Abstract

Background: Hypertension is defined as sustained elevation of resting systolic blood pressure (≥ 140 mm Hg), diastolic blood pressure (≥ 90 mm Hg), or both. In the United States, about 65 million people have hypertension. Only about 70% of these people are aware that they have hypertension, only 59% are being treated, and only 34% have adequately controlled blood pressure. But a population based study in Addis Ababa showed adult prevalence of hypertension is 30%. The level of blood pressure control in Tikur Anbessa General Specialized Hospital was unknown.

Objectives: The objective of this study was to assess the level of blood pressure control; factors associated with poor blood pressure control and describe antihypertensive treatment patterns at Tikur Anbessa General Specialized Hospital.

Methods: Hospital based cross sectional study was conducted at Tikur Anbessa General Specialized Hospital ambulatory hypertensive patients. Patients' card was reviewed to collect a one year BP measurement and the patients were interviewed during data collection. Convenience sampling method was used and 271 patients available during the data collection period (March 3, 2013 to April 8, 2013) were included in the study.

Result: Greater than half (59.9%) of the patients have uncontrolled blood pressure. Several factors like non-adherence (OR=8.41(3.084-22.927)P<0.001), long duration on treatment (OR=3.19(1.051-9.725)P=0.041),obesity(OR=2.803(1.33-5.911)P=0.007), rural residence (OR=16.8(1.754-160.8)P=0.014), high socioeconomic status (OR=6.632(1.49-29.46)P=0.013), family history of hypertension, self-reported excessive salt addition habit (OR=8.78(3.05-25.28)P<0.001), minimal activity or inactivity (OR=4.219(1.67-10.66) P=0.002),concomitant diabetes mellitus or chronic kidney disease (OR=23.85(8.19-69.39)P<0.001) and patients on multiple antihypertensive regimen were found to be associated with poor blood pressure control. Combination of ACE inhibitor and diuretic was found to be the most frequently prescribed regimen whereas combination of calcium channel blocker and diuretic follows.

Conclusion: Generally the level of blood pressure control at Tikur Anbessa hospital chronic care unit was found to suboptimal, and several factors like non adherence, long duration on treatment, obesity, rural residence, high socioeconomic status, family history of hypertension, concomitant diabetes mellitus or chronic kidney disease and multiple antihypertensive regimen were found to be associated with poor blood pressure control.

Key Words:

Blood pressure control, Antihypertensive Medication, Adherence to antihypertensive agents, Tikur Anbessa General Specialized Hospital

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Acronyms and Abbreviations

AA	Addis Ababa
ACE	Angiotension converting enzyme
ARB	Angiotension Receptor Blocker
BB	Beta Blocker
BP	Blood pressure
CAAA	Centerally acting alpha agonist
CaCB(CCB)	Calcium channel blocker
CO	Cardiac Out put
CVD	Cerebrovascular disorder
ESH	European Society of Hypertension
HTN	Hypertension
HR	Heart Rate
JNC6	Joint National committee Sixth Edition
JNC7	Joint National Committee Seventh Edition
MET	Metabolic Equivalent Task
MetS	Metabolic syndrome
MmHg	Millimeter of Mercury
PFSA	Pharmaceutical Fund and Supply Agency
TAGSH	Tikur Anbessa Generalized specialized Hospital

Table of contents

Contents Page

List of Tables and Figures Page

1. Introduction

1.1 Background

1.1.1 Hypertension and overview of antihypertensive pharmacotherapy

Hypertension is sustained elevation of resting systolic Blood pressure (≥ 140 mm Hg), diastolic BP (≥ 90 mm Hg), or both. Hypertension with no known cause (primary; formerly, essential hypertension) is most common. Hypertension with an identified cause (secondary hypertension) is usually due to a renal disorder. Treatment involves lifestyle changes and drugs, including diuretics, β - blockers, Angiotension Converting Enzyme (ACE) inhibitors, angiotensin II receptor blockers, and Calcium channel blockers (1).

In the US about 70% of the people are aware that they have hypertension, only 59% are being treated, and only 34% have adequately controlled BP. In adults, hypertension occurs more often in blacks (32%) than in whites (23%) or Mexican Americans (23%), and morbidity and mortality are greater in blacks. Also BP increases with age, about two thirds of people > 65 have hypertension, and people with a normal BP at age 55 have a 90% lifetime risk of developing hypertension. Because hypertension becomes so common with age, the age-related increase in BP may seem innocuous, but higher BP increases morbidity and mortality risk (2).

As a matter of fact, the definition of hypertensive BP thresholds evolves continuously according to new empirical data recorded worldwide. Currently, the guidelines of the European Society of Hypertension (ESH) propose to classify blood pressure levels according to optimal, normal, high normal and hypertensive groups using as thresholds the values provided by Table 1.1 (3)

Table 1.1: Blood pressure thresholds (in mmHg) for the stratification of hypertension according to the European Society of Hypertension (ESH), 2007 (3)

Category	Systolic		Diastolic
Optimal	<120		<80
Normal	120-129	and/or	80-84
High Normal	130-139	and/or	85-89
Grade 1 Hypertension	140-159	and/or	90-99
Grade 2 Hypertension	160-179	and/or	100-109
Grade 3 Hypertension	≥180	and/or	≥110
Isolated Systolic Hypertension	≥140	and	<90

Primary hypertension has no cure, but some causes of secondary hypertension can be corrected. In all cases, control of BP can significantly limit adverse consequences. Despite the theoretical efficacy of treatment, BP is lowered to the desired level in only one third of hypertensive patients in the US (4).

For all patients, treatment aims to reduce BP to < 140/90 mm Hg; for those with a kidney disorder or diabetes, the goal is < 130/80 mm Hg or as near this level as tolerated. Even the elderly and frail elderly can tolerate a diastolic BP as low as 60 to 65 mm Hg well and without an increase in cardiovascular events. Ideally, patients or family members measure BP at home, provided they have been trained to do so, they are closely monitored, and the sphygmomanometer is regularly calibrated. Treatment of hypertension during pregnancy requires special considerations because some antihypertensive drugs can harm the fetus (5).

Recommendations include regular aerobic physical activity at least 30 min/day most days of the week; weight loss to a body mass index of 18.5 to 24.9; smoking cessation; a diet rich in fruits,

vegetables, and low-fat dairy products with reduced saturated and total fat content; dietary sodium [Na^+] of < 2.4 g/day (< 6 g NaCl); and alcohol consumption of ≤ 1 oz/day in men and ≤ 0.5 oz/day in women. In stage 1 (mild) hypertension with no signs of target-organ damage, lifestyle changes may make drugs unnecessary. Patients with uncomplicated hypertension do not need to restrict their activities as long as BP is controlled. Dietary modifications can also help control diabetes, obesity, and dyslipidemias. Patients with prehypertension are encouraged to follow these lifestyle recommendations (6).

If systolic BP remains > 140 mm Hg or diastolic BP remains > 90 mm Hg after 6 months of lifestyle modifications, antihypertensive drugs are required. Unless hypertension is severe, drugs are usually started at low doses. Drugs are initiated simultaneously with lifestyle changes for all patients with prehypertension or hypertension plus diabetes, a kidney disorder, target-organ damage, or cardiovascular risk factors and for those with an initial BP of >160/100 mm Hg. Signs of hypertensive emergencies require immediate BP reduction with parenteral antihypertensives (4,7).

For most hypertensive patients, one drug, usually a thiazide-type diuretic, is given initially. Depending on the patient's characteristics and coexisting disorders, other drugs can be used initially or added to the thiazide. Low-dose aspirin (81 mg once/day) appears to reduce incidence of cardiac events in hypertensive patients and is recommended when tolerated and not contraindicated; some evidence suggests it is better to take the aspirin in the evening rather than in the morning—this timing appears to increase efficacy of antihypertensive drugs (7).

If the initial drug is ineffective or has intolerable adverse effects, another drug can be substituted. If the initial drug is only partly effective but well tolerated, the dose can be increased or a second drug with a different mechanism added. If initial systolic BP is > 160 mm Hg, 2 drugs are often used. Options include combining a diuretic with a β-blocker, an ACE inhibitor, or an angiotensin II receptor blocker and combining a Calcium channel blocker with an ACE inhibitor or an angiotensin II receptor blocker. An appropriate combination and dose are determined; many are available as single tablets, which improve compliance. For severe or refractory hypertension, 3 or 4 drugs may be necessary (7).

1.2 Statement of the problem

Evidence has indicated that uncontrolled blood pressure increases the heart's workload, causing it to enlarge and weaken over time. It also increases the risk of stroke, heart attack, kidney failure and congestive heart failure (43). Analysis of the global burden of hypertension revealed that over 25% of the world's adult population had hypertension in 2000, and the proportion is expected to increase to 29% by 2025 (8).

In developing countries, its morbidity and mortality are increasing from time to time due to a change in life style and sedentary life. In Africa, 15% of the population has hypertension. Although there is shortage of extensive data, 6% of the Ethiopian population has been estimated to have HTN. Approximately 30% of adults in Addis Ababa have hypertension above 140/90 mmHg or reported use of anti-hypertensive medication (9).

More than 80% of the world population lives in developing countries, where most of the worldwide burden of hypertension occurs. By 2025, almost three-quarters of people with hypertension will be living in developing countries. As late as 1940, hypertension was almost non-existent in under developed populations—e.g., a prevalence of 1.8% was reported in Ethiopian rural villages at this time (10).

Even though there is an information gap about the level of control of blood pressure in Ethiopia, a study in North America, North Africa and Asia showed that hypertension is highly prevalent, poorly treated and controlled, and an escalating health challenge in economically developing countries. The blood pressure control in United States' largest city, New York City, is also revealed to be inadequate the significant factor associated with it being poor access to health care (11, 12).

Through assessing the level of blood pressure control for a year, this study filled information gap about the level of blood pressure control and antihypertensive pharmacotherapy patterns. Furthermore factors associated with poor blood pressure control were assessed, that will aid in more rational way antihypertertensive therapy.

2. Literature Review

2.1 Epidemiology of Uncontrolled blood pressure

Hypertension is one of the major risk factors for coronary heart disease (CHD), myocardial infarction (MI), cerebrovascular accidents (CVA), chronic renal failure (CRF), and congestive heart failure (CHF) in the United States and in westernized or industrialized countries around the world. In industrialized countries, the risk of becoming hypertensive (blood pressure [BP] ≥140/90 mm Hg) over a lifetime is >90%. CHD is the leading cause of death in the United States, accounting for more than 800 000 deaths per year (more than one death per minute), and CVA is the fourth leading cause of death in the United States (13).

A national survey conducted in the 1990s in Germany, Finland, Sweden, England, Spain, Italy, Canada, and the United States showed that Average BP was 136/83 mm Hg in the European countries and 127/77 mmHg in Canada and the United States among men and women combined who were 35 to 74 years of age. This difference already existed among younger persons (35-39 years) in whom treatment was uncommon (i.e., 124/78 mm Hg and 115/75 mm Hg, respectively), and the slope with age was steeper in the European countries. For all age groups, BP measurements were lowest in the United States and highest in Germany. The age- and sex-adjusted prevalence of hypertension was28%in the North American countries and 44% in the European countries at the 140/90 mm Hg threshold. The findings for men and women by region were similar (14).

A retrospective Medical data based study conducted in Portugal by Manuel P. Morgado, Sandra A. Rolo et al on blood pressure control revealed in all, 37% of hypertensive patients (n = 76) had their blood pressure controlled according to international guidelines. About 45.5% of patients with a target blood pressure <140/90 mmHg (n = 156) were controlled, whereas in patients with diabetes or chronic kidney disease (n = 49) the corresponding figure was only 10.2% (P <0.001). Among patients initiating hypertension/ dyslipidemia consultation within the study period 32.1% had stage hypertension in the first appointment, but this figure decreased to 3.6% in the last consultation (P = 0.012) (15).

A study conducted in Mozambique showed that the prevalence of hypertension was slightly lower in women than men. Nearly 40% of treated hypertensives fulfilled criteria for control, at 42.9% of women and 28.7% of men. The prevalence of control among all of the hypertensives was 4.8% in women and 1.0% in men (16).

Coming to our country, Ethiopia, a population based, cross sectional survey, using the World Health Organization instrument for stepwise surveillance of chronic disease risk factors research conducted by Fikru Tesfaye, Peter Byass and Stig Wall revealed that out of the age-adjusted prevalence of high blood pressure, defined as systolic blood pressure (SBP)≥140mmHg(millimeters of mercury) or diastolic blood pressure (DBP) ≥ 90 mmHg or reported use of anti-hypertensive medication, was 31.5% (29.0, 33.9) among males and 28.9% (26.8,30.9) among females (9).

