

MANAGEMENT OF HYPERTENSION IN
SWEDRU DISTRICT HOSPITAL IN THE CENTRAL REGION OF
GHANA

BY
KNUST

GEORGE OSEI OWUSU B Pharm (Hons)

A thesis submitted to the Department of Clinical and Social Pharmacy,

Kwame Nkrumah University of Science and Technology

In partial fulfillment of the requirements for the degree

Of

MASTER OF SCIENCE

Faculty of Pharmacy and Pharmaceutical Sciences

College of Health Sciences

July, 2011

© 2011 Department of Clinical and Social Pharmacy

I hereby declare that this submission is my own work towards the Master of Science Degree programme and that, to the best of my knowledge, it contains no material previously published by another person nor the material which has been accepted for the award of any other degree of University, except where acknowledgement has been made in the text.

KNUST

.....
Student's Name

.....
Signature

.....
Date

Certified by

.....
Supervisor(s) Name

.....
Signature

.....
Date

Certified by

.....
Head of dept Name

.....
Signature

.....
Date

ABSTRACT

Background

Controlling high blood pressure is of paramount importance for preventing cardiovascular disease which develops into complications leading to the loss of life.

The Swedru District Hospital recorded a relatively high prevalence rate of hypertension coupled with a high mortality from cardiovascular disease e.g. heart failure, stroke and ischemic heart disease. The above observation informed the need to investigate the management of hypertension in the district hospital and make the necessary recommendations to improve or control the health problem.

Objectives

The objective of the study was to look for the factors that contributed to improper management of hypertension in the facility. These factors, if addressed, therapeutic outcome and patient well-being are likely to be improved.

Design

This is a cross-sectional study of 200 hypertensive patients that visited the hospital from 8th July 2005 to 16th September 2005. Both retrospective and interview methods were employed. The inclusion criteria were all hypertensive patients with BP of less than 250 /100mm Hg and greater than 120/80mmHg that attended the hospital from 8th July 2005 to 16th Sept 2005. Those patients with high BP greater than 250/100mmHg were excluded.

Findings

The survey revealed that 46% had their BP controlled to 140/90, 25% fairly controlled to 150/90 and 29% not controlled. Management of hypertension in the hospital needs to be improved according to WHO-ISH to reduce percentage of uncontrolled blood pressure. There was no classification into grades e.g. .grade 1,2 and 3. No stratification into low, moderate and high risk on the medication card. Complaints from patients about side effects were not adequately addressed. Non

adherence was exhibited by some patients on the account of adverse effect of drug, quantity of pills per day to be taken, cost of medicine and inadequate drug information. Review and monitoring were not regularly performed. Medicines were not rationally prescribed all the time. The study identified the factors that contributed to the inappropriate management of hypertension and made recommendations.

Conclusion

The management of hypertension is a challenging medical practice in Swedru District Hospital. Factors contributing to inappropriate management of hypertension include, lack of classification to grades and lack of stratification of risk. The others were inadequate education on the lifestyle modifications and on medicines ; no regular review and follow-up and finally irrational medicine prescription .

Recommendations

The following interventions were recommended. Routine classification of BP and stratification of risk factors should be written on the medication card of all hypertensive patients. Strict adherence to developed protocol on punctual appointment (review) and monitoring of laboratory investigations. Protocol on treatment targets and on non pharmacological advice for lifestyle modification. The others were routine measurement of BP of all patients to the hospital to increase detection and treatment of undiagnosed hypertension, and determination of BMI of all patients.

TABLE OF CONTENTS

ABSTRACT.....	.iii
TABLE OF CONTENTS.....	.v
LIST OF FIGURES.....	viii
LIST OF TABLES.....	ix
ACKNOWLEDGEMENT.....	x
CHAPTER ONE: INTRODUCTION	
1.1 background.....	1
1.2 Definition and Classification of Hypertension	2
1.3 Diagnostic Evaluation.....	3
1.4 Blood Pressure Measurement.....	3
1.5 Risk Factors.....	4
1.6 Management Strategies of Hypertension	6
1.7 Monitoring and Review.....	10
1.8 Patient Education on Antihypertension.....	11
1.9 Objective of Study.....	12
CHAPTER TWO – METHODOLOGY AND RESULTS	
2.1 Methodology.....	13
2.2 Results.....	14
CHAPTER THREE.DISCUSSION, CONCLUSION AND RECOMMENDATION	
3.1 Discussion	30
3.2 limitations.....	37
3.3 conclusion.....	38
3.4 Recommendation	38
REFERENCES.....	40
APPENDIX I.....	43
APPENDIX II.....	45
APPENDIXIII.....	47

LIST OF FIGURES

2.1	Age Distribution	15
2.2	Sex Distribution	16
2.3A	Occupation	16
2.3B	Occupation	17
2.4	Body Mass Index (Males)	18
2.5	Body Mass Index (Females)	18
2.6	When Diagnosed Hypertension	19
2.7	BP on Diagnosis	19
2.8	BP at the Time of Interview	20
2.9	Education on Hypertension	20
2.10	Identification of Drug	21
2.11	Side Effects from Antihypertensive Drug	23
2.12	Therapeutic Outcome	24
2.13	Drug Information	25
2.14	Concomitant Disease	25
2.15	Routine Laboratory	26
2.16	Antihypertensive Drug Prescribed (Monotherapy)	27
2.17	Antihypertensive Drug Prescribed (Combination Therapy)	28
2.18	Suspected Incompatibility and Drug Interaction	28

LIST OF TABLES

Classification of Blood Pressure	3
Stratification of risk	5

KNUST



ACKNOWLEDGMENT

Glory be to our Creator for the gift of life and knowledge to prepare this piece of work .I am grateful to my parents , Mr and Mrs Owusu and my guardians, Mr and Mrs Safo for the care and support given to me. I cannot end without the mention of my wife, Mrs Emelia Osei Owusu who encouraged me to complete this work.

The contributions and advice given to me by my supervisor, Prof. Mrs Frances Thelma Owusu-Daaku cannot be over emphasized and I am very grateful to her. Finally to the typist, Rita Darku, who never refused to type this project work, may our Maker replenish her dissipated energy.



CHAPTER ONE: INTRODUCTION

1.1 Background

Effective control of hypertension is one of the most important preventable causes of premature morbidity and mortality in most secondary health care facilities ¹.

The Swedru District Hospital's Annual Report for year 2004 revealed that among the ten (10) top reported diseases, hypertension ranked third, with 2,353 out of the total of 30,070 cases representing 7.8% of all the cases. Moreover, 10% of the death recorded at the facility was related to hypertension. The trend was not different from the previous year as hypertension represented 8.9% (n=1849) of all cases.

The relatively high prevalence of hypertension at the Swedru Government hospital coupled with a high mortality resulting from cardiovascular disease (CVD), e.g. stroke and ischaemic heart disease demands a critical look at the management of hypertension at the hospital to identify the contributing factors and suggest interventions. Controlling BP is paramount for preventing CVD.¹ Although managing hypertension to achieve the required level is a challenge for the health care professionals, studies have shown that strict protocol adherence, reinforcement of non-pharmacological advice and attention to patient compliance have a positive impact on mortality and morbidity ².

1.2 Definition and Classification of Hypertension

Hypertension is defined in terms of blood pressure level above which investigations and treatment are required, and also indicates a flexible numerical definition resulting from evidence of risk and availability of effective and well-tolerated drugs²

Hypertension is classified according to aetiology into primary and secondary hypertension. Primary hypertension (over 90% of all hypertension cases) has no tangible cause, however, it is associated with an increased risk of morbidity or mortality due to cardiac failure, renal failure, stroke, ischaemic heart disease and peripheral vascular disorders. Secondary hypertension which forms the remaining 10% or less is caused by renal disease, adrenal gland disorders, coarctation of the aorta or are drug –induced.³

Hypertension is represented by two numbers measured in millimeters of mercury (Abbreviated “mmHg”). The first number is systolic blood pressure (SBP). The second number is diastolic pressure (DBP). SBP is specifically the maximum arterial pressure during contraction of the left ventricle of the heart. DBP is the lowest arterial blood pressure of a cardiac cycle occurring when ventricles of the heart are relaxing and blood fills it. The numbers are usually expressed as a fraction, with SBP as the numerator and DBP as the denominator.

Table 1.1 the classification of Blood Pressure.

Category	Systolic B (mg Hg)	Diastolic BP (mmHg)
Optimal BP	<120	<80
Normal BP	<130	<85
High-Normal BP	130-139	85 – 89
Grade 1 Hypertension (mild)	140 – 159	90 – 99
Grade 2 Hypertension (moderate)	160 – 179	100 – 109
Grade 3 Hypertension (severe)	≥180	≥110

1.3 **Diagnostic Evaluation**

Diagnostic procedures are aimed at

- (1) Establishing target blood pressure levels (table 1.1)
- (2) Identifying secondary causes of hypertension
- (3) Evaluating the overall cardiovascular risk by searching for other risk factors, target organ damage, concomitant diseases and accompanying clinical conditions.

The diagnostic procedure comprises:

- (a) Repeated blood pressure measurements
- (b) Medical history
- (c) Physical examination, example; unusual sweating, unrest and palpitation
- (d) Laboratory and radiological investigations, example ECG, urea and electrolytes in the blood.

1.4 **Blood Pressure Measurement**

Blood pressure is characterized by large variations both within and between days and this suggests that the diagnosis of hypertension should be based on multiple blood pressure measurements taken on separate occasions.³ If a blood pressure is only slightly elevated, repeated measurement should be obtained over 3 months because there may be a regression to normal level. If a patient has a more marked blood pressure

elevation, evidence of hypertension-related organ damage, high or very high cardiovascular risk profile, repeated measurement should be obtained over shorter periods of time such as weeks or days⁴.

Blood pressure is measured with a device called a sphygmomanometer. It consists of an inflatable arm cuff, a hand pump, a valve to let the pressure out of the cuff and a gauge to read the pressure. First, the cuff is placed around the upper arm and inflated with the hand pump. When the cuff is fully inflated it pushes against the large artery in the arm stopping the blood flow momentarily. Then the cuff is gradually deflated to allow the blood to flow again. As the air is released, the person measuring the blood pressure listens to the korotkoff sound of the artery with a stethoscope. When the blood starts to pulse through the artery, it makes a second sound until the cuff is almost deflated. While the person listens and looks at the gauge, he or she records two important readings; SBP and DBP. Systolic Blood Pressure is the pressure reading on the gauge when the first korotkoff sound of blood flowing through the artery is heard. Diastolic Blood Pressure is the pressure reading on the gauge when the last sound is heard.

