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## Assessment of Prescription Pattern in Patients Suffering from Hypertension



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### ABSTRACT

The aim of this study was to evaluate prescription pattern in patients with hypertension. A total of 100 patients with hypertension were enrolled after obtaining consent. Data was documented in the data collection form. Prescription pattern was assessed using WHO drug prescribing indicators. Out of 100 patients, 55% were female and 45% were male. The most common co-morbidity was type 2 diabetes mellitus in 40% of patients followed by gastro esophageal reflux (GERD) and hypothyroidism in 15% of patients each. The total number of drug prescribed were 376 drugs. The total single drugs prescribed as injections was 7.18%, the total number of antibiotics prescribed was 3.19%. Out of 376 drugs, 89.36% were single drugs and 10.64% were fixed dose combination (FDC) drugs. Out of the total 118 antihypertensive drugs, 26.60% were single drugs and 4.79% were anti-hypertensive FDCs. The most commonly prescribed category of anti-hypertensive drugs were angiotensin receptor blockers (ARBs), followed by calcium channel blockers (CCBs) 2.50% and 9.57% respectively. The most frequently prescribed anti-hypertensive FDC was 2.39% Losar H, followed by 0.80% Telma H. Out of the total 236 non-antihypertensive drugs, 62.77% were single drugs and 5.85% were FDCs. Such studies need to be carried out by involving pharmacist to assess prescription pattern that might assist prescribers for prescription audit and promote rational use of drugs.



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## INTRODUCTION

Hypertension can be defined as a systolic pressure of 130 mmHg or greater and a diastolic pressure of more than 80 mmHg. Consistent BP readings of 140/90 mmHg or greater should undergo treatment. Hypertension is one of the most common chronic medical conditions. It has been linked to various complications like stroke, myocardial infarction, renal failure, etc (Arshad Muhammad Iqbal; Syed F. Jamal 2021). Hypertension is a huge risk factor for deadly and chronic diseases like chronic kidney disease (CKD), coronary artery disease (CAD), arrhythmias, stroke, and retinopathy (Oluseyi Adejumo 2017). Successful treatment of hypertension can significantly reduce the risk of stroke, coronary heart disease (CHD), congestive cardiac failure, and overall fatality (Oluseyi Adejumo 2017).

Hypertension-related diseases have led to between 20.5% and 69.6% of the total cases admitted in hospitals in Nigeria, with a high mortality rate of up to 42.9%. In the United States, it is reported that expenditure due to unsatisfactory blood pressure (BP) control goes up to about 1.4 billion US dollars per year (Oluseyi Adejumo 2017).

Several aetiologies can underlie hypertension. Most patients 90–95% have a highly heterogeneous ‘essential’ or primary hypertension with multi-factorial gene-environment etiology. (Oparil Bakris 2018).

Hypertension is considered the leading cause of cardiovascular death globally. In India, CADs are the largest portion of non-communicable diseases. The occurrence of hypertension in the Indian population is 29.8%. Most of these patients need drugs to regulate their BP. Of which about 70% need two or more medicines (Ansha subramaniyam 2018).

It is necessary to assess the antihypertensive prescription patterns in the outpatient department in hospital as the prevalence of hypertension is continuously increasing and cardiovascular disease is the leading cause of mortality (Maryam Salem Alkaabi 2019). Thus, aim to assess and analyse the prescription pattern among patients with hypertension.

## METHODOLOGY:

This present observational study was conducted in the Cardiology and Internal Medicine outpatient department of Shadan tertiary care hospital in Peeramcheru, Hyderabad. This present study was conducted for six months from October 2021 to April 2022. Ethics committee approval was obtained from Shadan hospital, Peeramcheru, Hyderabad. Patients aged equal

to or more than 25 years and equal to or less than 80 years, patients of both genders and patients with hypertension with or without co-morbid conditions were included in this present study. Patients below 25 years and above 80 years of age, pregnant and lactating women were excluded.

Patients were invited and explained about study with help of patient information leaflet (Annexure I). Patient verbal consent form was designed for this study and utilized (Annexure II) to obtain verbal consent from patients. Data collection form (Annexure III) was specially designed for this study and utilized for data collection. Data collection form comprised of demographics details such as age, gender, weight, unit, patient complaints, patient history, family history, provisional and final diagnosis, drugs treatment chart. Data was collected from patient medical records in outpatient cardiology and internal medicine department. Collected data was documented in it. Data collected was entered into excel sheet and descriptive statistical analysis was carried out, WHO prescribing indicators and JNC-8 guidelines were used for assessment of prescription pattern ([Http://apps. who. Int/ medicine docs/en/d/Js2289e/3.1.html](http://apps.who.int/medicine/docs/en/d/Js2289e/3.1.html), accessed on 21/02/22, Oluseyi Adejumo *et al.* 2019).