2.2 Factors associated with blood pressure control

According to Yaméogo NV, Kagambèga LJ, et al who recently (May 21 2012) published retrospective crossectional study assessing factors affecting blood pressure control with 456 hypertensive patients showed that the global cardiovascular risk calculated using the Framingham model was low in 21.3%, moderate in 34.0%, high in 24.8% and very high in 19.9% of cases. The proportion of uncontrolled hypertension was 54.2% (n=247 including 126 women and 121 men). This poor blood pressure control was associated (multivariate analysis) at age superior or equal to 60years, low socioeconomic status, high to very high cardiovascular risk, antihypertensive monotherapy, treatment duration superior or equal to 10years, an associated treatment and non-compliance therapy (17).

In Tran A and Gelaye B's research who conducted research in working adult in Addis Ababa approximately 36.0% of men and 42.0% of women reported having a fair or poor health status. Cardio metabolic and clinical characteristics of the study population. Approximately, a quarter of men (24.7%) and women (25.7%) were overweight (BMI 25.0–29.9 kg/m2). Women were more likely to be obese (10.2%) compared to men (2.1%). Approximately 46.0% of men and 31.0% of women were prehypersensitive (systolicBP 120–130mmHg or diastolic BP 80–89mmHg); 15.6% of men and 10.8% of women had stage 1 hypertension (systolic BP 140–159mmHg or diastolic BP 90–99mmHg) (18).

2.2.1 Non modifiable Risk factors

The prevalence of hypertension is more common in men compared to women until the age of 55 years. With aging, it begins to shift. That is because female sex hormones offer cardiovascular protection. The loss of estrogen at menopause causes a more rapid increase over the time in systolic pressure in women than in men. Men tend to have better control of systolic blood pressure, and combined blood pressure control and poorer control of diastolic blood pressure than women. However, other studies found that the male gender is associated with poor blood pressure control (19). Patients who develop hypertension before age of 40 years are more likely to have a strong family history (20).

2.2.2 Modifiable or Potentially controllable risk factors

Hypertension commonly occurs in diabetic patients. It affects about 20-60% of patients with diabetes mellitus depending on obesity, ethnicity, and age. Hypertension in type 2 diabetes mellitus occurs as a part of metabolic syndrome. While, hypertension in type 1 diabetes mellitus usually reflects the presence of diabetic nephropathy. In a study of hypertension in type 1 diabetes population compared to general population in US, individuals with type 1 diabetes mellitus had more hypertension (43% vs. 15%), albuminuria (13.6% vs. 2.2%) and macroalbuminuria (8.1% vs. 0.4%) than did non diabetic individuals (21).

Obese persons have a high risk of developing hypertension and CVD. In a cohort of female nurses, it was found that higher body mass index was associated with an increased risk of hypertension, and women with a body mass index of 31 kg/m^2 had a multivariate risk of 6.3 compared to women who had body mass index of less than 20 kg/m^2 (22). Hypertension prevalence among overweight and obese persons is higher than among normal weight persons. (23) The BP lowering effect of weight reduction may be enhanced by a simultaneous increase in physical exercise, by alcohol moderation in heavy drinkers and by reduction in sodium intake (24).

A study on hypertensive patients in Japan showed that a higher body mass index (BMI) was associated with lack of systolic hypertension control. Besides this, another study showed that highest body mass index was associated with poor blood pressure control (25).

Data from Framingham Study demonstrate that the risk for developing cardiovascular disease is related to the degree of total cholesterol and LDL-C elevation in a graded continuous manner. Hypertensive patients have a greater than expected prevalence of high blood cholesterol levels while conversely patients with hypercholesterolemia have a higher than expected prevalence of hypertension caused by metabolic syndrome. Treatment of hypertension should avoid drugs which can increase cholesterol level, for example diuretics and beta-blockers. Drugs of choice are those that do not affect lipid levels or those that decrease lipids level (26).

2.2.2.1 Adherance to medication

Institution based cross-sectional survey was done at University of Gondar teaching Hospital from April to August 2011 by Abere Dessie Ambaw et al revealed that HTN remained to be significantly associated with adherence to treatment of HTN. As the distance from the hospital decreased, the adherence to treatment of HTN got improved (AOR=2.02, 95% CI= 1.19, 3.43). Those who have controlled HTN had a significantly higher chance of being adherent to their treatment (AOR=2.93, 95% CI (1.73, 4.96). The odds of adherence to anti-HTN treatment among knowledgeable Clients was 6 times higher than the odds of adherence among HTN patients who were not knowledgeable (27).

Only 64.6% of Ethiopian study subjects were found to be adherent to their treatment. It is higher than what has been reported from Malaysia (44.2%) and Gambia 27 %.(34) this difference is possibly because more than half (59.6%) of the patients in the current study receive free medical care and drugs whereas in the other study patients had to pay for their treatment. However, it is lower than the studies done in Egypt (74.1%), another part of Pakistan (77%) and Scotland (91%).35 This might be due to better access and care to patients in these countries. It is also supported by the findings of this study that, for 71.3% of the non adherents, the hypertension treatment and care service was not accessible. In this study, significant association between sex and adherence level was observed. Accordingly, men were found to be less adherent when compared to women. This finding is in line with a study done in India, where men had almost threefold increase in risk of non- adherence as compared to women (28).

2.2.2.2 Diet and excess salt intake

The controversy surrounding the effect of salt intake on blood pressure has been inflamed by the publication of important and contradictory studies. Irrespective of Several studies have shown that migration from isolated low-salt societies to an urban environment with an increased salt intake is associated with a rise in blood pressure. Extent of salt consumption and the main sources of salt intake are difficult to measure accurately and vary widely in the developing countries where measurements were possible. The lowest mean urinary sodium excretion rates were reported in Ghana and in urban and rural Cameroon. The highest mean excretion rates were reported in north China. In Turkey, daily salt intake was about 18 g per person according to the SALturk study, and in an urban south Indian population, means daily salt intake was 8·5 g per person, which was correlated with risk of hypertension (10).

2.2.2.3 Alcohol consumption

Alcohol intake above 21 unit / week is associated with BP elevation which is reversible by reducing the intake. Hypertensive patients should be advised to limit their alcohol intake to 21 units/week for men and 14 units /week for women. Structured interventions to reduce alcohol consumption have on average a small effect on BP, reducing SBP by about 3 mmHg. In fact, consumption of smaller amounts of alcohol, to the recommended limits, may protect against coronary heart disease. Alcohol affects hypertension control negatively; this observation was noted in a cross sectional study conducted in Yijing area of Anhui Province in China. It was found that men who drink Chinese liquor (contain 60% alcohol) had higher systolic and diastolic blood pressure than non drinkers (29).

2.2.2.4 Smoking

Smoking is associated with hypertension when it is chronic and heavy. Blood pressure rise acutely during smoking. In a study of 19 smokers with hypertension, blood pressure rose from 140±7/ 99mmHg±3 to 151±5/108±2mmHg within 10 minutes after smoking. Extensive observation data show that smoking has a graded adverse effect on the risk of cardiovascular complications and smoking increases CVD risk more than mild hypertension. It is a major factor related to the persistent increase in coronary artery disease and stroke mortality in men

with treated hypertension. Those who stop smoking experience a rapid decline in risk about 50% after 1year but they need about 10 years to reach the level of nonsmokers. Repeated advice from physicians has been shown to decrease smoking by 21%. Nicotine replacement therapies can be safely used in hypertensive patients and approximately doubles smoking-cessation rates (30).

2.2.2.5 Khat chewing

A study conducted in Butajira district in Guraghe zone of southern Ethiopia among adults 35-65 years of age who reported regular chewing of Khat((Fresh eave of *Catha Edulis* which contains amphetamine like stimulat cathinone.*)* during the preceding five years to those who never chewed Khat during the same period showed that, the prevalence of hypertension was significantly higher among Khat chewers (13.4%) than non-chewers (10.7%), odds ratio (OR) = 1.66. A considerably high proportion of chewers (29.9%) than non-chewers (20.6%) had sub-optimal diastolic blood pressure (> 80 mmHg). The mean diastolic blood pressure was significantly higher among Khat chewers [75.0 (11.6)] than non-chewers [72.9 (11.7)], $P < 0.05$. Similarly, Khat chewers had significantly higher mean heart rate [76.3 (11.5)] than non-chewers [73.9 (12.6)], $P < 0.05$. There was no significant difference in mean systolic blood pressure between the two groups (31).

2.2.3 Environmental factors and life style

Among women, the prevalence of hypertension increased strongly with education in rural areas (0 to 4 years: 27.0%; ≥8 years: 46.8%) and decreased with education in urban areas (0 to 4 years: 45.8%; ≥8 years: 27.2%), whereas among men no difference what-so ever was observed by educational level in rural or urban (16).

During their follow-up period (median, 40.1 months), Juan José Beunza, Miguel Ángel Martı´nez-González et al performed prospective, dynamic cohort study, 11,837 Spanish university graduates, with a mean age of 36 years, were followed for an average of 40 months, from 1999 to 2006 observed 291 incident cases of hypertension. Higher levels of sedentary behaviors were associated with being male, younger, not engaging in leisure-time physical activities, having a self-diagnosis of hypercholesterolemia and consuming fewer fruits and

vegetables, and consuming more sodium and alcohol. They found a direct association between quartiles of total sedentary behavior and the risk of incident HTN. No association was found for non interactive sedentary behavior (TV viewing and sleeping), sleeping (total sleeping including "siesta"), TV viewing, and the risk of HTN. The patterns of both sleeping and TV viewing could affect the practice of interactive behavior (28).

The study with male Israel Defense Force officers who underwent periodic medical evaluation during the years 1991 to 1999 by Itamar Grotto, Michael Huerta, Ehud Grossman, and Yehonatan Sharabi showed Adjusted means of SBP and DBP were highest among low-ranking officers (SBP, 119 mm Hg, compared with 117 and 115 mm Hg among intermediate and high-ranking officers, respectively, P=0.001; DBP, 77 mm Hg, compared with 76 mm Hg among intermediate and high- ranking officers, P=0.001). These results lead them to the conclusion, low SES, as reflected by low rank, is associated with elevated blood pressure (32).

The study conducted by Elizabeth J. Mezick, Martica Hall and Karen A. Matthews by protocol lasting 1 week with participants wearing the ambulatory monitor for the 2 school days and nights and wearing an Actigraph on their non dominant wrist continuously over the 7 days and nights of the study showed that The relationship between sleep and 24-hour BP levels was driven largely by nocturnal BP; shorter sleep was related to higher nighttime SBP and DBP. Sleep duration tended to be associated with daytime BP in the hypothesized direction, but these relationships were not statistically significant. Finally, there was an inverse association between sleep duration and sleep:wake SBP ratios, such that shorter sleep was related to a smaller nocturnal decline in BP. All of the associations between sleep duration and BP remained after adjusting for BMI. Sleep duration was not related to sleep: wake DBP ratios (29).

On seasonal variation of blood pressure Hisao Mori, Hiroshi Ukai, Kouich Hirao , Hareaki Yamamoto performed cross-sectional studies on the BP control and the prescription and efficacy of antihypertensive drugs in hypertensive patients in Japan. The rate of patients with adequately controlled BP was lower in winter than in summer at both a target BP of 140/90 mmHg (36.2% vs .43.8%, $p < 0.001$ (30).

Taking a regular aerobic exercise has a small effect on blood pressure as it can reduce SBP and DBP by 5-6mmHg. In observational studies, it was noted that physical exercise exert a strong protective effect against cardiovascular mortality and this protection is lost when such exercise is discontinued. In fact, experts recommend the performance of mild exercise such as walking for 30-60 minutes at least 3 times a week in order to lower blood pressure. Physical exercise was found to be associated with lower systolic and diastolic blood pressure especially in women. In general, physical exercise is associated with lowering blood pressure (33).

2.3 Antihypertensive pharmacotherapy patterns

In United States the study conducted after the JNC7 was published indicated that the prescription pattern was changed when compared to JNC6. The study showed that the majority of patients in each cohort were prescribed antihypertensive drug therapy (93.3% and 93.8%, respectively). A trend toward more aggressive prescribing behavior was observed in the after-JNC 7 cohort; with 35.6% prescribed dual therapy and 24% prescribed 3 or more antihypertensive agents concomitantly. These rates compared with 31.4% and 16.5% in the before- JNC 7 cohort, respectively. Of the patients who were prescribed medication, ACEIs were the most commonly prescribed agents in the before-JNC 7 cohort (33.4%), whereas diuretics were most commonly prescribed in the after-JNC 7 cohort (40.6%). ACEIs, diuretics, and beta-blockers were the 3 most commonly prescribed classes in both cohorts. Alpha-blockers were the least commonly prescribed antihypertensive agents in each cohort (5.6% and 6.9%, respectively). Of the drug classes studied, those with the greatest relative increase in use between the before-JNC 7 and after-JNC 7 cohorts were thiazide diuretics (7.0% versus 19.9%); fixed-dose combination products (11.9% versus 20.8%; and ARBs (8.1% versus 13.5%) (34).