1.5 Risk Factors

Decisions about the management of patients with hypertension should not be made on BP alone but also on the presence of other risk factors, target organ damage, concomitant disease such as diabetes and cardiovascular and renal diseases, as well as on other aspects of the patients' personal medical and social situation⁵.

For instance, the BP target for diabetics, is 130/85mmHg

Middle aged man - 130/85mmHg

Elderly female - 140/90mmHg

The overall strategy is to assess the overall risk profile to know whether the patient is at low, medium, high or very high risk of cardiovascular complication. If the patient is at high risk and very high risk, immediate drug treatment is recommended⁶. For the medium risk group, the BP is monitored and other risk factors noted for several weeks to obtain further information before deciding on drug treatment. Patients who are in the low risk group are observed over a significant period of time before deciding on drug treatment .

Table 1. 2 - Stratification of risk to quantify prognosis⁷

Other risk factors and diseases history	Blood pressure (mmHg)				
	Normal SBP 120-129 or DBP 80-84	High Normal SBP 130-139 or DBP 85-89	Grade 1 SBP 140-159 or DBP 90-99	Grade 2 SBP 160-179 or DBP 100-109	Grade 3 SBP >180 or DBP >110
No other risk factors	Average risk	Average risk	Low added risk	moderate added risk	High added risk
1-2 risk factors	Low added risk	Low added risk	Moderate added risk	moderate added risk	Very high added risk
3 or more risk factors or TOD or diabetes	Moderate added risk	High added risk	High added risk	High added risk	Very high added risk
ACC	High added risk	Very high added risk	Very high added risk	Very high added risk	Very high added risk

TOD is Target Organ Damage

ACC is Associated Clinical Condition

1.6 MANAGEMENT STRATEGIES OF HYPERTENSION

1.6.1 TREATMENT GOAL

The primary goal of patients with hypertension is to achieve the reduction in the total risk of CVD. This requires treatment of all the reversible risk factors identified such as smoking raised cholesterol or diabetes and the management of associated clinical condition as well as treatment of raised BP.

Hypertension could be managed by

- i non pharmacological means, example lifestyle modifications,
- ii pharmacological therapy

1.6.2 NON-PHARMACOLOGICAL MANAGEMENT OF HYPERTENSION

Lifestyle changes should be instituted wherever appropriate in all patients including those who require drug treatment. These changes include:

- ❖ Smoking reduction or cessation
- ❖ Moderation of alcohol consumption
- ❖ Reduction of salt intake
- ❖ Increased physical activity
- ❖ Avoiding stress
- ❖ Weight Reduction if the patient is over-weight
- ❖ Increased intake of fruits and vegetables

1.6.2.1 OCCUPATION

By virtue of the level of activity in a particular profession it may be defined as a sedentary profession or non sedentary one.

Sedentary

Here, the person is most of the time not mobile; may sit in the executive chair for a greater length of time than he moves about. If the person is a trader and sells food/foodstuff, that person would be sitting all the time. This means that their occupation may worsen their health conditions. The person should be advised to do moderate exercises to help in the management of the hypertension. Examples of people in the sedentary group are food sellers, vehicle drivers, teachers, cashiers, baby sitters, and housewives.

Non Sedentary

This group has an occupation that makes them very active and do moderate or brisk exercise. This suggests that their job would in a way help in the management of their hypertension. The type of counseling to give such a person is to avoid stress and not over work oneself. Examples of people in the non sedentary group are farmers, artisans, labourers or orderlies.

1.6.2.2 BODY MASS INDEX (BMI)

Measurement of the weight and height of the individual patient is necessary to evaluate Body Mass Index using the formula

$$\text{BMI} = \text{Weight (kg)} / \text{height}^2 \text{ (m)} .$$

This forms the basis for deciding whether a person is obese or overweight.

BMI of 25 is considered overweight and 30 as obese. BMI of 20.1 – 25.0 for men and 18.7 – 23.8 for women are associated with the best life expectancy.

BMI of 30 represents a 50% excess risk and BMI of 35 a doubling of total mortality.

1.6.3 PHARMACOLOGICAL THERAPY OF HYPERTENSION

Drug treatment is recommended in patients with sustained grade 2 hypertension ($>160/100\text{mmHg}$). All patients with grade 1 hypertension ($140\text{--}159/90\text{--}99\text{mmHg}$) are to be offered treatment with antihypertensive drugs. Drug treatment is recommended if there is any complication of hypertension or target organ damage or diabetes and there is an estimated 10 year risk of cardiovascular disease of $>20\%$ despite lifestyle advice. When it is decided not to treat grade 1 hypertension with drugs lifestyle measures is encouraged and blood pressure and risk of cardiovascular disease are reassessed annually. There is general agreement on the principles governing the use of anti-hypertensive drugs to lower BP which is independent of the choice of particular drugs. These principles include:

- The use of low dose of drugs to initiate therapy, beginning with lowest available dose of the particular drug in an effort to reduce adverse effects.
- The change to different drug class altogether if there is very little response or poor tolerability to the first drug used before increasing the dose of the first drug or adding a second one.
- The use of long acting drugs providing 24-hour efficacy on a once daily basis.

1.6.4 ANTIHYPERTENSIVE DRUGS

The antihypertensives are a class of drugs that are used to treat hypertension. Evidence suggests that reduction of the blood pressure by 5mmHg can decrease the risk of stroke by 34% , of ischaemic heart disease by 21% and reduce the likelihood of dementia, heart failure, and mortality from cardiovascular disease.⁷ There are many classes of antihypertensives, which lower blood pressure by different means, however, five main classes are most important and widely used. The several classes of antihypertensives

differ in side effect profiles, ability to prevent endpoints (such as heart attack, stroke and heart failure) and cost. They are;

- Diuretics e.g frusemide
- Beta Blockers e.g atenolol
- Calcium Channel Blockers e.g nifedipine
- ACE Inhibitors e.g lisinopril
- Angiotensin II receptors antagonist e.g candesartan

1.7 DRUG INTERACTION / INCOMPATIBILITY OF DRUGS PRESCRIBED

Oral decongestants e.g. ephedrine tablets have well known effect on blood pressure and are generally contraindicated in individual's with hypertension. Chronic use of Non Steroidal Anti-inflammatory Drugs (NSAIDs) (other than daily low dose aspirin) has been found to increase blood pressure in both normotensive and untreated hypertensive individuals⁸. Additionally, NSAID use has been found to counteract the anti-hypertensive effect of thiazide diuretics, β -blockers, alpha blockers and angiotensin converting enzyme inhibitors (ACE-1)⁹. Hypertensive patients are therefore encouraged to use acetaminophen for pain and fever.

1.8 INAPPROPRIATE MEDICINE COMBINATION

Inappropriate medicine combination may come about as a result of combinations that do not produce any reasonable and beneficial therapeutic outcome as compared to the individual drugs used as monotherapy. This rather exposes the patient to side effects which may be unusual and increase cost of treatment. For example, the case of a diuretic with calcium channel blocker (CBB) is one of the controversial approaches to combination antihypertensive control. The overall evidence indicates that there is no benefit¹⁰. In 1991 Cappucciu et al¹³ investigated the combination of a diuretic

with Amlodipine in 90 patients with hypertension in a double blind randomized crossover trial. Their results demonstrated that the addition of Bendrofluazide to patients receiving Amlodipine did not cause any significant decrease in blood pressure.

Reasons why this combination is of no benefit are:

- (1) In addition to their vasodilating properties CCB have been shown to have diuretic and natriuretic effects. These effects occur in the acute phase of treatment and are maintained with chronic treatment¹². It is possible that in combination with a diuretic the CCB may block the volume depleting effect of the diuretic because the CCB has already depleted the plasma volume.
- (2) It is theorized that diuretics may have a vasodilatory action in addition to their diuretic effect. Overall, one would in effect be using two drugs with the same mechanism of action. This applies to the dihydropyridine CCB only³.

1.9 MONITORING AND REVIEW

Routine laboratory tests are recommended before beginning treatment of high blood pressure to determine organ damage or other risk factors. These laboratory tests include urinalysis, blood cell count, blood chemistry potassium, sodium creatinine, fasting glucose, total cholesterol and High Density Lipoprotein cholesterol and an electrocardiogram (ECG). Additional test may be recommended based on the condition.

There is the need to encourage patients to come for review or follow-ups to know how best the drugs prescribed has improved their health status .

1.10 PATIENT EDUCATION ON ANTIHYPERTENSIVE DRUGS

The patients are to be educated on their antihypertensive drugs to know the following:

- (1) Its name, why the patient is taking it and what it does.
- (2) Exactly when, how often and how much the patient should take
- (3) The possible side effects and what the patient should do if any occur.
- (4) Effects of the interaction of the patient's medication with either food or other medicines which the patient might be taking for the same or a different condition

Additional counseling/advice which may be given to hypertensive patients may include:

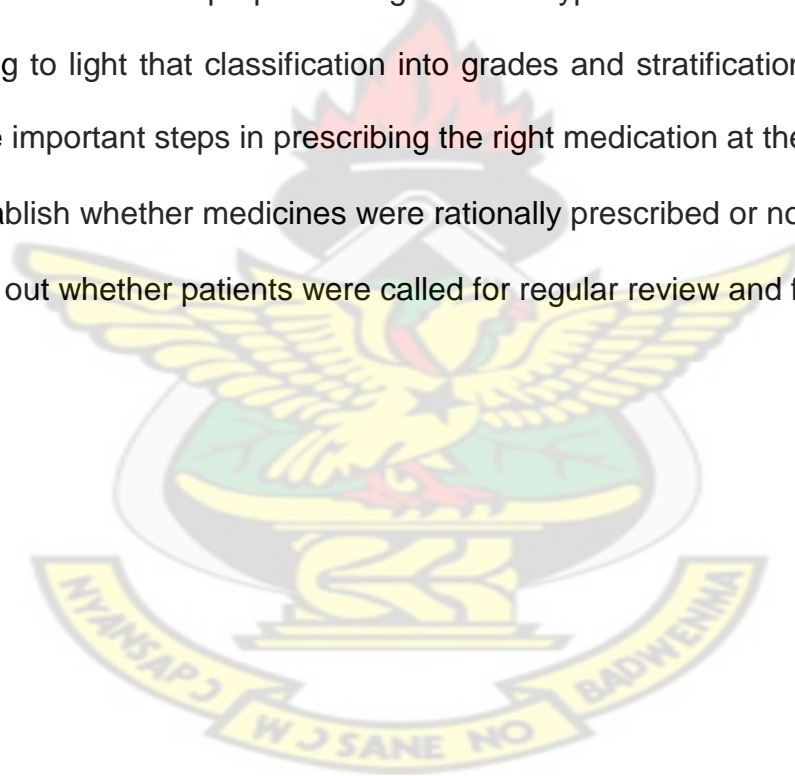
- (5) Starting treatment early and continuing it even though they may feel fine to prevent complications.
- (6) Complying with the dosage regimen, informing and encouraging the patient to continue taking the medications irrespective of how long they are recommended.
- (7) Establishing and maintaining more beneficial habits in regard to diet or lifestyle which can reduce or eliminate the need of drugs for high blood pressure.
- (8) Improving physical and emotional states and most importantly help one to live a healthier, much longer life.

