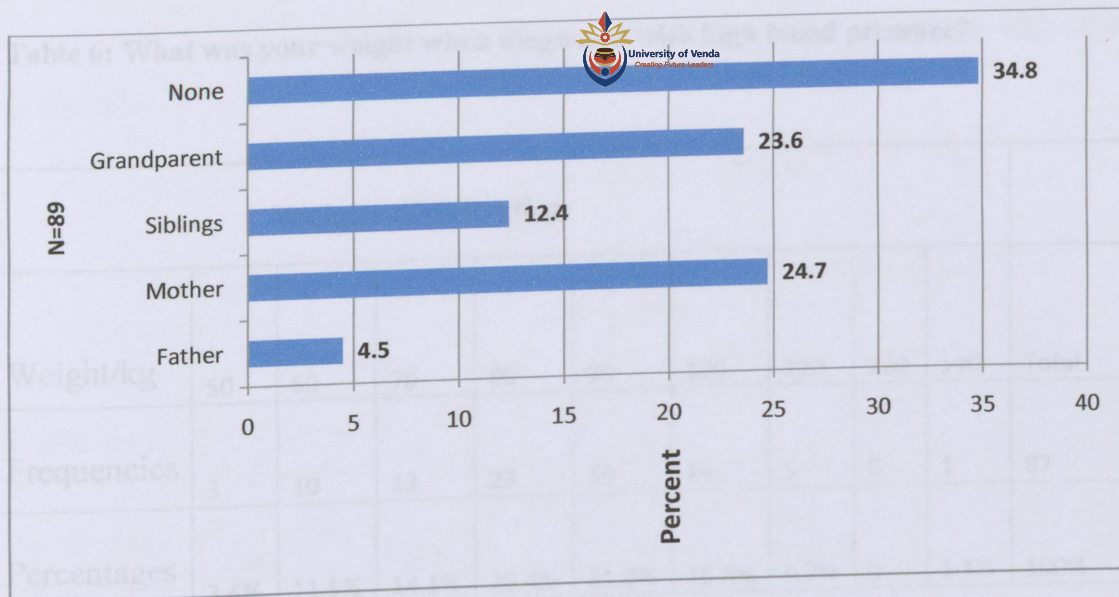


Fig.6: Family history with regards to high blood pressure.

Table 5: Distribution of participants according to whether or not they used to snore when diagnosed with high blood pressure by gender.

Snore	Males(n=14)		Females(n=73)		Total
	No	%	No	%	
Yes	8	57	26	36	34
No	6	43	47	64	53
Total	14	100	73	100	87

Fig. 7: Participants distribution according to whether they were having a snoring problem when diagnosed with high blood pressure.

Table 6: What was your weight when diagnosed with high blood pressure?



Weight distribution										
Weight/kg	50	60	70	80	90	100	110	120	130	Total
Frequencies	3	10	12	23	19	14	5	0	1	87
Percentages	3.4%	11.5%	14.1%	26.4%	21.8%	16.0%	5.7%	0	1.1%	100%

