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Prescribing patterns of antihypertensive agents and assessment of co-morbidities in hypertensive patients

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ABSTRACT

This guide is structured to assist physicians in the management of those hypertensive patients who present with specific comorbidities, such as diabetes, systolic dysfunction, obesity, renal disease, or previous cardiac events, often associated with hypertension. The clinical cases contained in this book have been selected to provide a paradigmatic set of scenarios frequently encountered in daily clinical practice, and will serve as an easy-to-access tool in applying general guidelines to individual patients, particularly in the choice of the most appropriate antihypertensive therapy. Treatment of hypertension with associated clinical conditions requires specific therapies and combinations of drugs, which are necessarily different from one comorbidity to another. By discussing exemplary cases that may better represent clinical practice in a “real world” setting, and analyzing step by step the diagnostic and therapeutic process, this book will assist cardiologists and physicians in selecting the diagnostic tools and forms of treatment best suited to the individual patient and the particular cardiovascular risk profile.

Keywords: Hypertension, diabetes and co-morbidities in hypertensive agents.

INTRODUCTION

Hypertension (HTN) is stated as “the persistently elevated arterial blood pressure (BP)”. Blood pressure is quantified as systolic and diastolic pressure measured in mm Hg. The systolic blood pressure represents the pressure due to ventricular contraction during systole whereas; diastolic pressure represents the pressure of ventricular relaxation in diastole. Although elevated blood pressure is regarded as essential for adequate perfusion of essential organs during the early and middle 1900's, it is now considered as one of the most significant risk factors for cardiovascular diseases(CV). Outcome trials have shown that anti-hypertensive drug therapy significantly reduces the risk of cardiovascular events^{1, 2} The vital goal of treating hypertension is to decrease hypertension associated morbidity and mortality. A goal BP of less than 140/90 mm Hg is suitable for general anticipation of cardiovascular events and cardiovascular deaths. However, achieving Blood Pressure of less than 130/80 mm Hg goal is

recommended in patients with co-morbid conditions like Diabetes, significant Chronic Kidney Disease, known Coronary Artery Disease (ischemic stroke, transient ischemic attack, peripheral artery disease, abdominal aortic aneurism), patients with left ventricular dysfunction (Systolic Heart Failure) must have a goal Blood Pressure of less than 120/80 mm Hg.³

MATERIALS AND METHODS

Study Design: This is an observational study conducted over a period of 6 months. The individuals who met the inclusion criteria are taken into consideration. The patients are included according to their interests and willingness in order to carry out the study.

Collection of Data

- ❖ Patients demographics.
- ❖ Prescription chart.

- ❖ Nursing notes.
- ❖ Medical records.
- ❖ Doctors notes.

Inclusion Criteria

- ❖ Patients above 20 years of age.
- ❖ Blood pressure above 120/80.
- ❖ In patients with case notes and laboratory investigations.
- ❖ Patients with co-morbid conditions.

Exclusion Criteria

- ❖ Paediatric department.

- ❖ Patients below 20 years of age.
- ❖ Pregnant and lactating women.

Methods and Collection Of Data

The individuals are examined including their-

- ❖ Chief complaints
- ❖ History of present illness
- ❖ Past disease history
- ❖ Past medications
- ❖ Complaints on any allergy to drugs
- ❖ Interview with patient or caretakers
- ❖ Patients prescription
- ❖ Medical records of inpatients.

RESULTS AND DISCUSSION

Table 1: Categorization Based on Age and Gender

COUNT OF AGE	NUMBER OF MALES	NUMBER OF FEMALES
20-29	1	2
30-39	8	9
40-49	19	22
50-59	17	32
60-69	35	40
70-79	25	18
80-89	11	10
90-99	0	1