There is the need to tell the patients to check with a doctor or pharmacist before taking any other medications to treat a different condition for reasons that certain medicines such as cold remedies, diet pills, nasal

spray and inhalers, laxative and antacid may counteract the drugs used to treat high blood pressure. Thus patients are to avoid taking medications that have not been prescribed or approved by a doctor or recommended by a pharmacist.

1.11 OBJECTIVE OF STUDY

- To establish whether sufficient education was given to the patients on lifestyle changes, on hypertension and drug information or not. These are factors which contribute to improper management of hypertension.
- To bring to light that classification into grades and stratification into levels of risk are important steps in prescribing the right medication at the right time.
- To establish whether medicines were rationally prescribed or not.
- To find out whether patients were called for regular review and follow –up .



CHAPTER TWO

METHODOLOGY AND RESULTS

2.1 **METHODOLOGY**

2.1.1 **Study Type**

This was a research study involving interviews and analysis of medication history cards. (OPD cards)

2.1.2 **Sampling Method**

Two hundred (200) patients were chosen from 2,353 hypertensive patients. The sampling fraction was 1 in 11 patients. Every eleventh hypertensive patient was chosen from all hypertensive patients that attended the hospital, starting from the second hypertensive patient to obtain 200 patients using the registration numbers (OPD Numbers). Thus, the order was 2nd, 13th, 24th and so on. The chosen patients were assisted to answer a questionnaire. (Appendix I)

With the registration numbers, the chosen hypertensive patients' medication history cards were traced at the records department to obtain the following information.

- (1) Classification of hypertension e.g. into mild, moderate, and severe.
- (2) Stratification of risk to quantify prognosis
- (3) Laboratory test performed
- (4) Drugs prescribed,
- (5) Suspected incompatibility and drug interaction of drugs prescribed.

2.1.3 **Pilot study**

The questionnaire was pre-tested using 20 patients. After this the actual data collection was carried out by trained two pharmacy students.

2.1.4 Inclusion criteria

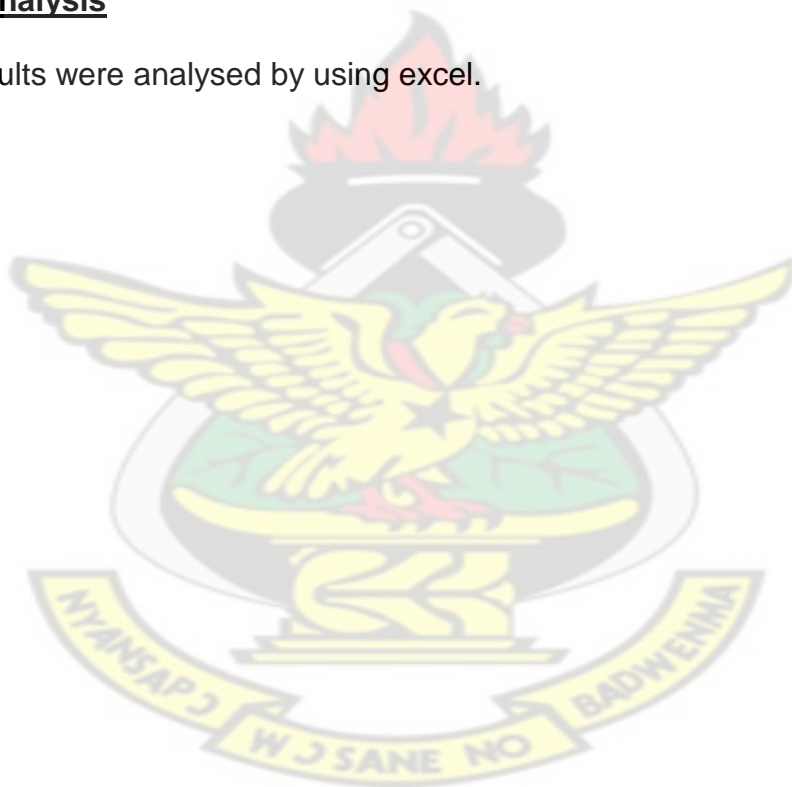
All hypertensive patients with BP of less than 250/100 mmHg and greater than 120/80mmHg who attended the hospital from 8th July to 16th September 2005 were considered.

2.1.5 Exclusion criteria

Hypertensive patients with complications and BP of greater than 250/100 and less than 120/80mmHg that required a tertiary/teaching hospital treatment intervention were excluded.

2.1.6 Data Analysis

The results were analysed by using excel.



2.2 RESULTS

The following were the results obtained from the completed questionnaires from 8TH July, 2005 to 16TH September 2005.

2.2.1 Age Distribution

Figure 2.1 shows that the ages of the sampled participants were normally distributed with the modal age between 60 and 69. The mean and median ages were 62.5 and 65 years respectively.

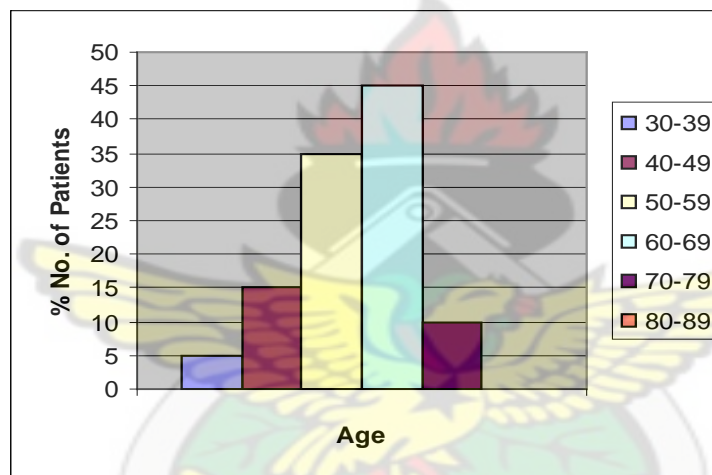


Fig 2.1 Age Distribution of hypertensive patients at Swedru Government Hospital (n=200)

2.2.2 Sex Distribution

Ninety (90) patients (45%) of the sample were males. 110 patients (55%) were females. (Fig. 2. 2)

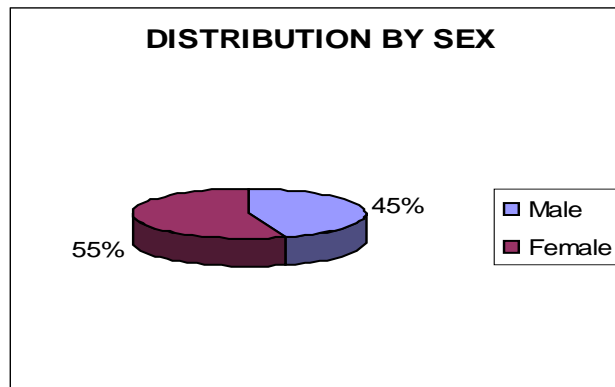


Fig 2. 2 Sex Distribution

2.2.3 Sedentary/non-sedentary Occupation

One hundred and twenty(120) patients (60%) who were classified to be non-sedentary. Eighty (80) patients (40%) were classified to be sedentary. Fig 2.3

A and B

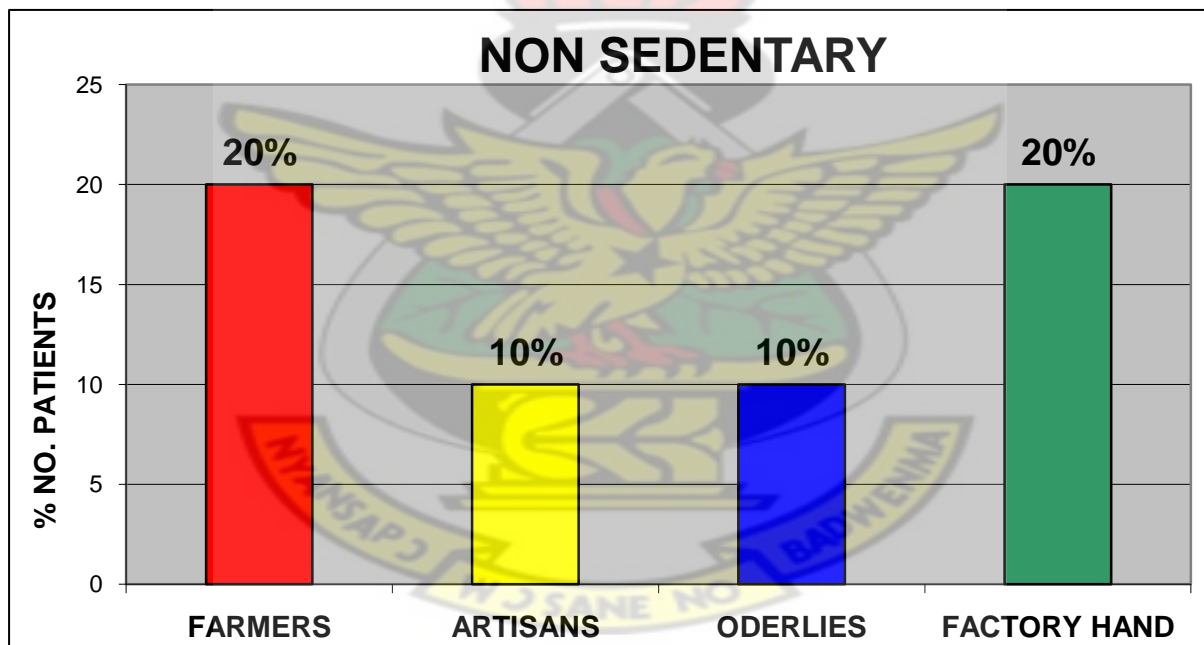


Fig 2.3 A Occupations (non-sedentary)