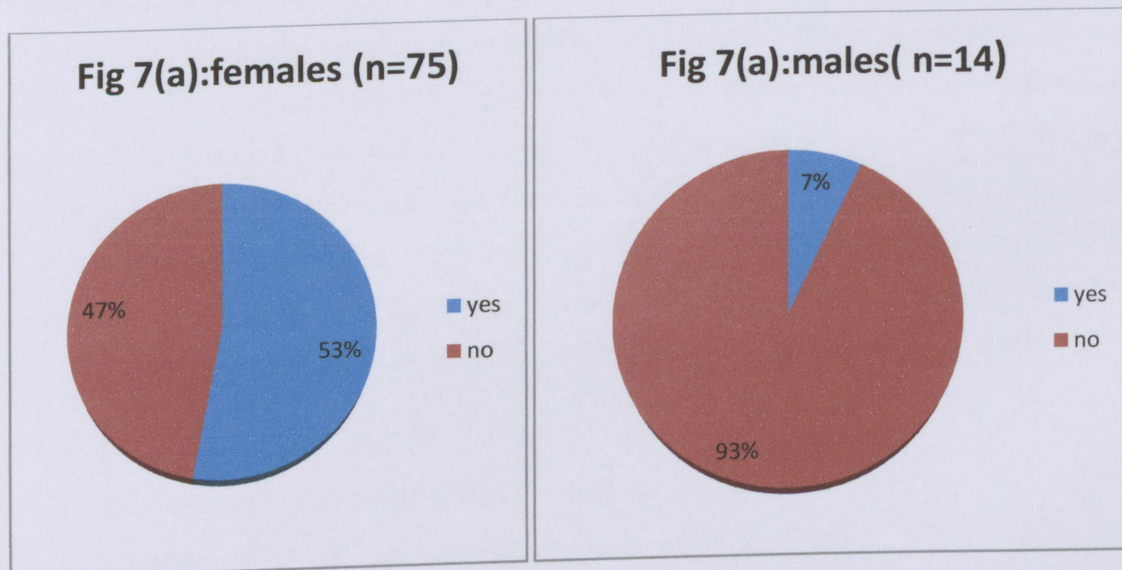


Fig. 7: Participants distribution according to whether they were having a major problem when diagnosed with high blood pressure.

Table7: What was the nature of your problem when diagnosed with high blood pressure?

5.1. Discussion		Nature of problem				
	Ill health	Unemployment	Family issues	Low income	Total	
frequency	1	26	10	3	40	
percentage	2.5%	65%	25%	7.5%	100%	

The age distribution of the participants was biased towards the middle age group (40-55 years). Moreover, the mean age when diagnosed with high blood pressure was approximately 45 years (i.e. middle age). As one gets, one develops a risk for high blood pressure and cardiovascular diseases. Blood vessels lose flexibility during the aging process which contributes to increasing pressure on the cardiovascular system. (Coetzee, 2010) concurs that individuals are at greater risk after age 35, although a healthy lifestyle can minimise the effects. This increase in risk with age is much more pronounced in western society. The main culprit is thought to be arteriosclerosis. These hardening and narrowing of the arteries, due to fatty deposits in the inner layer, is attributable to our diet and lifestyle habits (Coetzee, 2010). Lewis et al (1996) concur that gerontology considerations are vital. The following age related physical changes play a role in the pathophysiology of hypertension in elderly people.

- Loss of tissue elasticity.
- Increased collagen content and stiffness of the myocardium.
- Increased peripheral vascular resistance due to side factors.
- Decrease renin response to sodium and water depletion.
- Decreased renal function (Lewis et al, 1996)

This study in terms of education, 40% was either literate or had primary education and about 50% were unemployed. It is well documented that the unemployed have more health problems than the employed, and that social support facilities coping with unemployment. Illiteracy constitutes a challenge to security, employment and unemployment is a risk factor

5.1. Discussion

There were a total of 89 adult hypertensive patients interviewed with regard to the determinants of high blood pressure at Folovhodwe village in Mutale municipality. There were 14 males and 75 females. According to Coetzee (2010), gender has got its related risk patterns. A higher percentage of men than women have high blood pressure until 45 years of age. From 45-54 and 55 -64, the percentage of men and women with blood pressure are similar. After that, a much higher percentage of women have high blood pressure than men risk for women increases during pregnancy and after reaching menopause (Coetzee, 2010).

The age distribution of the participants was biased towards the middle age group (40-55 years). Moreover, the mean age when diagnosed with high blood pressure was approximately 45 years (i.e. middle age). As one gets, one develops a risk for high blood pressure and cardiovascular diseases. Blood vessels lose flexibility during the aging process which contributes to increasing pressure on the cardiovascular system. (Coetzee, 2010) concurs that individuals are at greater risk after age 35, although a healthy lifestyle can minimise the effects. This increase in risk with age is much more pronounced in western society. The main culprit is thought to be arteriosclerosis. These hardening and narrowing of the arteries, due to fatty deposits in the inner layer, is attributable to our diet and lifestyle habits (Coetzee, 2010). Lewis et al (1996) concur that gerontology considerations are vital. The following age related physical changes play a role in the pathophysiology of hypertension in elderly people.

- Loss of tissue elasticity.
- Increased collagen content and stiffness of the myocardium.
- Increased peripheral vascular resistance due to atherosclerosis.
- Decrease rennin response to sodium and water depletion.
- Decreased renal function (Lewis et al, 1996)

This study in terms of education, 46% was either illiterates or had primary education; and about 50% were unemployed. It is well documented that the unemployed have more health problems than the employed, and that social support facilitates coping with unemployment. Illiteracy constitutes a challenge to security, employment and unemployment is a risk factor

for high blood pressure. The study conducted by Atallah et al (2007) in the Caribbean, indicate that the high prevalence and poor control of hypertension have been observed in populations with low-socioeconomic status. Comparing an unemployed population with another employed population sharing the same culture, and another employed population living in another environment might enlighten the effects of factors accessible to primary prevention on the one hand and access to health care on the other hand. Prevalence of hypertension was higher among the unemployed and employed Caribbean population, than among an employed metropolitan French population. Higher prevalence of hypertension and poorer therapeutic control has been observed in lower social classes (Atallah, Inamo, Larabi, Chatellier, Rozet, Machuron, De Gaudemaris & Lang, 2007).

