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Research Article

**COMPARE THE EFFECTIVENESS AND SAFETY OF TRIPLE  
THERAPY VERSUS DUAL ANTI-HYPERTENSIVE THERAPY  
IN ADULTS****(Dr.) Lakhmisetty Priyanka\*, (Dr.) Sanikommu Divya Sree, (Dr.) Rallapalli Khadar Basha,  
(Dr.) Mundlapati Vijaya Raju, Dr. Sk Faizan Ali,****\*Asst. Professor, Department of Pharmacy Practice, Hindu College of Pharmacy****Article Received:** May 2021**Accepted:** May 2021**Published:** June 2021**Abstract:**

*Comparing the effectiveness of triple therapy and Dual Anti- Hypertensive therapy in Adults ex-plains the how adults are responding the both the therapies by using the statistical analysis, generally hypertension classified as primary and secondary primary, primary has reasons like life style and secondary has no reasons and hypertensive drugs to be use like telimisartan, Amlodipine are suggestive, the data is collected from different sources and by using statistical tools and techniques like t- test and table analysis the results acquired. Such that double therapy*

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**INTRODUCTION:**

Hypertension (HTN or HT), also known as high blood pressure (HBP), is a long-term medical condition in which the blood pressure in the arteries is persistently elevated. High blood pressure typically does not cause symptoms. Long-term high blood pressure, however, is a major risk factor for coronary artery disease, stroke, heart failure, atrial fibrillation, peripheral arterial disease, vision loss, chronic kidney disease, and dementia. High blood pressure is classified as primary (essential) hypertension or secondary hypertension. About 90–95% of cases are primary, defined as high blood pressure due to nonspecific lifestyle and genetic factors. Lifestyle factors that increase the risk include excess salt in the diet, excess body weight, smoking, and alcohol use.

The remaining 5–10% of cases are categorized as secondary high blood pressure, defined as high blood pressure due to an identifiable cause, such as chronic kidney disease, narrowing of the kidney arteries, an endocrine disorder, or the use of birth control pills. High blood pressure is a common condition in which the long-term force of the blood against your artery walls is high enough that it may eventually cause health problems, such as heart disease.

Blood pressure is determined both by the amount of blood your heart pumps and the amount of resistance to blood flow in your arteries. The more blood your heart pumps and the narrower your arteries, the higher your blood pressure. Even without symptoms, damage to blood vessels and your heart continues and can be detected. Uncontrolled high blood pressure increases your risk of serious health problems, including heart attack and stroke.

**Hypertensive: -**

Severely elevated blood pressure (equal to or greater than a systolic 180 or diastolic of 110) is referred to as a hypertensive crisis.

Hypertensive crisis is categorized as either hypertensive urgency or hypertensive emergency, according to the absence or presence of end organ damage, respectively.

In hypertensive urgency, there is no evidence of end organ damage resulting from the elevated blood pressure.

In these cases, oral medications are used to lower the BP gradually over 24 to 48 hours.

In hypertensive emergency, there is evidence of direct damage to one or more organs.

The most affected organs include the brain, kidney, heart and lungs, producing symptoms which may include confusion, drowsiness, chest pain and breathlessness.

In hypertensive emergency, the blood pressure must be reduced more rapidly to stop ongoing organ damage however, there is a lack of randomized controlled trial evidence for this approach.

**TYPES OF HYPERTENSIONS: -****Primary hypertension**

Hypertension results from a complex interaction of genes and environmental factors. Numerous common genetic variants with small effects on blood pressure have been identified as well as some rare genetic variants with large effects on blood pressure. Also, genome-wide association studies (GWAS) have identified 35 genetic loci related to blood pressure; 12 of these genetic loci influencing blood pressure were newly found. Sentinel SNP for each new genetic locus identified has shown an association with DNA methylation at multiple nearby CpG sites. These sentinel SNP are located within genes related to vascular smooth muscle and renal function. DNA methylation might affect in some way linking common genetic variation to multiple phenotypes even though mechanisms underlying these associations are not understood.

