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# KNOWLEDGE AND PRACTICE OF HYPERTENSIVE PATIENTS TOWARDS NUTRITIONAL AND LIFESTYLE RELATED FACTORS OF BLOOD PRESSURE CONTROL IN FELEGE HIWOT REFERRAL HOSPITAL, BAHIR DAR, NORTH WEST ETHIOPIA

NEGESSE, TAKELE

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**BAHIR DAR UNIVERSITY**

**BAHIR DAR INSTITUTE OF TECHNOLOGY**

**SCHOOL OF RESEARCH AND GRADUATE STUDIES**

**FACULTY OF CHEMICAL AND FOOD ENGINEERING**

**KNOWLEDGE AND PRACTICE OF HYPERTENSIVE PATIENTS  
TOWARDS NUTRITIONAL AND LIFESTYLE RELATED FACTORS  
OF BLOOD PRESSURE CONTROL IN FELEGE HIWOT REFERRAL  
HOSPITAL, BAHIR DAR, NORTH WEST ETHIOPIA**

**BY**

**TAKELE NEGESSE**

November, 2017  
Bahir Dar, Ethiopia

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HOSPITAL, BAHIR DAR, NORTH WEST ETHIOPIA

Takele Negesse

A Thesis Submitted to School of Research and Graduate Studies of Bahir Dar Institute of  
Technology in Partial Fulfillment of The Requirement for the Degree of Master of Science  
in Applied Human Nutrition in the Faculty of Chemical and Food Engineering

Advisor : Demewoz Moges (Asst. Professor)

BahirDar, Ethiopia  
November, 2017

## DECLARATION

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Date of submission: **November 15, 2017**

Place: **Bahir Dar**

This thesis has been submitted for examination with my approval as a university advisor.

Advisor Name: **Demewoz Moges**

Advisor's Signature:




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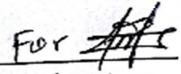
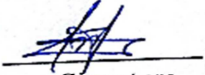
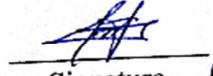
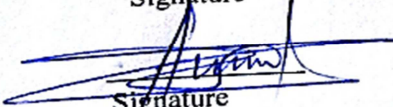
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Signature

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The following graduate faculty members certify that this student has successfully presented the necessary written final thesis and oral presentation for partial fulfillment of the thesis requirements for the Degree of Master of Science in Applied Human Nutrition.

**Approved By:**

<u>Demewoz Moges</u> Advisor	<u></u> Signature	<u>25/11/2017</u> Date
<u>Dr. Belaynew Wassie</u> External Examiner	<u></u> Signature	<u>25/11/2017</u> Date
<u>Dr. Hirut Asaye</u> Internal Examiner	<u></u> Signature	<u>25/11/2017</u> Date
<u>Dr. Hirut Assaye</u> Chair holder	<u></u> Signature	<u>25/11/2017</u> Date
<u>Ali Seid</u> Faculty dean	<u></u> Signature	<u>29/05/2018</u> Date

To my colleagues

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## ABSTRACT

**Introduction:** Hypertension is a major public health problem worldwide. Knowledge and skill on hypertension-related nutrition and life style modifications play an important role in controlling of hypertension and in preventing its long-term complications on hypertensive patients. However, the level of knowledge and practice of hypertensive patients towards nutritional as well as lifestyle factors was not clearly identified and understood in the study area which justifies to did this research.

**Objective:** To assess knowledge and practice of hypertensive patients towards nutritional and lifestyle related factors of blood pressure control in Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia.

**Methods:** An institution based cross sectional study was conducted from November 1, to December 31, 2016 among 339 hypertensive patients using systematic and simple random sampling technique. The data was collected by interviewer administered structured questionnaire and was analyzed by using SPSS version 20.0. Binary logistic regression model and multivariate regression was used to test association between dependent and independent variables.

**Result:** Among 312 hypertensive patients, 160 (51.3%) were females.. One hundred thirty three (42.6%) patients had high level knowledge towards nutritional and lifestyle factors of raised blood pressure control. The practice of salt restriction was 283(90.7%), actively doing physical exercise was 229(73.4%), and avoiding consumption of alcohol was 273(87.5%). Sex, marital status and income level had association with the practice hypertensive patients for raised blood pressure control.

**Conclusion and recommendation:** The knowledge and practice status of hypertensive patients towards nutritional and lifestyle factors of raised blood pressure control was not well addressed. Therefore; it requires attention to know and apply all nutritional and lifestyle factors of raised blood pressure control to reduce mortality and morbidity due to hypertension.

**Keywords:** Raised Blood pressure, Nutrition, lifestyle, Felege Hiwot Referral Hospital

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## LIST OF ABBREVIATIONS AND SYMBOLS

BP	Blood Pressure
BMI	Body Mass Index
CI	Confidence of Interval
CVD	Cardio Vascular Disease
CVS	Cardio Vascular System
DALY	Disability adjusted life Tear
DASH	Dietary Approaches to Stop Hypertension
FHRH	Felege Hiwot Referral Hospital
g	grams
JUH	Jimma University Hospital
HDL	High Density Lipoproteins
HTN	Hypertension
Kg/m <sup>2</sup>	Kilo gram per meter square
KAP	Knowledge, Attitude and Practice
HIV	Human immune virus
LMIC	Low and Middle-Income Countries
mm Hg	millimeter mercury
mg	Mili grams
NCD	Non-Communicable Disease
SD	Standard deviation
USA	United States of America
US	United States
WHO	World Health Organization
\$	Dollars

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# 1. INTRODUCTION

## 1.1. Background

Hypertension is commonly referred to as high blood pressure (*WHO, 2013*). Hypertension can be also defined as a systolic blood pressure equal to or above 140 mm Hg and/or diastolic blood pressure equal to or above 90 mm Hg (*WHO, 2013*). It is one of the most significant risk factors for cardiovascular (CV) morbidity and mortality resulting from target-organ damage to blood vessels in the heart, brain, kidney, and eyes (*Khan et al., 2014*). Hypertension causes 7.1 million premature deaths each year worldwide and accounts for 13% of all deaths, globally (*Lawes et al., 2008*). Various risk factors have been associated with hypertension including; age, sex, race, decrease physical activity, obesity, smoking, dietary and hormonal change (*WHO, 2013*).

The goal of hypertension management is to prevent short and long-term complications by achieving and maintaining the blood pressure at 140/90 mm Hg or lower (*Myo et al., 2012*). These patients need to be aware of various aspects of hypertension, especially of risk factors which may be modified. This will assist for bringing necessary modifications in lifestyle behaviors (*Demaio et al., 2013*). It is possible to lower blood pressure levels by simply adopting a healthy lifestyle.

The recommended lifestyle measures that have been shown to be capable of reducing blood pressure include: salt restriction, reduction of alcohol consumption, high consumption of vegetables and fruits and low-fat and other types of diet, weight reduction and maintenance and regular physical exercise including with cessation of smoking (*Appel L.J., 2003, Steven V. , 2013*). Because hypertensive patients are facing many health care issues and challenges such as less awareness which increase difficulties to change their lifestyle behaviors like modification of diet, stop smoking, increase physical activity and decrease weight (*Khatib& El-Guindy, 2008*). A study conducted in Jimma university hospital (JUH) showed that level of knowledge of hypertensive patients was 39% which is low (*Tessema et al., 2016*). Another study held in Bishoftu revealed that 26.7% of hypertensive patients had a practice of drinking alcohol (*Tesfaye et al., 2015*).

This shows that hypertensive patients had still lack of awareness and practice on dietary and life style modifications.

## **1.2. Statement of the problem**

The global prevalence of raised blood pressure in adults aged 18 years and over was around 22% in 2014 (*Dewhurst & Walker, 2016*). Twenty five percent of the world's adult population had hypertension in 2000, and the proportion is expected to increase to 29% by 2025 (WHO, 2013). In 2012, cardiovascular disease (CVD) killed 17.5 million people which are the equivalent of every 3 in 10 deaths in the world (*Mendis et al., 2014*). Hypertension is a risk factor for coronary heart disease and the single most important risk factor for stroke which is responsible for at least 45% of deaths due to heart disease, and at least 51% of deaths due to stroke (*Steven V., 2013*).

The world health organization (WHO) recently reported that 80% of deaths due to cardiovascular disease occur in low and middle-income countries (LMICs), with the highest death rate reported in African countries. The report also indicated that prevalence of hypertension in adults was higher in Africa (46%) than for instance in the USA (35%) (*Peberdy V., 2016*).

Although; there is shortage of extensive data, the reported rate of hypertension in Ethiopia is varied widely, with the highest rate of 31.5 % in male (*Assefa et al., 2014*) and the lowest rate of 0.8% in female (*Tesfaye et al., 2009*). In most studies of Ethiopia; the prevalence of hypertension was between 20% and 30%, it is higher in urban areas compared with rural counter parts which could be due to the life style, increased stress level, urbanization and due to decrease physical activity (*Mulugeta M., 2015*). In Bahir Dar, the prevalence of hypertension is estimated to be 25.1% (*Alamrew et al., 2015*).

There are many risk factors for hypertension: metabolic, behavioral, and socio-economic and others can be mentioned. Consumption of food containing too much salt and fat, and not eating enough fruit and vegetables, harmful levels of alcohol use, physical inactivity, lack of exercise and poor stress management are few of behavioral risk factors (*Mendis et al., 2014*). Social determinants of health, e.g. income, and education have an adverse



impact on behavioral risk factors and in this way, influence the development of hypertension (*Mendis et al., 2014*). Not addressing hypertension in a timely fashion will have significant economic and social impact. Premature death, disability, personal and family disruption, loss of income, and health care expenditure due to hypertension, take a toll on families, communities and national finance (*WHO, 2013*).

Despite the availability of safe and effective anti-hypertensive medications and the existence of clear treatment guidelines, hypertension is still inadequately controlled in a large proportion of patients worldwide (*Gupta R. and Gupta S. 2010*). Lifestyle modifications are instruments which are important to improve effective risk reduction for hypertension complications through controlling of some modifiable risk factors as; smoking, raised cholesterol level, obesity, decrease physical activity, and diet. Also, dietary approach to control hypertension (DASH) eating plan which are effectively lowers hypertension should be encouraged for these patients. It emphasizes fruits, vegetables, and low-fat dairy products and reduces fat and cholesterol consumption. Other dietary factors, such as a greater intake of protein or mono-unsaturated fatty acids, also reduce blood pressure (*Okwuonu et al., 2014*). Lifestyle modification programs are proved effective in behavior modification and promotion of healthy lifestyle practices among adolescents (*Elstin M. et al., 2014*).