Pharr et al (2011) also indicate that unemployed tend to have higher levels of impaired mental health including depression, anxiety, and stress, as well as higher levels of mental health hospital admissions, chronic disease (cardiovascular disease, hypertension, and musculoskeletal disorders), and premature mortality. Additionally, unemployment is associated with unhealthy behaviors such as increased alcohol and tobacco consumption and decreased physical activity which lead to development of high blood pressure (Pharr et al, 2011).

The association of unemployment and social support with health was examined on the basis of representative data derived from a German study. The GEDA (*Gesundheit in Deutschland Aktuell* [Current Health in Germany]) study was conducted in 2008/09 by the Robert Koch Institute, the nationwide governmental public health agency in Germany. The results shows that unemployed persons aged 30 to 59 years suffer physical, emotional, and functional impairment more commonly than employed persons. Men and women with little social support are more likely to be impaired in these three areas whether they are employed or not. Regression analysis reveals that unemployment and social support have significant, independent effects on both the incidence of such impairments and on their duration after age, income, and education have been controlled for. The health-related consequences of unemployment are a central subject of medical sociology, health psychology and social medicine and are regularly addressed by federal and regional health reporting bodies in Germany. Many studies have shown clearly that unemployed men and women suffer from more health problems including hypertension and more frequently behave in ways that pose risks to their health than those who are employed. Unemployed men and women's increased

consumption of medical and psychotherapeutic resources are also relevant to health services research. Unemployed people use health services more often, are more affected by sleep disorders, depression, anxiety disorders, and addictions, and commit suicide more frequently. Health-related consequences of unemployment manifest as psychosocial health problems such as hypertension due to loss of income, job-related social contact, or social prestige. Social resources have a particularly marked effect on how well individuals cope with unemployment: the person affected copes with the loss of his/her job more successfully if he/she has a social support network and does not feel alone. This article describes the relationship between unemployment; social support; and physical, emotional, and functional complaints in the German population of working age (whether employed or unemployed), on the basis of representative data for 2009. As yet there are no representative analyses in Germany of the association between unemployment, social support, and health which examine both the probability of impairments of various kinds and their duration (Kroll & Lampert, 2009).

According to WHO(2006), within the African American community, those with the highest rates of hypertension are more likely to be the middle aged or older, less educated, obese, physically inactive and diabetic (WHO, 2006).

The status of employment also looked very bleak as 45% of the patients interviewed had no jobs implying that this might also be a stimulant for hypertension since unemployment come along with a lot of misery. The Social context in which people live is increasingly being recognised as additional potential determinants of health and factors contributing to health disparities, over and above the effect of individual and household risk factors. Different Socio-economic groups may be linked to hypertension for example, spatial location and segregation may differentially expose members of affected groups to sources of chronic stress and social support in their residential environments, which could in term, generate group disparities in blood pressure levels (Morenoff et al, 2007).

In terms of marital status, 78.7% of the participants were divorced. This is a large percentage and this probably could have contributed to high blood pressure among the group. The process of going through divorce can be strenuous and there is some evidence that continuous stress can trigger biochemical changes within the body that raise the blood pressure and keep it high (Morenoff et al, 2007). Chronic stress can be linked to the larger social environment to hypertension risk. People exposed to repeated stress may develop

hypertension more frequently than others (Dillon et al, 2007). Female gender and being married were also associated with high body mass index (BMI) and large waist circumference (WC) (Malhotra et al 2008).

According to Miller (1999) cigarette smoking was regarded as a risk factor for overall cardiovascular diseases, however, it remains a significant risk for respiratory diseases and cardiovascular mortality. The finding shows that 50% of the males and 5.5% of the females among the participants were smoking when diagnosed with high blood pressure. The median numbers of cigarette per day were 10 for males and 6 for females. This shows that smoking could have been a contributing factor to hypertension among some of the participants. Not only does smoking or chewing tobacco immediately raise blood pressure temporarily, but the chemicals in tobacco can damage the lining of the artery walls. This can cause arteries to narrow, increasing your blood pressure. Second-hand smoke can also increase blood pressure (Coetzee, 2010).