Single variant test performed in this study for the 35 sentinel SNP (known and new) showed that genetic variants singly or in aggregate contribute to risk of clinical phenotypes related to high blood pressure. Blood pressure rises with aging and the risk of becoming hypertensive in later life is considerable.

Several environmental factors influence blood pressure. High salt intake raises the blood pressure in salt sensitive individuals; lack of exercise, central obesity can play a role in individual cases. The possible roles of other factors such as caffeine consumption and vitamin D deficiency are less clear. One review suggests that sugar may play an important role in hypertension and salt is just an innocent bystander. Events in early life, such as low birth weight, maternal smoking, and lack of breastfeeding may be risk factors for adult essential hypertension, although the mechanisms linking these exposures to adult hypertension remain unclear.

An increased rate of high blood urea has been found in untreated people with hypertension in comparison with people with normal blood pressure, although it is uncertain whether the former plays a causal role or is subsidiary to poor kidney function.

Average blood pressure may be higher in the winter than in the summer. Periodontal disease is also associated with high blood pressure.

#### **Secondary hypertension: -**

Secondary hypertension results from an identifiable cause. Kidney disease is the most common secondary cause of hypertension.

Hypertension can also be caused by endocrine conditions, such as Cushing's syndrome, hyperthyroidism, hypothyroidism, acromegaly, Conn's syndrome or hyperaldosteronism, renal artery stenosis (from atherosclerosis or fibromuscular dysplasia), hyperparathyroidism, and pheochromocytoma.

Other causes of secondary hypertension include obesity, sleep apnea, pregnancy, coarctation of the aorta, excessive eating of liquorice, excessive drinking of alcohol, certain prescription medicines, herbal remedies, and stimulants such as cocaine and methamphetamine.

Arsenic exposure through drinking water has been shown to correlate with elevated blood pressure. Depression was also linked to hypertension.

A 2018 review found that any alcohol increased blood pressure in males while over one or two increased the risk in females.

#### **DRUGS:**

**Thiazide diuretics: -** Diuretics, sometimes called water pills, are medications that act on your kidneys to help your body eliminate sodium and water, reducing blood volume.

Thiazide diuretics are often the first, but not the only, choice in high blood pressure medications.

Thiazide diuretics include chlorthalidone hydrochlorothiazide (Microzide) and others.

If you're not taking a diuretic and your blood pressure remains high, talk to your doctor about adding one or replacing a drug you currently take with a diuretic.

#### **Central-acting agents:-**

These medications prevent your brain from signaling your nervous system to increase your heart rate and narrow your blood vessels. Examples include clonidine (Catapres, Kapvay), guanfacine (Intuniv, Tenex) and methyl dopa.

#### **Alternative medicine**

Although diet and exercise are the most appropriate tactics to lower your blood pressure, some supplements also may help lower it.

These include: Fiber, such as blond psyllium and wheat bran, Minerals, such as magnesium, calcium and potassium, Folic acid, Supplements or products that increase nitric oxide or widen blood vessels (vasodilators), such as cocoa, coenzyme Q10, L-arginine or garlic, Omega-3 fatty acids, found in fatty fish, high-dose fish oil supplements or flaxseed

#### **Major drugs used in the double therapy and triple therapy: -**

##### **1.Telmisartan: -**

**Mechanism of action: -** Telmisartan is an angiotensin II receptor blocker that shows high affinity for the angiotensin II receptor type 1 (AT1), with a binding affinity 3000 times greater for AT1 than AT2.

In addition to blocking the RAS, telmisartan acts as a selective modulator of peroxisome proliferator-activated receptor gamma (PPAR- $\gamma$ ), a central regulator of insulin and glucose metabolism. It is believed that telmisartan's dual mode of action may provide protective benefits against the vascular and renal damage caused by diabetes and cardiovascular disease

Telmisartan activates PPAR- $\delta$  receptors in several tissues.