A study conducted in eastern Portugal by Manuel P. Morgado, Sandra A. Rolo et al Thiazide-type diuretics were the most prescribed antihypertensive drugs (67%) followed by angiotensin receptor blockers (60%) and beta-blockers (43%). About 95.9% patients with comorbid diabetes were treated with an angiotensin-converting enzyme inhibitor or an angiotensin receptor blocker. And finally coming to conclusion, many hypertensive patients prescribed with antihypertensive therapy fail to achieve blood pressure control in clinical practice (15).

Conceptual Framework

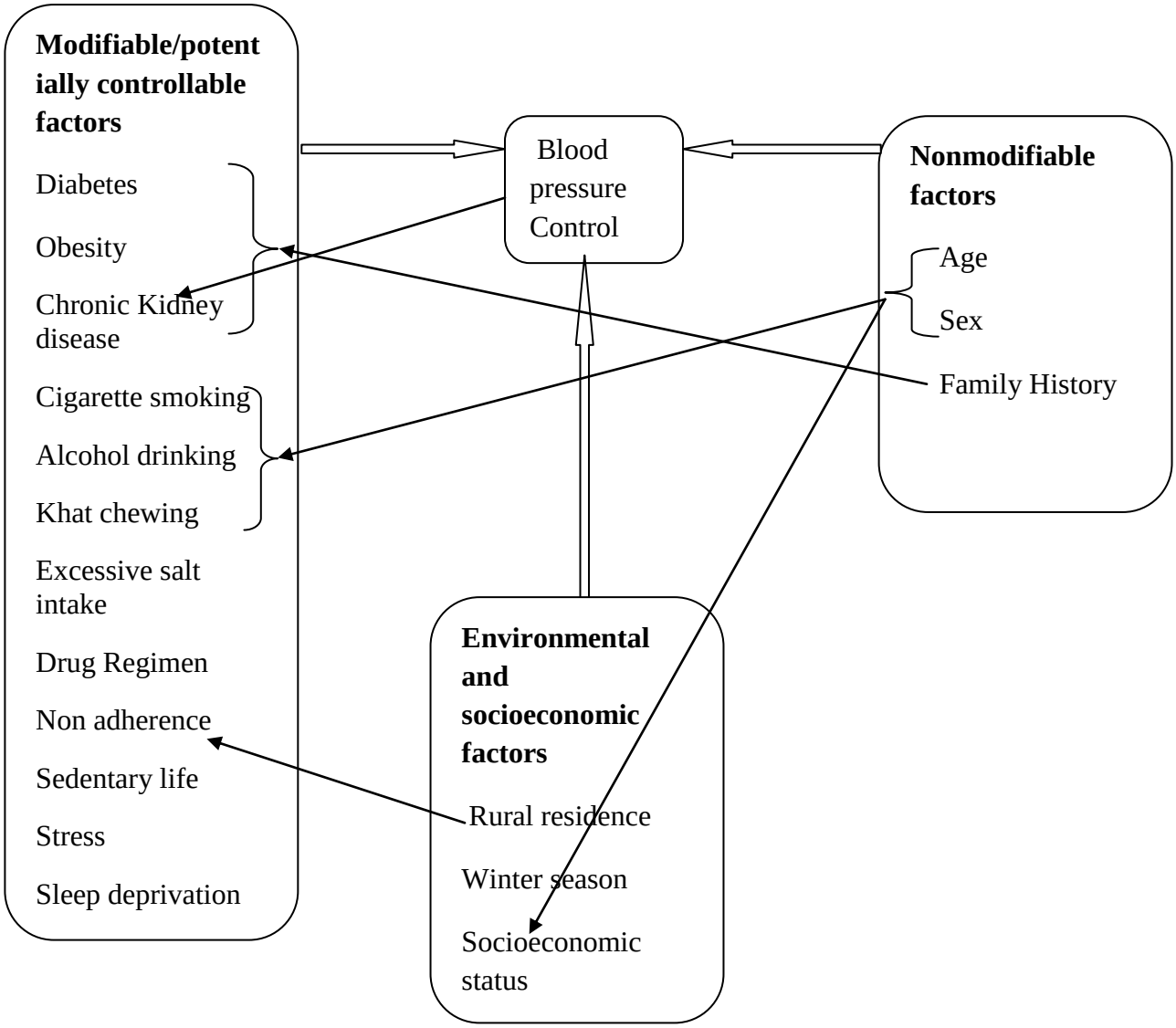

Fig 2.1 Conceptual Framework showing blood pressure and factors associated with it

3. Rationale of the Study

The rise in prevalence of hypertension and uncontrolled blood pressure may be a result of rapid changes in diet and physical activity related to urbanization and modernization, which has affected both urban and rural dwellers. (10) As study by Fikru Tesfaye and Peter Byass , shows the adult prevalence of hypertension in Addis Ababa is 30% i.e. 31.5% (29.0, 33.9) among males and 28.9% (26.8, 30.9) 9 among females that is greater than the hypertension prevalence in New York City. According to Sonia Y. Angell, MD, MPH; Renu K. Garg, MPH who conducted a research by a title of 'Prevalence, Awareness, Treatment, and Predictors of Control of Hypertension in New York City' Among New York city adults, the prevalence of hypertension was 25.6% (95% CI 23.4% to 27.8%) and was similar for men and women (35).

This clearly shows that the classical idea that restricts cardiovascular disorder burden to western world no longer works. It is the problem of resource limited countries too. According to the Investigators view despite these evidences less number of researches is done on hypertension in Ethiopia. Furthermore, less attention is being given towards controlling blood pressure in this country compared to communicable diseases. This is why the investigator is impressed in doing this specific work.

This specific research will aid as a base to perform further research in the area of hypertension and blood pressure control in Ethiopia. Furthermore the information gap regarding the level of blood pressure control among hypertensive patients in Tikur Anbessa General specialized hospital will be filled. The identification of potential risk factors associated with poor blood pressure will aid to perform stronger research in a search for most important predictors associated with poor blood pressure control. It aids also to predict groups of patients and situations which require aggressive antihypertensive treatment in the general course of antihypertensive pharmacotherapy.

4. Objectives

4.1 General objective

To assess the level of blood pressure control, factors associated with blood pressure control and describe antihypertensive pharmacotherapy patterns among patients at the Hypertension chronic care clinic, TAGSH

4.2 Specific objectives

- To determine the level of blood pressure control
- To identify factors associated with of blood pressure control
- To describe the antihypertensive pharmacotherapy patterns

4.3 Research Questions

At the end of this research the following questions are expected to be answered.

- What is the level of blood pressure control of hypertensive patients in TAGSH?
- How many percentages of hypertensive patients are receiving first line treatment as per standard guidelines?
- What are risk factors associated with poor control of blood pressure how strong these risk factors are?

5. Methods and Participants

5.1 Study Area and period

The research was conducted at Tikur Anbessa General Specialized Hospital's chronic care clinic. Tikur Anbessa Hospital is the biggest open Public referral Hospital in Ethiopia, with 600 beds and it is located at the central region of Addis Ababa city and it is staffed with the most senior specialists. The hospital gives service to population of Addis Ababa city and its soundings majorly, but patients come to the hospital from all over Ethiopia (36). The hospital gives service as both inpatient and ambulatory follow up. The hospital's Hypertensive Chronic care clinic is one of the clinics which give service to ambulatory patients. It is staffed with sixteen Specialists twenty General practitioners, five bachelor's degree Nurses and fifteen diploma nurses. The study was conducted starting from March 3, 2013 to April 8, 2013

5.2 Study design

Hospital based cross sectional study was conducted at TAGSH ambulatory hypertensive patients. Patients' card was reviewed to collect a one year BP measurement and the patients were interviewed during data collection.

5.3 Population

5.3.1 Source population

All hypertensive patients on follow up at Tikur Anbessa General specialized hospital's chronic care clinic.

5.3.2 Study population

All hypertensive patients on follow up at Tikur Anbessa General Specialized Hospital's chronic care clinic at the period of data collection and who fulfilled the inclusion criteria. (March 3, 2013 to March 29, 2013)

5.4 Inclusion and Exclusion criteria

5.4.1 Inclusion criteria

- All hypertensive adult patients of age greater than or equal to 18 years

- Patients who attended the chronic care department for hypertension care at least for one Year.

5.4.2 Exclusion criteria

- Patients who are critically ill
- Patients who are psychotic and/or unable to communicate with data collector due to other underlying medical disorder.

5.5 Sampling Technique and Sample Size Determination

5.5.1 Sampling Technique

Convenience sampling technique was used and every patients who were at hypertensive chronic care unit were included until the sample size calculated was filled.

5.5.2 Sample Size

The required sample size was determined by considering the following assumptions for interview questionnaires: Since similar literatures done in the same or similar place were not available for using proportion. Considering maximum sample size = 50%

- So the proportion = 50 %.
- Confidence interval= 95%
- Margin of error = 5%, and
- Non-response rate = 5%

The formula for calculating the sample size was,

$$\mathbf{n = \frac{(Z\,\alpha/2)^2\,P\,(1-P)}{d^2} = \frac{(1.96)^2 0.5\,(1-0.5)}{(0.05)^2} = 384.16}$$

With the above assumptions, the sample size was calculated and the overall sample size was found to be =384.16 +19.21 (5% non-response rate) = 403.37 respondents. Since the population of hypertensive patients at Tikur Anbessa Hospital Chronic follow up unit is less than 10,000 (i.e 1056 patients correction formulas is used (37).

$$n = \frac{n_o}{1 + no/N}$$

=403/1+403/1056

= 291

5. 6 Variables

5.6.1 Dependent variables

- Level of Blood pressure control

5.6.2 Independent variables

Demographic factors

- Sex
- Age
- Marital status
- Religion
- Ethnic group

Anthropometric Measurement factors

- Height
- Weight
- BMI

Socioeconomic and Environmental factors

- Income
- Winter season
- Occupation
- Residence

Drug and food related factors

- Antihypertensive regimen
- Smoking status
- Khat chewing status
- Alcohol intake status
- Extra salt intake

Co morbidities

- Diabetes
- Chronic Kidney Disease
- Stress

Other Variables

- Family History of Hypertension
- Sedentary life

5.7 Data Collection procedures.

To collect primary data, questionnaires and interview were used in the study. In addition to the questionnaire, data collection format was developed by the principal investigator to collect the blood pressure measurements and antihypertensive medications used by respective study subjects. The questioner was developed first in English and translated to Amharic by Language expert. The questionnaire was developed after literatures were reviewed thoroughly. The questionnaire contains both close ended and open ended questions. It has parts that assess socio demographic, anthropometric, social drug use, adherence and sedentary life estimation questions. For estimation of sedentary life International physical Activity Questionnaire (IPAQ, 2002) was adopted and optimized. Four items Validated Morisky Scale was used to judge the adherence status of the study subjects. The Amharic Version was back translated to English to proof consistency. And for the secondary data, patient's cards were reviewed. The data was collected by 4 Bsc Nurses and one Medical intern. They were trained for one day by the investigator before data collection.

5.8 Data Quality Assurance

The questionnaire was pre-tested with 10 patients before the actual data collection. Training was given for data collectors and questionnaire was prepared by English and Amharic languages; which are translated from English to Amharic by the investigator with the aid of Language expert. Data collectors was instructed to check the completeness of each questionnaire at the end of each interview.

5.9 Operational definitions and definitions of terms

Adherent patients -are patients who pass Validated Four Item Morisky Scale for adherence measurement.

Co morbid Conditions- diagnosed diseases other than hypertension.

Controlled blood pressure- The average blood pressure of at least three measurements in a year kept at less than 140/90 mmHg for non-diabetic/no renal disorder and less than 130/80 mmHg in diabetic patients/renal disorder.(4)

Current smoker- is the patient who smoked in the past 30 days

Extra salt intake- Patients who report addition of salt on food on table.

High Alcohol intake-Male patients weighing ≥60kg who drink greater than two standard drink, and Male patients weighing <60kg and female patients who drink greater one standard drink.