The study conducted at the University of Alabama at Birmingham in 2009 showed that heavy consumption of alcohol is associated with increase BP and increase risk of uncontrolled BP due to its physiologic effects. In a small prospective study, cessation of heavy alcohol consumption led to a reduction in 24 hour ambulatory systolic blood pressure and diastolic blood pressure of 7.2 and 6, 6mmhg, respectively (Pisoni et al, 2009).

According to Smith (2003), although the media has widely publicized the beneficial effects of alcohol on the heart, it must be remembered that this applies only to moderate alcohol intake. People who have more than two drinks per day are much more likely to have sustained elevation in blood pressure than non-drinkers. Alcohol may therefore be an unrecognized cause of hypertension in a large number of moderate to heavy drinkers. In many hypertension cases, elimination of alcohol lowers their blood pressure sometimes even into a normal range without medication (Smith, 2003). The results reveal that 35.7% of males and 12% of females was an alcohol drinker when diagnosed with high blood pressure. The results reveal that on the average, the men drank more bottles of alcohol on a daily basis than the women. The men were likely to drink about 7 bottles of alcohol per day while the women only drank 4.5 bottles. This shows that among those drinking alcohol, gender was a possible risk factor (Smith, 2003).

The results of the study indicate that among the female respondents, 89% were taking salt moderately while 11% were taking a lot of salt. Among the male respondents, 93% were taking salt moderately and 7% were taking a lot of salt when diagnosed with high blood pressure. Excessive salt intake has been noted to initiate high blood pressure in some people. However, it was found that majority of people diagnosed with high blood pressure took salt moderately deviating from the expected scenario that blood pressure is usually associated with excessive salt intake. Thus salt intake might not be a contributing factor to high blood pressure but there are more serious underlying causes. Excessive salt intake is considered to be responsible for initiation of hypertension in some people. Studies on populations with a low sodium intake (usually the primitive hunter-gatherer societies) show that when people from these societies adopt modern lifestyles, the prevalence of hypertension increases. Furthermore, when sodium is restricted in some hypertensive people, their blood pressure is controlled. A sodium intake may activate a number of presser mechanisms and cause water retention. In western countries, even though almost everyone consumes high sodium diet, only about 20% develop hypertension. This indicates that some degree of sodium sensitivity must be present for high sodium intake to trigger development of hypertension (Lewis, 2006). It has been known for a long time that societies with diets high in salt experience more hypertension and the associated complications of heart attack, stroke, and organ damage. It is not known, however, if increased salt is itself responsible for elevated blood pressure. It might be, for example, that people from societies with increased salt intake may also have some other dietary factors or an inherited factor that is responsible for their hypertension. Most physicians do not believe that it plays an important role. The most likely explanation is that there are other environmental and genetic factors that along with high salt intake all work together to cause hypertension. if you take more salt, your kidneys will retain more water inside the body, resulting in increased blood pressure (Smith, 2003). According to the National Institute of Health public access author manuscript (NIH), excessive dietary sodium is common in subjects with resistance hypertension and may directly increase blood pressure and/or blunt the antihypertensive effects of most agents, including diuretics and angiotensin-converting enzyme inhibitors (Pisoni et al, 2009).

According to Morenoff et al (2007), the social context in which people live is increasingly being recognized as additional potential determinants of health and factors contributing to health disparities, over and above the effect of individual and household risk factors. The findings of the study shows that 84% of the females and 50% of the males' respondents were

not exercising when diagnosed with high blood pressure. This implies that the participants possibly lacked knowledge regarding physical fitness and its benefits. Lack of exercises contributes to high blood pressure. Among those who were exercising, 87.1% were exercising occasionally. This scenario explains that participants with no exercise at all were more likely to suffer from high blood pressure than people who exercised. Exercise helps lower blood pressure by reducing stress, causing weight loss, which also helps lower blood pressure, and by stimulating circulation. The American Heart Association recommends 150 minutes of moderate exercise a week. The association suggests 30 minutes a day, five days a week. Moderate exercise is defined as exercise that is high enough than carrying on a conversation or singing. Getting out of breath, and signal activity that may be too intense are not required when exercising

According to Dirksen et al (2007) history of close blood relative .e.g. parents or sibling, with hypertension is associated with an increased risk for developing hypertension. The level of blood pressure is strongly familial, although it is not known exactly what is inherited that leads to high blood pressure. The estimation of the genetic factors of hypertension ranges from 25-65%. And alteration in renal function may be implicated in the development of hypertension and this may be inherited (Lewis et al, 1996). The results of this study show that 65% of participants inherited from their family members. Thus people with a family history of hypertension were more likely to have hypertension. Dirksen et al (2007) concur that history of close blood relatives with hypertension is associated with a risk of developing hypertension.