Hypertensive patients are facing many health care issues and challenges such as less awareness and health education which increase difficulties to change their lifestyle behaviors (*Awoke M. et al., 2014*). Therefore; these patients should be targeted for specific assessment and interventions to overcome the challenges and obtain adequate health awareness about hypertension and understanding of nutritional and lifestyle behavior modifications which play an important role in the ability to successfully control raised blood pressure and prevent short and long-term complications (*Awoke M. et al., 2014*).

Effective life style modification can lower BP by at least as much as a single anti-hypertensive drug. Even a 2 mmHg decrease in diastolic BP has been found to reduce hypertension prevalence by 17%, risk of coronary heart disease by 6% and stroke by 15% (*Peberdy V., 2016*). The DASH diet has been found to lower weight and heart rate which

are highly associated with mortality. The DASH diet in combination with alcohol and salt restriction, weight loss, and aerobic exercise will achieve 14.2/7.4 mmHg reduction among hypertensives. These reduce hypertension from 38% to 12% within 6 months (*Peberdy V., 2016*).

Knowledge about frequent physical activity, weight management, low salt intake, high consumption of vegetables and fruits including with low-fat and fiber containing types of diet and ceasing cigarette smoking will motivate for managing raising BP with securing medication. Having sufficient knowledge and practice towards risk factors on raised BP will enhance self-caring on the health problem. However; this knowledge may not be addressed by different factors. Increasing patients' awareness and practicing it based on the recommendations is the necessary aspect. The problem is enhanced in developing and poor countries like Ethiopia. The factors should be identified and resolved to minimize the social and economic burden of hypertension in the community and to enhance quality of life of individual patient.

This research is therefore tried to assess knowledge and practice of hypertensive patients towards nutritional and life style risk factors in FelegeHiwot referral Hospital; Bahir Dar, North West Ethiopia.

### **1.3. Justification of the Problem**

There is significant knowledge barrier in different studies in the globe including in Ethiopia regarding with nutrition and the lifestyle modification of hypertensive patients.

This study was conducted for assessing knowledge and practice status about nutritional and lifestyle related factors of hypertensive patients of raised blood pressure control in Felege Hiwot referral hospital (FHRH) which was not held before. In the study site, there were hypertensives patients who are on anti-hypertensive medication and follow up whose BP is not well controlled. Therefore; the level of gaps on knowledge and practice of hypertensive patients towards their nutritional and lifestyle factors which controls raised blood pressure should be determined. It was important to identify the factors associated with the gaps.

The research result clearly helps health professionals on the way of addressing, counseling and educating patients to adhere nutritional and life style modifications which improves the primary goal of hypertension treatment.

## 2. LITERATURE REVIEW

### 2.1. Burden of Hypertension

Hypertension contributes to the burden of heart disease, stroke, kidney failure, premature mortality and disability (*WHO, 2013*). Hypertension is a serious warning sign that significant lifestyle changes are required (*WHO, 2013, Peberdy V., 2016*).

In 2013, all member states adopted the World Health Organization (WHO) target of reducing preventable mortality from non-communicable diseases (NCDs) cardiovascular diseases, cancer, diabetes or chronic respiratory diseases by 25% by 2025 (*Mendis, 2014, Francesco C. and Michelle M., 2016*). From these, tackling hypertension has been identified as a key measure in achieving this target, and one of the nine global targets set out by the WHO's Global Action Plan for the prevention and control of NCDs is: "a 25% relative reduction in the prevalence of raised blood pressure" (*Mendis et al., 2014*).

Until recently, hypertension was mainly associated with more affluent regions of the world. However, the condition is increasingly emerging in low and middle-income countries (LMICs) where health resources are scarce and stretched by a high burden of infectious diseases and where awareness and treatment levels on hypertension control are still very low (*Sarki et al., 2015*). Currently, the worldwide burden of hypertension is greatest in low and middle-income countries (LMICs) where it affects about 1 in every 5 of the adult population and this is projected to increase. By 2025, almost 3 out of every 4 people with hypertension will be living in LMICs (*Mendis et al., 2014, Sarki et al., 2015*). The absolute numbers affected by hypertension in LMICs are therefore considerably higher and are likely to increase as globalization and economic advancement usher in urbanization and longer life expectancy in these countries (*Sarki et al., 2015*).

In the case of hypertension complications, families face catastrophic health expenditure and spending on health care, which is often long term, pushing tens of millions of people into poverty (*Sarki et al., 2015*). Over the period 2011-2025, the cumulative lost output in low- and middle-income countries associated with non-communicable diseases is projected to be US\$ 7.28 trillion of which about US\$ 500 billion (approximately 4% of

gross domestic product) for low- and middle-income countries. Cardiovascular disease including hypertension accounts for nearly half of the cost (*WHO, 2014*).

High blood pressure was almost non-existent in African societies in the first half of the twentieth century (*Peberdy V., 2016*). Some studies estimate now that in some settings in Africa, more than 40 percent of adults have hypertension (*Peberdy V., 2016*). There were approximately 80 million adults with hypertension in sub-Saharan Africa in 2000 and projections based on current epidemiological data suggest that this figure will rise to 150 million by 2025 (*WHO, 2013, Sarki et al., 2011*). The prevalence of raised blood pressure was higher in low-income countries compared to middle-income and high-income countries (*Mendis et al., 2014*).

These trends have been strongly linked with changes in individual and societal lifestyle such as an increase in tobacco use, excessive alcohol consumption, reduced physical activity and adoption of "Western" diets that are high in salt and unhealthy fats and oil (*William B., 2015*). Increasing of urbanization is one of the main reasons for the rise of prevalence in hypertension (*William B., 2015*). The levels of hypertension are structurally higher in urban than in rural settings mainly because of contextual and behavioral factors associated with urban environments such as dietary changes and sedentary lifestyle that together form a complex system conducive for developing hypertension (*Mendis et al., 2014*). Unhealthy diet is estimated to be related to about half of hypertension cases (*Mendis et al., 2014*).

The prevalence of hypertension in Ethiopia is high for which four studies revealed that 22.4% (*Helelo T. et al., 2014*) and 27.9% (*Abebe et al., 2015*) and 28.3% (*Abebe et al., 2015*) that was studied in Durame, Dabat and Gondar respectively in positive association with different risk factors.

## **2.2. Nutrition and Lifestyle Related Factors to control blood pressure**

The clinical approach to hypertension is addressing only a tiny fraction of hypertensive cases in countries which requires preventing the development of hypertension and lowering blood pressure levels by simply adopting a healthy diet and lifestyle (*Beatrice et al., 2015*). A 5 mmHg lower systolic blood pressure is said to cause a 20–25% decrease in stroke and 15–20% decrease in coronary heart disease (*Vijver et al., 2013*).

The recommended diet and lifestyle measures that have been shown to be capable of reducing blood pressure include: Salt restriction, moderation or avoiding of alcohol consumption, high consumption of vegetables and fruits, low consumption of fat diet and regular physical exercise. Weight reduction and cessation of smoking are also other life style modification measure to reduce BP levels (*WHO, 2014, Vijver et al., 2013, Beatrice et al., 2015*). Hypertensive patients irrespective of their stage or grade should be aware and motivated to adopt and practice these measures.

### **A. Salt restriction**

Increased dietary salt intake increases blood pressure and subsequently increases the risk of CVDs, causing death and disability in most countries around the world. There is compelling evidence that reduced salt intake lowers blood pressure and risk of CVD (*WHO, 2012*). Decreased salt intake not only reduces blood pressure and related CVD risk, but has other beneficial cardiovascular effects that are independent of and additive to its effect on blood pressure (*WHO, 2012*). It has been reported to have a direct effect on reducing stroke, left ventricular hypertrophy, aortic stiffness, and chronic kidney disease and proteinuria (*WHO, 2013, Peberdy V., 2016, Gersh et al., 2010*). Individuals who consume more than 3.5 gram per day of sodium, develops CVD more likely (*Pfister et al, 2014*).

Each additional six grams salt per day resulted in an approximate 0.4 mmHg per year higher systolic blood pressure. This would mean a blood pressure elevation of 20–30mmHg over the life time of an individual, which increases the risk for disease. Salt reduction can save a lot of lives. A universal reduction in dietary intake of sodium by 2.9

gram per day can lead to a 50% reduction in the number of people requiring anti-hypertensive treatment; a 22% reduction in the number of deaths resulting from strokes; and a 16% reduction in the number of deaths from CHD (*WHO, 2012*). A meta-analysis of 36 studies found that decreased sodium intake resulted in a decrease in resting systolic blood pressure of 3.4 mmHg and a decrease in resting diastolic blood pressure of 1.5 mmHg. WHO recommends that adults should consume less than 2000 milligrams of sodium, or 5 g of salt per-day (*WHO, 2013*).

Food processing reduces the amount of potassium in many food products. For that reason, it is reasonable to infer that the total impact of reducing salt intake on cardiovascular outcomes could be greater than those expected from blood pressure reduction only. Few intervention studies have been conducted to show that a reduction in salt intake and an increase in potassium improve the blood pressure in African population (*Vijver et al., 2013*). A study in Kenya reported that supplementation with potassium in newly diagnosed patients with hypertension reduced the blood pressure. The reduction in salt intake was accompanied by a decline in both systolic and diastolic blood pressure of 10 mm Hg and more (*Aburto N., 2013*). About 30% of HTN cases are related to increased salt consumption (*Aburto N.J., 2013*).

The main dietary source of sodium worldwide is salt. However, sodium can be found in other forms, and the main source of dietary sodium consumption depends on the cultural context and dietary habits of the population, but in many countries processed foods are the main source (*WHO, 2012*).

## **B. Tobacco Use**

Tobacco use is defined as current use of any tobacco product in either smoked or smokeless form. Tobacco smoking includes cigarettes, cigars, pipes, hookah, shisha, water-pipe and any other form of smoked tobacco (*Mendis et al., 2014*).