Hypertension-is the persistent elevation of arterial blood pressure greater than 140/90 mmHg as measured from brachial artery. (4)

Heavy smoker- Is the smoker who smoke ≥25cigarettes per day

Obese Patients- are patients with BMI ≥30 Kg/m^2 (4)

Sedentary life- Inactive patients according to International Physical activity (IPAQ) classification

Urban resident- is patients who live in district (woreda) capital or higher urban area.

Winter season - the season with relatively cold weather; June, July and August in Central Ethiopia.

Sleep Deprivation- Average daily sleep duration of less than 8 hour.

5.10 Methods of data Analysis

The Data was cleaned, coded, entered to Epi info 7 before analysis. The data was exported to SPSS version 16.0 (Chicago, IL, 2007) and analyzed. Moreover, information obtained from documents, reports and statistical records were entered into SPSS version 16 and Mean, standard deviation and frequencies were calculated. Factors associated with blood pressure control were analyzed with bivariate and multivariate logistic regression. All factors with a p-value <0.25 in the bivariate logistic regression analysis were further entered into the multivariate model to control confounding effects. Chi square tests were used to analyze associations. P<0.05 was used as statistically significant.

5.11 Limitations of the study

The limitations of the study that were expected are mainly on the quality of data from the card and missing of relevant information. The blood pressure control status depends only on the measurements on appointment day in physician's office.

5.12 Ethical consideration

The study was conducted after approval secured from the Ethical Review Committee of Jimma University and TAGSH, Addis Ababa University. This committee has written a formal letter of permission to Addis Ababa University, Tikur Anbessa Generalized hospital to permit access the data and cooperate. The study was conducted after approval is secured from the Ethical Review Committee of Jimma University. The Addis Ababa University Tikur Anbessa General specialized Hospital research ethical review committee rechecked for ethical considerations and permitted the data access. Finally written consent was obtained from each study participants before making interview and confidentiality was secured. In addition all the responses were kept confidential and anonymous and participants were able withdraw from the study at any time during interview.

5.13 Dissemination plan

The result of this thesis will be presented to Jimma University Collage of Public Health and Medical sciences. The research results will be presented and a copy of the result will be given to TAGSH. Presentations at professional, local, and national meetings and finally effort will be made for publication in peer reviewed national or international journal.

6. Results

6.1. Socio-demographic Characteristics

Participants:

A total of 291 eligible clients were included in the chronic follow up unit during the study period, with the response rate of 99.6%. The study consisted of 165(57.7%) females. The mean age of the respondents was 52.04±12.73 years. By ethnic classification 142(49.5%) respondents were Amharas, 109(37.5%) were Oromos, 25(8.9%) were Guraghes, whereas the remaining 4.1% were others by ethnicity. Majority of the respondents 240(82.5%) were orthodox by religion and 214 (73.5%) were married. Out of the all respondents 124(42.6%) attended at most secondary school and 117(40.2%) respondents were civil servants. Eighty nine (30.5%) of respondents have income ≥2500 Ethiopian Birr.

Out of the total 291 respondents 131(45%) have reported the presence of family history of hypertension at least in one of their parents, whereas 160(55%) have reported that there is no known family history of hypertension in the parents. Majority of the respondents 273(93.8%) were urban (at least Woreda capital) dwellers were as only 18(6.2%) were rural dwellers. Regarding the social drug use behavior, majority 252(86.6%) denied alcohol drinking whereas 39(13.4%) reported that they drink alcohol. Almost all 281(96.6%) the patients reported that they do not smoke cigarette; whereas 10 (3.4%) have reported that they are current smokers. Regarding Khat(Fresh leave of Catha *edulis* containing amphetamine like stimulant) chewing, 263(90.4%) reported they aren't chat chewers, wheras 28(9.6%) reported that they chew chat.

Table 6.1: Socio demographic characteristic of the study participants (n = 291), TAGSH, Addis Ababa, Central Ethiopia, 2013

Variables	Categories	Frequency	Percent
Sex	Male	95	32.6
	Female	196	67.4
Ethnic groups	Amhara	144	49.5
	Oromo	109	37.5
	Guraghe	26	8.9
	Tigre	9	3.1
	Others	3	1.0
Religion	Ethiopian Orthodox	240	82.5
	Muslim	28	9.6
	Protestant	23	7.9
Occupation	Civil servant	117	40.2
	Private	41	14.1
	Driver	10	3.4
	Housewife	39	13.4
	Retired	82	28.2
	Unemployed	1	0.3
Educational status	No formal Education	24	8.2
	Elementary	40	13.7
	Secondary	124	42.6
	University/College	103	35.4
Residence place	Urban	273	93.8
	Rural	18	6.2
Marital status	Unmarried	38	13.1
	Married	214	73.5
	Divorced	4	1.4
	Widowed	35	12.0

6.2 Blood pressure control and associated factors

The mean baseline systolic blood pressure of the patients was 154.38±14.161mmHg whereas the mean baseline diastolic pressure was 101.37±11.21mmHg. The one year average systolic blood pressure of the patients was 134.59±13.98 mmHg. Whereas the mean diastolic blood pressure of the patients was 81.85±8.328mmHg. The one year average blood pressure of the patients revealed that majority (59.9%) of the patients had uncontrolled blood pressure. Whereas only 40.1 % of the study subjects were found to have controlled blood pressure.

The blood pressure control and sex cross tabulation revealed that 62.1% of all male study subjects were found to have their blood pressure uncontrolled whereas 57.7% of all female study subjects are found to have their blood pressure uncontrolled. The chi square analysis showed statistically insignificant association difference among sex. The odds ratio for sex of the patient (male/female) is 0.831 CI 95% (0.503, 1.372).

Table 6.2: Sex of the patient and blood pressure status cross tabulation, TAGSH, March 2013

Sex of the patient * Bp status Crosstabulation					
	Sex		**BP status**		**Total**
			Controlled	**Uncontrolled**	
	Male	Frequency	36	59	95
		Percent	37.9%	62.1%	100.0%
	Female	Frequency	83	113	196
		Percent	42.3%	57.7%	100.0%
Total		Frequency	119	172	291
		Percent	40.9%	59.1%	100.0%

The blood pressure control among rural and urban dwellers varied significantly(X^2=13.275 P<0.001). The cross tabulation of blood pressure control and place of residence showed that 56.4% of urban dwellers were found to have their blood pressure uncontrolled whereas 100% of rural dweller subjects were found to have their blood pressure uncontrolled.

The bivariate logistic regression showed that many factors are associated with uncontrolled blood pressure. Factors that were significantly associated with blood pressure at P<0.05 are adherence status, family history of hypertension, residence place (urban or rural), BMI, income, sedentary life, number of drugs in the regimen and duration of treatment.

While dealing with these factors separately, Adherent patients are eight times more likely to have controlled blood pressure than non adherent patients OR=8.41 (95%CI, 3.084-22.927) P<0.001. Patients who reported to have either paternal or maternal family history of hypertension are almost four times (OR=4.484, 95%CI=1.369-14.51, P=0.013) more likely to have uncontrolled blood pressure than those with no known family history of hypertension. Rural dwellers are found to have almost seventeen times greater risk of uncontrolled blood pressure compared to urban dwellers (OR=16.8 ,95% CI=1.754-160.8,P=0.014).

Separate Analysis was done to determine if there is significant difference between winter and other season measurements using total of 1560 measurements; out which 1137 (72.8%) measurements are nonwinter measurements. The bivariate regression result showed winter season (COR=1.121, 95%CI=0.88-1.415, P=0.339), the non winter season being referent.

Table 6.3: Residence place and Blood pressure status cross tabulation a TAGSH, March, 2013

Residenceplace * Bpstatus Crosstabulation					
			Bpstatus		Total
			Controlled	Uncontrolled	
Residence place	Urban	Frequency	116	156	272
		Percent	97.5%	90.7%	93.5%
	Rural	Frequency	3	16	19
		Percent	2.5%	9.3%	6.5%
Total		Frequency	119	172	291
		Percent	100.0%	100.0%	100.0%

Table 6.4: Family history of hypertension and blood pressure control cross tabulation a TAGSH, March, 2013

Family history * BP status Crosstabulation					
			BP status		Total
			Controlled	Uncontrolled	
Family history	Yes	Count	70	61	131
		Percent	58.8%	35.5%	45.0%
	NKFH	Count	49	111	160
		Percent	41.2%	64.5%	55.0%
Total		Count	119	172	291
		Percent	100.0%	100.0%	100.0%

NKFH- No Known Family History

The bivariate logistic regression revealed that factors like place of rural residence, low income, and adherence, family history of hypertension, sedentary life and long duration on antihypertensive therapy adversely affect blood pressure control. The analysis hasn't show statistically significant difference between both sexes.

Table 6.5: Factors associated with blood pressure control Bivariate and Multivariate Analysis of factors associated with uncontrolled hypertension among study participants in TAGSH (n=291) March, 2013

Variables	Blood pressure status		COR(95%CI) P value	AOR(95%CI) P value
	Uncontrolled	Controlled		
Sex				
Female	113	83	1.00	---
Male	59	36	1.204 (0.729-1.989)P=0.469	---
Educational Status				
No formal Education	14	10	1.00	1.00
Elementary	30	10	0.853(0.346-2.1)P=0.731	2.862(0.349-23.5) P=0.328
Secondary	64	60	1.828(0.806-4.146) P=0.149	3.479(0.652-18.563)P=0.145
College/University	64	39	0.650(0.382-1.106) P=0.015	0.417(0.063-2.736) P=0.53
Adherence status				
Adherent	65	66	1.00	1.00
Non Adherent	107	53	2.05(1.2753.297)P=0.003	8.41(3.084-22.927) P<0.001
Family History				
NKFH	111	49	0.384(0.238-0.622) P<0.001	0.223(0.068-0.73)P=0.013
Yes	61	70	1.00	1.00
Self Reported Excessive Salt addition habit				
No	85	91	1.00	1.00
Yes	87	28	3.326(1.98-5.586) P<0.001	8.78(3.05-25.28)P<0.001
Alcohol drinking Status				
No	153	100	1.00	1.00
Yes	19	19	0.654(0.330-1.295)P=0.159	0.124(0.027-0.575)P=0.008
Cigarette Smoking Status				
No	164	117	1.00	1.00
Yes	8	2	0.350(0.073-1.68)P=0.19	0.211(0.014-3.189)P=0.61
BMI				
Normal	84	74	1.00	1.00
Overweight	53	34	1.373(0.8-2.338) P=0.243	0.414(0.15-1.139)P=0.088
Obese	35	11	2.803(1.33-5.911)P=0.007	2.476(0.659-9.3)P=0.179
Residence Place				
Rural	16	3	3.966(1.129-13.9) P=0.032	16.8(1.754-160.8)P=0.014
Urban	156	116	1.00	1.00
Income status (Monthly income in Birr)				
Very Low(<516)	26	32	1.00	1.00
Low (516-1315)	32	35	1.125(0.556-2.28)P=0.743	1.827(0.472-7.065)P=0.88
High(1316-2500)	56	21	3.282(1.597-6.75)P=0.001	6.632(1.49-29.46)P=0.013
Very high(>2500)	58	31	2.303(1.17-4.53) P=0.016	1.783(0.451-7.058)P=0.41
Sedentary Classification				
Inactive	48	19	2.74(1.472-5.11)P=0.001	4.219(1.67-10.66) P=0.002
Minimally active	54	24	2.44(1.367-4.364)P=003	2.486(1.044-5.923)P=0.04
Vigorously active	70	76	1.00	1.00
Co morbidities				
NKC	74	84	1.00	1.00

DM/CKD	95	26	4.148(2.43-7.079) P<0.001	23.85(8.19-69.39)P<0.001
Other	3	9	0.378(0.099-1.45) p=0.156	0.306(0.032-2.882)P=0.301
Regimen				
Single	16	36	1.00	1.00
Double	102	64	3.586(1.84-6.985) P<0.001	2 (2.352-6.36)P=0.001
Triple	47	18	5.878(2.637-13.1)P<0.001	5.1 (3.9-11.05)P<0.001
>Three	7	1	15.75(1.79-138.8)P=0.013	7.02(2.81-13.06)P=0.012
Duration of treatment				
<2 Years	34	33	1.00	1.00
2-4 Years	32	30	1.035(0.519-2.06) P=0.922	1.482(0.387-5.67)P=0.566
>=5 Years	106	56	1.84(1.031-3.275) P=0.39	3.19(1.051-9.725)P=0.041
Sleep deprivation				
No	71	41	1.00	1.00
Yes	101	78	0.748(0.46-1.214) P=0.24	1.097(0.423-2.84)P=0.849
Season				
Winter	276	147	1.121(0.88-1.415)	
Non Winter	712	425	1.00	

6.3 Antihypertensive Pharmacotherapy patterns

Regarding the antihypertensive patterns at TAGSH, greater than half 166 (57%) of the patients were on dual antihypertensive drug while 65(22.3%) were on triple antihypertensive therapy.