According to Prater (2007) severe mutation, including the deletion of entire portions of DNA within the gene for one of the proteins, often results in the development of hypertension at a young age. Subtle mutation in single or a few bases of the genetic code, which are inherited over generations, takes decades to manifest into a disorder. Overtime, incremental increases in blood pressure due to the production of extra proteins or receptors will weaken the body's feedback system more than it will normally keep any such aberrations in check and this will result in hypertension (Prater, 2007).

According to Silverberg and Oksenberg (2001), about 50% of patients with essential hypertension have obstructive sleeping apnoea (OSA), and another 40% of essential hypertension patients are habitual snores, but without OSA. There is now convincing evidence that habitual snoring and OSA are independent risk factors for essential

hypertension, and that the treatment of OSA and habitual snoring will reduce blood pressure. The results of the study indicate that 54% of the respondents were snoring during sleep whereas 46% were not snoring when diagnosed with high blood pressure. These also indicate that snoring might contribute to high blood pressure. According to Millman et al (2011) the data suggest that the high prevalence of hypertension in OSA is primarily related to age and excess obesity seen in these patients. In morbidly obese young patients with OSA, factors directly to OSA may be also contributing to the development of hypertension. With increasing age, other competitive risks may obscure any independent effect that OSA may exert.

The study reveals that average participants weighed 79 kg. Moreover the distribution of respondents was shown to be normal with a mean weight of 83 kg. People with a weight score of more than 70 kg were more likely to have high blood pressure than people with lesser weight. Thus excessive weight due to lack of physical inactivity was found as a significant factor that contributes to blood pressure. Overweight and hypertension are common conditions in the South African black adult population. Overweight has been reported to be 34% in urban black women in Cape Town, and 28-33% in rural women. Obesity is known to be one of the most important risk factors contributing to hypertension, which has been reported in 19-35% of black men studied in Durban and Cape Town. It has been recognized that overweight which starts early in life and persists into adulthood, increases the risk of overweight related conditions, such as hypertension later in life. Adolescence is also known to be an important stage to develop central pattern of body fat, which predisposes to CHD at a later age. Furthermore, essential hypertension may have its inception in childhood (Monyeki et al, 2007). The typical female body shape that distresses many women is associated with lower risk in premenopausal women. Called 'pear-shaped', it means that extra weight is carried around the hips and thighs. Men tend to be 'apple-shaped, carrying excess fat around the belly and this can make them more prone to high blood pressure and heart disease (Coetzee, 2010) Blood pressure increases for any people of any age with the increase of weight and rises gradually with age. The cross sectional study conducted in Khayelitsha in 2008 indicates that the prevalence of overweight /obesity was 53.4% and 18.7%, and that of abdominal obesity was 71.5% and 23.4%, among women and men respectively. However, more women (21.3%) than men (11.2%) reported walking more than 45 minutes per day. Female gender and being married were associated with high body mass index (BMI) and large waist circumference (WC). Recent migration was also associated

with smaller WC. The findings suggest that physical activity may play less of a role in obesity control, or more than 45 minutes of physical activity required reducing the risk of obesity, especially in women. At least among South African women, obesity control focused on nutritional interventions may be more beneficial than increasing the intensity or duration of physical activity (Malhotra et al, 2008).

The results of the study shows that among the females respondents 53% were having a major problem and the major problem was unemployment meaning that experiencing major problem could have contributed to high blood pressure among the females. According to the study by Kroll et al (2009), unemployed persons aged 30 to 59 years suffer physical, emotional, and functional impairment more commonly than employed persons. . It is well documented that the unemployed have more health problems than the employed, and that social support facilitates coping with unemployment (Kroll, 2009).

5.2. Conclusion

Based on the results of the study, the following conclusions were made regarding hypertension. The major contributing factors identified among the respondents are:

- Low socio-economic status, high illiteracy and unemployment rates.
- Age
- Poor social habits, such as smoking and drinking alcohol.
- High divorce rates
- Lack of exercise
- Genetic factors

5.3. Recommendations

Based on the results of the study and conclusion, primary health workers in Folovhodwe village should intensify health education and promotion activities on hypertension by focusing on the identified contributing factors of high blood pressure in the study. The researcher recommends that awareness campaigns and researches on high blood pressure should be conducted on a regular basis including low socioeconomic, poor social habits, unemployment, genetic factors and others as these are the factors contributing to high blood pressure among the respondents. Females should be encouraged to empower themselves in

order to live better lives and not depend on their partner for daily living. Community involvement should be established with regard to how to live good lives including physical fitness.