Smoking prevalence in both high-income and upper-middle-income countries is broadly similar, although slightly higher in high income countries which was 25% and middle-income countries at which was 22%. Among low-income countries; the average

prevalence was 18% and, various forms of tobacco consumption are popular, cigarette smoking accounts for about 80% of all forms of current smoking (*Sarki et al., 2015*).

Being tobacco free is especially important for people with hypertension. Tobacco smoking is known to increase the risk of developing hypertension and cardiovascular diseases like stroke, thrombosis and heart attack. Smoking causes an immediate increase in blood pressure resulting in higher ambulatory blood pressure levels for smokers than for non-smokers. Smoking cessation is known to reduce the overall risk of cardiovascular diseases. Smoking is estimated to cause nearly 10% of CVD (*Mendis et al., 2014*). There is a large body of evidence from prospective cohort studies regarding the beneficial effect of smoking cessation on coronary heart disease mortality (*WHO, 2014*).

### **C. Alcohol Consumption**

There is a direct effect between high levels and specific patterns of alcohol consumption and rising risk of hypertension (*WHO, 2013*). In 2012, it was estimated that 3.3 million deaths, or 5.9% of all deaths worldwide, were attributable to alcohol consumption. More than half of these deaths occurred as a result of NCDs. An estimated 5.1% of the global burden of disease as measured in disability-adjusted life-years (DALYs) is attributed to alcohol consumption. The influence of heavy drinking, on increasing blood pressure levels has been reported in Nigeria (*Vijver et al., 2013*).

The relationship between alcohol consumption with coronary heart disease and cerebrovascular diseases is complex. It depends on both the level and the pattern of alcohol consumption (*James et al., 2014*). These effects tend to disappear if the patterns of drinking are characterized by heavy episodic drinking. Various mechanisms have been proposed for the protective effect of light to moderate alcohol consumption, including the beneficial effects of alcohol on the HDL cholesterol level, thrombolytic profile and platelet aggregation (*Roerecke M. & Rehm J., 2010*).



#### **D. Physical Activity**

Adequate physical activity has been shown to have many health promoting effects and has a direct, independent role in reducing hypertension. Traditionally, it has been thought that a high level of physical activity could in part explain the low levels of chronic diseases found in most of Africa (*Campbell et als., 2014*). However, the amounts of physical activity have been decreasing as a result of the high rate of urbanization that has been occurring across the continent, physical inactivity is related to about 20% of hypertension (*Campbell et als., 2014*).

Adults over 18, including those 65 and older, should do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week, or at least 75 minutes of vigorous-intensity aerobic physical activity, or an equivalent combination of the two. Adults aged 65 and above with poor mobility should perform physical activity to enhance balance and prevent falls on three or more days per week (*WHO, 2010*).

Insufficient physical activity is the fourth leading risk factor for mortality (*Mendis et al., 2014*). Approximately 3.2 million deaths and 32.1 million DALYs which representing about 2.1% of global DALYs – each year are attributable to insufficient physical activity (*James et al., 2014*). People who are insufficiently physically active have a 20% to 30% increased risk of all-cause mortality compared to those who engage in at least 30 minutes of moderate intensity physical activity most days of the week (*WHO, 2010*). In adults, participation in 150 minutes of moderate physical activity each week (or equivalent) is estimated to reduce the risk of ischemic heart disease by approximately 30%. Many studies that have examined the association between physical activity and CVDs have reported reduced risk of death from coronary heart disease and reduced risk of overall CVDs, coronary heart disease and stroke, in a dose versus response fashion (*James et al., 2014, WHO, 2010*)).

Physical activity is a key determinant of energy expenditure and thus fundamental to energy balance and weight control. Physical activity improves endothelial function, which enhances vasodilatation and vasomotor function in the blood vessels. The beneficial effects of physical activity on cardiovascular risk may be mediated, at least in part,

through these effects on intermediate risk factors (*Mendis et al., 2014*). The prevalence of insufficient physical activity is higher in high-income countries compared to low-income countries due to increased automation of work and use of vehicles for transport in high-income countries. High-income countries have more than double the prevalence of insufficient physical activity compared to low-income countries for both men and women, with 41% of men and 48% of women being insufficiently physically active in high-income countries compared to 18% of men and 21% of women in low-income countries. Older people were less active than younger people; 19% of the youngest age group did not meet the recommended level, compared to 55% of the oldest age group (*WHO, 2010*). Documented health benefits of regular physical activity among young people also include reduced body fat; more favorable cardiovascular and metabolic disease risk profiles (*James et al., 2014*).

#### **E. Consumption of Fruits and Vegetables**

Most of the benefits of fruits and vegetables come from reduction in CVD and risk factors, particularly hypertension. Approximately 16 million (1.0%) DALYs and 1.7 million (2.8%) of deaths worldwide are attributable to low fruit and vegetable consumption (*James et al., 2014*). Many people in Africa often eat insufficient fruits and vegetables, resulting in low potassium intake. This in turn is associated with higher blood pressure. In some patients; a potassium intake of 90 mili mole per day is recommended. About 20% HTN cases are related to low consumption of fruit and vegetables (*Campbell et als., 2014*).

Potassium-rich food helps to reduce blood pressure. WHO recommends potassium consumption at least 3,510 mg per day for adults (*James et al., 2014*). Potassium-rich foods include: beans and peas (approximately 1,300 mg of potassium per 100 g), nuts (approximately 600 mg/100 g), vegetables such as cabbage (approximately 550 mg/100 g) and fruit such as bananas and papayas. Adequate consumption of fruit and vegetables reduces the risk of hypertension (*Kotseva et al., 2010*).

## **F. Obesity**

Scientific knowledge on obesity today is in fact quite robust. This is particularly true in connection to the influence of a dietary pattern characterized by routine consumption of energy-high and nutrient-poor foods, or ultra-processed foods, which is clearly and consistently linked to the development of obesity and other NCDs (*WHO, 2014*).

The World Health Organization (WHO) defines obesity as a condition in which excess body fat has accumulated to such an extent that health may be adversely affected. The degree of body weight is usually expressed as BMI; this is the ratio of weight in kilograms to the square of height in meters. The BMI is used to classify a person's body weight as underweight (BMI less than 18.5), normal weight (BMI 18.5-24.9), overweight (BMI 25-29.9), or obese (BMI greater than 30) (*Mendis et al., 2014*).

Obesity is a growing health problem in both developed and developing countries. Worldwide, at least 2.8 million people die each year as a result of being overweight or obese, and an estimated 35.8 million (2.3%) of global DALYs are caused by overweight or obesity (*Mendis et al., 2014*). Obesity is a cardiovascular risk factor closely linked to diet and physical inactivity. Obesity results, when there is an imbalance between energy intake in the diet and energy expenditure. Regular physical activity can prevent obesity by increasing the expended energy (*James et al., 2014*). Obesity greatly increases the risk for hypertension and has also been shown to be associated with coronary artery disease and some cancers, and to reduce life expectancy (*Campbell et al., 2014*). Obesity is related to about 30% of hypertension (*WHO, 2010*).

### **2.3. Hypertensive patients Knowledge for nutritional and lifestyle factors to control raised blood pressure**

Awareness about factors of blood pressure is very much essential for the control of raised blood pressure. Considering the high morbidity and mortality due to hypertension and knowing that if a patient has knowledge about the risk factors, patient will be more careful about the management, and a better BP control can be achieved (*Mahajan et als., 2012*).

Several studies throughout the world had shown that lifestyle, such as physical activity and nutrition plays an important role in controlling raised blood pressure and preventing its long-term complications. In order to actively improve their lifestyle, patients must have knowledge and understanding the potential positive effects of nutritional and lifestyle modification (*Mahajan et als., 2012*).

Patients with hypertension should have the knowledge about they need to take care of them, to be able to define their condition, to evaluate risk factors, and to appreciate the significance of lifelong medical control (*Chotisiri et al., 2012*).

A 2015 study of Nepal by Shrestha and et al. on knowledge, attitude and practice on hypertension among antihypertensive medication users showed that 93% respondents had knowledge on excessive salt that induces high blood pressure (*Shrestha et al., 2016*) and a study of knowledge, attitudes, and practices on lifestyle and cardiovascular risk factors among metabolic syndrome patients in an urban tertiary care institute of Sri-Lanka revealed that; Knowledge on contribution of salt toward raised BP(93%) (*Amarasekara et al., 2016*) which was high. A similar study of knowledge and perceptions related to hypertension, lifestyle behavior modifications and challenges that facing hypertensive patients in Egypt, Tanta university Hospital revealed that about 82.2% hypertensive patients were aware about excessive salt intake increase risk for developing hypertension (*Saham et al., 2015*).

There is study in JUH which revealed that a highest patient knowledge towards salt restriction (98.5%) (*Tesfaye et al., 2015*). Whereas a similar study conducted by Patnaik and et al revealed that about 63% knew the case (*Patnaik et al., 2017*) and 62% were

aware of salt reduction to manage their hypertension for the similar study conducted in Ghana which are lower compared to other studies (*Afia et al., 2015*).

A 2015 study of Nepal by Shrestha and et al. on knowledge, attitude and practice on hypertension among antihypertensive medication users showed that 90% respondents had knowledge on excessive alcohol intake for risk of raised BP (*Shrestha et al., 2016*). A similar study in Ghana and India revealed that 67.08% (*Anowie&Darkwa, 2015*) and 52% (*Bollampally et al., 2016*) had knowledge on alcohol for inducing BP in respective order. On the other hand a 2014 Patnaik and et al. study on lifestyle pattern and hypertension related knowledge, attitude and practices among diagnosed patients of hypertension revealed that 28% aware of the challenge of high consumption of alcohol for risk of raise BP (*Patnaik et al., 2017*) which was low. Similarly, 66.3% hypertensive patients were not aware that drinking alcohol increase risk for hypertension which was found in a study of Tanta university hospital-Egypt and Bishoftu-Ethiopia of which outcomes were equivalent (*Saham , 2015, Tesema, 2016*).