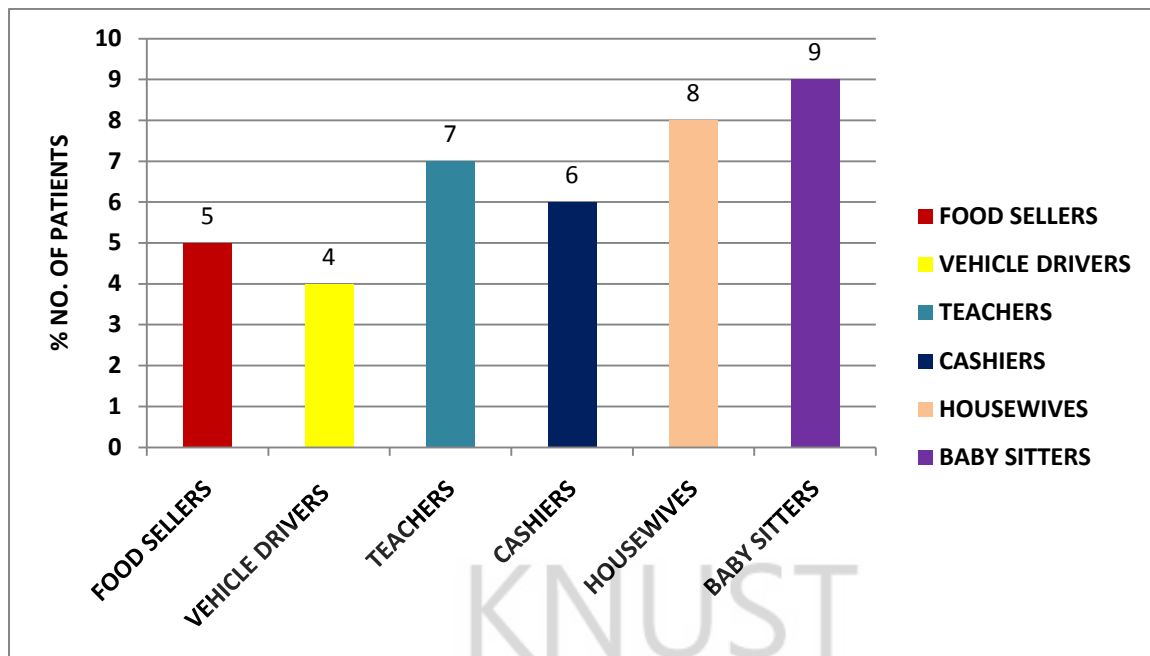


Fig 2. 3 B Occupations (sedentary)

2.2.4 Body Mass Index (BMI)

There were twenty-seven 27 male patients (13.5%) and 34 female patients (17%) who had BMI in the range of 30 – 40, representing the overweight group. 45 female patients (22.5%) and 36 male patients (18%) had BMI in the range of 25 – 29.9, representing the obese class . 19 females (9.5%) and 15 males (7.5%) in the range of 20 – 24.9, that is normal. 13 females (6.5%) and 12 males (6%) had less than 20 representing the underweight group. (Fig.2.4; 2.5).



Fig. 2.4 Body Mass Index (Males)

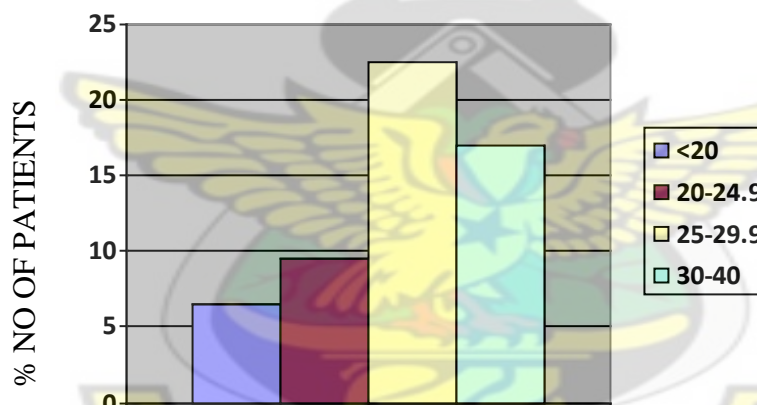


Fig. 2.5 Body Mass Index (Females)

2.2.5 Duration of Hypertension

There were forty (40) patients (20%) who had been diagnosed as being hypertensive for 1 month – year; 83 patients (41%) for 1 – 5 years; 40 patients (20%) for 5-10 years; 30 patients (15%) for 10 to 15 years; 7 patients (4%) for 15 and above years. (Fig.2.6)

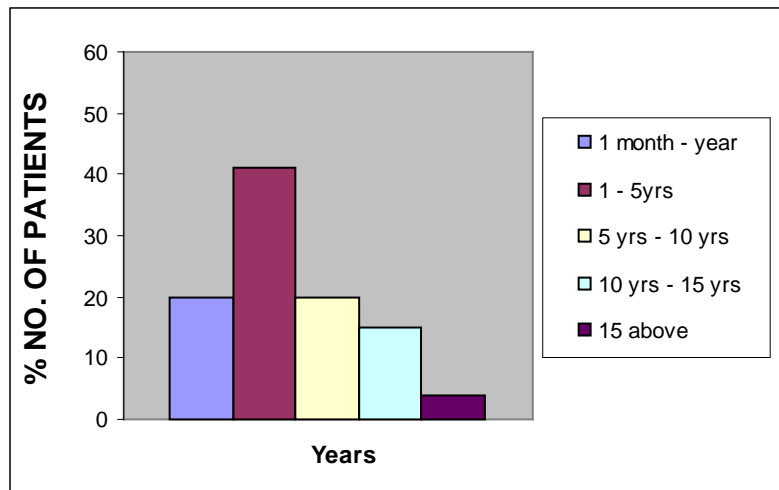


Fig.2.6 When Diagnosed Hypertensive

2.2.6 Blood Pressure on Diagnosis

Based on the BHS classification in table 1, twenty-three patients (11.5%) had Grade 1 hypertension (Refer to table 1). 127 patients (63.5%) had Grade 2 hypertension; 50 patients (25%) had Grade 3 hypertension. (Fig.2.7)

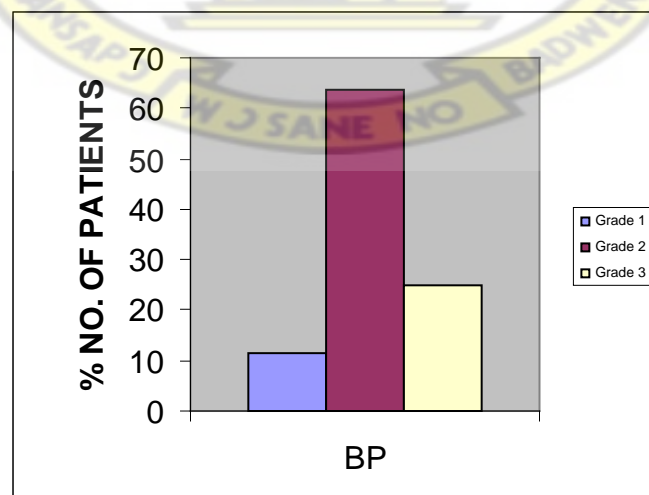


Fig.2.7 hypertension classification on Diagnosis

2.2.7 BP at the time of Interview

Ninety-two patients (46%) had their BP controlled that is 120–129/80–84. 50 patients (25%) fairly controlled that is 130-139/85-89 and 58 patients (29%) were not controlled. (Fig.2.8)

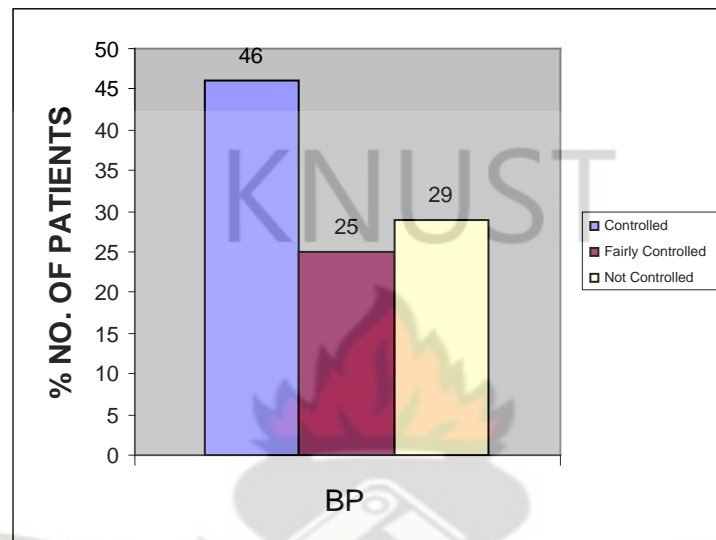


Fig.2.8 BP at time of Interview

2.2.8 BP Measurement

All the patients (100%) said BP was taken immediately after sitting. 150 patients 75% said the BP was taken only once and 25% said twice.

2.2.9 Counseling and Education on Hypertension

One hundred and seventy eight 178 patients (89%) said they had been educated on their condition. Twenty two, 22 patients (11%) responded that they had had no education. (Fig.2.10)

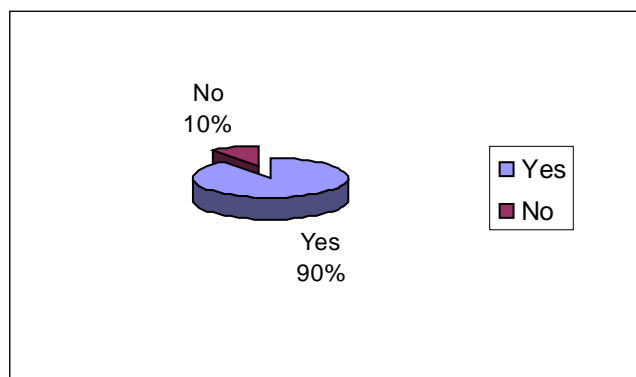


Fig.2.9 Education on Hypertension

2.2.10 Informed to come back for review

The majority (n=190) of patients were not informed to come back for review.