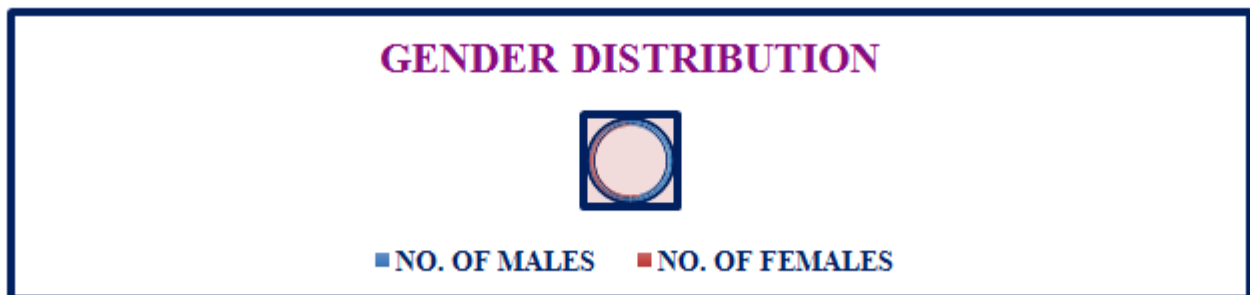


Figure 1: categorization based on age and gender

Table 2: Hypertensive History of Patients

HYPERTENSIVE HISTORY	NUMBER OF PATIENT'S
1	5
2	3
3	26
4	11
5	20
6	12
7	16
8	15
9	26
10	9
11	1
12	24
14	1
15	53
20	28

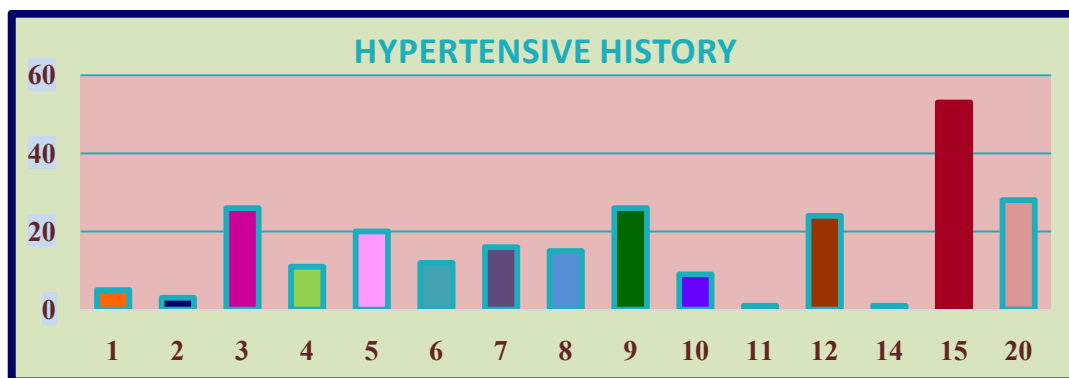


Figure 2: hypertensive history of patient's

Table 3: Blood Pressure Categorization

STAGES OF BLOOD PRESSURE	SYSTOLIC BLOOD PRESSURE	DIASTOLIC BLOOD PRESSURE
NORMAL	24	28
ELEVATED	38	75
STAGE-1	92	94
STAGE-2	74	52
HYPERTENSION CRISIS	22	1

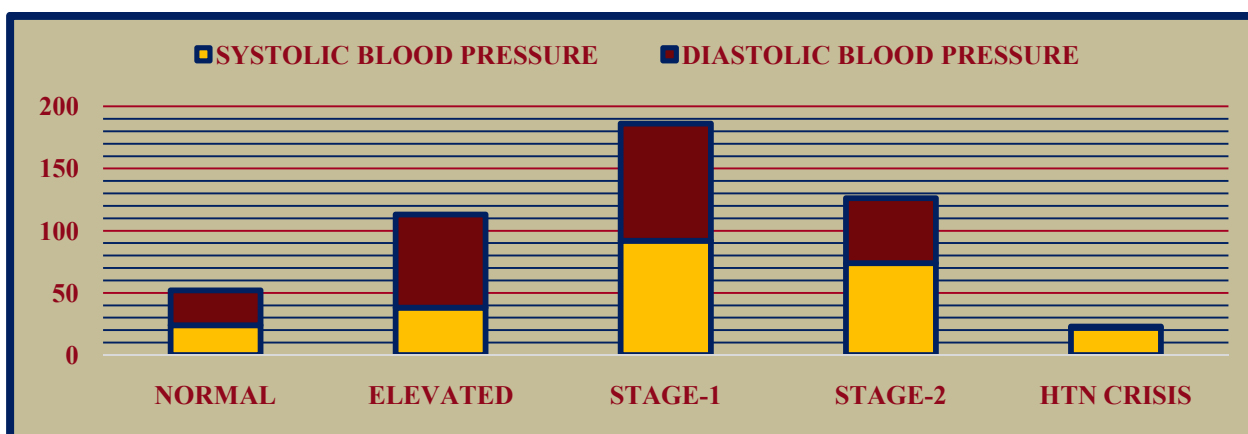


Figure 3: Blood Pressure categorization

Table 4: Mean Arterial Pressure

Mean Arterial Pressure Types	No. of Patients	Percentage
Normal	125	50%
Bottom Line	71	28.4%
High	54	21.6%