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Instructions:

World Health Organisation. (2006). World health report, Reducing risks and promoting healthy lifestyle.

- 1. Respond to all questions.
- 2. Please tick or fill the gaps as appropriate.
- 3. Do not write your names.
- 4. Do not discuss answers with friends.

Respondent's Code (for official use)

Section 1: Demographic information including socio-economic factors

1. What is your gender?

1. Female	2. Male
<input type="checkbox"/>	<input type="checkbox"/>

2. What is your current marital status?

1. Single	2. Married	3. Divorced	4. Widowed	5. Separated	6. Others, specify
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. How old are you?

1. 18-28 years	2. 29-39 years	3. 40-50 years	4. 51-61 years	5. 62 & above
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What is your level of education?

1. Did not attend school	2. Grade 1-7	3. Grade 8-11	4. Tertiary
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 1: The Questionnaire (English version)

Instructions:

1. Respond to all questions.
2. Please tick or fill the gaps as appropriate.
3. Do not write your names.
4. Do not discuss answers with friends.

Respondent's Code (*For official use*)

Section 1: Demographic information including socio-economic factors.

1. What is your gender?

1. Female	2. Male

2. What is your current marital status?

1. Single	2. Married	3. Divorced	4. Widow	4. Separated	5. Others, specify	

3. How old are you?

1. 18-28 years	2. 29-39 years	3. 40-50 years	4. 51-61 years	3. 62 & above

4. What is your level of education?

1. Did not attend school	2. Grade 1-7	3. Grade 8-12	4. Tertiary

5. What is your employment status?

1.Unemployed	2.Employed	3.Self employed	4.Pensioner	5.Other, specify

6. Were you a smoker when diagnosed with high blood pressure?

1. Yes	2. No

7. If yes, how many cigarettes were you smoking per day?

8. Were you an alcohol drinker when diagnosed with high blood pressure?

1. Yes	2. No

9. If yes, about how many bottles or cans were you drinking per day?

10. How much salt were you taking in your food when diagnosed with high blood pressure?

1.Moderate	2. A lot	3. None

11. Were you employed when diagnosed with high blood pressure?

1. Yes	2. No

12. If yes, what type of occupation?

13. Were you exercising when diagnosed with high blood pressure?

1. Yes	2. No

14. If yes, how often?

1. Daily	2. Weekly	3. Occasionally

15. Were you using contraceptives when diagnosed with high blood pressure?

1. Yes	2. No	3. Not applicable

23. If not, what was the problem?

Section 2: Genetic and other factors contributing to high blood pressure.

Respond to the following questions and fill appropriately.

16. How old were you when you were diagnosed with high blood pressure?

17. In your family, does any of the following have/had high blood pressure? (tick as many as applicable)

1. Father	2. Mother	3. siblings	4. Grandparents	5. None

18. Do you snore a lot during sleep?

1. Yes	2. No

19. What was your weight when diagnosed with high blood pressure?

 kg

20. Were you having a major problem when you were diagnosed with high blood pressure?

1. Yes	2. No

21. If yes, what was the nature of the problem?

--

22. Were you having a good relationship with your neighbours when you were diagnosed with high blood pressure?

1. Yes	2. No

23. If not, what was the problem?

--

1. Musadzi	2. Munna

2. Tshimo tshavho maclona na zve tshingiro ndi tshimo?

1. Ndo malwa	2. A thongo malwa	3. Ndo tshava	4. Na tshabetsa	5. Zwinwe-vho (kha vho tshushedze)

3. Vha na minwaha anogona?

1. 18-28	2. 29-39	3. 40-49	4. 50-59	5. 60-69

4. Murole wa nthasa we vha phasa ndi tsho?

1. A thongo dzhena tshikolo	2. Gircidi 1-7	3. Xhokisi 8-12	4. Phungo ya ntha ha watiriki

5. Tshimo tshavho kha zve machumbe ndi tshimo?

1. A thi shumi	2. Ndi a shuma	3. Ndi toro o-shuma	4. Ndi bola masedendo	5. Zwinwe-vho (kha vho tshushedze)

APPENDIX 2: The Questionnaire (Venda version)

Vha humbelwa zwi tevhelaho:

1. Vha humbelwa u fhindula mbudziso dzothe.
2. Vha humbelwa u dadza magake ho teaho.
3. Vha songo nwala madzina avho.
4. A vho ngo tendelwa u amba nga ha phindulo na khonani yavho.