##### **Pharmacokinetics: -**

The substance is quickly but to varying degrees absorbed from the gut. The average bioavailability is about 50% (42–100%).

Food intake has no clinically relevant influence on the kinetics of telmisartan.

Plasma protein binding is over 99.5%, mainly to albumin and alpha-1-acid glycoprotein.

[9] It has the longest half-life of any ARB (24 hours) and the largest volume of distribution among ARBs (500 liters).

Less than 3% of telmisartan is inactivated by glucuronidation in the liver, and over 97% is eliminated in unchanged form via bile and faeces.

##### **Side effects: -**

Side effects are similar to other angiotensin II receptor antagonists and include tachycardia and

bradycardia (fast or slow heartbeat), hypotension (low blood pressure) and edema (swelling of arms, legs, lips, tongue, or throat, the latter leading to breathing problems). Allergic reactions may also occur.

### **Amlodipine**

Amlodipine is used in the management of hypertension and coronary artery disease in people with either stable angina (where chest pain occurs mostly after physical or emotional stress) or vasospastic angina (where it occurs in cycles) and without heart failure. It can be used as either monotherapy or combination therapy for the management of hypertension or coronary artery disease. Amlodipine can be administered to adults and children 6–17 years of age. Calcium channel blockers, including amlodipine, may provide greater protection against stroke than other classes of blood pressure-lowering medications.

Amlodipine along with other calcium channel blockers are considered the first choice in the pharmacological management.

Amlodipine is a long-acting calcium channel antagonist that selectively inhibits calcium ion influx across cell membranes. It targets L-type calcium channels in muscle cells and N-type calcium channels in the central nervous system which are involved in nociceptive signalling and pain perception. Amlodipine has an inhibitory effect on calcium influx in smooth muscle cells to inhibit contraction.

Amlodipine ends up significantly reducing total vascular resistance without decreasing cardiac output expressed by pressure-rate product and cardiac contractability in comparison with verapamil, a non-dihydropyridine. In turn, following treatment lasting a month, with amlodipine, cardiac output was significantly enhanced. Unlike verapamil which has efficacy in moderation of emotional arousal and reduces cardiac load without lowering cardiac output demands, amlodipine increases the cardiac output response concomitantly with increased functional cardiac load.

### **Mechanism of action**

Amlodipine is an angio selective calcium channel blocker and inhibits the movement of calcium ions into vascular smooth muscle cells and cardiac muscle cells which inhibits the contraction of cardiac muscle and vascular smooth muscle cells. Amlodipine inhibits calcium ion influx across cell membranes, with a greater effect on vascular smooth muscle cells. This causes vasodilation and a reduction in peripheral

vascular resistance, thus lowering blood pressure. Its effects on cardiac muscle also prevent excessive constriction in the coronary arteries.

Negative inotropic effects can be detected in vitro, but such effects have not been seen in intact animals at therapeutic doses. Among the two stereoisomers [R (+), S (-)], the (-) isomer has been reported to be more active than the (+) isomer.[38] Serum calcium concentration is not affected by amlodipine. And it specifically inhibits the currents of L-type Cav1.3 channels in the zona glomerulosa of the adrenal gland.

The mechanisms by which amlodipine relieves angina are:

**Stable angina:** amlodipine reduces the total peripheral resistance (afterload) against which the heart works and reduces the rate pressure product, thereby lowering myocardial oxygen demand, at any given level of exercise.

**Variant angina:** amlodipine blocks spasm of the coronary arteries and restores blood flow in coronary arteries and arterioles in response to calcium, potassium, epinephrine, serotonin, and thromboxane A2 analog in experimental animal models and in human coronary vessels in vitro.

Amlodipine has additionally been found to act as an antagonist of the mineralocorticoid receptor, or as an anti-mineralocorticoid. vascular resistance and consequent reduction in blood pressure.