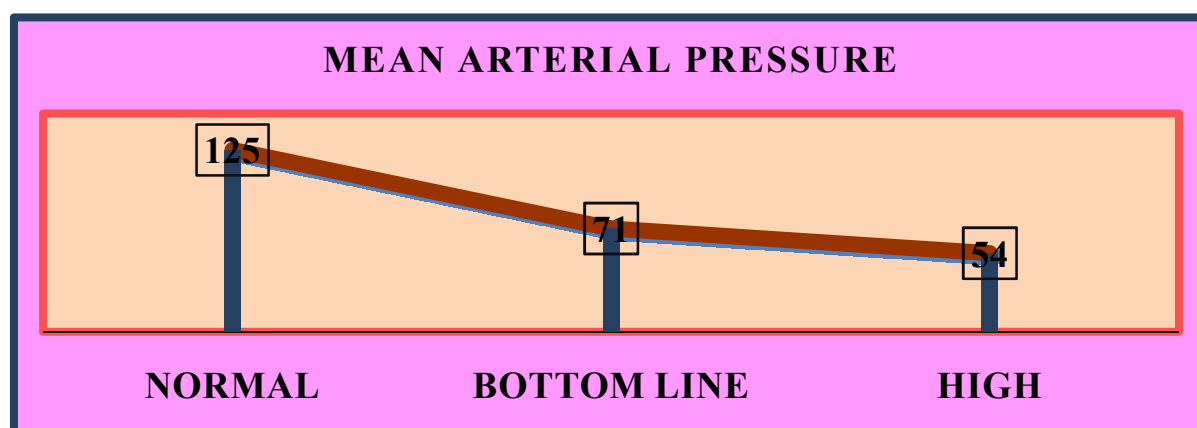
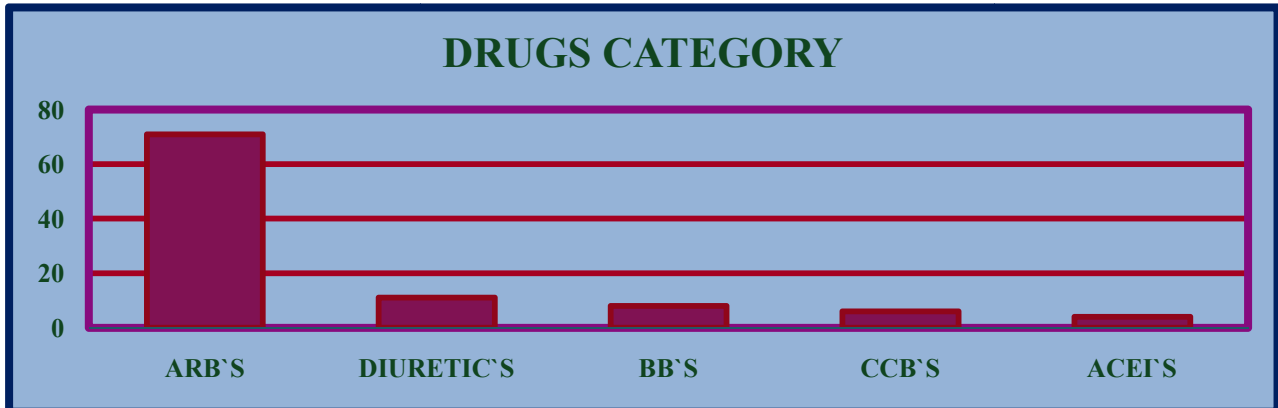


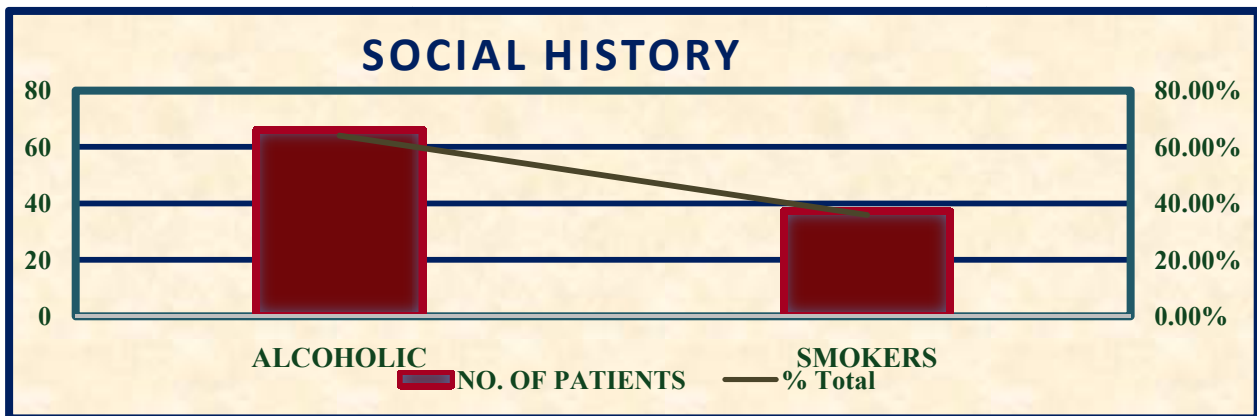
Figure 4: Mean Arterial Pressure

Table 5: Antihypertensive Drugs Category

Antihypertensive Drugs Category	Number of Patient's	Percentage
ARB'S	71	28.4%
DIURETIC'S	11	4.4%
BB'S	8	3.2%
CCB'S	6	2.4%
ACEI'S	4	1.6%

**Figure 5: Antihypertensive Drugs Category****Table 6: Social History of Hypertensive Patient's**

Social History	Number of Patients	Percentage
Alcoholic	66	26.4%
Smokers	37	14%

**Figure 6: Social History of Hypertensive Patient's****Table 7: Antihypertensive Mon therapy**

Antihypertensive Drugs	Number of Patient's	Percentage
Telmisartan	57	22.8%
Amlodipine	7	2.8%
Furosemide	6	2.4%
Nifedipine	3	1.4%
Captopril	3	1.4%
Metoprolol	2	0.8%
Torsemide	2	0.8%
Losartan	2	0.8%
Olmesartan	2	0.8%
Propanolol	1	0.4%
Ramipril	1	0.4%
Terlipressin	1	0.4%