Regarding with obesity and physical inactivity; about 88.5% hypertensive patients had knowledge on overweight for high blood pressure resulted in Nepal (*Shrestha et al., 2016*) and a 2014 Patnaik and et al study revealed that about 43% hypertensive patients knew the risk of ignoring physical activity for raised BP (*Patnaiket al., 2017*). Similarly, Bollampally and et als reported that about 46% hypertensive patients were aware of the risk of obesity for raised blood pressure on their study whereas Patnaik and et al resulted in 59% respondents knew that obesity is a risk factor for the case (*Bollampally, 2016, Patnaik, 2017*). Other similar studies also found different results on the knowledge of physical exercise effect on raised blood pressure for their hypertension: a study of Srilanka revealed that 63% of respondents were unaware for actively doing physical exercise for greater than 30 minutes (*Amarasekara et al., 2016*). Another Ghanaian study revealed that about 73.2% of patients were unaware for physical exercise (*Anowie & Darkwa, 2015*) with similar fashion as the study of Egypt; about 63 % (*Afia et al., 2015*) patients had wrong knowledge for physical activity in Ghanaian study.

A study of knowledge and perceptions related to hypertension, lifestyle behavior modifications and challenges that facing hypertensive patients in Egypt, Tanta Hospital revealed that 42.8% and 51.5% from hypertensive patients had wrong answer about overweight and inactivity are at greater risk for developing hypertension respectively (*Saham et al., 2015*). A cross sectional study conducted in Nigeria on KAP of blood pressure control revealed that 67.3% had poor knowledge of exercise for hypertension control (*Awotidebe et al., 2014*). The study of Bishoftu also revealed that 51.5% patients had wrong answer on physical inactivity (*Tesema et al., 2016*).

Regarding with the control of raised blood pressure; the Patnaik and et als reported that 39% of hypertensive patients knew the harm of tobacco smoking on their BP (*Patnaik et al., 2017*) and 37% of respondents were aware about the case in the study of Ghana of 2012 (*Afia et al., 2015*). A similar study of knowledge and perceptions related to hypertension, lifestyle behavior modifications and challenges that facing hypertensive patient in Egypt, Tanta Hospital revealed that about 58.4% hypertensive patients were aware about smoking to raise BP (*Saham et al., 2015*) and nearly 84% of hypertensive patients had knowledge about influence of smoking on hypertension in the study of Tamil Nadu, India (*Durai & Muthuthandavan, 2015*). Similar study which was conducted in Ethiopia, Bishoftu; revealed that 60% hypertensive patients had knowledge on smoking danger for raised blood pressure (*Tessema et al., 2016*).

Knowledge on dietary modifications to control blood pressure of hypertensive patients is essential to minimize mortality and morbidity by the disease. Studies showed that there are gaps on this modification. A study in Srilanka revealed that 45.4% were unaware of increased vegetable consumption as a positive factor for raised BP control (*Amarasekara et al., 2016*) and a cross sectional study conducted among the hypertensive males who were attending in Tamil Nadu, India; nearly 84% had knowledge about influence of smoking and alcohol on hypertension and 82% had knowledge about dietary factors which control hypertension (*Durai & Muthuthandavan, 2015*). The JUH study participants' knowledge on the benefit of balanced diet for the management of HTN was 39% which was low (*Tesema et al., 2016*).

The overall average knowledge of respondents towards nutritional and lifestyle risk factors of Bishoftu (75.9%) (*Tesfaye et al., 2015*) which is greater than the study of Indian Nagar urban (15.6%) (*Mahjan et al., 2012*) and similar study of Tanta university hospital-Egypt (67.3%) (*Saham, 2015, Tessema, 2016*).

#### **2.4. Hypertensive patients Practice for nutritional and lifestyle factors for raised blood pressure control**

Significant and positive associations between knowledge and practice found in some studies hoped to encourage health care providers to take of challenge to educate and motivate community and provide full support to those who wish to modify their lifestyle (*Francesco & Michelle, 2016*).

Salt consumption is a prominent risk factor to raise BP of hypertensive patients. A 2015 study of Nepal by Shrestha and et al. on knowledge, attitude and practice on hypertension among antihypertensive medication users showed that only 32.5% (*Shrestha et al., 2016*) hypertensive patients moderate their salt intake which is lower than the Bollampally study finding in India in which 61% hypertensive patients were avoiding adding extra salt in their diet (*Bollampally et al., 2016*). On the other hand; a study conducted in Mankayane Hospital, Swaziland study showed that 75% hypertensive patients were avoiding extra salt in their diet which was equivalent with the study of Rural Clinic of Coastal Karnatak of Manglore (24.4%) (*Casper and Louis, 2013, Shankar et al., 2014*). Another study in Jimma university specialized hospital on KAP regarding with life style modification assessed that 98.5% study participants of JUH avoided adding salt to their food which was higher than the study in Bishoftu which was 80% (*Tessema, 2016, Tesfaye, 2015*).

Alcohol consumption had to be moderated or avoided in order to reduce the mortality and morbidity of hypertensive patients by raised BP. A cross-sectional study which was conducted at Shivaji Nagar urban slum showed that 25.89% of hypertensive patients were alcoholic (*Mahjan et al., 2012*) and 12.5% of hypertensive patients were consuming alcohol in the study of Egypt (*Shrestha et al., 2016*). On another study of Patnaikel and et als reported that 8.8% hypertensive patients were consuming alcohol (*Patnaikel et al.,*

2017) and 28% of hypertensive patients in Mankayane Hospital, Swaziland were consuming alcohol (*Casper and Louis, 2013*). A study of knowledge, attitudes and practice of non-pharmacologic therapy among hypertensive patients in Bishoftu indicated that 26.7% of respondents drank alcohol (*Tesfaye et al., 2015*).

Although; cigarettes smoking is another risk factor to raise BP of hypertensive patients which should be avoided, many studies showed that it is not ceased by hypertensive patients. A 2015 study of Nepal by Shrestha and et al. on knowledge, attitude and practice on hypertension among antihypertensive medication users showed that 12% hypertensive patients were smokers (*Shrestha et al., 2016*) which is lower than the study conducted by Patnaikel and et al. result for which 22.5% hypertensive patients were study time smokers (*Patnaiket al, 2017*). A study conducted in Mankayane Hospital, Swaziland study showed that 11% (*Casper and Louis, 2013*) hypertensive patients were smokers which are higher than the study conducted in JUH, Ethiopia for which only 1.5% were smokers (*Tessema et al., 2016*).

In order to prevent the complications of raised BP within hypertensive patients, moderate physical activity plays an essential role. However; physical inactivity is a key determinant to control raised BP in hypertensive patients, there are some deviations in various studying in doing so. A 2015 study of Nepal by Shrestha and et al. on knowledge, attitude and practice on hypertension among antihypertensive medication users showed that 11% were doing regular physical exercise (*Shrestha et al., 2016*) whereas about 16% patients were doing at least recommended physical activity in the Bollampally study of India (*Bollampally et al., 2016*).

A 2014 Patnaik et al. study of lifestyle pattern and hypertension related knowledge, attitude and practices among diagnosed patients of hypertension revealed that, 86.3% were not practicing regular walking or any fitness activities (*Patnaiket al, 2017*) whereas a study conducted in Mankayane Hospital, Swaziland study showed that 89% were physically active for more than 30 minutes per day (*Casper and Louis, 2013*). Similar



studies which were conducted in Ethiopia, Bishoftu revealed that 33.3% hypertensive patients had little or no activity which was higher than the report of JUH in which was 10.2% of the patients reported to practice “little or no activity” (*Tessema, 2016, Tesfaye, 2015*).

Dietary modification is another management to control raised BP in hypertensive patients and different studies were conducted to support the modification. Minimizing saturated fatty acids and oils by consuming high amount of fruits and vegetables is a recommended lifestyle modification. A 2015 Shrestha and et al study of Nepal showed that only 14.5% hypertensive patients had avoided fatty food consumption (*Shrestha et al., 2016*) which is better than the study conducted in Jimma university specialized hospital on KAP regarding with life style modification assessed that 34% of the respondents didn't eat diet like cheese and eggs at all (*Tesema et al., 2016*). Similarly, a study conducted in Bishoftu showed about 26.7% hypertensive patients avoid fatty foods from their diet (*Tesfaye et al., 2015*).

A 2014 Patnaik et al. study of lifestyle pattern and hypertension related knowledge, attitude and practices among diagnosed patients of hypertension revealed that 78.4% were taking mixed diet, only 18.6% were taking fruits daily and 81.4% were not taking or occasionally taking fruits (*Patnaiket al, 2017*).