### **REVIEW OF LITERATURE**

1. **Bharat Bhushan, seema Gupta; Comparative Efficacy and Safety of Triple Therapy Vs Dual Anti-Hypertensive Therapy in Hypertensive Patients.** Various classes of anti-hypertensive drugs are used for the treatment monotherapy or in combination. Monotherapy is not always sufficient to achieve blood pressure control and combination therapy with at least two drugs, including a thiazide diuretic is recommended in patients with stage 2 hypertension.
2. **Destro M, Crikelair N; Triple combination therapy with amlodipine, valsartan, and hydrochlorothiazide vs dual combination therapy with amlodipine and hydrochlorothiazide for stage 2 hypertensive patients.** Aml/Val+HCTZ provided significantly greater BP reductions than Aml+HCTZ in patients with stage 2 hypertension. Aml/Val+HCTZ triple therapy may be a suitable option for patients

requiring more than two agents to reach target BP.

3. **Daniel Duprez, Rita samuel; Ambulatory blood pressure response to triple therapy with an angiotensin-receptor blocker (ARB), calcium-channel blocker (CCB), and HCTZ versus dual therapy with an ARB and HCTZ.**

Initiating antihypertensive treatment with moderate doses of ARB/CCB with a diuretic is more effective in lowering nighttime and daytime ABP and reducing ABP load than a maximal dose of an ARB with a diuretic.

4. **Oparil S, Lee Jones; Triple therapy with olmesartan medoxomil, amlodipine besylate, and hydrochlorothiazide in adult patients with hypertension.**

In these adult patients with moderate to severe hypertension, triple combination treatment with OM 40 mg + AML 10 mg + HCTZ 25 mg was associated with significant BP reductions compared with dual combinations of the individual components.

5. **Manish Maladkar, Suresh P. Kulkarni; Triple drug combination of telmisartan, amlodipine and hydrochlorothiazide in the treatment of essential hypertension.**

Telmisartan when combined with amlodipine and HCT showed better control of both SBP and DBP. Thus this combination may serve a potential role in achieving desired BP goals, in patients with essential hypertension, which are otherwise poorly managed by either monotherapy or dual drug therapy. At the same time studied triple drug combination exhibits comparable tolerability profile to that of dual drug combination.

6. **Joseph L. Izzo Jr MD, Steven G. Chrysant MD, Dean J. Kereiakes MD, Thomas Littlejohn III MD,**

The TRINITY ABPM sub study verifies that, during a 12-week period in individuals with moderate to severe hypertension, a once-daily triple combination (OM 40 mg, AML 10mg, and HCTZ 25mg) reduces systolic and diastolic BP to a greater degree than any of the 3 combinations of any 2 components at equivalent doses over the entire 24-hour dosing interval. The triple-combination regimen also resulted in a greater percentage of patients reaching ABP

targets, including mean 24-hour, daytime, and night time BP values.

7. **MassimoVolpe, Cristina Miele & Uwe Haag in Efficacy and Safety of a Stepped-Care Regimen Using Olmesartan Medoxomil, Amlodipine and Hydrochlorothiazide; Patients with Moderate-to-Severe Hypertension.**

A treatment algorithm based olmesartan/amlodipine ( $\pm$  HCTZ) provides a high degree of BP control in patients with moderate-to-severe hypertension. The open-label study design suggests similar results are obtainable in clinical practice.

8. **Hazel Mae A. Abraham, MD, C. Michael White; The Comparative Efficacy and Safety of the Angiotensin Receptor Blockers in the Management of Hypertension and Other Cardiovascular Diseases.**

The ARBs have proven to be a highly effective class of agents for the treatment of hypertension and its comorbidities over the past 2 decades. There are 8 ARBs approved for use in the USA for the treatment of hypertension. While there were theoretical benefits of combining ARBs with ACE inhibitors (e.g., proteinuria reduction), event-driven trials have not shown a benefit and in fact have demonstrated increases in adverse renal events. Hence, there is no clinical rationale for combining ARBs with ACE inhibitors (or direct renin inhibitors) in the management of hypertension.