Atenolol	1	0.4%
Valsartan	1	0.4%
Carvidelol	1	0.4%
Mannitol	1	0.4%
Bisoprolol	1	0.4%
Vasopressin	1	0.4%

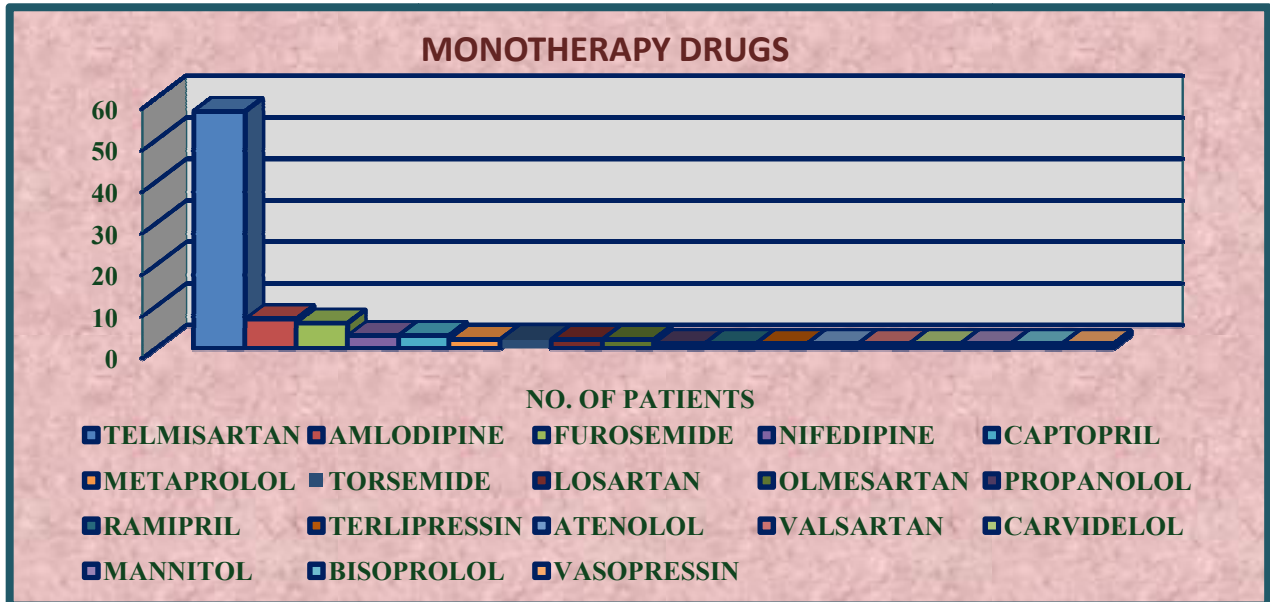


Figure 7: Antihypertensive Mono therapy

Table 8: Antihypertensive Dual Therapy Category

Anti-hypertension Dual Therapy	Number of Patient's	Percentage
CCB'S+ARB'S	22	8.8%
ARB'S+BB'S	20	8%
Diuretic +ARB'S	17	6.8%
CCB'S+BB'S	16	6.4%
ACEI'S+ARB'S	16	6.4%
Diuretic +Diuretic	3	1.2%
BB'S+BB'S	3	1.2%
Diuretic +CCB'S	2	0.8%
Diuretic +ACEI'S	2	0.8%
ACEI'S+BB'S	2	0.8%
Nitrates +ACEI'S	1	0.4%
Diuretic +Alpha Blocker	1	0.4%
CCB'S+ACEI'S	1	0.4%
CCB'S+CCB'S	1	0.4%