Calculation of percentage of drugs from an essential drug list was done utilizing following formula. Numbers of drugs prescribed that are listed in essential drug list were divided by the total drugs prescribed and then it was multiplied with 100 (<https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2021.02>).

## RESULTS AND DISCUSSION:

Total 100 patients were included in this study after obtaining verbal consent.

### Gender wise distribution:

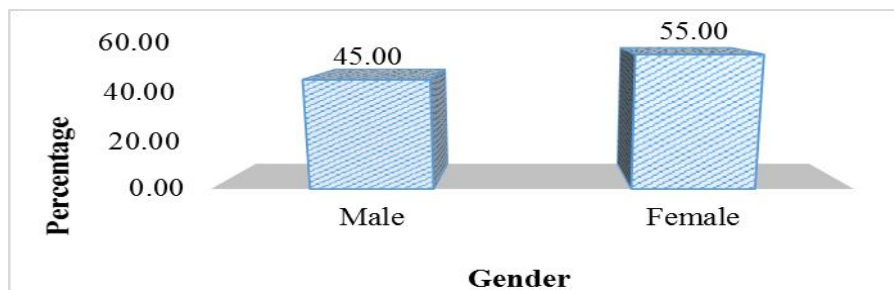


Fig. No.1.: Gender wise distribution

Gender wise distribution is represented in Fig. No.1. Oluseyi Adejumo *et al.* reported that 66.1% were females and 33.9% were males. This present study results were similar to Oluseyi *et al* results. Oluseyi Adejumo *et al.* reported that the prevalence of female

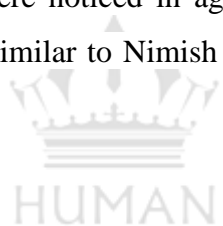
patients in the study may indicate more health conscious behaviour among female patients than male patients (Oluseyi Adejumo *et al.* 2019).

**Age wise distribution:**

**Table No.1.: Age wise distribution**

S. No.	Age group (in years)	Number (N)	Percentage (%)
1	25-35	10	10
2	36-45	27	27
3	46-55	29	29
4	56-65	17	17
5	66-75	14	14
6	76-80	3	3
	Total	100	100

Age wise distribution is represented in Table. No.1. **Nimish S. Narkar *et al.*** reported that majority 38.5% of patients were noticed in age category of 51 to 60 years. The results of this present study were similar to Nimish S. Narkar *et al.* results (**Nimish S. Narkar *et al* June 2021**).



**Co-morbidities status :**

**Table No. 2.: Co-morbidities status**

S. No.	Co-morbidities	Number (N)	Percentage (%)
1	Type 2 diabetes mellitus	40	40.00
2	GERD	15	15.00
3	Hypothyroidism	15	15.00
4	Hyperlipidaemia	11	11.00
5	Obesity	2	2.00
6	COPD	1	1.00
7	Depression	1	1.00
	Total	85	85.00

Common co-morbidities status is represented in Table. No.2. Sang Hyuck Kim et. al. reported that majority 27.6% and 13.8% suffered from dyslipidemia and coronary heart disease respectively. The results of this present study were contrary to Sang Hyuck Kim et al results (Sang Hyuck Kim et al 2019).

**Details of drug therapy:**

**Table No 3.: Details of drug therapy:**

S. No.	Drug therapy details in patients with hypertension	Number (N)	Percentage (%)
1	Total number of prescriptions analyzed	100	100
2	Total number of drugs prescribed	376	100
3	Total number of anti-hypertensive prescribed	118	31.38
4	Total number of non-anti-hypertensive prescribed	258	68.62
5	Total number of single drugs prescribed	336	89.36
6	Total number of single anti-hypertensive prescribed	100	26.60
7	Total number of single non anti- hypertensive prescribed	236	62.77
8	Total number of FDC prescribed	40	10.64
9	Total number of anti- hypertensive FDC prescribed	18	4.79
10	Total number of non anti-hypertensive FDC prescribed	22	5.85

Details of drug therapy are represented in Table. No.3. In this present study, total 100 prescriptions were analysed. Total 376 drugs were prescribed to 100 patients with hypertension. Out of total 376 drugs prescribed,31.38% of drugs were antihypertensive drugs and 68.62% were non-antihypertensive drugs. Out of total31.38% anti-hypertensive drugs, 26.60% were single anti-hypertensive drugs and4.79% were anti-hypertensive FDC drugs. Out of the total68.62% non-antihypertensive drugs, 62.77% were single non-antihypertensive drugs and 5.85% non-antihypertensive FDC drugs.