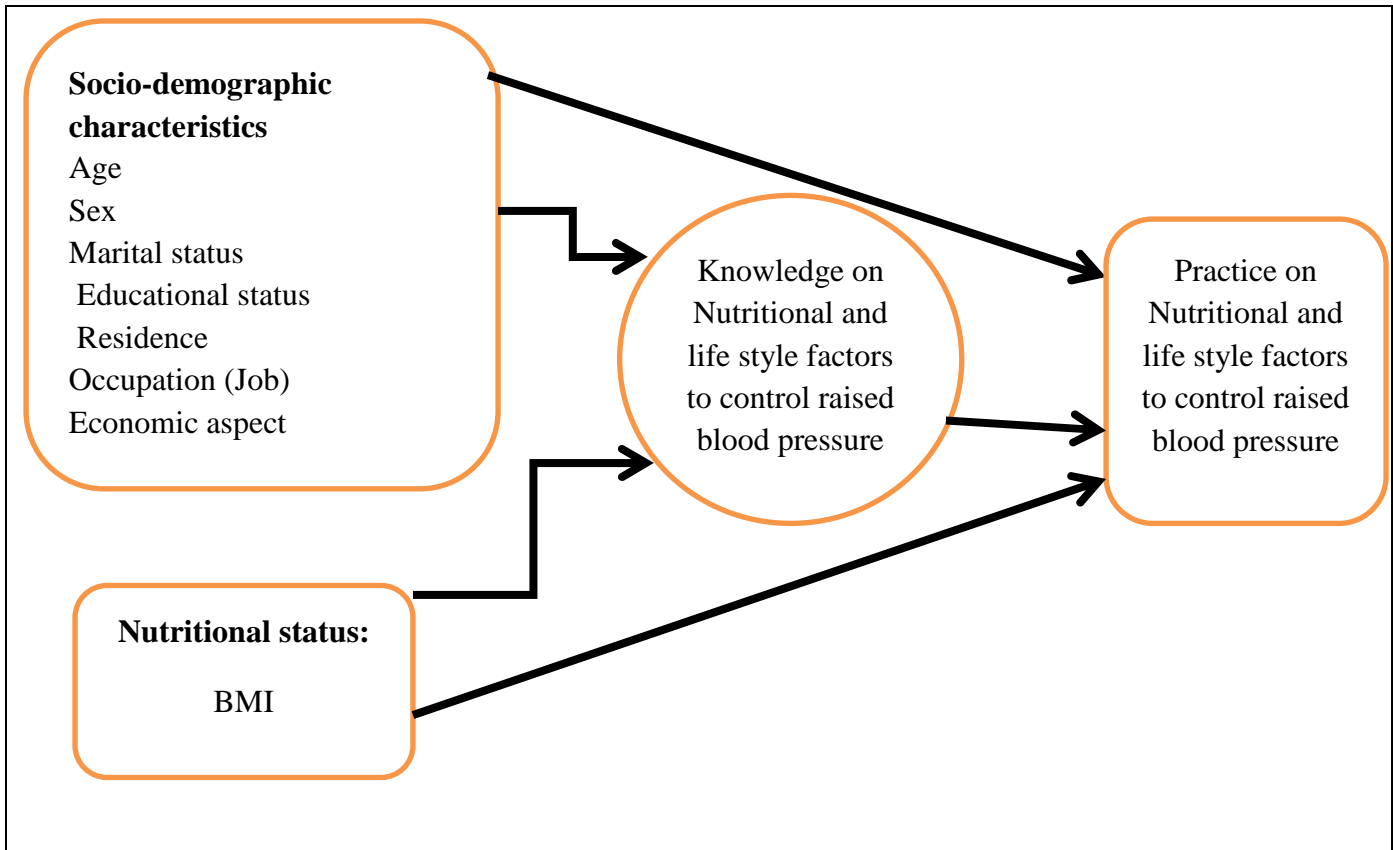


Figure 1. Conceptual frame work for knowledge and practice of hypertensive patients towards nutritional and life style factors to control raised blood pressure

### **3. OBJECTIVE**

#### **3.1. General objective**

- To assess knowledge and practice of hypertensive patients towards nutritional and life style related factors for raised blood pressure control

#### **3.2. Specific objectives**

- To assess the knowledge of hypertensive patients to nutritional and lifestyle factors towards raised blood pressure control
- To measure the practice of hypertensive patients to nutritional and lifestyle factors towards raised blood pressure control
- To identify the factors associated with the nutritional and lifestyle practice for raised blood pressure control among hypertensive patients

## **4. MATERIALS AND METHODS**

### **4.1. Study design and period**

Institutional based cross-sectional study was conducted on hypertensive patients who were attending at Felege Hiwot Refferal Hospital (FHRH) from November 1 to December 31, 2016.

### **4.2. Study Setting**

Felege Hiwot referral hospital (FHRH) serves about seven million populations who were coming from Bahir-Dar city and neighboring zones and regions. It is the biggest and busiest hospital in Amhara region which is located at BahirdarCity; the capital of the Amahara national regional State. Bahir-Dar city is 563 km far from Addis Ababa in the North Western of Ethiopia. It has 26 departments with more than 420 patient beds for inpatient service. It is designed to treat either acute or chronic cases like hypertension, diabetes mellitus, cancer etc. with about 498 health professionals in different level. According to the report of the hospital; in 2008 Ethiopian fiscal year; there were 2776 hypertensive patients who were treated in FHRH of which, 1325 were females and 2 were under 18 years old.

### **4.3. Source population**

All hypertensive patients who had follow up in FHRH were the source populations.

### **4.4. Study population**

All hypertensive patients who came to the study site during the study period for hypertension follow-up were the study population.

### **4.5. Sampling unit**

Hypertensive patients who were coming to FHRH for hypertensive treatment during the study period were sampling

#### **4.6. Inclusion criteria**

Hypertensive patients of age not less than 18 who were available during the study period were included in the study.

#### **4.7. Exclusion criteria**

Hypertensive patients who were under co-morbid condition of mental illness had been excluded.

#### **4.8. Study Variables**

##### **✓ Dependent variables**

- Knowledge of hypertensive patients towards nutritional and lifestyle factors to control raised blood pressure
- Practice of hypertensive patients towards nutritional and lifestyle factors to control raised blood pressure

##### **✓ Independent variables**

- Socio-demographic and economic characteristics: age, sex, marital status, job, and level of education, family history and residence and self-care ability had been taken as independent variables.
- Nutritional status: BMI

#### **4.9. Sample size and sampling strategies**

During the period of data collection; about 1850 hypertensive patients were expected to come to the hospital for pharmacological treatments.

##### **✓ Sample size determination**

According to a study conducted in a health care facility India, assessment of knowledge, attitude and practice of hypertensive patients towards nutritional and lifestyle risk factors was found as a poor score of knowledge (72.3%) and a poor score of practice (82.8%) (*Siraj & Tauheed, 2015*).

By considering the above finding; sample size was determined by using sample mean proportion population formula at 95% confidence interval and 5% standard error;

$$ni = \frac{Z_{\alpha/2}^2 (P)(1 - P)}{d^2}$$

Where the value of  $Z_{\alpha/2}$  at 95% CI is 1.96 and d is 0.05.

Table 1. Sample size determination with different proportions

S.n	Characteristics	P	1-P	$Z_{\alpha/2}$	d	Sample size(n)
1	Knowledge	0.277	0.723	1.96	0.05	308
2	Practice	0.172	0.828	1.96	0.05	219

The largest sample size was taken to make more sample size; i.e. 308 and including 10% of non-respondents, the final sample size was 339.

#### ✓ Sampling method

Samples had been selected based on systematic random sampling method. The first sample was selected by simple random sampling method and the next samples were selected by using  $K^{\text{th}}$  sample nomination from daily appointment registry; i.e.  $K=1850/339 \approx 5$ . Therefore; every fifth patient who came for known hypertensive treatment at the triage registration book of the hospital was selected.

#### 4.10. Data collection and quality control

The data were collected by interview with structured questionnaire and with appropriate physical measurements. The questionnaire: included questions which measure knowledge and practice of hypertensive patients towards nutritional and life style risk factors. The questionnaire had four parts: questions for socio-demographic characteristics, weight and height data collection tool for BMI, questions to asses' knowledge and questions to measure practice of respondents on nutritional and life style risk factors of blood pressure

control. The knowledge part of question had nine questions with a value of 1 for correct response and 0 for incorrect response.

The practice part of question had 12 questions with value of 1 for correct practice and zero for poor practice. The BMI was calculated based on the measured value of height and weight using calibrated weight scale and height meter. All questions were translated appropriately in to Amharic language.

An experienced data collector was recruited and trained on how to collect the data. The questionnaire was pretested at Dangila hospital for five percent of samples i.e. 16 hypertensive patients and the questionnaire didn't need reconstruction. The data was collected from November 1 to December 31, 2016 on the five working days and working hours of the week at the hospital triage.

Data quality has been controlled by the investigator with predefined checklists and by giving training for data collector before data collection was started. Supervision was applied to control data quality.

#### **4.11. Data handling and statistical analysis**

The collected data were seriously examined to avoid errors and cleaned from some incomplete responses and measurements and entered in to Statistical package for social service (SPSS) version 20. The analysis was performed by using tables, graphs and frequencies. Descriptive analysis was used for analysis of socio-demographic characteristics and the status of knowledge and practice of hypertensive patients towards nutritional and lifestyle risk factors.

Statistical package for social service (SPSS) 20 was use for data analysis. In order to catch data entry errors visual check-ups and comparisons of the entered data with the paper questionnaires were used. Binary logistic regression analysis was made to obtain odds ratio and the confidence interval of statistical associations of determinant factors with good nutritional and lifestyle related practice to manage hypertension. All factors which were analyzed with bivariate logistics analysis were transferred to Multivariate

logistic regression model. The strength of statistical association was measured by adjusted odds ratios and 95% confidence interval. Statistical significance was declared at  $P < 0.05$ .

#### **4.12. Operational Definitions**

**Sufficient physical activity** means

- 150 minutes of moderate-intensity physical activity per week;
- $\geq 30$  minutes of moderate intensity physical activity per day

The knowledge status of hypertensive patients were classified as follows:

**High level knowledge:** - Knowledge score that fell not less than seven points ( $\geq 80\%$ )

**Moderate level knowledge:** - Knowledge score that fell between 6-7 points (60%-79%)

**Low level knowledge:** - Knowledge score below six points (0-59%)

**Good practice:** - Practice score that fell not less than 8 points ( $\geq 60\%$ )

**Poor practice:** - Practice score that fell below 8 points (0-59%).

#### **4.13. Ethical consideration**

Ethical clearance was obtained from Institutional Review Board of Faculty of Chemical and Food Engineering, Bahir Dar Institute of Technology. The regional health bureau ethical review board approved and gave formal letter to FHRH. Further permissions were obtained from Medical Director of Felege Hiwot Referral Hospital and Informed consents were obtained from the hypertensive patients before the interview. No names were recorded and the respondents were assured of their confidentiality. A respondent was clearly told about the study and the information needed from them. The respondents were given the chance to ask anything about the study and left free to refuse or stop the interview at any time they want.