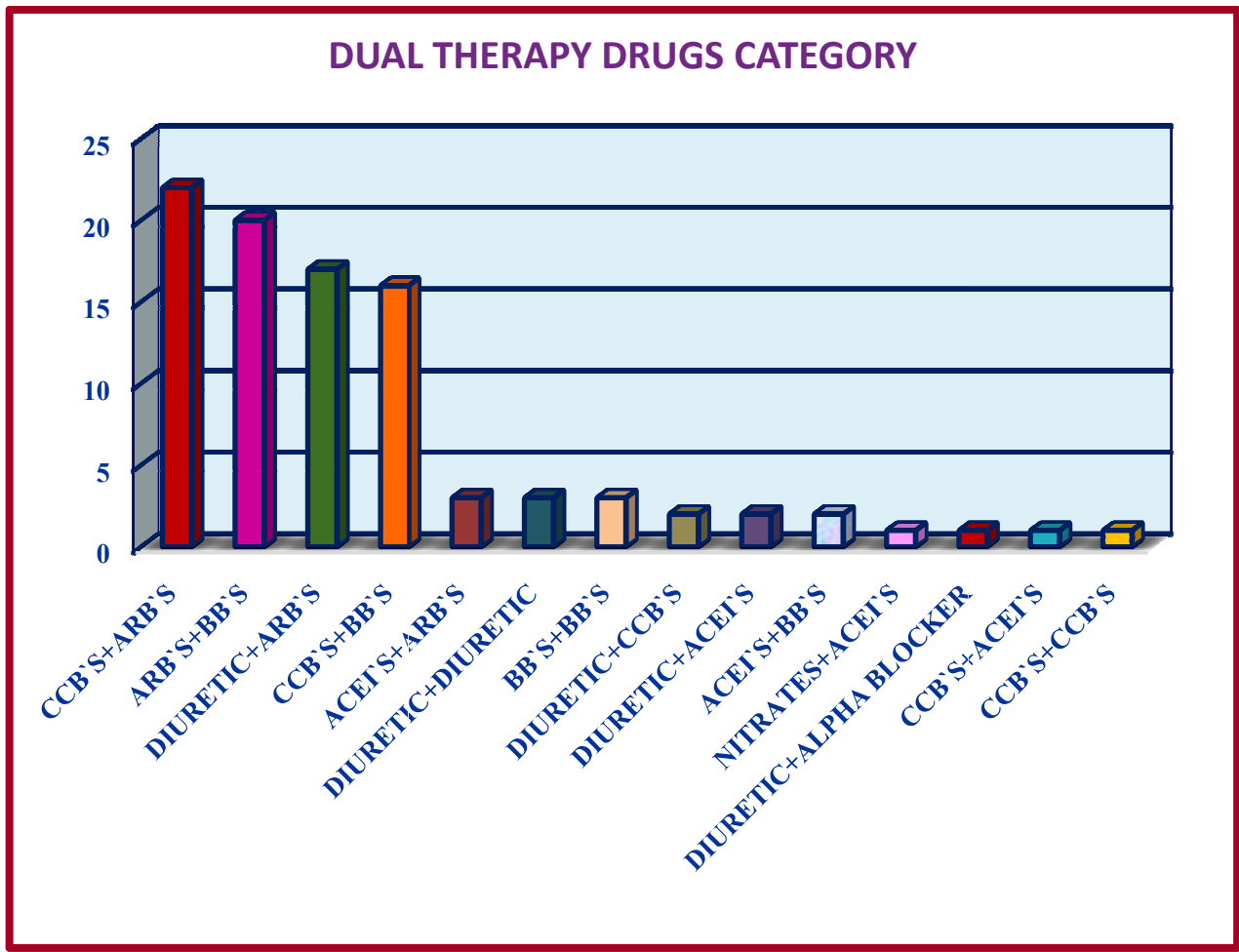


Figure 8: Antihypertensive Dual Therapy

Table 9: Antihypertensive Triple Therapy Category

Antihypertensive Triple Therapy Category	Number of Patient's	Percentage
CCB'S+BB'S+ARB'S	20	8%
ARB'S+CCB'S+ Diuretics	3	1.2%
ARB'S+ Diuretics+ Nitrates	3	1.2%
Diuretic +ARB'S+BB'S	2	0.8%
Alpha Blocker +ACEI'S+ Diuretic	2	0.8%
BB'S+ Nitrates+ Diuretics	1	0.4%
Diuretics +BB'S+ACEI'S	1	0.4%
CCB' Alpha Blocker+ARB'S	1	0.4%
Diuretic +CCB'S+ Alpha Blocker	1	0.4%
Alpha Blocker +ARB'S+ Diuretics	1	0.4%