## AIM AND OBJECTIVES

### AIM:

To compare the effectiveness and safety of triple therapy versus dual anti-hypertensive therapy in adults, to compare the effectiveness of dual therapy versus triple therapy, to identify and report adverse drug reactions, side effects, to measure the medication adherence.

The study will be done in both inpatient and outpatient wards of cardiology department in Sri Krishna institute of medical sciences (SKIMS), located beside manipuram flyover, near RTC Bus stand, Thamma ranga reddy nagar, Guntur, Andhra Pradesh-522001. The study will be carried out for a period of six months i.e. from October 2019 to March 2020 at Sri Krishna Institute Of Medical Sciences, Guntur.

**TABLE 1 COMORBIDITIES**

COMORBIDITIES	NUMBER OF PATIENTS	PERCENTAGE
DM	27	45%
IHD	06	10%
CAD	11	18
MI	05	8

Table 1 shows the patient characteristics with co morbidities.

45% of patients were reported with having DM and 18.3% were with CAD and 10% of patients with IHD and 8.3% of patients with MI.

**TABLE 2: DOUBLE THERAPY**

DRUG CLASS	DRUGS	NO OF PATIENTS	PERCENTAGE
Calcium channel blocker+ Angiotensin receptor blocker	Amlodipine + Telmisartan	8	13.3%
Calcium channel blocker +beta blocker	Amlodipine + Metoprolol	11	18.3%
Angiotensin receptor blocker+ beta blocker	Telmisartan + Metoprolol	15	25%
Calcium channel blocker+ Angiotensin receptor blocker	Telmisartan + Cilnidipine	3	5%
Calcium channel blocker +beta blocker	Cilnidipine + Metoprolol	2	3.3%
Calcium channel blocker +beta blocker	Metoprolol + Nifedipine	1	1.6%
Calcium channel blocker+ Nitrates	Amlodipine + Isosorbide mononitrate	1	1.6%
Calcium channel blocker+ Angiotensin receptor blocker	Cilnidipine + Olmesartan	1	1.6%

Table 2: shows the double therapy combination of drugs given to patients

25% patients were taking telmisartan+ metoprolol combination ,18.3% patients were taking amlodipine+ metoprolol combination, 13.3% were taking amlodipine+ telmisartan combination, 5% were taking telmisartan+cilnidipine,3.3% were taking cilnidipine+ metoprolol combination,1.6% were taking metoprolol+ nifedipine, amlodipine+ isosorbide mononitrate, cilnidipine+ Olmesartan combinations.

**TABLE 3: TRIPLE THERAPY**

DRUG CLASS	DRUGS	NO OF PATIENTS	PERCENTAGE
Calcium channel blocker+ Diuretic+ Angiotensin receptor blocker	Olmesartan+Chlorothiazide+ Cilnidipine	4	6.6%
Calcium channel blocker+ Beta blocker+ Angiotensin receptor blocker	Metoprolol+Cilnidipine+ Olmesartan	3	5%
Calcium channel blocker+ Angiotensin receptor blocker+ Vasodilating agent	Telmisartan+Cilnidipine+ Glyceryl trinitrate	2	3%
Calcium channel blocker+ Diuretic+ Angiotensin receptor blocker	Cilnidipine+Telmisartan+ Torsemide	4	6%
Calcium channel blocker+ Alpha blocker+ Beta blocker	Amlodipine+Prazosin+ Metoprolol	5	8.3%

Table 3 represents triple therapy combination of drugs given to patients

8.3% patients were taking Amlodipine+ prazosin+ torsemide combination, 6.6% patients were taking Olmesartan+ Chlorothiazide+ Cilnidipine, 6% patients were taking Cilnidipine+ telmisartan+ torsemide combination, 5% were

taking Metoprolol+ Cilnidipine+ Olmesartan combination, 3% were taking Telmisartan+ Cilnidipine+ Glyceryl trinitrate combination

**TABLE 4: BLOOD PRESSURE (DOUBLE THERAPY) VISIT-1**

Blood pressure range	No. of Patients	Percentage
140/90	12	29%
150/70	12	29%
150/90	10	23%
160/90	8	19%

Table 4 represents blood pressure range during visit 1

Among 42 patients 13 patients were with 160/90 mmHg blood pressure (31%), 12 were with 170/80 mmHg (29%), 11 were with 170/100 mmHg (26%), 6 were with 180/90 mmHg (14%) blood pressure.