Only, 10 patients (5%) reported that they were told to come for review.

2.2.11 Identification of Drug

178 patients (89%) could identify the drug they were taken for BP control. 22 patients 11% said they did not know the drug. (Fig.2.11)

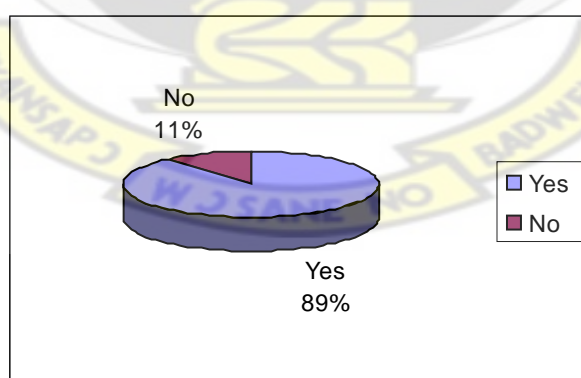


Fig.2 .10 Identification of Drug

2.2.12 Cost of Drugs

One hundred and twenty nine(129) patients (65%) could afford to pay for their drugs 43 patients. (21%) could not afford and 28 (14%) patients could not tell.

2.2.13 Dietary and Life-style changes

There were 115 patients (76%) who reported they were informed not to take alcohol, 40 patients (20%) were not advised to do so. Nine patients (4%) said they could not remember whether they were told or not..

One hundred and eighty- five(185) patients (92.5%) reported that they had been advised to reduce intake of salt and fatty food and increase intake of vegetable however 15 (7.5%) patients said they were not told.

One hundred and fifty (150) patients (75%) said, they were informed to stop smoking. 50 patients (25%) said they were not told.

There were 182 patients (91%) who reported they were told to do moderate exercise but avoid stress. However 18 patients 9% said they were not told.

2.2.14 Patient advised to take drug everyday to improve condition

One hundred and sixty-six(162) patients (81%) said they were advised to take drug everyday to improve condition and 23 patients (11%) said, they were not told. There was no response from 15 patients.

2.2.15 Side Effects

Seventy-three(73) patients (36%) did experience side effects, 119 patients (60%) did not have any side effects, 8 patients (4%) did not answer. Out of those who experienced side effects, 6% had headache and fatigue,5% had erectile dysfunction, 8% had sleep disturbances ,9% had dry cough ,and 8% had oedema. Fig.2.11 (The drugs in parentheses are suggestive ones that might cause that side effect.)

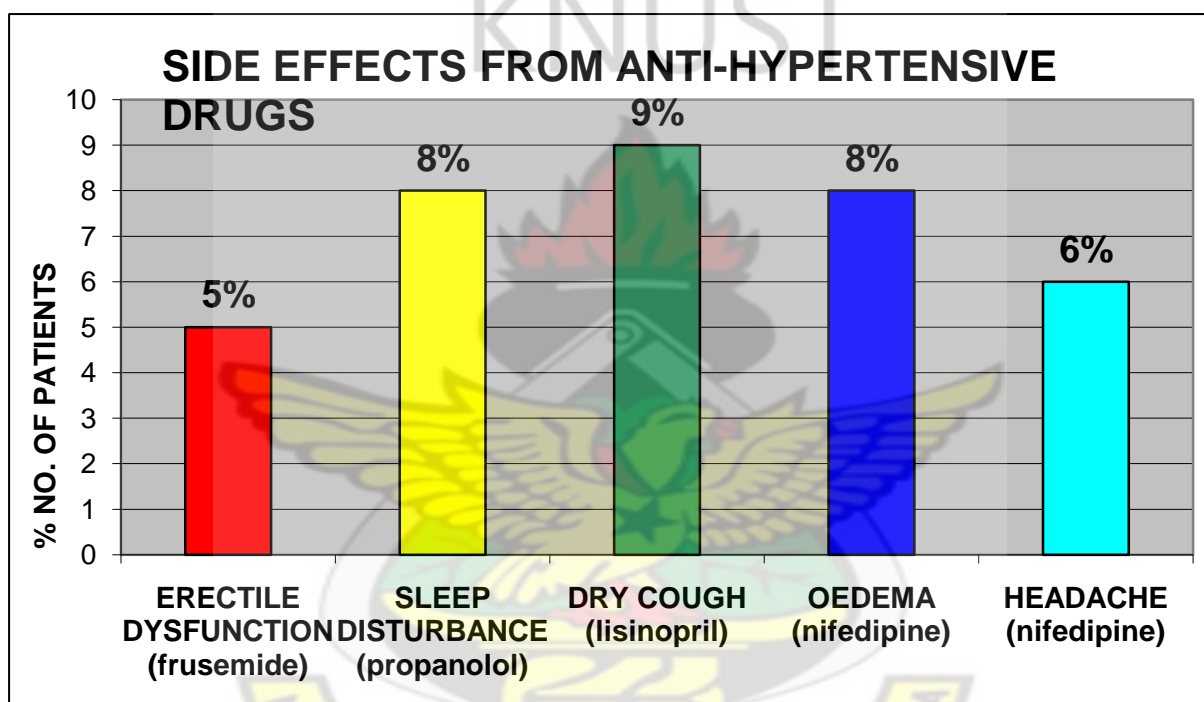


Fig.2.11 Side Effects from Antihypertensive Drugs

2.2.16 Complaints to Medical Officer/ Pharmacist

There were 73 patients (36%) who said they made a report to a Clinician or Pharmacist about this side effects they experienced. 118 patients (60%) did not make any report to the Clinician or Pharmacist. 9 patients (4%) could not say anything.

2.2.17 Patient informed that condition could only be managed

One hundred and sixty-eight(168) patients (84%) were told condition could be managed and not cured completely. 23 patients (11%) said they were not informed. 9 patients 4.5% did not respond.

2.2.18 Reasons for not taking the medication

Thirty patients (15%) did not adhere to antihypertensive regimen due to side effects. The cost of medication was also a factor for non adherence and 42 patients (21%) admitted that. Nevertheless 128 patients (64%) had no problem and fully complied in taking their drugs.

2.2.19 Therapeutic outcome

One hundred and eighteen(118) patients (59%) said they are satisfied and their conditions had improved. 60 patients (30%) said they were still not well and not satisfied with their medication. 7 patients (3.5%) could not tell and 15 patients (7.5%) did not respond. (Fig.2.12)

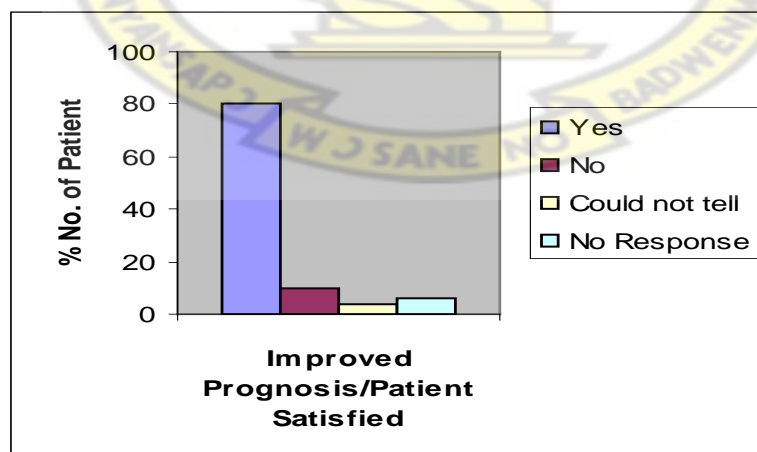


Fig.2.12 Therapeutic Outcome

2.2.20 Patient Education On Antihypertensive Drug

Sixty-nine patients (34.5%) reported they had fully adequate information about their medicines and how to use it. Eighty-eight patients (44%) had somewhat adequate information, 36 patients (18%) had inadequate drug information. 7 patients (3.5%) could not tell. Fig (2.13)

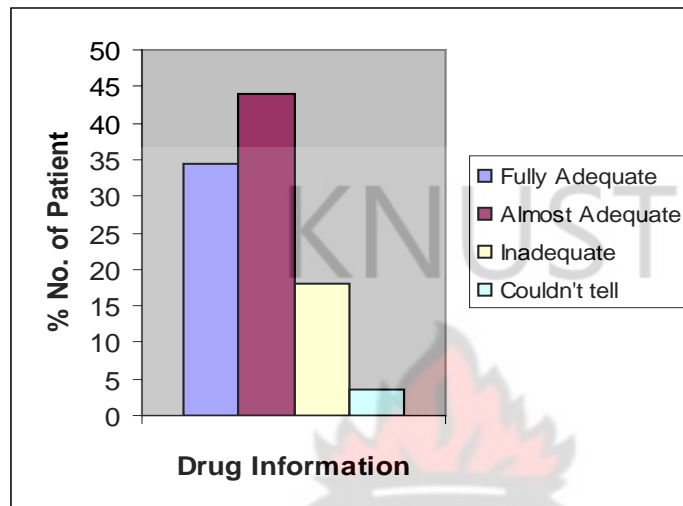


Fig.2.13 Drug Information

2.2.21 Concomitant Disease

There were 30 of the hypertensive patients (15%) who had diabetes, 20 of the patients (10%) had asthma. 10 patients representing (5%) had hyperlipidaemia; another 10 patients representing (5%) had gout; 16 patients (8%) of them had angina; another 10 (5%) had Bradycardia in addition to hypertension. 3 patients (1.5%) had renal insufficiency. (Fig.2. 14)