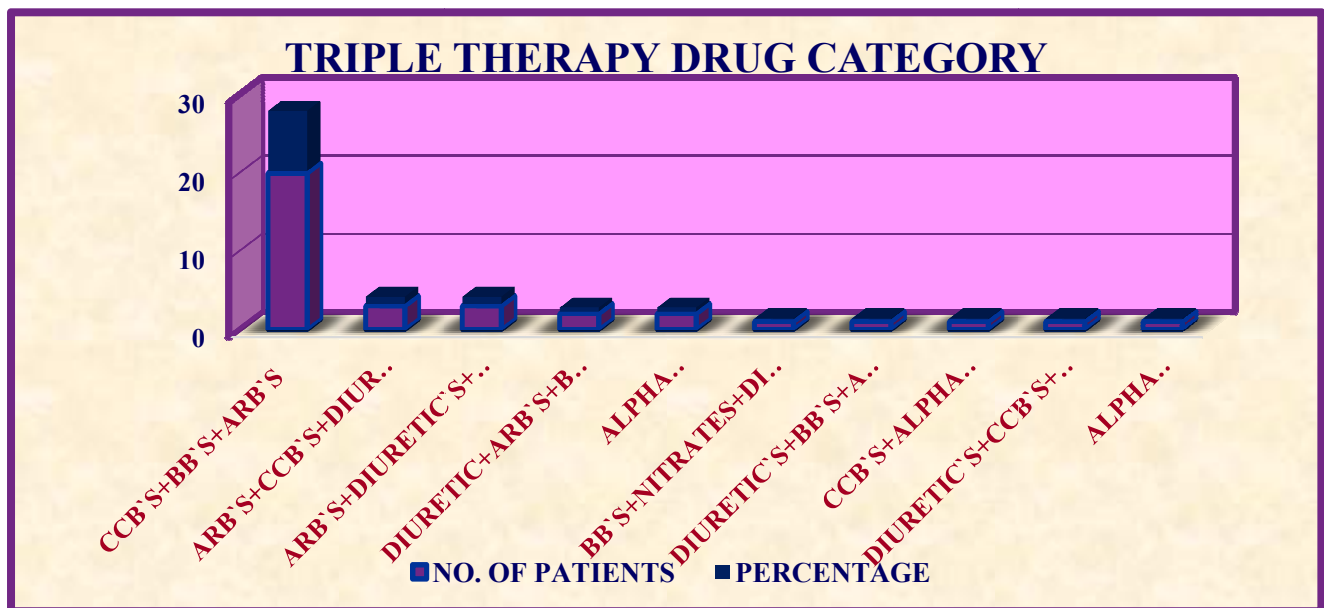


Figure 9: Antihypertensive triple therapy category

Table 10: Single Co-Morbidity

Single Co-Morbidity	Number Of Patient'S	Percentage
ID	19	7.6%
CAD	10	4%
CKD	8	3.2%
BD	7	2.8%
RD	7	2.8%
CVA	3	1.2%
LD	3	1.2%
CD	2	0.85
UTI	2	0.8%
GD	2	0.8%
ACC HTN	2	0.8%
AKI	1	0.4%
TIA	1	0.4%
HG	1	0.4%
FI	1	0.4%
RC	1	0.4%
ND	1	0.4%
VD	1	0.4%
IH	1	0.4%
UC	1	0.4%
DM	1	0.4%
LD	1	0.4%

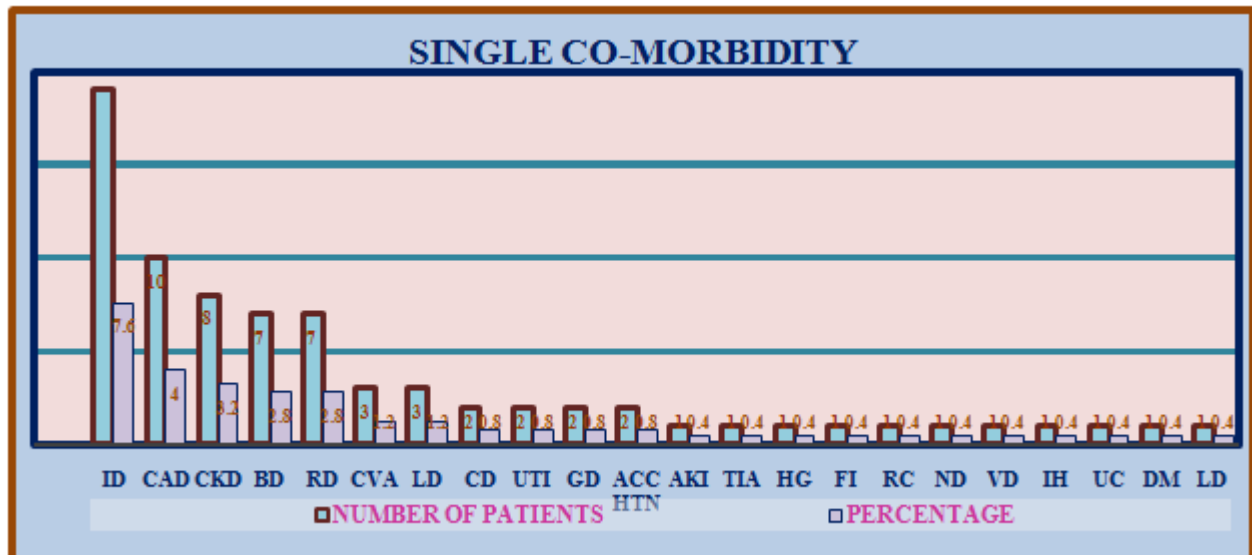


Figure 10: single co-morbidity

Table 11: Dual Co-Morbidity

Dual Co-Morbidities	Number of Patient's	Percentage
ID+DM	28	11.2%
CAD+DM	24	9.6%
CKD+DM	20	8%
GD+DM	8	3.2%
RD+DM	7	2.8%
UTI+DM	6	2.4%
HG+DM	5	2%
ND+DM	5	2%
BD+DM	4	1.6%
RD+CKD	3	1.2%
DE+DM	2	0.8%
UC+DM	2	0.8%
ID+CKD	2	0.8%
RC+DMBD+CKD	2	0.8%
ND+CKD	1	0.4%
DKA+DM	1	0.4%
ACC HTN+DM	1	0.4%
GBD+DM	1	0.4%
AKI+DM	1	0.4%
ALD+DM	1	0.4%
CVA+DM	1	0.4%
RC+CKD	1	0.4%
RC+CAD	1	0.4%
UTI+LRTI	1	0.4%
RD+CVA	1	0.4%
FI+DM	1	0.4%
ID+CAD	1	0.4%
UC+CAD	1	0.4%
GAD+DM	1	0.4%
CKD+CAD	1	0.4%