## **5. RESULTS**

### **5.1. Socio-demographic Characteristics**

Three hundred twelve hypertensive patients were included in the study. Among these; one hundred sixty (51.3%) were females. The minimum, mean, standard deviation and maximum age of the study participants were 18, 48.61, 16.61 and 88 years in respective order with the majority of greater than 65 years 67(21.5%). The majority of the respondents had no education which accounts for one hundred fifty-two (50.6%); the elementary, higher and secondary education accounts for 61(19.6%), 52(16.7%), and 41(13.1%) respectively. The mean BMI status of study participants was 24.24 kg/m<sup>2</sup>. (Table2)

Table 2. Distribution of socio-demographic characteristics and BMI status for studied hypertensive patients in FHRH, NWE; from November 1 to December 31, 2016 (n=312)

<b>Socio-demographic variables</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Sex</b>		
Male	152	48.7%
Female	160	51.3%
<b>Age category</b>		
18 – 24	13	4.2%
25 – 34	64	20.5%
35 -44	57	18.3%
45 – 54	61	19.6%
55 – 64	50	16.0%
≥65	67	21.5%
<b>Marital status</b>		
Single	55	17.6%
Married	209	67.0%
Divorced/widowed	48	15.4%
<b>Residence</b>		
Urban	127	40.7%
Rural	185	59.3%
<b>Educational Status</b>		
No education	158	50.6%
Elementary (1-8)	61	19.6%
Secondary (9-12)	41	13.1%
Higher Education	52	16.7%
<b>Job</b>		
No job	22	7.1%
House Wife	56	17.9%
Self Employed	132	42.3%
hired (government, private, NGO)	52	16.7%
Retired	50	16.0%
<b>Income</b>		
≤1500	128	41.0%
1501-3000	129	41.3%
≥3001	55	17.6%
<b>BMI status(Kg/m<sup>2</sup>)</b>		
Under Weight	17	5.4%
Normal	150	48.1%
Over Weight	133	42.6%
Obese	12	3.8%

## 5.2. Knowledge of hypertensive patients towards nutritional and lifestyle factors to control raised blood pressure

Two hundred eighty-five (91.3%) respondents knew the use of salt restriction to manage raised blood pressure. One hundred forty-three (45.8%) respondents knew that smoking exacerbates raises blood pressure. Two hundred thirty-one (74.0%) and 143(45.8%) knew that avoiding alcohol consumption and cessation of smoking help to control raised blood pressure with respective order. (Table3)

Table 3. Knowledge of recommended nutritional and lifestyle factors of studied hypertensive patients in FHRH, NWE; from November 1 to December 31, 2016 (N=312)

<b>Dietary and life style components that helps to control raised blood pressure</b>	<b>Frequency</b>	<b>Percentage</b>
Salt restriction	285	91.3%
Eating high amount of fruits within daily diet	191	61.2%
Decrease using high fat containing animal products (milk, meat, cheese, butter) and oils	170	54.5%
Consuming of fish within daily diet	94	30.1%
Eating high amount of vegetables within daily diet	163	52.6%
Eating high amount of grain with in daily diet	130	41.9%
≥30 minutes of moderate intensity physical activity per day	196	62.8%
Minimizing alcohol consumption	231	74.0%
Ceasing cigarette smoking	143	45.8%

The overall knowledge status of hypertensive patients towards nutritional and lifestyle factors of raised BP control were resulted in; 103(33.0%) had high level knowledge, and 141(45.2%) had low level knowledge as presented in figure 2.

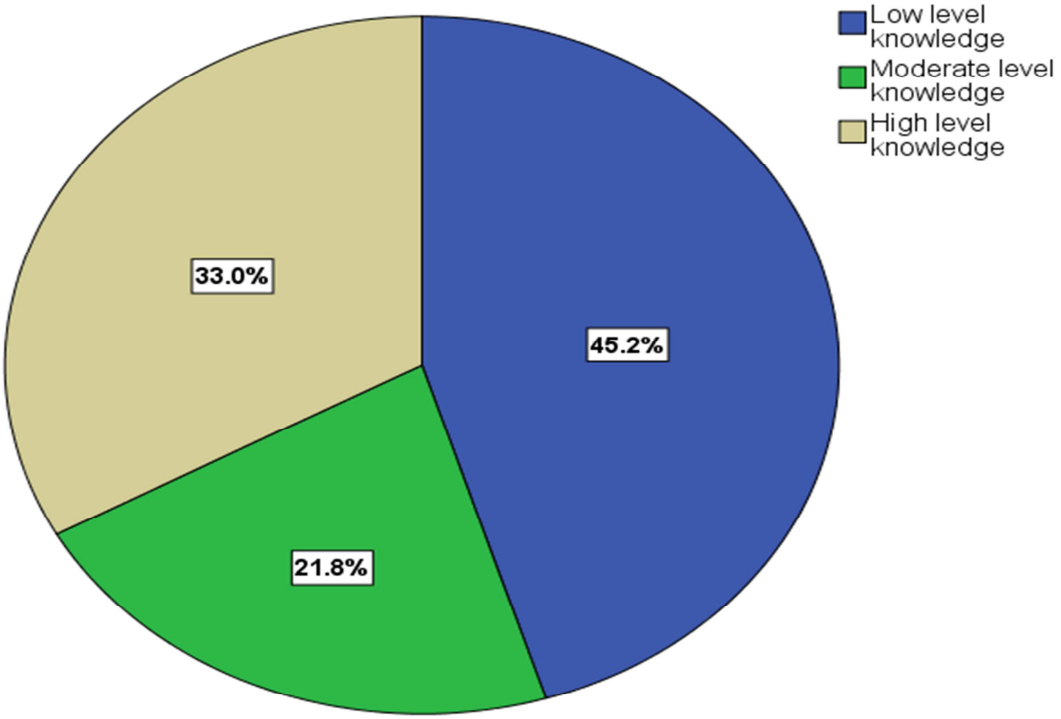


Figure 2. Knowledge status of recommended nutritional and lifestyle factors of studied hypertensive patients for raised blood pressure control in FHRH, NWE; from November 1 to December 31, 2016 (n=312)

## 5.2. Practice of hypertensive patients towards nutritional and lifestyle factors of raised blood pressure control

From three hundred twelve study participants; two hundred eighty-three (90.7%) were salt restricted and the remaining hypertensive patients were not restricted of using salt in their diet. On this research fifty-seven (18.3%) and seventy-six (24.4%) of hypertensive patients consume fresh vegetables and fruits daily respectively as shown in Table 4.

Table 4. Practice of recommended nutritional and lifestyle risk factors of studied hypertensive patients in FHRH, NWE; from November 1, 2016 to December 31, 2016 (n=312)

<b>Practice of diet and lifestyle characteristics to control raised blood pressure</b>	<b>Frequency</b>	<b>Percentage</b>
Not adding extra salt	283	90.7%
moderate intensity physical activity $\geq$ 30 minutes per day or $\geq$ 150 minutes per week	229	73.4%
Currently no smoking	312	100.0%
Currently avoiding harmful alcohol consumption	273	87.5%
Consuming grains at least three times daily	236	75.6 %
Not consuming high fat containing products	204	65.4%
Minimize consuming butter and food oils	177	56.7%
Consuming fruit at least three times daily	57	18.3%
Consuming Vegetables at least three times daily	76	24.4%
Consuming nuts and legumes 3-5 times weekly	197	63.1%
Consuming fish	49	15.7%

The overall practice status of hypertensive patients study participants to control raised BP was resulted in; 179(57.4%) had good practice, and 133(42.6%) had poor practice.

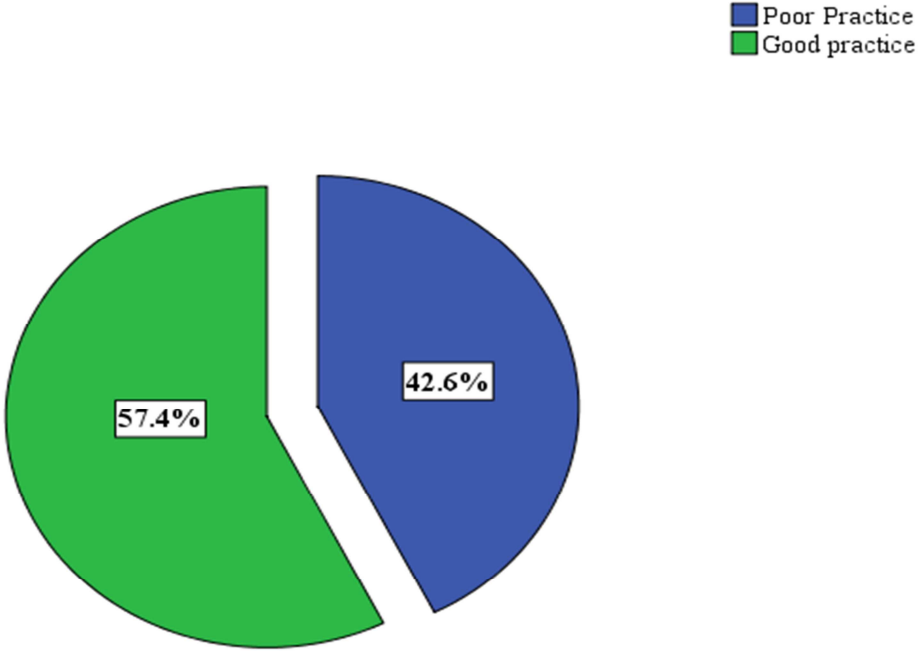


Figure 3. Practice status of recommended nutritional and lifestyle factors for raised blood pressure control of studied hypertensive patients in FHRH, NWE; from November 1 to December 31, 2016 (n=312)

### **5.3. Factors associated with practice of hypertensive patients towards nutritional and lifestyle factors to control raised blood pressure**

All variables which were analyzed by bi-variate analysis were entered to multivariate analysis to control confounding factors. In the multivariate analysis; it's found that female hypertensive patients had two times more likely [AOR (95% CI) = 2.24(1.35-3.73)] to had good practice than males in controlling raised BP. Educational status had significant association with practice; for which hypertensive patients who had higher education had three times more likely [AOR (95% CI) = 3.10(1.43-6.73)] to had good nutritional and life style practice than those who had no formal education. Similarly; hypertensive patients who had secondary education had two times more likely [AOR (95% CI) = 1.98(0.90-4.36)] and who had primary education had 47% of more likely [AOR (95% CI) = 1.47(0.77-2.82)] to had good nutritional and life style practice than those who had no formal education to control raised BP.

It was also found that the positive practice of hypertensive patients towards nutritional and lifestyle factors: who earned a monthly income of above 3000 birr had three times more likely [AOR (95% CI) = 3.76(1.73-8.20)] and who earned between 1501 and 3000 birr had a 2% increment [AOR (95% CI) = 1.02(0.57-1.81)] of good practice than those who earned a monthly income of less than 1501 birr to control raised BP.

The practice of hypertensive patients also associated with their marital status in controlling raised BP: single hypertensive patients had two times more likely [AOR (95% CI) = 2.66(1.10-6.42)] to have good practice than those who are either divorced or widowed and those who are married had three times more likely [AOR (95% CI) = 3.02(1.43-6.29)] to had good practice on nutritional and lifestyle factors than those who were divorced or widowed as shown in Table 5.