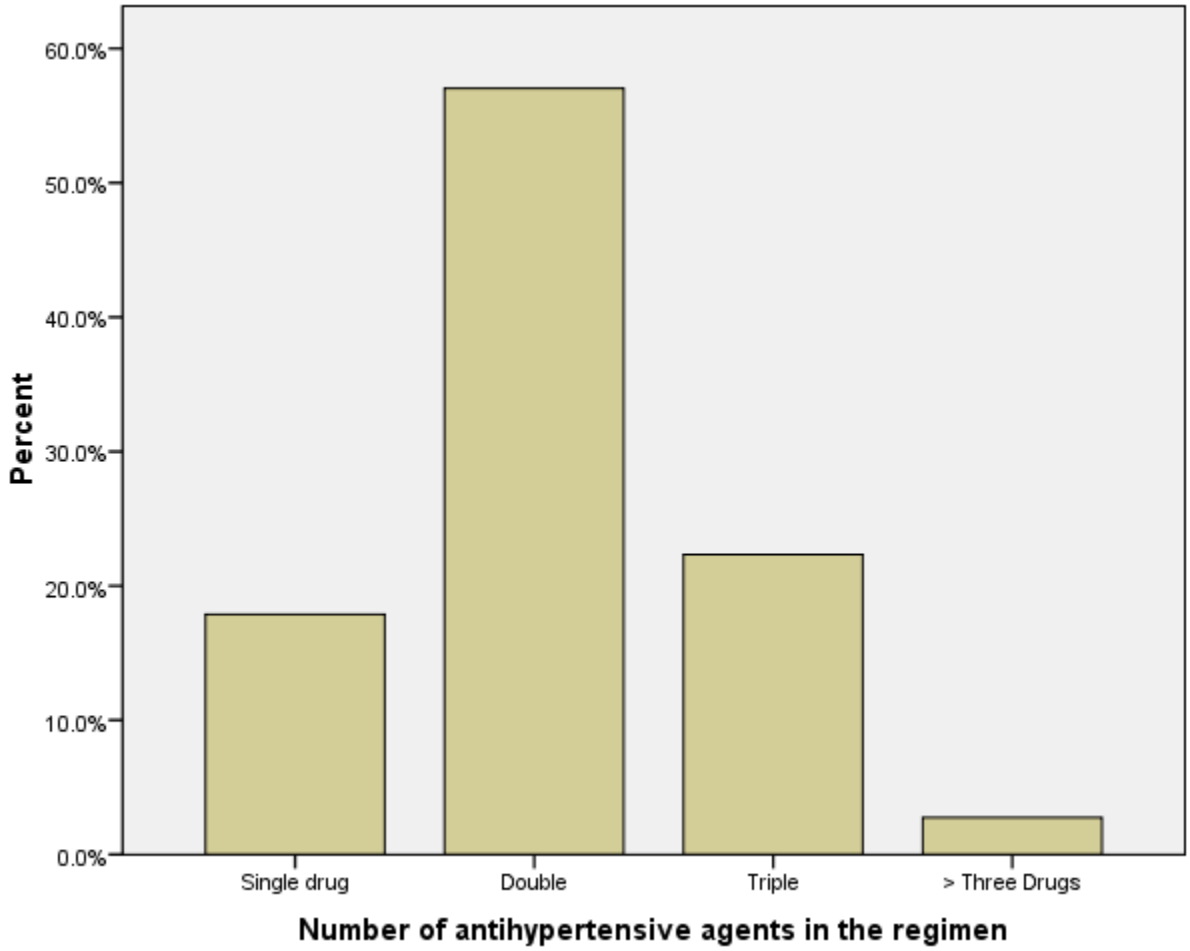

Figure 2: Graph showing the number of antihypertensive agents in the regimen of TAGSH chronic care unit hypertensive patients, March 2013

The baseline blood pressure and the number of antihypertensive agents are shown by the following figures. As the figures depict all patients on single antihypertensive treatment have baseline systolic blood pressure between 140 and 160 mmHg. Among patients on dual antihypertensive therapy 33.1% have baseline systolic blood pressure of 150 mmHg, while 24.1% of them have baseline systolic blood pressure of 140mmHg. Forty percent of patients on triple antihypertensive therapy have baseline systolic blood pressure of 160mmHg. Among patients who are on greater than three antihypertensive agents 75% have the baseline systolic blood pressure of 160mmHg.

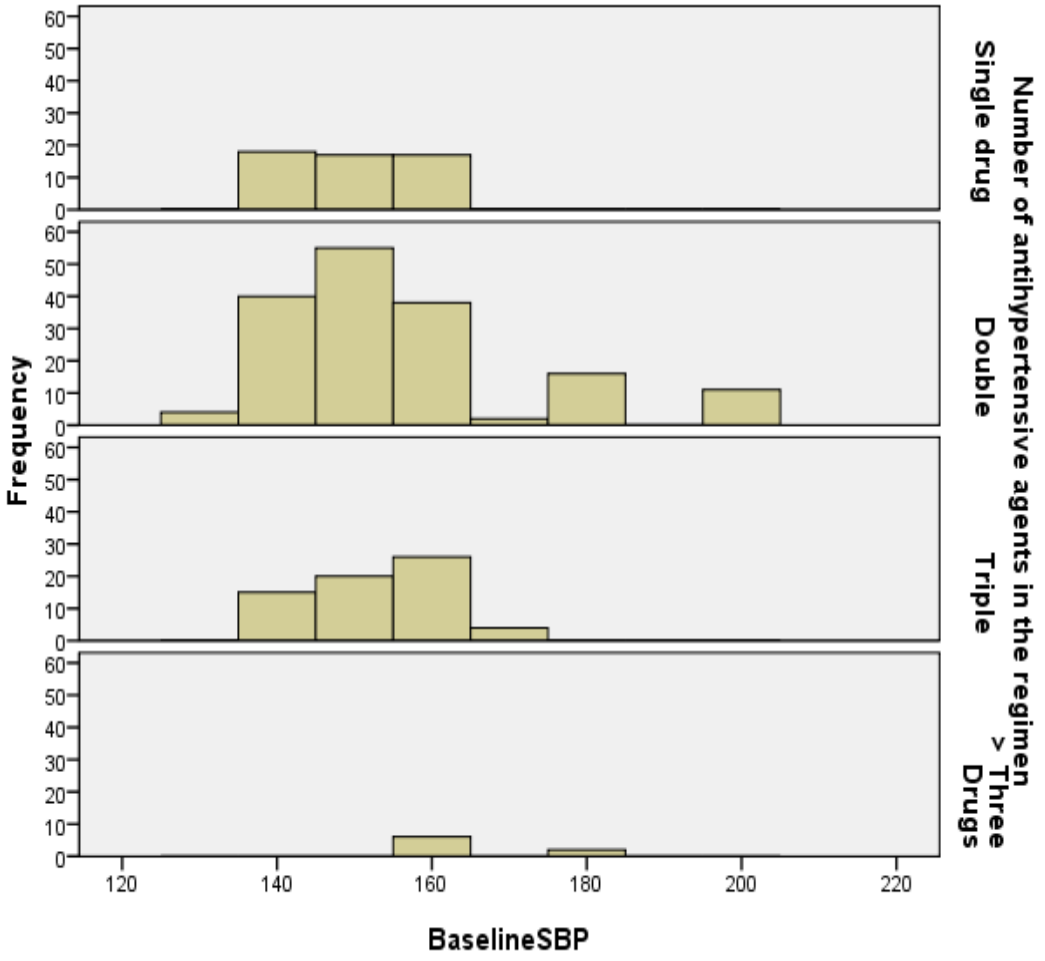

Figure 3: Histogram showing the baseline systolic blood pressure with the number of antihypertensive agents among TAGSH, Hypertensive chronic follow up unit patients, March 2013

Among patients on single antihypertensive treatment 65.4% had baseline DBP of 100 or 110 mmHg, whereas 17.3% had baseline DBP of 120 mmHg. Among patients on dual antihypertensive therapy 54.8% had baseline DBP of 100 or 110 mmHg, whereas 22.3% had baseline DBP of 90 mmHg. In patients on triple antihypertensive treatment 75.4% had baseline DBP of 100 or 110 mmHg, while 24.6% of them had baseline DBP of 80 or 90 mmHg.Most patients(75%) on greater than three antihypertensive therapy had baseline DBP of 110 mmHg, whereas the rest(25%) had baseline DBP of 120mmHg.

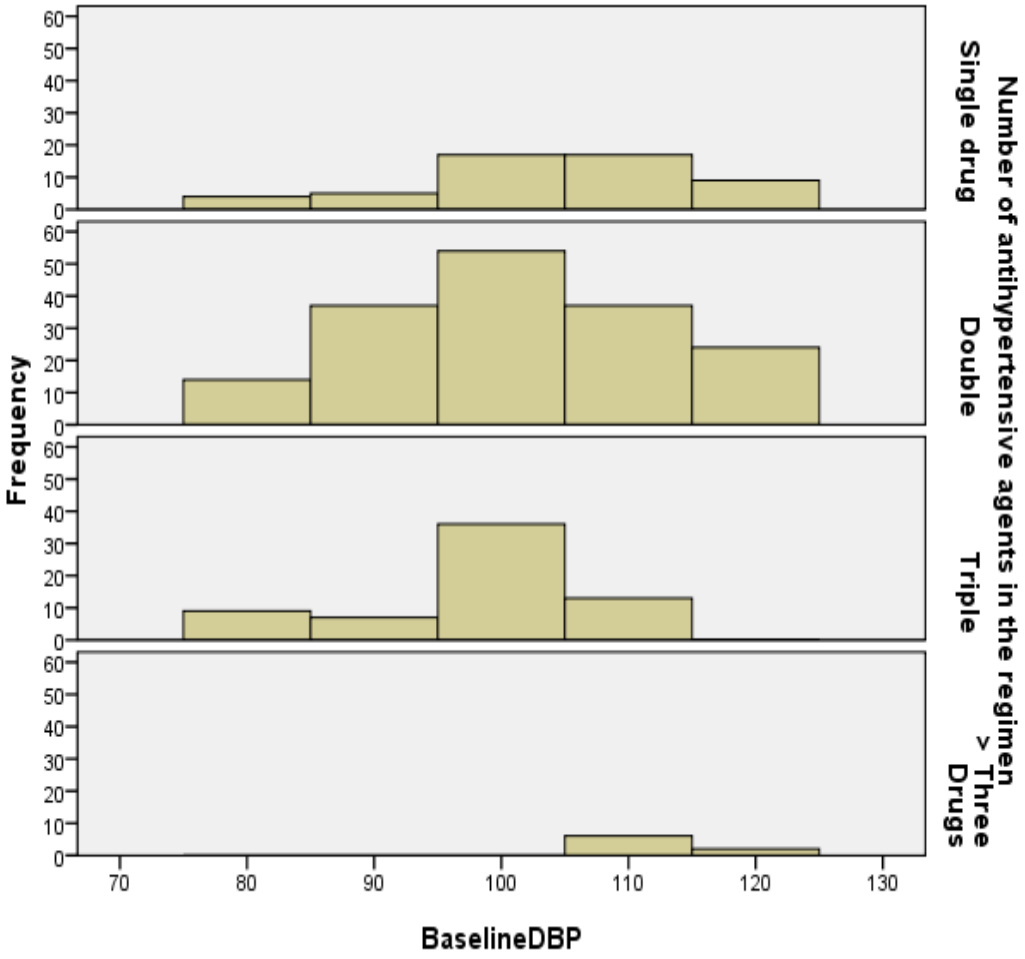

Figure 4: Histogram showing the baseline Diastolic blood pressure with the number of antihypertensive agents among TAGSH, Hypertensive chronic follow up unit patients, March 2013

By drug class, combination of ACE inhibitor and diuretic was found to be the most prescribed regimen with the percentage of 25.1% of all combinations, whereas combination of CCB and diuretic stood second with 12.7%. Other Combinations were also noted as the following figure depicts.