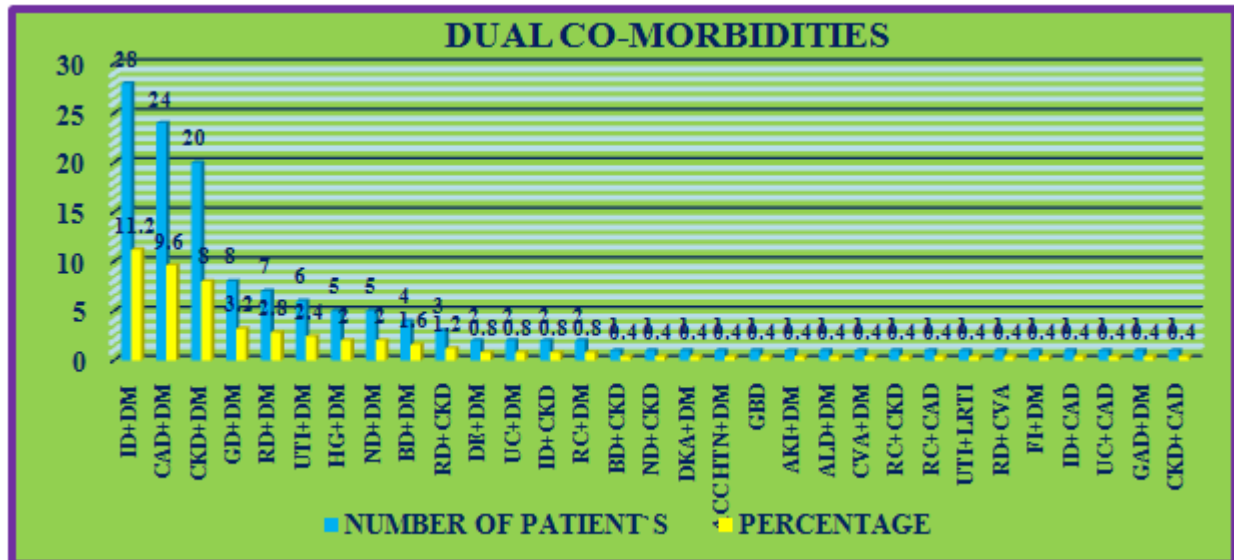


Figure 11: Dual Co-Morbidity

Table 12: Multiple Co-Morbidity

Multiple Co-Morbidities	Number of Patient's	Percentage
ID+DM+CKD	6	2.4%
ID+DM+CAD	5	2%
VD+DM+CVA	3	1.2%
BD+DM+CAD	2	0.8%
RD+DM+CVA	2	0.8%
ID+DM+CAD+CKD	2	0.8%
GD+DM+CKD	2	0.8%
GD+DM+CAD	1	0.4%
UTI+DM+RD	1	0.4%
ALD+DM+CAD	1	0.4%
CAD+DM+CKD	1	0.4%
RC+DM+CKD	1	0.4%
TIA+DM+CKD	1	0.4%
UTI+DM+CAD	1	0.4%