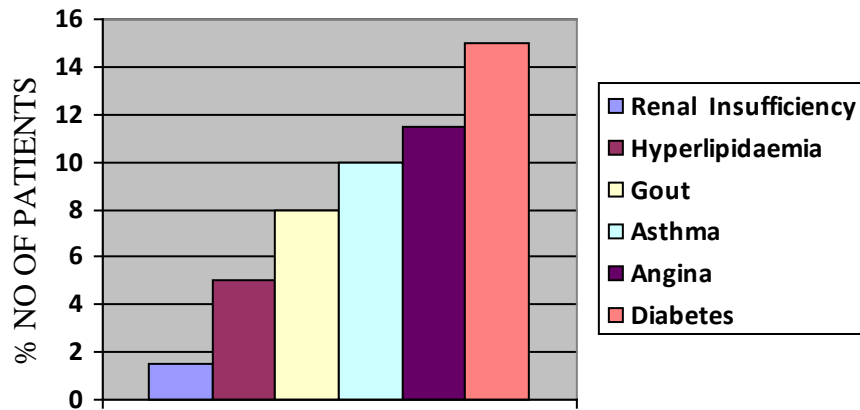


Fig.2. 14 Concomitant Disease

2.2.22 Routine Laboratory Test Performed

Electrocardiography (ECG) was not performed for any of the patients. 25 (12.5%) patients had a laboratory test on serum creatinine. 50 (25%) on plasma glucose; serum potassium was not performed on any of the patient. Serum Uric Acid was performed on 7 patients (3.5%); and Serum HDL Cholesterol was performed on 3 (1.5%) patients. (Fig.2.15)

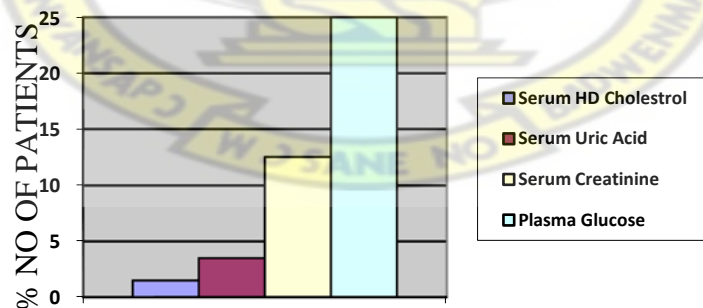


Fig.2.15 Routine Laboratory Test Performed

2.2.23 Anti-hypertensive Drug Prescribed

Ninety-five(47.5%) patients were receiving monotherapy of anti-hypertensive medication. Some were receiving β -blockers or calcium antagonists, or ACE- inhibitors .and 10 (5%) patients were receiving centrally-acting agents only. (Fig.2.16)

There were 105 (52.5%) patients who received combination therapy of anti-hypertensives medication. Some were receiving Diuretic and β -Blocker; diuretic and ACE-Inhibitors; calcium antagonist and diuretic; calcium antagonist and ACE Inhibitor; Others were on a β -Blockers and ACE inhibitors and finally 10 (5%) patients were receiving a β -Blocker and a Calcium Antagonist.(Fig.2.17)

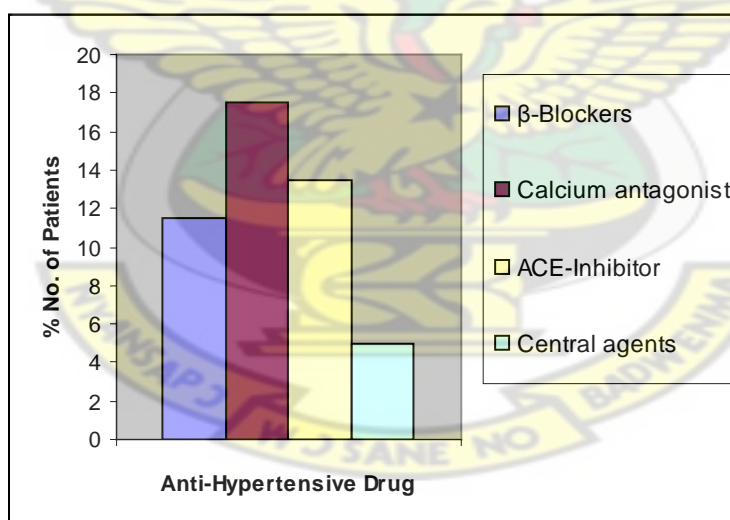


Fig.2.16 Anti-hypertensive Drug Prescribed (Monotherapy)

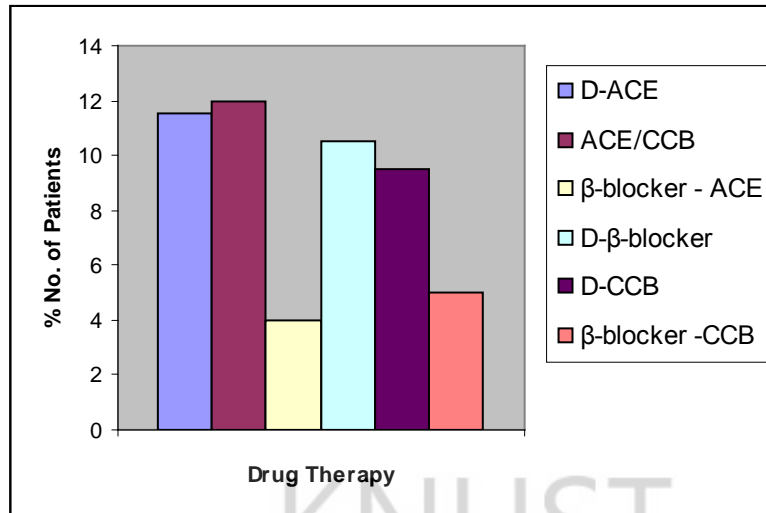


Fig.2.17 Anti-hypertensive Drug Prescribed (Combination therapy)

2.2.24 Adjuvant Medication

There were 50 (25%) client who were receiving low dose Aspirin and 40 patients 20% were receiving Statins.

2.2.25 Suspected Incompatibility; Drug Interaction and Adverse Drug Reaction

One hundred (50%) patients were receiving NSAIDS e.g. diclofenac and decongestant such as Ephedrine nasal drop in addition to their anti-hypertensive drug. 10 (5%) patients were receiving antidepressant specifically Amitriptyline tablets and 20 (10%) of the patients were receiving prednisolone, a steroid (Fig.2.18)

Five patients who were pregnant women were given Nifedipine and Thiazide. ACE Inhibitor and ACE-Receptor antagonist were never prescribed to them which was a good practice.

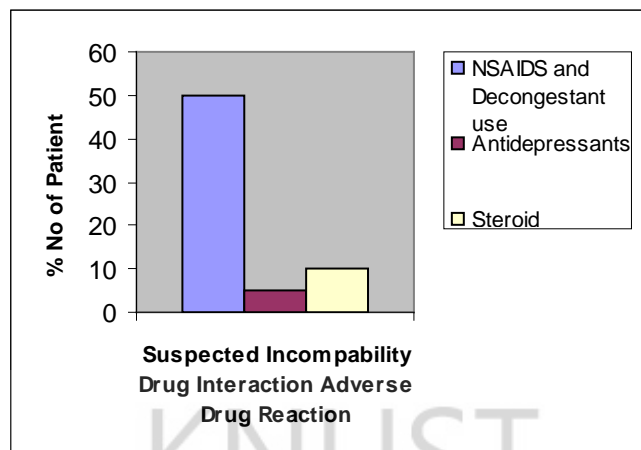


Fig.2.18 Suspected Incompatibility

2.38 Rational Prescribing

30 (15%) patients who were diabetics were given calcium antagonist. β -Blockers were not prescribed for asthmatic patients. 23 (11.5%) hypertensive and diabetic patients were given loop diuretic.

CHAPTER THREE:

DISCUSSION, CONCLUSION AND RECOMMENDATION

3.1 DISCUSSION

3.11 Prevalence

From the cross-sectional study, the results show that the prevalence of hypertension was highest at age 60 and above. The modal age was between 60 and 69 years (fig 2.1.). Patients at age 30 and below with hypertension may come from a family with history of vascular and heart diseases.

Eight people had been found to have been living with hypertension for 15 years. None of the hypertensive patients had been managed for more than twenty years. It could be possible that most patients might have lost their lives within twenty years due to crises or complications from hypertension.

Most of the BP readings were taken once and a few twice. However, the procedure required that BP should be taken at least two times and the average is taken.

3.12 Classification and Stratification

On the OPD cards or patient medication history cards, there was no classification of hypertension into Grades 1, 2 and 3 and there was no stratification into low risk, moderate risk and high risk. Classification and stratification are expected to guide the Medical Officer to prescribe rationally. Grade 1, low risk individuals are most likely to be given monotherapy of anti-hypertensive medication and Grade 2, moderate to very high risk are given combination therapy of anti-hypertensives.

3.13 Pharmaceutical Care

Uncontrolled BP may be due to a number of factors such as inappropriate medicine combination and non-adherence on the part of the patient

Inappropriate medicine selection was observed in a number of cases. From the medication history cards, diabetic patients were normally given monotherapy of antihypertensive medication, nifedipine 20mg twice daily which is not the drug of choice. Twenty patients (10%) with diabetes were given Nifedipine and therefore they were not assured of nephroprotection which is seen in patient given ACE – Inhibitor e.g. Captopril. The prevalence of hypertension is increased in patient with diabetes mellitus. There are two forms – type 1 and type 2. Available evidence indicates that patients might have a renal protection from the regular inclusion of ACE inhibitor in type 1 and of an angiotensin receptor antagonist in type 2 diabetes¹⁴

Again almost all the diabetic-hypertensive patient had their BP greater than 130mmHg. A combination therapy of anti-hypertensives medication would be acceptable or appropriate to reduce BP to acceptable level to prevent endpoint such as heart attack stroke and heart failure

From the medication history cards (Appendix III), it was also found that Nifedipine 20mg and Bendrofluazide 5mg combination was used. The patients on this combination did not benefit from the drugs. This was obvious from their respective blood pressures which were not significantly controlled, for the predicted ones were not achieved.

Beta-blocker and ACE-inhibitor combination has reduced effect. Wing et al¹³ conducted a randomized double-blind crossover study of enalapril and atenolol in 100 patients with hypertension. The predicted BP was reduced by 30% - 50% compared with monotherapy reductions.

From the OPD cards (appendix III), 8 out of 200 patients were given β -blocker and ACE-Inhibitor. From Wing et al, the combination of Atenolol and Lisinopril is not of any benefit to the patients. They are rather exposed to the side effects of the two drugs.