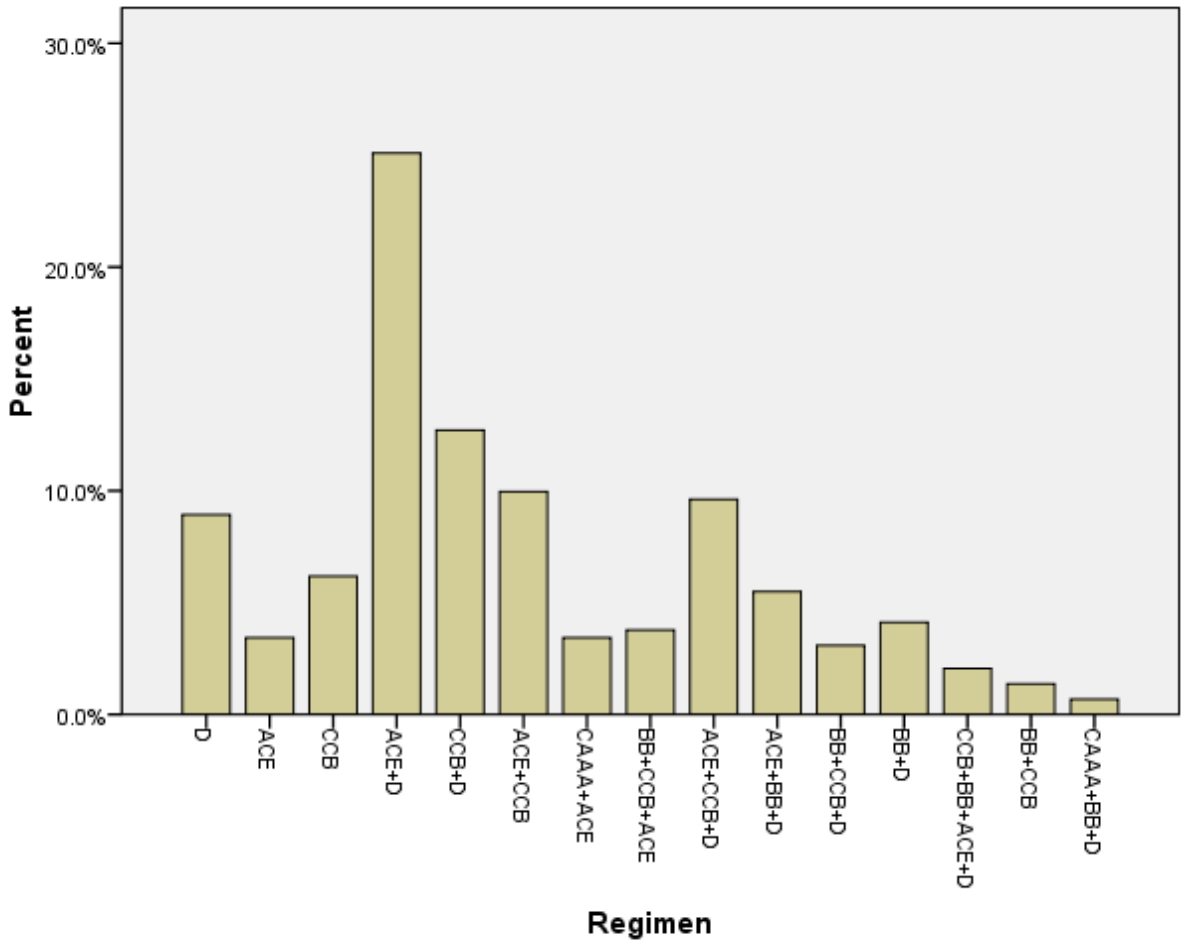

Figure 5: Graph showing antihypertensive classes used to treat hypertension in TAGSH with the percentage of each class, March 2013

Regarding the consideration of the first line agents, according to the compelling indications stated on the JNC7, 62.2% of the study subjects were receiving first fine agents; the remaining study subjects have at least one irrational antihypertensive agent in their regimen.

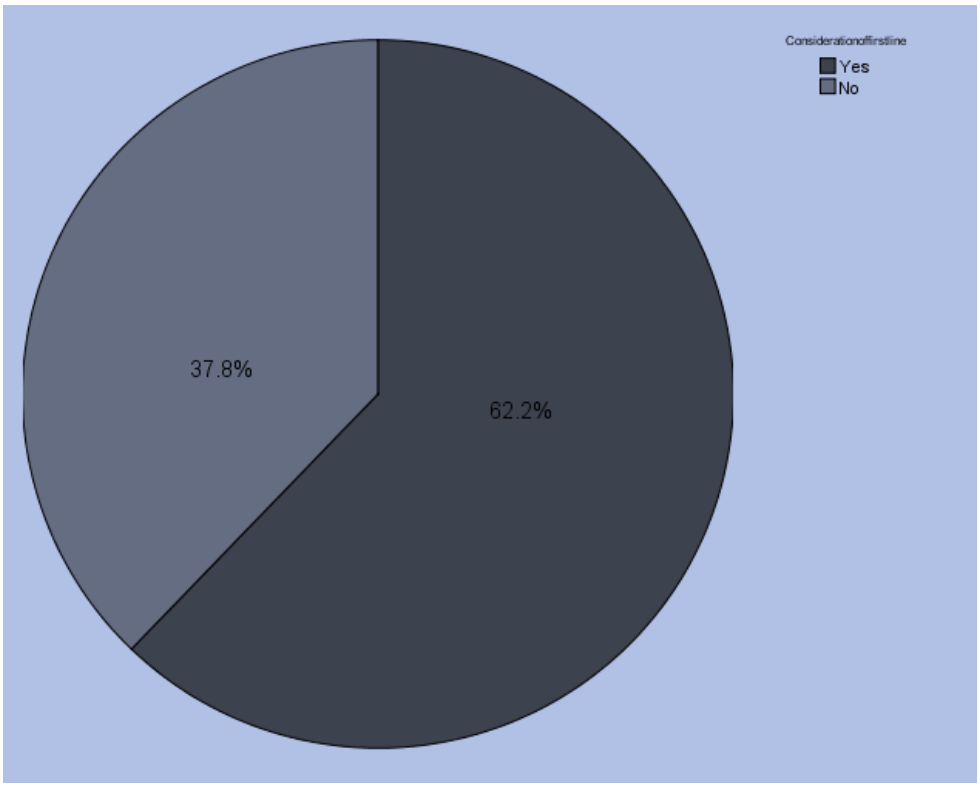

Figure 6: Pie chart showing the level of consideration of first line agents according to JNC7 recommendations in TAGSH, March 2013

Table 6.6: Antihypertensive regimen among TAGSH chronic care unit patients March, 2013

Drug Regimen	Frequency	Percent
Aldomet+Atenolol+HCT	2	0.7
Aldomet+Enalapril	10	3.4
Amilodipine	6	2.1
Amilodipine+Atenolol+HCT+Enalapril+Lasix	4	1.4
Amilodipine+HCT+Enalapril+Lasix	1	0.3
Amilo+Lasix	4	1.4
Atenolol+Amilodipine+HCT	4	1.4
Atenolol+Enalapril+HCT+Nifedipine	2	0.7
Atenonolol+HCT	12	4.1
Atenolol+HCT+Enalapril+Lasix	1	0.3
Atenolol+Nifedipine+Enalapril	9	3.1
Enalapril	10	3.4
Enalapril+Amilodipin+HCT	12	4.1
Enalapril+Atenolol+Lasix	11	3.8
Enalapril+HCT+Atenolol	4	1.4
Enalapril+HCT+Nifedipine	8	2.7
Enalapril+Lasix	10	3.4
HCT	25	8.6
HCT+Amilodipine	2	0.7
HCT+Enalapril	54	18.5
HCT+Enalapril+Lasix	1	0.3
Lasix+Atenolol+Amilodipine	4	1.4
Lisinopril+Amilodipine+Lasix	8	2.7
Lisinopril+HCT	6	2.1
Nifedipine	12	4.1
Nifedipine + Enalapril	30	10.3
Nifedipine +HCT	31	10.6
Propranolol+Nifedipine	4	1.4
Propranolol+Nifedipine+HCT	4	1.4
Total	291	100.0

7. Discussion

Regarding the level of blood pressure control at TAGSH chronic care unit, it is relatively lower level of uncontrolled blood pressure (59.9% uncontrolled) compared to, the US about only 34% have adequately (66% uncontrolled BP) (2); and the level of blood pressure control is also relatively similar with the level of blood pressure control in eastern Portugal where 37% of the patients had their blood pressure controlled (15).). But the level of uncontrolled blood pressure in TAGSH was found to be quite similar with the prevalence of uncontrolled blood pressure in Mozambique, which was reported to be 60% (16), this could be due to socioeconomic similarity between the two countries.

Most of the findings of this specific work are coherent with the finding of other similar works in different countries. Some variables haven't showed significant association however, the frequency description for example has shown difference between male and female, but the advanced statistics fail to depict the deference. A study conducted in Mozambique showed that the prevalence of hypertension was slightly lower in women than men. Nearly 40% of treated hypertensive patients fulfilled criteria for control, at 42.9% of women and 28.7% of men. The prevalence of control among all of the hypertensive patients was 4.8% in women and 1.0% in men (16). This study showed significant difference between male and female. This difference between the two might be because of the sample size, the higher the sample size the more the probability to reveal the difference between the two.

While dealing with socioeconomic factors associated with blood pressure control, the investigator initially assumed that blood pressure control could be difficult among those who have relatively very high income. But the results have shown that patients who have high income are less likely to have uncontrolled blood pressure. This specific finding partly agrees with the blood pressure control study with male Israel Defense Force officers who underwent periodic medical evaluation during the years 1991 to 1999 by Itamar Grotto, Michael Huerta, Ehud Grossman, and Yehonatan Sharabi which showed Adjusted means of SBP and DBP were highest among low-ranking officers (SBP, 119 mm Hg, compared with 117 and 115 mm Hg among intermediate and high- ranking officers, respectively, P=0.001; DBP, 77 mm Hg, compared with 76 mm Hg among intermediate and high- ranking officers, P=0.001). These results lead them to the conclusion, low SES, as reflected by low rank, is associated with elevated blood pressure

(32). But the study results showed that blood pressure control is most difficult in patients with high income OR=6.632(1.49-29.46) P=0.013, whereas it is similar among the patients of both extremities OR=1.00 (referent) among very low income, OR=1.827(0.472-7.065) P=0.88 among those with low income and OR=1.783(0.451-7.058) P=0.41 among those with Very high income.

Coming to the seasonal changes in blood pressure control, a study from Japan showed that blood pressure control is more difficult in winter season than other seasons (38); but this study showed no significant deference between winter and other seasons OR=0.892(95%CI 0.707-1.127)P=0.339. This could be because of the climate difference between Japan and central Ethiopia.

Coming to physical activity level this study showed that blood pressure control is relatively difficult for patients who are minimally active or inactive than those who are physically active OR=2.486(1.044-5.923)P=0.04,OR=4.219(1.67-10.66) P=0.002 respectively the patients with vigorous activity being considered as referent. Other studies also support this idea; taking a regular aerobic exercise has a small effect on blood pressure as it can reduce SBP and DBP by 5-6mmHg (33). In observational studies, it was noted that physical exercise exert a strong protective effect against cardiovascular mortality and this protection is lost when such exercise is discontinued. In fact, experts recommend the performance of mild exercise such as walking for 30-60 minutes at least 3 times a week in order to lower blood pressure (33).

Adherence, as measured by validated 4 item Morisky scale, has shown significant association with uncontrolled blood pressure, with among non adherent OR=8.41(3.084-22.927) P<0.001. Other study, institution based cross-sectional survey was done at University of Gondar teaching Hospital also revealed that HTN remained to be significantly associated with adherence to treatment of HTN. As the distance from the hospital decreased, the adherence to treatment of HTN got improved (AOR=2.02, 95% CI= 1.19, 3.43). Those who have controlled HTN had a significantly higher chance of being adherent to their treatment (AOR=2.93, 95% CI (1.73, 4.96 (27).

While dealing with residence place of the patients revealed that blood pressure control among rural dwellers is low compared to urban dwellers .A study in Mozambique also shows similar

result (16). This could because of difficulty in the access to private care, secondary and tertiary health care levels and also difficulty in access to antihypertensive drugs.

A study in United states, Ontario show control rates were very high (90%) in the 46% on monotherapy but only 46% in those on 2+ drugs, that indicate patients on more complex antihypertensive regimen are less likely to have their blood pressure controlled (46). This study also showed that patients taking single or double hypertensive agents are less likely to have uncontrolled blood pressure. This may be not due to the complexity or simplicity of the regimen, but it may explain the effort to control blood pressure by adding antihypertensive agent to the patients' regimen.