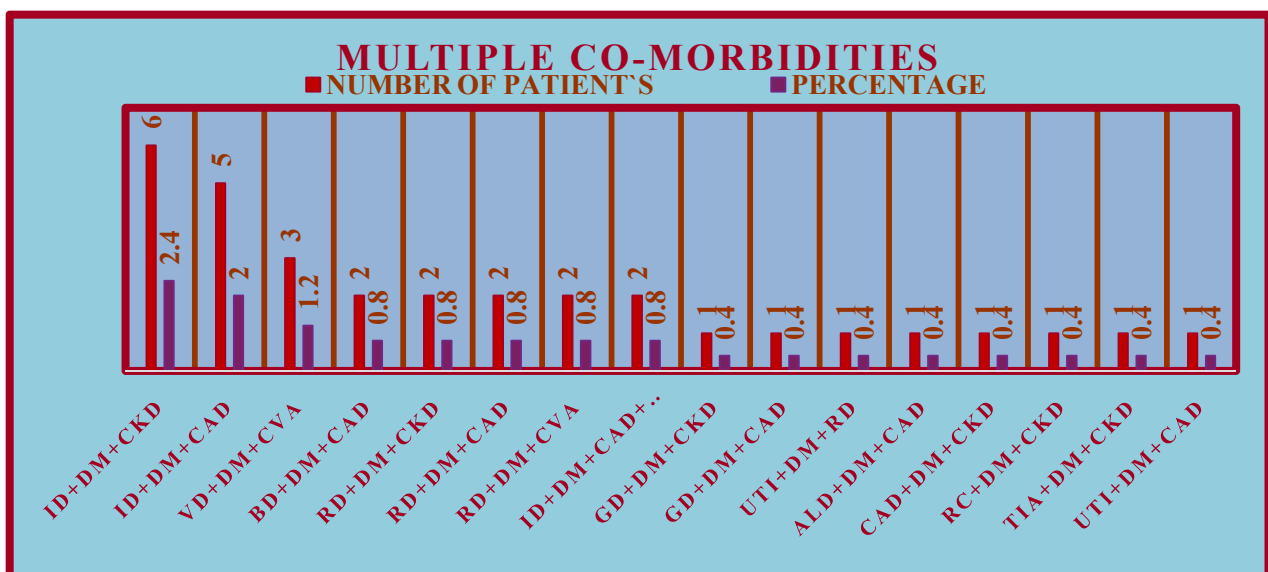
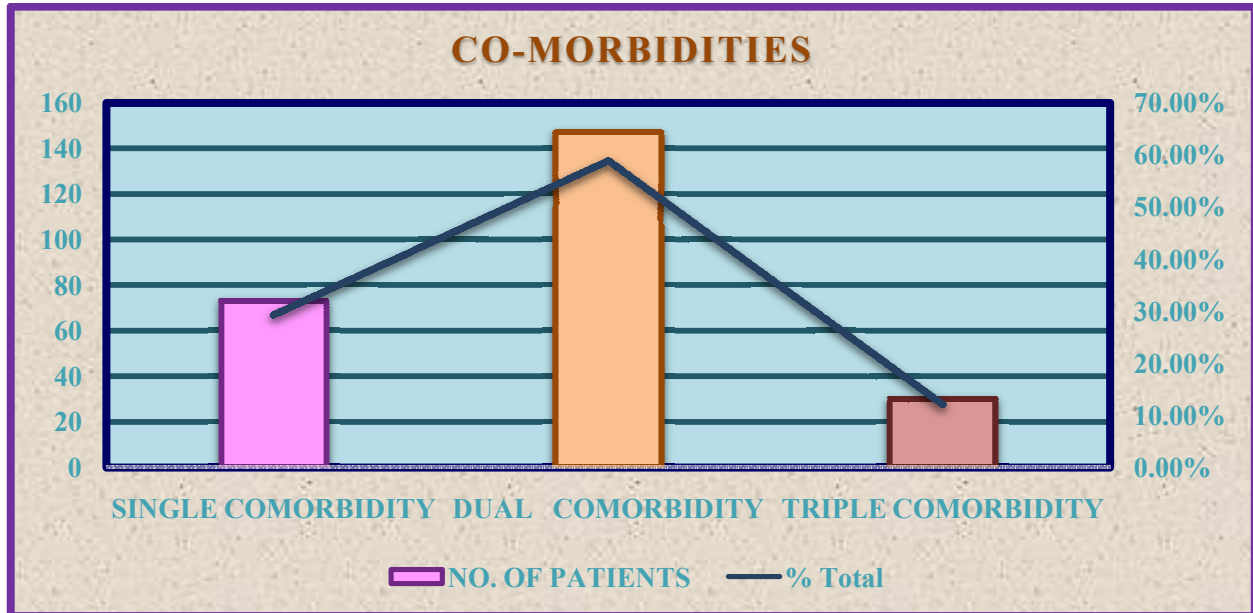


Figure 12: Multiple Co-Morbidity

Table 13: Co-Morbidities with Hypertension

Co-Morbidities	Number of Patient's	Percentage
Single Co-Morbidity	73	29.20%
Dual Co-Morbidity	147	58.80%
Triple Co-Morbidity	30	12.00%

**Figure 13: Co-Morbidities with Hypertension**

Hypertension is a persistently elevated arterial blood pressure. The epidemiological data shows that 31% of the population has hypertension and among males and females, females are more prevalent according to our study. The prevalence of females is higher due to improper therapy, lack of awareness, an unhealthy lifestyle.⁴

The age groups 40-69 have more affected females followed by males at age group 60-79. Blood pressure increases with age, presence of co-morbid condition, body weight, and lifestyle modification. The cause of hypertension may be known in some individuals where as in most of the patients the cause is unknown. During the study period 92 individuals were stage 1(36.8) hypertensive followed by stage 2(29.6%), elevated (15.2%) and normal(9.6%).^{5,6}

The individuals must be made aware of hypertension and directions about management with drugs and non-pharmacological implementation. The presence of hypertension for years may lead to further complications which if managed and monitored regularly can reduce risk.

⁷The elderly patients with >65years of age diagnosed as hypertensive according to JNC 8 guidelines due to multiple pathologies leading to poly pharmacy, consumption of over

the counter medications. The choice of anti-hypertensive used for the management was ARB followed by diuretics, beta blockers, calcium channel blockers and ARB'S.

The risk of co-morbid conditions is enhancing due to social habits, improper life style, irregular drug management and loss of physical activity.⁸

CONCLUSION

Our study which includes 300 samples provides the prevalence of hypertension higher in women. The most common choice of therapy followed was monotherapy involving Telmisartan (22.8%0). The management of hypertension was followed by monotherapy, dual therapy, and multiple therapies. The individuals with single co-morbidity were managed with monotherapy and the patients with two or more disorders are followed with dual triple and multiple therapies. However, blood pressure control was obtained in some individuals, and in some blood pressure was still elevated after drug management due to the presence of co-morbid conditions and poor lifestyle modifications.

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