Table 5. Bi-variate and Multivariate result for the determinants of hypertensive patients towards Diet and lifestyle practice in FHRH, NWE; from November 1 to December 31, 2016

Variables	Level of practice		P-value	COR (95%CI)	AOR (95%CI)
	Good (%)	Poor (%)			
<b>Sex</b>	Male	77(43.0)	75(56.4)	0.019	1
	Female	102(57.0)	58(43.6)		1.7(1.1-2.6)
<b>Age classification</b>	18 – 34	47(26.3)	30(22.6)		1
	35 – 55	37(20.7)	20(15.0)	0.233	1.18(0.58-2.40)
	>55	95(53.1)	83(62.4)		0.60(0.23-1.60)
<b>Residence</b>	Urban	84(46.9)	43(32.3)	0.01	1.85(1.6-2.95)
	Rural	95(53.1)	90(67.7)		1
<b>Educational status</b>	No Formal Education	77(43.0)	81(60.9)		1
	Primary(1-8)	36(20.1)	25(18.8)		1.5(0.83-2.75)
	Secondary(9-12)	28(15.6)	13(9.8)	0.008	2.27(1.09-4.70)
	Higher Education	38(21.2)	14(10.5)		2.85(1.44-5.68)
<b>Job</b>	Unemployed	15(8.4)	7(5.3)		1
	Employed	106(59.2)	81(60.9)	0.567	0.61(0.24-1.57)
	Retired	58(32.4)	45(33.8)		0.60(0.23-1.60)
<b>Income</b>	<1500	61(34.1)	67(50.4)		1
	1500-3000	75(41.9)	54(40.6)		1.53(0.93-2.49)
	>3000	43(24.0)	12(9.0)	0.001	3.94(1.90-8.15)
<b>Marital Status</b>	Single	36(20.1)	20(15.0)		2.9(1.30-6.47)
	Married	125(69.8)	84(63.2)	0.016	1.40(1.25-4.59)
	Divorced/widowed	18(10.1)	29(21.8)		1
<b>BMI status(Kg/m<sup>2</sup>)</b>	Malnutrition	94(52.5)	68(51.1)		1
	Normal	85(47.5)	65(48.9)	0.089	0.95(0.60-1.48)
<b>Knowledge status</b>	Low level knowledge	74(41.3)	67(50.4)		1
	Moderate level knowledge	39(21.8)	29(21.8)	0.193	1.22(0.68-2.18)
	High level knowledge	66(36.9)	37(27.8)		1.62(0.96-2.72)



## 6. DISCUSSION

Hypertension is a major public health problem in developing countries which even reduces quality of life after anti-hypertensive medication is started (*WHO, 2013*). Therefore; concomitant use of non-pharmacological therapy should be awakened and implemented to reduce the mortality and morbidity of hypertensive patients by raised BP. This cross-sectional study was conducted at Felege Hiwot Referral Hospital to assess the current knowledge and practice of hypertensive patients with regard to the importance of nutritional and lifestyle modification in controlling their raised BP.

Our finding on knowledge of salt restriction; revealed that 91.2% respondents were aware which is lower than the result of similar study reported by *Tesfaye and et al* (98.5%), *Amarasekara and et al.* (93%) and *Sherata et al.* (93%). On the other hand our result is higher than similar study of Tanta university hospital which was 82.2% (*Seham et al., 2015*) which might be difference in educational status. In the Nepal, Bishoftu and Srilanka study found that about 20.5%, 43.3% and 4.5% respondents were illiterate in respective order whereas 59.45% hypertensive patients were illiterate in the study conducted in Egypt. Our respondent educational status revealed that about 50.6% hypertensive patients were without any formal education. Our finding is higher than the result of the similar study conducted by *Patnaik et als.* (63%). The difference may be due to marital status that 84.3% and 67% of respondents were married from *Patnaik et als* report and our finding in respective order.

Regular alcohol consumption raises BP in treated hypertensive subjects while moderate consumption may do no harm. Regarding with the knowledge on moderation of alcohol consumption; about 74 % respondents were informed, which is lower than the study of Nepal (90%) (*Shrestha et als., 2016*). This difference may be due to gender difference of which about 60% respondents were males in study of Nepal and 48.7% were males in our study. Males may be more informed than females regarding with alcohol consumption. Our finding on knowledge of alcohol consumption is better than similar studies in African continent like Ghana (67.08%) (*Anowie & Darkwa, 2015*), Tanta University Hospital-

Egypt (66%) (*Saham et al., 2015*) and Ethiopia-Bishoftu (66%) (*Tessema et al., 2016* ). This may be due to study time and setting difference. On the other hand it is higher than a 2014 Patnaik et al. study (28%) which may be due to job difference of respondents.

The finding of this study shows that knowledge of exercise for BP control among patients with hypertension was not excellent (62.8%). This finding is lower than the findings of the study among the hypertensive patients in Bharatpur; Chitwan, Nepal (88.5%) (*Shrestha et al., 2016*). This deviation is might be due to socio-economical and educational difference and our result is better than the report of Bollampally (46%), Patnaik (43%), Amarasekara (37%), and Saham (33.7%). This difference might be due to socio-cultural difference between different African and Asian regions (*Bollampally, 2016, Patnaik, 2017, Anowie & Darkwa, 2015, Amarasekara et al., 2016, Saham, 2015*).

Smoking is a strong risk factor for cardiovascular diseases including hypertension. Our research showed that about 45.8% of hypertensive patients knew the risk of cigarette smoking for raised BP which is better than other similar study findings like Ghana (37%) (*Afia et al., 2015*). A similar study of knowledge and perceptions related to hypertension, lifestyle behavior modifications and challenges that facing hypertensive patient in Egypt, Tanta university Hospital revealed that about 58.4% hypertensive patients were aware about smoking to raise BP (*Saham et al., 2015*) and nearly 84% of hypertensive patients had knowledge about influence of smoking on hypertension in the study of Tamil Nadu, India (*Durai & Muthuthandavan, 2015*) which is higher than our finding. As discussed before the degree of illiteracy is higher in our study than other studies which were conducted in India and Egypt. There is also difference in economical development between these study areas.

Knowledge on dietary modifications to control blood pressure of hypertensive patients is essential to minimize mortality and morbidity caused by the disease. This study showed that about only 52.6% and 41.9% respondents knew the positive effect of consuming vegetables and fruits in respective order. The result of this deviation is similar with other studies like study in Srilanka; only 54.6% hypertensive patients were aware of increased

vegetable consumption as a positive factor for raised BP control (*Amarasekara et al., 2016*). Due to different reasons our finding is better than similar study of JUH (39%) (*Tesema et al., 2016*).

The overall average knowledge of our respondents towards nutritional and lifestyle risk factors (78.2 %) is almost equivalent with the study of Bishoftu (75.9%) (*Tesfaye et al., 2015*) which is better than the study of Indian, Nagar urban slum (15.6%) (*Mahjan et al., 2012*) and a similar study on lifestyle modifications of Egypt (67.3%) (*Saham et al., 2015*). This might be due to study time and health policy difference.

Raised BP is not well controlled by knowing only the risk factors by hypertensive patients; it should be implemented in actual skill and practice to overcome the mortality and morbidity of the case. Salt consumption is a prominent risk factor to raise BP of hypertensive patients. The result of our study revealed that 90.7% hypertensive patients were salt restricted from their diet which is higher than the study conducted by *Shrestha and et als* in Nepal (32.5%), *Bollampallyand et als* in India (61%), *Casper and Louis* in Swaziland (75%) and *Shankar and et als* in Manglore (24.4%) (*Shrestha, 2016, Bollampally, 2016, Casper and Louis, 2013, Shankar et al., 2014*). This may be due to difference in social and cultural determinants between different studies. Regarding with salt consumption; our finding is lower than the JUH study (98.5%) but higher than the study in Bishoftu which was 80% (*Tesema, 2016, Tesfaye, 2015*). In JUH study about 57.7% were females for which caution may be taken by females rather than males to moderate salt consumption.

The direct effect between alcohol consumption and rising risk of hypertension attributes for hypertensive induced death (*WHO, 2014*). The current study revealed that 12.5% were alcohol consumers which is lower than other studies: India (25.89%) (*Mahjan et al., 2012*), Swaziland (28%) (*Casper and Louis, 2013*) and Ethiopia-Bishoftu (26.7%) (*Tesfaye et al., 2015*). The finding is equivalent with the result reported by *Shrestha and et al* of Srilanaka (12.5%) (*Shrestha et al., 2016*) and higher than the *Patnaik and et al* report of India (8.8%) (*Patnaik el al., 2017*). The difference in alcohol consumption pattern can be related to socio-cultural, educational level and economical status of different countries and regions.

Smoking cessation reduces overall cardiovascular diseases (*James et als., 2014*). In our study; no one was smoking cigarettes which are different from 1.5% smokers' in the study of JUH (*Tesema et als., 2016*), 6.7% of smokers in the study of Bishoftu (*Tesfaye et al., 2015*), 76.2% smokers of Tanta university hospital (*Saham et als., 2015*), 60.25% (*Mahjan et al., 2012*) of Indian study and 11% of Mangalore (*Shankar et al., 2014*) which may be due to socio-cultural difference between different communities. This revealed that those patients have removed at least one important raising BP risk factor.

Physical activity is a key determinant of energy expenditure and thus it is fundamental to energy balance and weight control (*WHO, 2014*). However; physical inactivity is a key determinant to control raised BP in hypertensive patients, our study showed that 73.4% hypertensive patients practiced moderate physical activity which is higher than the finding of Nepal (11%) (*Shrestha et al., 2016*), Bollampally study of India (16%) (*Bollampally et al., 2016*) and study of Swaziland (only 4 % had good adherence for exercise) (*Casper and Louis, 2013*) which might be due to socio-demographic difference between the studied respondents.

Consuming fruits and vegetables come for reduction of about 20% hypertension cases (*Campbell et als., 2014*). From our research, the practice of consuming high amount of green leafy vegetables was found (24.4%) and fruit was found (18.3%) which is poor that violates the recommended balanced diet pattern of a hypertensive patient. This result is lower than similar study of JUH in which about 34.6% patients were using balanced diet (*Tessema et al. 2016*). The difference may be raised from availability and economical security.

In controlling raised BP; the overall good practice status (57.4%) is significantly associated with sex, educational status, marital status and level of income.

## **7. LIMITATIONS OF THE STUDY**

The questions for practice were requiring memory. This could have caused recall bias. The other limitation of the study was; the respondents were hypertensive patients with pharmacological treatment which ignores other hypertensive patients who didn't start anti-hypertensive medication.

## **8. CONCLUSION**

The knowledge and practice level of hypertensive patients to control raised blood pressure was fair but not well addressed. Sex, educational status, marital status and level of income has significant association with the practice of hypertensive patients for nutritional and life style factors responsible to raise BP.