**TABLE5: VISIT-2 (DOUBLE THERAPY)**

Blood Pressure Range	No. of Patients	Percentage
120/80	11	26%
130/80	13	31%
120/85	12	29%
130/85	6	14%

Table 5 represents blood pressure range during visit 2

Among 42 patients 12 were with 140/90 mmHg blood pressure (29%), 12 were with 150/70 mmHg (29%), 10 patients were with 150/90mmHg (23%) blood pressure, 8 were with 160/90mmHg (19%) blood pressure.

**TABLE 6: VISIT-3 (DOUBLE THERAPY)**

Blood pressure range	No. of Patients	Percentage
160/90	13	31%
170/80	12	29%
170/100	11	26%
180/90	6	14%

Table 6 represents blood pressure range during visit 3

Among 42 patients 11 were with 120/80mmHg (26%) blood pressure, 13 were with 130/80mmHg (31%), 12 were with 120/85mmHg (29%), 6 were with 130/85mmHg (14%) blood pressure.

**TABLE 7: BLOOD PRESSURE (TRIPLE THERAPY) VISIT 1**

Blood Pressure Range	No. of Patients	Percentage
170/90	8	44%
180/80	4	22%
190/90	3	17%
200/100	3	17%

Table 7 represents blood pressure range during visit 1

Among 18 patients 8 were with 170/90mmHg (44%) blood pressure, 4 were with 180/80mmHg(22%), 3 were with 190/90mmHg (17%), 3 were with 200/100mmHg (17%) blood pressure.

**TABLE 8: VISIT-2(TRIPLE THERAPY)**

Blood Pressure Range	No. of Patients	Percentage
160/80	7	39%
170/85	2	11%
180/90	2	11%
150/90	7	39%

Table 8 represents blood pressure range during visit 2

Among 18 patients ,7 were with 160/80mmHg (39%) blood pressure, 2 were with 170/85mmHg (11%), 2 were with 180/90mmHg (11%), 7 were with 150/90mmHg (39%) blood pressure.

**TABLE 9: VISIT-3(TRIPLE THERAPY)**

Blood Pressure Range	No. of Patients	Percentage
120/80	8	44%
130/85	1	6%
130/80	6	33%
120/85	3	17%

Table 9 represents blood pressure range during visit 3

Among 18 patients, 8 were with 120/80mmHg (44%) blood pressure, 1 were with 130/85mmHg (6%), 6 were with 130/80mmHg (33%), 3 were with 120/85mmHg (17%) blood pressure.

**TABLE 10: PAIRED SAMPLES STATISTICS: DOUBLE THERAPY**

Paired Samples Statistics – Double Therapy					
DOUBLE THERAPY		Mean	N	Std. Deviation	Std. Error Mean
PAIR-1	VAR00001 (REVIEW 1)	3.3800	42	0.89820	0.11213
	VAR00002 (REVIEW 2)	3.4800	42	0.83224	0.11417

**Table11: Paired Samples Correlations:**

Paired Samples Correlations				
DOUBLE THERAPY		N	Correlation	Sig.
PAIR-1	VAR00001 & VAR00002 (REVIEW 1 & REVIEW 2)	42	0.433	0.000



Table 12: Paired Sample T Test:

Paired Samples Test									
DOUBLE THERAPY		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
PAIR-1	VAR00001 - VAR00002 (REVIEW 1-REVIEW 2)	1.22000	0.58678	0.08523	0.85070	1.35147	12.2782	41	.000