Khethekanyo 1: Zwidombedzwa maelana na vhumvha ha muthu khathihi na zwa matshilele na masheleni

1. Vha wa mbeu – de?

1. Musadzi	2. Munna

2. Tshiimo tshavho maelana na zwa mbingano ndi tshifhio?

1.Ndo malwa	2. A thongo malwa	3. Ndo talwa	4.Ndo tutshelwa	5.Zwinwe-vho (kha vha talutshedze)

3. Vha na minwaha mingana?

1.18-28	2. 29-39	3. 40-50	4. 51-61	5. 62 uya ntha

4. Murole wa nthesa we vha phasa ndi ufhio?

1.A thongo dzhena tshikolo	2.Gireidi 1-7	3.Gireidi 8-12	4.Pfunzo ya ntha ha matiriki

5. Tshiimo tshavho kha zwa mushumo ndi tshifhio?

1.A thi shumi	2.Ndi a shuma	3.Ndi tou di-shuma	4.Ndi hola mundende	5.Zwinwe-vho (kha vha talutshedze)

Kha vha swaye hoteaho kana vha dadzoteno:

6. Vho vha vha tshidaha musi vha tshi wanala uri vhana Mutsiko wa malofha naa?

1.Ee	2.Hai

7. Arali zworalo lungana nga duvha?

--

8. Vho vha vha tshinwa zwikambi musi vha tshi wanala uri vhana Mutsiko wa malofha naa?

1.Ee	2.Hai

9. Arali vho vha vha tshinwa, vho vha vha tshinwa mabodelo mangana nga duvha?

--

10. Vho vha vha tshi la hani muno kha zwiliwa musi vha tshi wanala uri vhana Mutsiko wa malofhanaa?

1.Lwo edanelaho	2.Lwo kalulaho	3.Ndo vha ndi sa li

11. Vho vha vha tshishuma musi vha tshi wanala uri vhana Mutsiko wa malofha naa?

1.Ee	2.Hai

12. Vho vha vha tshishuma mushumo de?.....

13. Vho vha vha tshi ita dzi nyonyoloso musi vha tshi wana uri vhana Mutsiko wa malofha naa?

1.Ee	2.Hai

14. Vho vha vha tshi ita nyonyoloso ngana?

1.Nga duvha	2.Nga vhege	3.Linwe duvha-vho

15. Vho vha tshi shumisa pilisi dza vhutea muta naa?

1.Ee	2.Hai	3.Azwielani

23. Arai zwaniso zwa tshi shuma?

Khethekanyo 2: Zwivhango zwa mutsiko wa malofha maelana na zwadledza na zwinwe-vho.

Fhindulani mbudziso dzi tevhelaho vha dadze hotea.

16. Vho vha vha na minwaha mingana musi vha tshi wanala uri vhana Mutsiko wa malofha?

17. Kha muta wa havho ndi nnyi are na Mutsiko wa malofha?

1.Khotsi	2.mme	3.Dzi khaladzi	4.A huna	5.makhulu

18. Vho vha tshi lemela lungafhani musi vha tshi wanala uri vhana Mutsiko wa malofha?

19. Vho vha vhana thaidzo musi vha tshi wanala uri vha na Mutsiko wa malofha naa?

1.Ee	2.Hai

20. Vho vha vha na thaidzo de?.....

21. Vha a hona musi vho edela naa?

1.Ee	2.Hai

22. Vho vha vha na thaidzo na vha dzula tsini musi vha tshi wanala uri vhana mutsiko wa malofha naa?

1.Ee	2.Hai

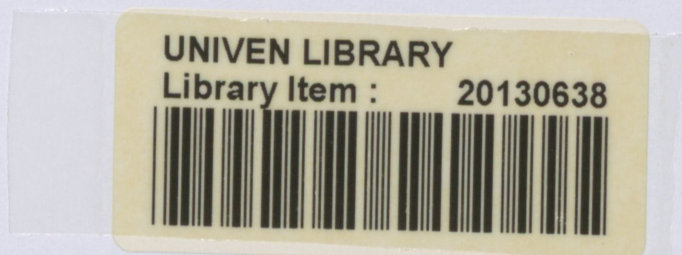
23. Arali zworalo yo vha i thaidzo-dee?

--

Should you agree to participate in the study, I would like to explain the consent to you. Furthermore, you are free to withdraw your participation. The information gathered during this study is confidential.