## **9. RECOMMENDATION**

Patients should be educated and counseled at any outlet of health institution on the nutritional and lifestyle modification for better control of raised BP. Medias, governmental and non-governmental organizations should promote the implementation of those nutritional and life style modifications based on factors that affect the practice. Marital status, gender and educational level based messages should be identified and addressed.

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## 11. APPENDIX

### A. Questionnaire

#### Part one: Consent of respondent

***Research Topic: Hypertensive patients' knowledge, attitude and practice towards nutritional and lifestyle factors to control raised blood pressure.***

Dear Respondent,

My name is Takele Negesse. I am in the process of completing the MSC in applied human nutrition from Bahir Dar University. I therefore invite you to participate in my research study. All that is expected from you is to complete the questionnaire attached. The contents of the questionnaire are about Hypertensive patients knowledge and practice to control raised blood pressure.

The aim of the research is to determine the knowledge and practice of people with hypertension and how to control raised blood pressure.

It would be appreciated if you could participate in the study. All information will be treated as **confidential** and anonymity will be ensured at all times. Permission for conducting this study has been granted by the relevant authorities. Participation in this study is voluntary and you are free to refuse in participating or withdraw your consent and discontinue participation at any time. If there is some gaps towards your knowledge and practice towards nutritional and lifestyle factors to control raised blood pressure, I will advise how to fill the gaps.

In order to ensure anonymity, you are requested not to tell your name.

The implication of completing the questionnaire is that informed consent has been obtained from you.

Do you agree to participate? Please say YES or NO.

If yes, shall we continue?

Thank you!

#### **Part two: Socio-demographic Questions**

Socio-demographic Questions	Response		Code
	Characteristics	value	
Sex	Male	1	Q1
	Female	2	
Age in years			Q2
Marital status	Unmarried	1	Q3
	Married	2	
	Separated	3	
	Divorced/widowed	4	
	Refused	66	
Area of residence	Urban	1	Q4
	Rural	2	
Educational status	None	1	Q5
	Primary school	2	
	Secondary school	3	
	Higher	4	
Job	Unemployed(Student , not hired but can work)	1	Q6
	Home maker	2	
	Self employed	3	
	employed (Governmental, Private, NGO)	4	
	Retired	5	
-Level of income	<1500	1	Q7
	1500-3000	2	
	>3000	3	



**Part three: Nutritional status**

- 8. Height in centi-meters=\_\_\_\_\_ cm
- 9. Weight in Kilograms=\_\_\_\_\_ Kg
- 10. BMI status=\_\_\_\_\_ (Kg/m<sup>2</sup>)

**Part four: Knowledge questions towards nutritional and life style factors to control raised blood pressure**

<b>Knowledge questions towards nutritional and life style factors to control raised blood pressure</b>	<b>Response( Yes=1, No=0)</b>	<b>Cod e</b>
Do you know that salt restriction acts as central pillar in controlling raised blood pressure?		Q11
Do you know that doing regular physical exercise acts as central pillar in controlling raised blood pressure?		Q12
Do you know that avoiding alcohol consumption acts as central pillar in controlling raised blood pressure?		Q13
Do you know that smoking cigarettes exacerbate raised blood pressure?		Q14
Do you know that eating high amount of fruits will help for controlling raised blood pressure?		Q15
Do you know that eating high fat containing animal products will harm controlling raised blood pressure?		Q16
Do you know that Eating whole grains will help for controlling raised blood pressure?		Q17
Do you know that Eating fish will help for controlling raised blood pressure?		Q18
Do you know that Eating vegetables will help for controlling raised blood pressure?		Q19

**Part Five: Practice questions towards hypertension risk factors of hypertensive patients to control raised blood pressure**

20. Do you currently do physical exercise? (1=yes, 0=no) ,
21. If yes, how much?
- 1) less than 30 minutes per day
  - 2)  $\geq 30$  minutes of moderate intensity per day
  - 3) Greater than 150 minutes moderate intensity per week
22. Do you currently smoke cigarettes?
- 1) yes    2) no
23. How long do you smoke? \_\_\_\_\_years\_\_\_\_\_month.  
don't know/not sure/refuse to answer
24. How many cigarettes did you smoke on the days you smoked?  
\_\_\_\_\_ cigarettes 88) don't know/not sure/refuse to answer
25. Do you currently drunk alcohol? 1) Yes 2) no
26. During the last 30 days how many times did you drink 5/4 (man/woman) or more portions of alcoholic drinks in a single day? \_\_\_\_\_portions.
27. Do you add salt to your food currently without trying it?
- 1) Yes    2) no

<b>Dietary questions</b>	<b>Response(Yes=1, No=0)</b>	<b>Code</b>
Currently, Do you eat fruits three times daily?		Q28
Currently, do you eat fresh vegetables three times daily?		Q29
Do you eat high-fat dairy products?		Q30
Do you eat whole grains three times Daily?		Q31
Do you consuming butter and oil?		Q32
Do you eat nuts and legume more than 5 times weekly?		Q33
Do you eat high fat containing meat?		Q34
Do you eat fish?		Q35

**ክፍል ሁለት፡ የሶሻል ዲሞክራሲ መጠየቅ**

የሶሻል-ዲሞክራሲ መጠየቅ	መሰረት	ውጤት	ኮድ
ይታ	ወገድ	1	ጥ1
	ሴት	2	
ስድሜ	-----ስመት		ጥ2
የጋብቻ ሁኔታ	ያሳገባ(ች)/ የተፈታ(ች)	1	ጥ3
	ያገባች	2	
	ስመመሰሰ ፈቃደኛ ያልሆነ(ች)	3	
የሚኖሩበት ቦታ	ከተማ	1	ጥ4
	ገጠር	2	
የትምህርት ደረጃ	ያልተማረ (ዘመናዊ ትምህርት)	1	ጥ5
	1ኛ ደረጃ	2	
	2ኛ ደረጃ	3	
	ከፍተኛ ደረጃ	4	
የስራ-ሁኔታ	ስራ የሰጠው (ተማሪ፤ የቤት ስመቤት፤ ስራ-ራሳገገ)	1	ጥ6
	በግሰ ስራ የሚተዳደር	2	
	ተቀጣሪ (በመንግስት፤ በግሰና መንግስታዊ ባለሆኑ ድርጅቶች)	3	
	ጦሪታ የወጣ	4	
የገቢ-ሁኔታ	<1500	1	ጥ7
	1500-3000	2	
	>3000	3	

**ክፍል ሶስት: የክብደት ሁኔታ**

- 8. ቁመት በሳ/ሜትር-----
- 9. ክብደት በኪሎ ግራም-----
- 10. BMI (ኪሎግራም/ሜ<sup>2</sup>)-----

**ክፍል ስራት: የስውቀት መጠዶች**

የስውቀት ጥያቄዎች	ትክክል ከሆነ 1፤ ስህተት ከሆነ ዜ፤ ደዳፍ	ኮድ
ጨው መመገብ የደምግፊትን ስንደሚያባብስ ያውቃሉን		11
ዘወትር የስካሰ ስቃት ስንቀስቃሴ ማድረግ የደም ግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		12
ስለኮስ መጠቀም ማቆም የደም ግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		13
ሲጋራ ማጨስ ማቆም የደም ግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		14
ፍራፍሬዎችን መመገብ የደምግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		15
ቅባት የበዛባቸውን የስንሰሳት ተዋዳኮችን መመገብ የደምግፊትን ሰመቆጣጠር ስንቀፍት ስንደሆነ ያውቃሉን		16
የስህሰ ዘሮችን (ስንዴ፣ ስጃ፣ ራዝ፣ ገብስና የመሳሰሉትን) መመገብ የደምግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		17
ስሳ መመገብ የደምግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		18
ስትክስቶችን መመገብ የደምግፊትን ሰመቆጣጠር ስንደሚረዳ ያውቃሉን		19

**ክፍል 3: የተገባር ጥያቄዎች**

20. ባለፉት ሰባት ቀናት የሕክምና ብቃት እንቅስቃሴ አድርገዋልን 1. አዎ 2. የሰላም

21. መሰረድ አዎ ከሆነ፤ ምን ያህል

1. በቀን ከሰዓት ደቂቃ በታች

2. መካከለኛ እንቅስቃሴ ከሰዓት ደቂቃ በላይ በቀን

3. በሳምንት ከ150 ደቂቃ በላይ

22. በአሁኑ ጊዜ ያጠጋሉን 1. አዎ 2. የሰላም

23. ሰላም ያህል ጊዜ አጭሰዋል

24. በቀን ምን ያህል ጊዜ ያጠጋሉ

25. በአሁኑ ጊዜ አስኮል ደጠጣሉን 1. አዎ 2. የሰላም

26. ባለፉት 30 ቀናት ምን ያህል ጊዜ 5 መስኪያ (ሰውንድ)/ 4 መስኪያ (ሰሴት) ጠጥተዋል

27. የምግብ ጠጠር በአሁኑ ጊዜ ደጠጠላሁን 1. አዎ 2. የሰላም

የአመጋገብ ማድረጃዎች	ተክክል ከሆነ 1፤ከህተት ከሆነ ዜሮን ደዳፍ	ኮድ
በአሁኑ ጊዜ በቀን ሶስት ጊዜ ፍራፍሬዎችን ይመገባሉን		28
በአሁኑ ጊዜ በቀን ሶስት ጊዜ ስትክፈቶችን በሦፊው ይመገባሉን (ገመን፤ ስሳጣ፤ ቲማቲም)		29
በአሁኑ ጊዜ ከፍተኛ ስብ ያሳቸውን የወተት ተዋጭዎችን ይመገባሉን (ወተት፤ ስደብ)		30
በአሁኑ ጊዜ የእህል ዘሮችን (ስንዴ፣ ስጃ፣ ራዝ፣ ገብስና የመሳሰሉትን በቀን ሶስት ጊዜ ይመገባሉን)		31
ቅቤና ዘደት ይመገባሉን		32
ሆራሆራዎችን (ባቂ፣ ስተፎ፣ ሸምብራ) የመሳሰሉትን በሳምንት ከስምስት ጊዜ በላይ ይመገባሉን		33
ቅባት ያስበት ስጋ ይመገባሉን		34
ስሳ ይመገባሉን		35