TABLE 13: PAIRED SAMPLES STATISTICS: TRIPLE THERAPY

Paired Samples Statistics					
TRIPLE THERAPY		Mean	N	Std. Deviation	Std. Error Mean
PAIR-1	VAR00001 (REVIEW 1)	3.8400	18	0.94886	0.17460
	VAR00002 (REVIEW 2)	3.8600	18	0.99784	0.17993

Table 14: Paired Samples Correlations:

Paired Samples Correlations				
TRIPLE THERAPY		N	Correlation	Sig.
PAIR-1	VAR00001 & VAR00002 (REVIEW 1 & REVIEW 2)	18	0.740	0.000

Table 15: Paired Sample T Test:

Paired Samples Test									
TRIPLE THERAPY		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
PAIR- 1	VAR00001 - VAR00002 (REVIEW 1-REVIEW 2)	0.57000	0.5617	0.06782	0.52312	0.54939	6.424	19	0.000

**COEFFICIENT OF VARIATION:**

The formula for the coefficient of variation is:

$$\text{Coefficient of Variation} = (\text{Standard Deviation} / \text{Mean}) * 100.$$

**TABLE 16: COEFFICIENT OF VARIATION VALUES:**

Mean	SD	CV (%)
<b>DOUBLE THERAPY</b>		
3.3800	0.89820	26.573964497
3.4800	0.83224	23.914942529
<b>TRIPLE THERAPY</b>		
3.8400	0.94886	24.709895833
3.8600	0.99784	25.850777202

**TABLE 17: ADVERSE EFFECTS (HYPOTENSION)**

THERAPY	TOTAL NO OF PATIENTS	HYPOTENSIVE PATIENTS	PERCENTAGE
	42	25	59%
	18	16	88%

Table 17 represents adverse effects

In double therapy among 42 patients, 25 patients were developed hypotension (59%), in triple therapy among 18 patients, 16 patients were developed hypotension (88%).

**TABLE 18: VERTIGO**

THERAPY	TOTAL NO OF PATIENTS	PATIENTS WITH VERTIGO	PERCENTAGE
Double	42	20	48%
Triple	18	15	83%

Table 18 represents vertigo

In double therapy among 42 patients, 20 patients were observed with vertigo condition (48%) in triple therapy among 18 patients, 15 patients were observed with vertigo condition (83%).

**TABLE 19: CREATININE LEVELS**

THERAPY	TOTAL NO OF PATIENTS	NO OF PATIENTS WITH INCREASED CREATININE LEVELS	PERCENTAGE
Double	42	25	60%
Triple	18	15	83%

Table: 19 represents creatinine levels

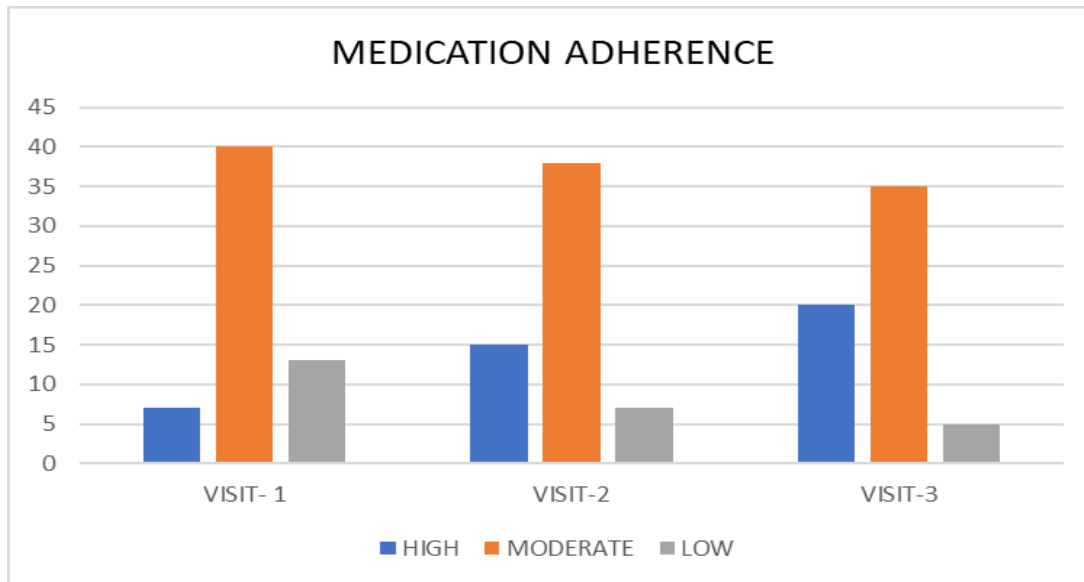
In double therapy among 42 patients, 25 were with increased creatinine levels (60%), in triple therapy among 18 patients, 15 were with increased creatinine levels (83%).