Diabetes and chronic kidney disease are highly related with hypertension.While, hypertension in type 1 diabetes mellitus usually reflects the presence of diabetic nephropathy. In a study of hypertension in type 1 diabetes population compared to general population in US, individuals with type 1 diabetes mellitus had more hypertension (43% vs. 15%), albuminuria (13.6% vs. 2.2%) and macroalbuminuria (8.1% vs. 0.4%) than did non diabetic individuals (21). This specific work also indicates blood pressure control is relatively difficult in patients with co morbidities either DM or CKD or both together.

Coming to findings related to obesity, obese patients are found to have greater risk of uncontrolled blood pressure compared to patients with normal BMI. This finding goes parallel with other studies that shows obese persons have a high risk of developing hypertension and CVD. In a cohort of female nurses, it was found that higher body mass index was associated with an increased risk of hypertension, and women with a body mass index of 31 kg/m^2 had a multivariate risk of 6.3 compared to women who had body mass index of less than 20 kg/m^2 (22).

Excessive Salt addition habit has been linked to poor blood pressure control, daily salt intake was about 18 g per person according to the SALturk study, and in an urban south Indian population, means daily salt intake was 8·5 g per person, which was correlated with risk of hypertension (10). The finding of this specific research also shows that patients with habit of adding excessive salt in their diet are eight times more likely to have uncontrolled blood pressure than those who do not OR=8.78(3.05-25.28)P<0.001.

The main strength of this study is, many factors that were supposed to be associated with poor blood pressure control were assessed at a time after through literature review. Data were collected both from patients' card and patients themselves this helped the investigator to have more complete information. The level of consideration of first line agent was determined by analyzing the regimen and concurrent co morbid conditions with JNC7 guideline recommendations. To analyze the winter and non winter blood pressure measurement; the individual 1560 measurements were categorized to winter or non winter depending on the respective date of measurement. Efforts were done to standardize sedentary life classifications and Adherence statuses by using IPAQ and validated four item Morisky scale. Finally, the study assesses blood pressure measurements of a year to judge the level of blood pressure control.

This study is cross sectional study and may suffer from may biases specially, social desirability bias, especially on self reported sensitive issues like cigarette smoking status, chat chewing status, alcohol intake status. Another limitation was the convenience sampling method chosen for the sake of relatively short data collection period may limit the generalizability of the results to the population. Coming to the quantification of the reported daily alcohol intake; it was difficult to standardize local drinks and local bottles in order to judge the patient is binge drinker or not the same limitation also for the "excessive" salt addition habit.

8. Conclusion

Generally the level of blood pressure at TAGSH chronic care unit was found to be poor, where greater than half of the patients have their blood pressure uncontrolled. Several factors like non adherence, long duration on treatment, obesity, rural residence, low socioeconomic status, family history of hypertension, self reported excessive salt addition habit, minimal activity or inactivity, concomitant diabetes mellitus or chronic kidney disease and multiple antihypertensive regimen were found to be associated with poor blood pressure control. Whereas factors like sex, religion, ethnicity, sleep deprivation and seasonal variations haven't showed statistically significant association with blood pressure control. Coming to the antihypertensive pharmacotherapy patterns, greater than half 166 (57%) of the patients were on dual antihypertensive drug while 65 (22.3%) were on triple antihypertensive therapy. More than a half, 62.2% of the study subjects were receiving first fine agents.

9. Recommendations

- The blood pressure control at TAGSH was found to be suboptimal and efforts should be taken toward controlling blood pressure by the hospital and other stakeholders.
- The TAGSH chronic care unit staff members are strongly recommended to give health education to patients regarding the importance of adherence, dietary salt restriction and physical activities in the blood pressure control and consequences of poor blood pressure control.
- Regarding the idea of winter blood pressure crisis, there is no need of dose adjustment for winter season in TAGSH.
- PFSA is strongly recommended to secure the antihypertensive drug availability in rural areas, as the poor control in rural areas revealed could be due to shortage of antihypertensive drugs in rural area.
- Adherence to International or national guidelines is urged by the practicing professionals of TAGSH, as some unusual and combinations that are not recommended by guidelines were observed.

Assurance of the principal Investigator

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Public Health in effect at the time of grant is forwarded as the result of this application.

Name of the student: _____

Date._____ Signature _____

APPROVAL OF THE FIRST ADVISOR

Name of the first advisor:_____

Date._____ Signature _____

References

1. Rosendorff C, Black HR, Cannon CP, et al. Treatment of hypertension in the prevention and management of ischemic heart disease: A scientific statement from the American Heart Association Council for High Blood Pressure Research and the Councils on Clinical Cardiology and Epidemiology and Prevention. Circulation 2007; 115 (21):2761–2788.
2. Houston MC. New insights and approaches to reduce end organ damage in the treatment of hypertension: Subsets of hypertension approach. American Heart Journal 1992; 123: 1337–1367.
3. Task A, Members F, Mancia G, Backer G De, Uk AD, Cifkova R, et al. 2007 Guidelines for the management of arterial hypertension The Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). 2007; 1462–536.
4. Chobanian AV, Bakris GL, Black HR,et al. The Seventh Report of the Joint National Committee on Prevention,Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 Report.Hypertension 2003;42:1206–52
5. Hansson L, Zanchetti A, Carruthers SG, et al. Effects of intensive blood pressure lowering and low-dose aspirin in patients with hypertension:Principal results of the Hypertension Optimal Treatment (HOT) randomized trial. HOT Study Group. Lancet 1998; 351(9118):1755–1762
6. Appel LJ, Brands MW, Daniels SR, et al. Dietary approaches to prevent and treat hypertension: A scientific statement from the American Heart Association. Hypertension 2006;47(2):296–308.
7. ALLHAT Officers and Coordinators for the ALLHAT Collaborative Research Group. Major outcomes in high-risk hypertensive patients randomized to angiotensin-converting enzyme inhibitor or calcium channel blocker vs diuretic:The Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). JAMA 2002;288(23):2981–2997.
8. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension : analysis of worldwide data. 2005;

9. Tesfaye F, Byass P, Wall S. Population based prevalence of high blood pressure among adults in Addis Ababa: uncovering a silent epidemic. BMC cardiovascular disorders [Internet].2009Jan[cited 2012 Dec 29];9:39. Available from: 10.Ibrahim MM, Damasceno A. Hypertension in developing countries. Lancet [Internet]. Elsevier Ltd; 2012 Aug 11 [cited 2012 Nov 1];380(9841):611–9.
10. Ibrahim MM, Damasceno A. Hypertension in developing countries. Lancet [Internet]. Elsevier Ltd; 2012 Aug 11 [cited 2012 Nov 1];380(9841):611–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22883510
11. Whelton PK, He J, Muntner P. Prevalence , awareness , treatment and control of hypertension in North America , North Africa and Asia. 2004;545–51.
12. Angell SY, Garg RK, Gwynn RC, Bash L, Thorpe LE, Frieden TR. Control of Hypertension in New York City. 2008;46–53.
13. Kannel WB. Some lessons in cardiovascular epidemiology from Framingham.Am J Cardiol 1976; 37: 269–282.
14. Wolf-maier K, Cooper RS, Rodrı F. Hypertension Prevalence and Blood Pressure Levels in 6 European Countries , Canada , and the United States. 2003;289(18):2363–9.
15. Morgado MP, Rolo S a, Pereira L, Castelo-Branco M. Blood pressure control and antihypertensive pharmacotherapy patterns in a hypertensive population of Eastern Central Region of Portugal. BMC health services research [Internet]. BioMed CentralLtd; 2010Jan[cited2012Dec29];10(1):349.
16. Damasceno A, Azevedo A, Silva-Matos C, Prista A, Diogo D, Lunet N. Hypertension prevalence, awareness, treatment, and control in mozambique: urban/rural gap during epidemiological transition. Hypertension [Internet]. 2009 Jul [cited 2012 Nov 26];54(1):77–83.
17. Yaméogo NV, Kagambèga LJ, Millogo RC, Kologo KJ, Yaméogo AA, Mandi GD, Ilboudo E, Toguyeni BJ, Samadoulougou AK, Zabsonré P. Factors associated with poor blood pressure control in hypertensive black Africans: Cross-sectional study of 456 hypertensive patients from Burkina Faso. Annales de cardiologie http://www.ncbi.nlm.nih.gov/pubmed/22677180

18. Tran A, Gelaye B, Girma B, Lemma S, Berhane Y, Bekele T, et al. Prevalence of Metabolic Syndrome among Working Adults in Ethiopia. International journal of hypertension [Internet]. 2011 Jan [cited 2012 Dec 29];2011:193719.
19. Maric C, Involvement of the Renin-Angiotensin System. American Heart association journal.2005; 475–6.
20. DekkersJC, Treiber FA, Kapuku G, Snieder H,et al.Differential Influence of Family History of Hypertension and Premature Myocardial Infarction on Systolic Blood Pressure and Left Ventricular Mass Trajectories in Youth. Journal of American academy of pediatrics .2003; 111-1387
21. Abelea DANAD. Treatment, and Control in an Adult Type 1 Diabetes Population and a Comparable. 2005;28(2):301–6.
22. Schutte AE, Huisman HW, Rooyen JM Van, Schutte R, Malan L, Reimann M. Should obesity be blamed for the high prevalence rates of hypertension in black South African women ? 2008;528–36
23. Bramlage P, Pittrow D, Wittchen H, Kirch W, Boehler S, Lehnert H, et al. Prevalent and Poorly Controlled. 2004;904–10.
24. Grundy SM, Balady GJ, Criqui MH, Fletcher G, Hiratzka F, Houston-miller N, et al. Statement for Healthcare Professionals From the AHA Task Force on Risk Reduction Primary Prevention of Coronary Heart Disease: Guidance From Framingham A Statement for Healthcare Professionals. 1998;905-10
25. Bizien MD, Pharm D, Jue SG, Panning C, Cusack B, Peterson T. Blood Pressure Control and Factors Predicting Control in a Treatment-Compliant Male Veteran Population. 2004;24(2):179–87.
26. Fletcher B, Berra K, Ades P, Braun LT, Burke LE, Durstine JL, et al. Managing abnormal blood lipids: a collaborative approach. Circulation [Internet]. 2005 Nov 15 [cited 2013 Jan 28];112(20):3184–209.
27. Dessie A, Asres G, Meseret S, Birhanu Z. Adherence to antihypertensive treatment and associated factors among patients on follow up at University of Gondar Hospital, Northwest Ethiopia. BMC public health [Internet]. BioMed Central Ltd; 2012 Apr 10 [cited 2012 Dec 29];12(1):282

28. Inkster ME, Donnan PT, MacDonald TM, Sullivan FM, Fahey T: Adherence to antihypertensive medication and association with patient and practice factors. J Hum Hypertens 2006, 20(4):295–297.
29. Press E, Cardoso M, Toffolo F, Aguiar-nemer AS De. Alcohol : Effects on Nutritional Status , Lipid Profile and Blood Pressure. 2012;2(6):205–11.
30. Primatesta P, Falaschetti E, Gupta S, Marmot MG, Poulter NR. The online version of this article, along with updated information and services, is located on the World Wide Web at: 2012;187–93
31. Getahun W, Gedif T, Tesfaye F. Regular Khat (Catha edulis) chewing is associated with elevated diastolic blood pressure among adults in Butajira , Ethiopia : A comparative study. 2010;4–11.
32. Grotto I, Huerta M, Grossman E, Sharabi Y. Relative Impact of Socioeconomic Status on Blood Pressure. 2007;1140–5.
33. Halbert JA, Silagy CA, Finucane P, Withers RT, Hamdorf PA, Andrews GR. The effectiveness of exercise training in lowering blood pressure : a meta-analysis of randomised controlled trials of 4 weeks or longer. 1997;641–9.
34. Jackson JH, Sobolski J, Krienke R, Wong KS, Frech-Tamas F, Nightengale B. Blood pressure control and pharmacotherapy patterns in the United States before and after the release of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) guidelines. Journal of the American Board of Family Medicine : JABFM [Internet]. 2008 [cited 2012 Dec 29];21(6):512–21.
35. Angell SY, Garg RK, Gwynn RC, Bash L, Thorpe LE, Frieden TR. Control of Hypertension in New York City. 2008;46–53
36. http://www.inctr.org/network-magazine/current-edition/partner-profile/tikur-anbessa-black-lion-hospital/ Cited on Day 10/12/2012
37. Tikur Anbessa Hospital Renal unit data base, Availalable during data Collection
38. Mori H, Ukai H, Yamamoto H, Saitou S, Hirao K, Yamauchi M, et al. Current status of antihypertensive prescription and associated blood pressure control in Japan. Hypertension research : official journal of the Japanese Society of Hypertension [Internet]. 2006 March 29(3):143–51. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16755149

ANNEXES

Annex I

Questionnaire (Data to be filled by Trained Data Collector) English Version

1. Age?.....Years
2. Sex? M/F……
3. Weight?.....Kg
4. Height?.....Meter
5. Ethnicity? 1. Amhara

   2. Oromo

   3. Guraghe

   4. Tigre 5.others (Please specify)…….
6. Religion?

   1. Ethiopian Orthodox Christian

   2. Muslim

   3. Protestant

   4. Catholic 5. Others(Please specify)…….
7. Occupation?.....
8. Educational status?

   1. Illiterate (cannot read and write)

   2. Elementary school

   3. Secondary school

   4. University/college studies
9. When was you first told to be hypertensive?.....DD/MM/YY(E.C)
10. At what age was you first diagnosed to be hypertensive?.....Year

11. Are you married? Yes/No……..
12. Are any of your parents hypertensive? Yes/No……
13. What is your Monthly income?.....ETB
14. Where do you live?