No β -blocker was given to asthmatic patients because they are contraindicated in asthmatics. They were given calcium antagonist e.g. Nifedipine which may have slight bronchodilator effect to improve their condition¹⁶. They were also given ACE-Inhibitor. . Three of the patients had severe renal insufficiency and two of them were given Thiazide e.g. bendrofluazide which should be avoided as it might be ineffective in these patients¹⁷. Thiazide inhibits sodium re-absorption at the distal convoluted tubules of the nephrons in the kidney. Thus for insufficient kidney, this mechanism of action by the drug might be defective. They were also given ACE-I, Lisinopril at a dose of 20mg daily which should be reduced to 5mg or 10mg daily. ACE-Inhibitor might precipitate renal failure in patient with renal insufficiency especially those renovascular disease. Thus, there was the need to start with a low dose and whilst monitoring the renal function.¹⁶

Steroids and anti-hypertensive drugs were given concurrently. 20 patients out of 200 patients were on steroids and anti-hypertensives and the two drugs show drug interaction. Steroids are known to increase BP and therefore the patient may not receive the expected BP control. 20 out of 200 patients under study were given NSAIDS for low back pain e.g. Piroxicam, Diclofenac always. This should be discouraged and rationally be given paracetamol. NSAIDS antagonize the hypotensive effect of some antihypertives..

Five percent of the patients had hyperlipidaemia (Appendix I, - Concomitant disease) and five of them were given diuretic e.g. Bendrofluazide 10mg daily and Atenolol 100mg daily. These two agents are known to worsen lipid profile

in higher doses and therefore in these patients, very low doses are recommended¹⁸. An adjuvant e.g. Fluvastatin 20mg could be added to the drug therapy provided total cholesterol is > 3.5mmol/l.

Statins are of good benefit when used in combination with other anti-hypertensives, especially for patients with hyperlipidaemia. Pregnant women who are hypertensive were given Nifedipine 20mg. Some were given thiazide or loop diuretic e.g. frusemide 40mg daily all the time. However, diuretic should be given to pregnant women with caution or avoided because of already compromised plasma volume which may be further reduced by the diuretics¹⁹.

3.14 Review, Monitoring and Laboratory Investigations

Review and monitoring were performed but not regularly. Less than 10% of the 200 clients studied were asked to come for review. Review is necessary to know the outcome of the treatment. This would promote the prescription of needs- related medicines for patients. No electrocardiography ECG was requested for all the patients and no serum potassium laboratory investigation was performed. Only three out of 200 patients were requested to do serum HDL-cholesterol and seven out of 200 were investigated for serum uric acid. 12.5% of patients were investigated for serum creatinine and 50% were for plasma glucose level. Laboratory investigations are directed at providing evidence of other risk factors, searching for secondary hypertension and assessing absence or presence of target organ damage²⁰. In that sense, all co-existing risk factors could be revealed and addressed to prevent high rate of morbidity and mortality. Each class of antihypertensive drug has its own monitoring parameter to be investigated and expected side effects to be monitored. E.g. prior to introduction of ACE-Inhibitor, renal function should be

monitored and this should be rechecked between one and two weeks before starting treatment. Potassium levels should be monitored during therapy since ACE-Inhibitors can cause hyperkalemia and adverse effects such as dry cough and metallic taste in the mouth²¹. Most importantly blood pressure should be monitored to ensure that the reading was falling.

The presence of microalbuminuria is both an early marker of renal damage and an indicator of increased cardiovascular risk. Ideally, a periodic laboratory investigation would alert health professionals for the necessary control measures to be put in place.

Complaints from patients about side effects were not adequately addressed. A patient on ACE-Inhibitor experiencing dry cough, should have his medication changed to one that is free of such side effect and others whilst maintaining its therapeutic outcome. Some of these patients had been taking lisinopril and a number of antibiotics to treat upper respiratory infection for one year. Some patients on propranolol were having sleep disturbance and they were given diazepam 5/10mg daily for every visit to the hospital which was inappropriate. Withdrawal of propranolol to replace with another antihypertensive drug to meet the therapeutic needs of the patients cannot be over-emphasized.

3.15 Lifestyle Changes, Non Adherence, Counseling and Drug Information

Even though a greater proportion of the patients were informed about lifestyle-changes, the proportion not informed, had significant negative impact on the management of hypertension in the facility. Lifestyle changes could reduce concomitant risk factors and could improve the control of BP . For others, it might result in the need for fewer drugs or lower dosage of drugs. Alcohol consumption is expected to less than 3 units per day for men and less

than 2 units for women. Salt intake is expected not to be more than 100mmol per day or 6kg sodium chloride per day. A blood pressure distribution curve of non-sedentary group would shift more to the left than the sedentary members compared to the optimal BP distribution curve, implies that there is increased physical activity in the non-sedentary group.

Less than 20% of the sample, both males and females had normal BMI and less than 15% were underweight. The remaining were obese and overweight and they had to work out weight reduction exercise.

Patient who were underweight should also be informed for a change to normal weight. Weight gain is a critical risk factor for patients to progress to type II diabetes.

BMI should be measured on every hypertensive patients that comes to hospital and recorded on the medication history card. This would help the health worker to know what counseling to give.

Non-adherence was exhibited by some patients for several reasons. The reasons included the adverse effects of drugs and quantity of pills they were supposed to be taking. The cost of medicine and inadequate drug information could also have contributed to poor adherence. Especially if patients were not informed that they were to take the drugs for life and that would increase their life expectancy. They should have been informed that even though they might experience some adverse effects, they needed to continue with their medications in order to derive the full benefit which outweighs the minor or temporary discomfort from side effects. Work schedule of certain hypertensive patients did not allow good adherence and

therefore such patients would not be able to take their medications as expected. Such patients could be prescribed with drugs that were taken once daily. Again, the aged who depend on other people to take their drugs may also show non-adherence if the person is not reliable. About a third of the patients were unable to pay for the cost of treatment. High cost of treatment might be due to many drugs per prescription and might be attributed to inappropriate combination and non-generic prescribing.

The study revealed that 15% of the patients experienced side effects. This could be attributed to inappropriate medicine selection and combination. Proper assessment of individual patient's needs related medicines might not be done and counseling notes were not taken into consideration.

According to Fig. 2.13 the number of patients with adequate drug information was very low and therefore extra work should be done by prescribers and dispensers to give adequate information on drugs and counseling on the use of medication by patients.

3.16 Therapeutic outcome

Just over half the patients involved in the study had improved conditions and were satisfied. This re-echoed the fact that there is room for improvement in the management of hypertension in the hospital. The above –mentioned factors when addressed could raise the number of patients with improved outcomes to over 160, which is over 80%.

3.2 Limitations

‘Social desirability’ was also a limiting factor. The subjects may indicate what they think is the correct choice or what they think the investigator wanted to hear. Workload on the part of prescribers and the health professionals did not create the enabling environment for quality management of hypertension.

KNUST



3.3 CONCLUSION

Management of hypertension is a challenging medical practice in Swedru District Hospital. Factors contributing to inappropriate management of hypertension include improper measurement of blood pressure, lack of classification and stratification of risk e.g. grade 1 low risk, grade 2 high risk. The rest were lack of enough education on lifestyle modifications, drugs and education about the conditions to clients on the part of prescribers and dispensers; lack of regular review and monitoring, non-adherence to taking the prescribed drug by the patient; irrational medicine prescription and the presence of concomitant disease.

3.4 RECOMMENDATION

Routine measurement of BP of all patients that attend the hospital should be performed to increase detections and management of hypertensive patients. The classification of BP and stratification of risk should be written on the patient records. This will help the clinicians prescribe rationally. Some incentives could be given to prescribers who are able to achieve average consulting time of over 7.5 minutes. This sort of motivation can improve the performance of the prescribers.

Again, prescribers should be encouraged to refer patients to a teaching or regional hospital when attempts of achieving blood pressure control were not encouraging. Prescribers and Pharmacists should be urged to educate the patients very well and let them know that the consequence of non-adherence could be fatal. Simple dosage regimen should be prescribed normally to the patient to improve adherence e.g. once a day.

The prescribers should be sensitized on the issue of inappropriate combination and non-generic prescription by organizing monthly clinical meetings to reduce

the number of drugs per prescription whilst maintaining the best clinical outcome.

Also the sphygmomanometer should be calibrated periodically to meet quality assurance

Prescribers should be encouraged to closely monitor and review cases to always achieve an appreciable clinical outcome. Information on lifestyle measures like avoidance of high cholesterol foods and fatty meals should be well stressed to the patient by the pharmacist/prescriber/dispenser.

Medicines and therapeutic committee should develop a protocol on counseling for hypertensive patients. This could be laminated and hung on the wall of consulting rooms and the dispensary and made available to clinical team. Again, protocol on rational combination of anti-hypertensive medicines could also be treated in the same way.

Develop a protocol for hypertension management that covers screening policy, investigations, and treatment targets and follow up strategies. Methods for identifying and recalling patients who drop out should also be developed. Written information should be made available to patients about hypertension and its treatment.

REFERENCES

1. Swedru District Hospital 2004 Annual Report
2. Zanchetti Alberto, Hanet Pavel, Hanson Lennart, Martin Ingrid, Mimran Albert, Sleight Peter et al 2003, European Society of Cardiology Guidelines for the Management of Arterial Hypertension 2003;6: 1012
3. Ramsay Lawrence E., Williams Bryan, Johnson G Dennis, McGregor Graham A et al. British Hypertension Society Guidelines for Hypertension Management BMJ 1999 (319:630 – 635)
4. Alderman Michael , Kikuo Arakawa, Lawrie Berlin et al 1999 WHO/ISH Hypertension Practices Guidelines for Primary Care Physicians
5. O'Brien ET, Petrie JC Littler, WA De Sweet M, Padfield P D, Dillion M J et al. Blood Pressure Measurement: Recommendations of the British Hypertension Society, 3rd ed. London BMJ Pub. 1997
6. Alderman M H. Blood Pressure Management: Individualized Treatment Based on Absolute Risk and the Potential for Benefit. Ann Intern Med 1993; 1991: 329-335
7. Law M , Wald N, Morris J .Lowering Blood to Prevent Myocardial Refraction and Stroke; A New Preventive Strategy Health Technol 7(31): 1-94
8. Houston MC, Non-steroidal Anti-Inflammatory Drugs and Anti-hypertensive; American Journal of Medicine 1991; 190; (suppl 5D): 42S – 47S
9. Pouller N. Thompson AV Server PS 4 Double-Blood Placebo-Controlled Crossover trial to investigate the additive hypertensive effect of a diuretic to