**TABLE 20: MEDICATION ADHERENCE**

<b>MEDICATION ADHERENCE</b>			
	VISIT-1	VISIT-2	VISIT-3
HIGH	7	15	20
MODERATE	40	38	35
LOW	13	7	5

Table 20 represents medication adherence

During visit 1 ,7 patients were with high adherence, 40 were with moderate adherence, 13 were with low adherence. During visit 2, 15 patients were with high adherence, 38 were with moderate adherence, 7 were with low adherence. During visit 3, 20 were with high adherence, 35 were with moderate adherence, 5 were with low adherence.



**Fig: 1 Medication adherence**

#### DISCUSSION:

- This study is to determine the effectiveness and safety of double therapy and triple therapy.
- This study was carried out with 60 patients who are diagnosed with Hypertension
- In the taken sample size and subjects, the prevalence of hypertension was greater in male subjects than in female subjects that are 54% in Males and 46% in Females.
- Considering the age factors, the prevalence of hypertension was more in age group of 51-70 years ,16% at the age of 41-50 years, 10% at the age of 71-80 years, 3% at the age of 18-40 years, were observed.
- In the taken sample 45% patients are diabetic,18.3% are suffering with CAD,10% are suffering with IHD,8.3% are suffering with MI. Among these subjects the most common comorbidity is diabetes.
- According to our study initially blood pressure was high and treated with double and triple therapy and we observed 2nd visit blood pressure reduced slightly reduced and at 3rd visit blood pressure was reduced to normal.
- In triple therapy among 18 patients,16 (88%) patients were shown up with hypotension, 15 patients were shown up with vertigo (83%) and in double therapy among 42 patients ,25 (59%) patients were shown up with hypotension, 20 patients were shown up with vertigo (48%) .
- Medication adherence usually refers to whether patients take their medications as prescribed (example-twice daily) as well as whether they continue to take a prescribed medication. Taking medicine as prescribed or medication adherence is important for controlling chronic conditions, treating temporary conditions, and overall long term health and well-being.
- Morisky medication adherence scale was used to calculate the medication compliance which contains 8 questionnaires and the information was gathered during patient counselling. This scale is used in our study to know the significance of medication adherence.
- In our study the patients having low medication compliance at an initial stage due to lack of knowledge about the comorbidities and usage of medications. Later, the compliance overcame by patient counselling about the medication use and their disease Condition.

#### CONCLUSION:

- In the present study it was observed that most of the patients were prescribed with double therapy than the triple therapy.
- The highly prescribed Double therapy combination is Telmisartan + Metoprolol (25%)
- The highly prescribed Triple therapy combination is Amlodipine + Prazosin+ Metoprolol(8%)
- In our study we observed that 11.6% patients

were highly adhered to their regimen and 66.6% are moderately adhered 21.6% are low adhered to their regimen in the 1st visit In their 3rd visit 33.3% are highly adhered 58.3% are moderately adhered 8.3% are low adhered to their regimen. . This change has occurred due to the proper patient counselling by clinical pharmacist which we need to appreciate. This enhancement in the medication adherence also leads to the improvement of these outcome measures.

- Finally based on our study double therapy is more effective and safer than triple therapy.

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