    1. Urban 2. Rural

15. Do you drink alcohol now? Yes/No…….

16. Please tell me how much you drink per day? Quantify

    1) One standard drink (equivalent to 350 ml Beer)
    2) Two standard drink
    3) Three standard drink
    4) Four standard drink
    5) Five standard drink
    6) Greater than five standard drink

17. Is there Somebody who smoke in your home or workplace? Yes/No……

18. Do you smoke?

    Yes/No……Quantify (Sticks/day)……

19. Do you chew Khat? Yes/No……
20. Have you ever visited psychiatrist? Yes/No……
21. Have you experienced severe depression recently (three months)? Yes/No…….
22. Have you experienced severe stress recently (three months)? Yes/No…….
23. Do you add salt on your food on table? Yes/No……
24. When did you start taking? DD/MM/YY……E.C
25. Do you ever forget to take your prescription drugs? Yes/ No…….
26. Are you careless at times about taking your drugs? Yes/ No……..
27. Do you sometimes stop taking your drugs when you feel better? Yes/ No……..
28. Do you sometimes stop taking your drugs if they make you feel worse? Yes/ No……
29. If there is history of pregnancy, Note the duration of pregnancies(If any)

Pregnancy1 from Date…….to……E.C

Pregnancy2 from Date…… to…….E.C

Pregnancy 3 from Date……to……E.C

Pregnancy 4 from Date…….to……E.C

30. In a week, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

____days per week

☐ No vigorous physical activities → ***Skip to question 32***

31 . How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about all the **moderate** activities that you did in a week. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

32. In a week, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

☐ No moderate physical activities → ***Skip to question 34***

33. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in a week. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

34. In a week, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

☐ No walking → ***Skip to question 36***

35. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays in a week. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

36. In a week, how much time did you spend **sitting** on a **week day**?

_____ **hours per day** ☐ **Do not know**

_____ **minutes per day**

37. How much time in a day do you sleep? _____ **hours per day**

Annex II

Data collection format from Patient Card

1. Card No……
2. Patient's Name (Abbreviations only) ……..Age……sex……..
3. Date first diagnosed to be Hypertensive……..
4. Date…… of the first antihypertensive Regimen started and duration……..

First regimen (Include Drug name, Dose, Route, Frequency)

1.……

2……

3……

4……

Date…….of the second antihypertensive regimen started and duration……..

Second regimen (Include Drug name, Dose, Route, Frequency)

1.……

2……

3……

4……

5. Date…….of the third antihypertensive regimen started and duration…….(specify if there are other regimens)

Third regimen (Include Drug name, Dose, Route, Frequency)

1.……

2……

3……

4……

6. SBP /DBP baseline (Before starting the first Antihypertensive regimen)…….

7. SBP /DBP……. on First appointment, Date……

8. SBP/DPB……..on Second appointment, Date……. (Include all appointments of 1 year back)

9. SBP /DBP ……4th Appointment Date……

10. SBP /DBP ……5th Appointment Date…….

11. SBP /DBP ……6th Appointment Date…….

12. SBP /DBP ……7th Appointment Date……

13. SBP /DBP ……8th Appointment Date……

14. SBP /DBP ……9th Appointment Date……

15. SBP /DBP ……10th Appointment Date……..

16. SBP /DBP ……11th Appointment Date……..

17. SBP /DBP…….12th Appointment Date……Specify on separate Page if there are extra Appointment date Measurements.

18. Comorbidities …… …….(Diabetes, Chronic Kidney disease.. (specify all diagnosed)

Annex II

Questionnaire (Amharic version)

ለህክምና ምርምር የተዘጋጀ መጠይቅ

በቅድምያ ቃለምልልሱን ለማካሄድ ፍቃደኛ ስለሆኑ አመሰግናለሁ ፡፡ እኔ አደሙ ተስፋዬ በጅማ ዩኒቨርሲቲ የድህረ ምረቃ ትምህርት ማዘያ ምርምር እየተከታተልኩ ስለሆነ ለምርምሩ የሚረዳኝን ቃለምልልስ ሰላደረጉልኝ በድጋሚ እያመሰገንኩ በዚህ ቃለ ምልልስ የምሰጠኝ መረጃ ሚስጥራዊና ስም አልባ እንደሆነና ለምርምር ተግባር ብቻ እንደምመል አረጋግጣለሁ ፡፡

I. በዳታ ስብሰቢ የምሞላ መጠይቅ ፤

1. እድሜዎት ስንት ነው ? _____ አመት
2. ፆታ ወ/ሴ _____
3. ክብደትዎ ስንት ነው _____ ኪ.ግ
4. ቁመትዎ ስንት ነው _____ሜ
5. ከየትኛው ጎሳ (ብሔር / ብሔረሰብ) ነው የሚመዱበት ?
   1. አማራ
   2. ኦሮሞ
   3. ጉራጌ
   4. ትግራይ
   5. ሌላ ካለ ግለፅ_____
6. ሐይማኖትዎ ምንድነው ?
   1. የኢትዮጵያ ኦርቶዶክስ ክርስያን
   2. መስሊም
   3. ፕሮቴስታንት
   4. ሌላ (ግለጽ)_____
7. መተዳደርያ ስራዎን ይግለፁልኝ እስቲ ?
8. የትምርት ደረጃ ?
   1. አልተማሙም (መፃፍ / ማንበብ አይችሉም)
   2. 1ኛ ደረጃ
   3. 2ኛ ደረጃ
   4. ዩኒቨርሲቲ / ኮሌጅ ትምህርት

9. መቼ ነበር የደም ግፊት እንዳለብዎ የተነገሮት ? ቀን /ወር/ ዓ.ም _____

10. ያኔ ስንት ዓመትዎ ነበር ? _____

11. ትዳር አለውት ? አዎ/ አይደለም _____

12. ከቤተሰብዎ (ከ እናት ወይም አባት) የደም ግፊት እንዳለበት የታወቀ አለ ? አዎ/ አይደለም _____

13. የወር ገቢዎን ይተምኑ ? _____ ብር

14. የት ነው የሚኖሩት ?

1. ከተማ
2. ገጠር

15. አልኮል ይጠጣሉ ? አዎ/ አይደለም _____

16. ለጥያቄ ቁጥር 21 መልስዎ አዎ ከሆነ ምን ያክል እንደምጠጡ ያሳወቁን ?

1. በአንድ ብራ የምታመን
2. በ ሁለት ብራ የሚመን
3. በሶስት ብራ የምታመን
4. በአራት ብራ የምታመን
5. በአምስት ብራ የምታመን
6. ከአምስት ብራ በላይ የምታመን

17. በስራ ቦታዎ ወይም ቤትዎ ወስጥ ስጋራ የምያጨስ ሰው አለ ? አዎ / አይደለም _____

18. እርሶዎስ ያጨሳሉ ?/ አይደለም _____

19. ጫት ይቅማሉ ? አዎ / አይደለም _____

20. የአዕምሮ ህክምና አማክረው ያውቃሉ ? አዎ / አይደለም

21. ከሶስት ወር ወዲህ ከበድ የሚሉት የድብርት ግዜ አሳልፈዋል ? አዎ / አይደለም

22. ከሶስት ወር ወዲህ ከባድ የሚሉት የጭንቀት ግዜ አሳልፈዋል ? አዎ / አይደለም

23. ምግብ ላይ ጨው ይጨምራሉ ? አዎ / አይደለም _____

24. ከመቼ ጀምረው ነው mD¾n@T መመለድ የጀመሩት ? ቀን /ወር /ዓ.ም _____

25. yªzz&ÉTN mD¾n@T mWsD rStW ¶Wšlƒ?

26. mD¾n@T¿N SwSD GDyl}nT ysì¿ªL?

27. aNëNd_ s^áÉT mD¾n@T¿N mWsD ¶Öìlƒ?a¿/aYdlM

28. aNëNd_ mD¾n@t> ±Ysìì{W s^qÝ mWsD ¶Öìlƒ?a¿

29. yARGZ³ Æz_ ·l Gz_WN ¶SªW±lƒ

1¼ ARGZ³ kqN----------Ask----------¹.M

2¼ ARGZ³ kqN----------Ask ----------¹.M

3¼ARGZ³ kqN----------Ask ----------¹.M

4¼ ARGZ³ kqN----------Ask----------¹.M

30. b±NT WSE MN ¶KL qN k²D yì@²L ANQSšs_ ¶dR¬lƒ (And KBdT ìN±T¤ mÖfR wYM BSKl_T mNëT)

----------qN/±MNT

☐ MNM ·lƒ wd E¶q† q>ER 32

31. k®Y yteqsWN ANQSšs_ lMN ¶KL Gz_ ¶k³W³lƒ?

----------s¹T/qN

----------dq#š/qN

☐ A®WqWM/ARGe¼ aYdluƒM

men¼ ANQSšs_ (ìlTM)TN} eNkR aR¬WANDTnFs& yM¶r¬[WN ANQSšs_ nW¥¥

32. bsMnT WSE men¼ ANQSšs_ ANd q®L Aš m]kM yAGR g&Ø ±yxMR MN ¶KL ¶dR¬lƒ?

----------qN/±MNT

33. Anz^UN men¼ ANQSšs_¿T lMN ¶KL ys™lƒ?

--------s¹ªT/qN

----------dq#š/qN

☐ A®WQM/ARGe¼ aydlWM

❖ B±MNT lMN ¶KL Gz_ yAGR g&Ø ANdM¶dRg& ¶Sb&¥¥ yAGR g&ØW lmZ³³T SÍRT wYM yArFT ì±lÜ¶ l^ÒN Y{®L¥¥

34. b±MNT WSE lMN ¶KL q³T nW B¶NS y10 dq#š yAGR g&Ø yì@¶dRg&T

---------qN/±MNT

☐yAGR g&Ø Bz&M a®dRGM ·lƒ wd E¶q† 36

35. bnz^U q³T WSE lMN ¶KL Gz_ yAGR g&Ø ¶dR¬lƒ?

--------s¹T/qN

----------dq#š/qN

☐ a®WQM/ ARGe¼ aydlWM

❖ Ymxrá E¶q†¿{ SlmqmE yÒ³L¥¥ bSMNT yS™ q³T WSE bb_T WSE LÒN Y{®L¤ yb^Å S™ AysÝ æd¼§N ÆBItW wYM tqMeW ¬dM BÉ t†l_v^\#N mmLkT

36. b±MN WSE lMN ¶KL Gz_ yqm½lƒ?

----------s¹T/ qN

----------dq#š /qN

☐ A®WQM/ ARGe¼ aYdlWM

37 bqN lMN ¶KL s¹T Yt¼lƒ? ----------s¹T/ qN

Annex III

Informed Consent

Name of principal investigator: Adamu Tesfaye

Research title: Blood Pressure Control Associates and Antihypertensive Pharmacotherapy Patterns in Tikur Anbessa General Specialized Hospital Chronic Care Department, Addis Ababa, Ethiopia

Card number_____

Code number_____

1. I confirm that I understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is completely voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I understand that my medical notes will be looked at by data collectors of this study and necessary information will be extracted. I give permission for these individuals to have access to my records.
4. I agree to take part in the above study. I would like to confirm my agreement by signing.

Participant's name _____ Signature_____ date_____

Name of the data collector: _____ Signature: _____ date_____

Name of the principal investigator: _____ Signature: _____ date_____

Thank you for your participation and cooperation!