that produced by nifedipine J. Cardiovasc. Pharmacol. 1987; 10 (suppl 10): S53-5

10. Cappuccio FP, Markandu ND, Singer DRJ et al. A Double-blind crossover study of the effect of concomitant therapy in Hypertensive patients treated with amlodipine Am J Hyperten. 1991; 4:297-302
11. Cappuccio FP MacGregor GA. Hypertensions Pathophysiology Diagnosis and Management. New York Raven Press Ltd 1995: 2969 – 82
12. Timmermans PBM, Worg PC Chu AT et al. Angiotensin receptor and angiotensin] Receptor antagonist. Pharmacol Rev 1993; 45:205-251
13. Wing LMH, Chaimers JP, West MJ et al Enalapril and atenolol in essential Hypertension attenuation of hypotensive effects In combination Clin Ex Hypertension 1988; 10: 119-133
14. Smith D, Neutsh Jm, Jankelow D, et al A Comparative study of atenolol, nifedipine and their combination in the treatment of hypertension S. Afr med J 1991; 79:12-15
15. Pool JL, Gennari J, Goldstein R et al. Controlled, Multicenter study of the antihypertensive effects of lisinopril, hydrochlorothiazide and Lisinopril plus hydrochlorothiazide in the treatment of 394 patients with mild to moderate essential hypertension J .Cardiovasc.. Pharmacol 1987; 9 (supply 3): S 36-42.
16. BNF British National formulary (BNF) 2005; 49:72-73
17. Curb JD Pressel SL, Cutler JA, Savage PJ, Aplegate WB Black H, et al for the systolic Hypertension in the Elderly Programme Co-operative Research Group. Advantage of diuretic-based antihypertensive treatment on cardiovascular disease risk in older diabetic patients with isolated systolic hypertension.. JAMA 1996; 276: 1886 – 1892.

18. Kasiske BI, Kahl. RSW et al. Effect of antihypertensive therapy on the kidney in patients with diabetes: a Meta – regression analysis Ann Int Med 1993; 18 8: 129 - 138
- Sleight et al, World Health Organisaton (WHO), International Society Of Hypertension, (ISH), Practice, Guildlines, For, Primary, Care, Physicians, 1999; 45:1-12.
19. Fishmay WH Effects of Non-steroidal Anti-inflammatory Drug Therapy on Blood Pressure and Peripheral Edema Am J Cardiol. 2002; 89:18D – 25D
20. Chalmers, Paul Chusid, Jay N Cohn, Ingrid Martin, Karl-Heinz, Rahn Peter S.



APPENDIX I

2.1.3 Questionnaire for hypertensive patient

The questionnaire sought information on the following:

- (1)(i) How old are you?
(a) 30-39 (b) 40-49 (c) 50-59 (d) 60-69
(e) 70-79 (f) 80-89
- (ii) Sex: tick Male Female
☐ ☐
- (iii) Weight (iv) Height
- (v) What is your occupation?
- (2) When were you diagnosed as hypertensive?.....
What was your
(i) BP.....what is your BP now?.....
(ii) Pulse.....what is your pulse now?.....
(iii) (a) How long were you allowed to sit before BP measurement.
- (b) How many times was BP measurement taken?.....
- (3) What education were you given on your disease condition.....
- (4) Were you told to come back for review?.....
- 5) What drugs are you taking for your hypertension? Name and/or describe
.....
- (6) How much do you normally pay for your prescribed drugs for each visit to the hospital?
- (7) What counsel were you given on the following :
(i) smoking.....
(ii) alcohol.....

(iii) salt, fatty food and vegetable intake.....

(iv) exercise.....

Did you follow?

(8) Were you told never to stop taking your drug and that you are taking it throughout your life?

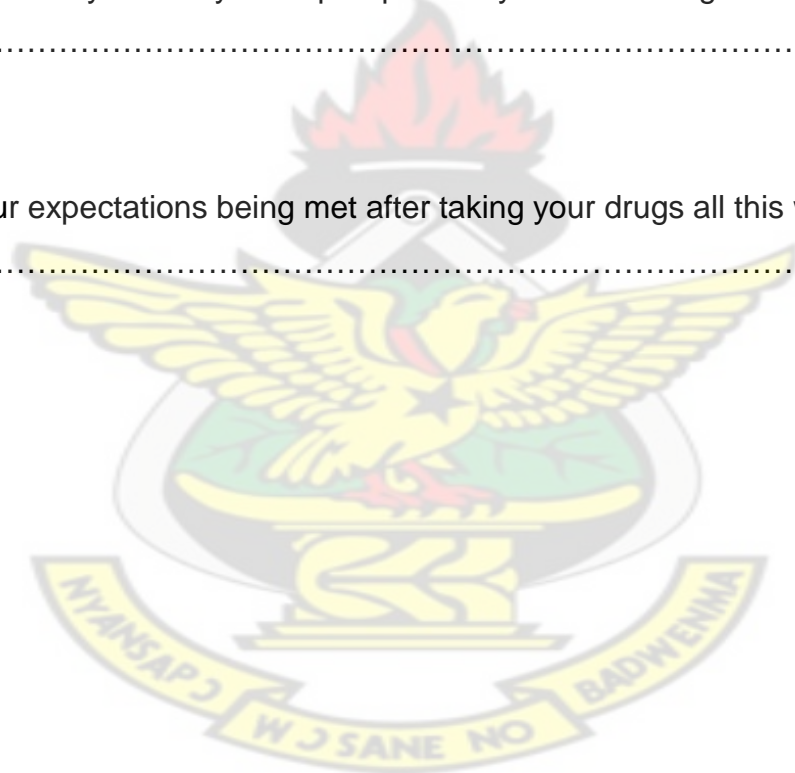
(9) Were you told that your condition could only be management but not treated?

(10) (a) Do you experience drug uneasiness (side effects) after taking your drug?.....

(b) Have you reported any of these side effects to your Doctor/pharmacist?

(11) What normally makes you stop or prevent you from taking the drug?

(12) Are your expectations being met after taking your drugs all this while?



APPENDIX II RESPONSE TO QUESTIONNAIRE

No	INDICATOR	RESPONSE	NO	%
1	Age	30-39 40-49 50-59 60-69 70-79 80-89	10 30 70 90 20 -	5 15 35 45 10 -
	Sex	Male Female	90 110	45 55
	BMI	30 – 40 25 - 29.9 20 - 24.9 <20	61 81 35 23	30.5 40.5 17.5 1.5
2	When diagnosed of Hypertension	1 month - year 1 - 5yrs 5 yrs - 10 yrs 10 yrs - 15 yrs 15 above	40 83 40 30 7	20 41 20 15 4
	BP on diagnosis	mild moderate severe	23 127 50	11.5 3.5 25
	BP at time of Interview	Controlled Fairly Controlled Not Controlled	92 50 58	46 25 29
3	Had education on condition	Yes No	178 22	90 10
4	Review	Yes No	10 190	5 95
5	Could identify name of drug	Yes No	178 22	90 10
6	Cost of drugs	Affordable Not Affordable Could not tell	129 43 28	65 21 14
7	Advised not take alcohol	Yes No Don't remember	151 40 9	76 20 4
(I)	Comply not taking alcohol	Yes No No Response	158 33 9	76 20 4

(ii)a	Advised to reduce intake of salt and fatty food and increase intake of vegetables	Yes No No Response	185 10 5	93 5 2
b	Comply to do so	Yes No No Response	180 15 5	90 7.5 2.5
(iii)a	Advised to do moderate exercise but avoid stress	Yes No	149 51	75 25
b	Comply to do so	Yes No	149 51	75 25
(iv)a	Advised to stop smoking	Yes No	150 50	75 25
b	Comply to do so	Yes No	145 55	72.5 27.5
8	Advised to do moderate exercise and avoid stress	Yes No Somehow	162 23 15	81 11 8
9	Advised to take drug everyday to improve condition	Yes No No Response	162 23 15	81 11 8
10	Informed that condition could only be managed	Yes No No Response	168 23 9	85 11 4
11	Feel uneasy on taking drug (Side effects)	Yes No No Response	73 119 8	36 60 4
12	Made a report to Medical officer/ Pharmacist	Yes No Couldn't tell	73 118 9	36 60 4
13	Reason for non-compliance	Problem of drug Economical No Problem	30 42 128	15 21 64
14	Improved outcome/ patient satisfied	Yes No Could not tell No Response	118 60 7 15	59 30 3.5 7.5
15	Drug Information	Fully Adequate Somewhat adequate Inadequate Couldn't tell	69 88 36 7	34.5 44 18 3.5

APPENDIX III

Retrospective Analysis of medication history card

Table of Results

Indicator	Observation	No	%
Concomitant Disease	Diabetes	30	15
	Asthma	20	10
	Hyperlipidaemia	10	5
	gout	16	8
	Angina	20	11.5
	Renal insufficiency	3	1.5
Routine Laboratory Test Performed	Electrocardiography (ECG)	-	-
	Serum Creatinine	25	12.5
	Plasma glucose	50	25
	Serum Potassium	-	-
	Serum Uric Acid	7	3.5
	Serum HD-Cholesterol	3	1.5
Anti-hypertensive Drug Prescribed	Monotherapy	95	47.5
	β-Blockers	23	11.5
	Calcium antagonist	35	17.5
	ACE-Inhibitor	27	13.5
	Central agents	10	5
	Combination therapy	105	52.5
	(1) Diuretic and β-blocker	21	10.5
	(2) Diuretic and ACE inhibitor	23	11.5
	(3) Calcium antagonist and Diuretic	19	9.5
	(4) Calcium and ACE-inhibitor	24	12
Adjuvant Medications	(I) Aspirin 75mg daily	50	25
	(ii) Statins e.g. fluvastatin 10mg daily	40	20
Clinical Condition			
(I) Pregnancy	Nifedipine and Thiazide/loop diuretic	5	2.5
	ACE-1	-	-
	ACE- R	-	-

Suspected incompatibility	NSAIDS and Decongestant use	100	50
Drug interaction	Antidepressants	10	5
Adverse drug reaction	Steroid	20	10
Not rationally prescribed	Calcium antagonist e.g. Nifedipine given diabetic patient	30	15
	β -blocker given to asthmatics	-	-
Not rationally prescribed	loop diuretic given to diabetes	23	11.5
Enhanced side effect	β -blocker to elderly hypertensive Patient	20	10
Contraindication	Thiazide given to hypertensive patient with renal insufficiency	3	5