Your cooperation is highly appreciated.

Researcher Name: Ramano N.S



Appendix 3: Cover letter

Dear respondent

I am a student at the University of Venda conducting a study on factors contributing to high blood pressure among adults' in your village. You are kindly requested to participate in this study by responding to the questions that I would like to ask you. The study is conducted for educational purpose and is aimed at fulfilling the requirements towards my master's degree in Public Health.

Should you agree to participate in the study, I would like to explain the consent to you. Furthermore, you are free to withdraw your participation. The information gathered during this study is confidential.

Your cooperation is highly appreciated.

Researcher Name: Ramaano N.S

Appendix 4: Permission to conduct study. (Headman) (Department of Health)

P O Box 782

Louis Trichardt

0920

02 April 2012

The Headman (Department of Health)

Folovhodwe village

Mutale

0956 (Request for permission to conduct research)

Request for permission to conduct research

I am Sylvia Ramaano, currently doing Master of Public Health at the University

I am Sylvia Ramaano, currently doing Master of Public Health at the University of Venda. I am presently engaged in a research study entitled *factors contributing to high blood pressure among adults at Folovhodwe village, Mutale district: Limpopo.*

The study will be conducted at Folovhodwe village among adults, both females and males. The results will help to add knowledge on the factors contributing to hypertension. The copy of research will be forwarded to the Department of Health.

Hoping that permission to conduct the study will be granted

Yours faithfully

Student: Ramaano NS.....dates.....

Appendix 5: Permission to conduct study (Department of health)

P O box 782

Louis Trichardt

0920

02 April 2012

The Department of Health

Polokwane

0700

Request for permission to conduct research

I am Sylvia Ramaano, currently doing Master of Public Health at the University of Venda. I am presently engaged in a research study entitled *factors contributing to high blood pressure among adults at Folovhodwe village, Mutale district: Limpopo.*

The study will be conducted at Folovhodwe village among adults, both females and males who are on hypertensive treatment. I am requesting to use clinic register. The results will help to add knowledge on the factors contributing to hypertension. The copy of research will be forwarded to the Department of Health.

Hoping that permission to conduct the study will be granted

Yours faithfully

Student: Ramaano NS.....dates.....



NAME OF RESEARCHER/INVESTIGATOR:
RAMAANO NS
Student No. 9812416

PROJECT TITLE: FACTORS CONTRIBUTING TO HIGH BLOOD PRESSURE AMONG ADULTS AT FOLOVHODWE VILLAGE IN MUTALE MUNICIPALITY, VHEMBE DISTRICT IN LIMPOPO PROVINCE.

PROJECT NO: SHS/11/PH/06/E0811

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Dr. R Risenga	University of Venda, Advanced Nursing	Supervisor
Mr. A Tugli	University of Venda, Public Health	Co-supervisor
Ms. Ramaano NS	University of Venda,	Investigator - Student

ISSUED BY:
UNIVERSITY OF VENDA, HEALTH, SAFETY AND RESEARCH ETHICS COMMITTEE

Date Considered: 30 August 2011
Decision by Ethical Clearance Committee Granted

Signature of Chairperson of the Committee: *R. Nikodem*
Name of the Chairperson of the Committee: Prof. C.V. Nikodem



University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 09501, LIMPOPO PROVINCE, SOUTH AFRICA
TELEPHONE (015) 962 8504/8484 /8313 FAX (015) 962 8439
"A quality driven financially sustainable, rural-based Comprehensive University"



DEPARTMENT OF HEALTH

Ref:4/2/2

Enquiries: Selamolela Donald

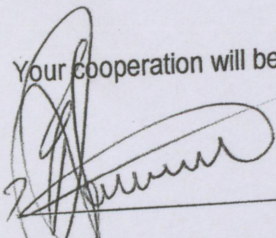
Ramaano NS
University of Venda
Thohoyandou
0950

Dear Ms Ramaano

Re: Permission to conduct the study titled: Factors contributing to high blood pressure among adults at Folovhodwe village in Mutale Municipality, Vhembe District in Limpopo Province.

1. The above matter refers.
2. Permission to conduct the above mentioned study is hereby granted.
3. Kindly be informed that:-
 - Further arrangement should be made with the targeted institutions.
 - In the course of your study there should be no action that disrupts the services.
 - After completion of the study, a copy should be submitted to the Department to serve as a resource.
 - The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.

Your cooperation will be highly appreciated.



Head of Department

2017/05/23
Date