**Assessment of prescribing indicators:**

**Table No 4 .: Assessment of prescribing indicators :**

S. No.	Prescribing indicators as per WHO	Percentage (%)	WHO standard values
1	Average number of drugs per prescription	3.76	1.6-1.8
2	Percentage of drugs prescribed by generic name	25.53	100
3	Percentage of encounters with an antibiotic prescribed	3.19	20.0-26.8
4	Percentage of encounters with an injection prescribed	7.18	13.4-24.1
5	Percentage of drugs prescribed from WHO model of essential drug list 2021	25.27	100

**Assessments of prescribing indicators are represented in Table. No.4.**

**Average number of drugs prescribed per prescription:**Ansha Subramanian *et al* reported 5.02 average numbers of drugs per prescription. The results of this present study were contrary to Ansha Subramanian *et al.* results (Ansha Subramanian *et al.*,2018).

**Percentage of drugs prescribed by generic name:**Varsha Varakantham *et al* conducted study to compare the prescriptions of year 2012 versus year 2014. Author reported that 28.3% drugs were prescribed by generic name in 2012 and only 11.3% drugs by generic name in 2014. The results of this present study were almost similar to Varsha Varakantham *et al* reports for prescriptions of year 2012 and contrary to Varsha Varakantham *et al.* reports for prescriptions of year 2014 (Varsha Varakantham *et al* 2018).

**Percentage of antibiotics prescribed:** In this present study, out of the total 376 drugs 3.19% single and FDC antibiotics were prescribed and it was good as per WHO prescribing indicator ([Http:// apps. who. Int /medicinedocs /en/d/Js2289e /3.1.html](http://apps.who.int/medicinedocs/en/d/Js2289e/3.1.html)).

**Percentage of injections prescribed:** In this present study, out of the total 376 drugs 7.18% injections were prescribed and it was good as per WHO prescribing indicators ([Http:// apps. who. Int /medicinedocs /en/d/Js2289e /3.1.html](http://apps.who.int/medicinedocs/en/d/Js2289e/3.1.html)).

**Percentage of drugs prescribed as per EDL:** In this present study, out of total 376 drugs 25.27 % of drugs were prescribed from essential drug list as published in year 2021 and it was not up-to the mark as per WHO indicators (<https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2021.02>).

**Details of single antihypertensive prescribed status:**

**Table No 5 .: Details of single antihypertensive prescribed**

S. No.	Class	Number (N)	Percentage (%)
1	ACE inhibitor	4	1.06
2	Angiotensin receptor blocker	47	12.50
3	Calcium channel blockers	36	9.57
4	Beta-blocker	7	1.86
5	Diuretics	4	1.06
6	Centrally acting	2	0.53
	Total	100	26.60

Details of single antihypertensive prescribed are represented in Table. No.5. Sam Hyuk Kim *et al* reported that majority 51.61% were ARB category drugs followed by 45.03% CCB category drugs. The results of this present study were similar to Sam hyuk *et al* results (Sam Hyuk Kim *et al* 2019).

**Details of single Antihypertensive classes prescribed status:**

**Table No.6 : Details of single Antihypertensive classes prescribed:**

S. No.	Class	Names of the drugs prescribed	Number (N)	Percentage (%)
1	ACE inhibitor	Ramipril	2	0.53
		Enalapril	1	0.27
		Benzapril	1	0.27
2	Angiotensin receptor blockers	Telmisartan	35	9.31
		Losartan	12	3.19
3	Calcium channel blockers	Nifedipine	1	0.27
		Amlodipine	9	2.39
		Cilnidipine	25	6.65
		Benidipine	1	0.27
4	Beta blockers	Carvidilol	2	0.53
		Bisoprolol	1	0.27
		Nadolol	1	0.27
		Atenolol	2	0.53
		Metoprolol	1	0.27
5	Diuretics	Furosemide	2	0.53
		Hydrochlorothiazide	2	0.53
6	Centrally acting	Clonidine	2	0.53
	Total		100	26.60

Details of single antihypertensive classes prescribed are represented in Table. No.6. Sam Hyuk Kim et al reported that majority 51.61% were prescribed with ARB category drugs followed by 45.03% with CCB category drugs. This present study results were similar to Sam Hyuk Kim et al results (Sam Hyuk Kim *et al* 2019).



**Details of Antihypertensive FDCs prescribed**

**Table No.7 : Details of Antihypertensive FDCs prescribed:**

S. No.	Anti-hypertensive FDC drugs	Number (N)	Percentage (%)
1	Telmed AM	1	0.27
2	Losar H	9	2.39
3	Triforge	1	0.27
4	Telma H	3	0.80
5	Amlovas-M	1	0.27
6	Amlokind AT	1	0.27
7	Dytor plus	1	0.27
8	Telmed AH	1	0.27
	Total	18	4.79

Details of Antihypertensive FDCs prescribed are represented in Table. No.7. Oluseyi reported that in 51.8% were on FDC. The frequently prescribed antihypertensive drug combinations, 19.2% given to patients were diuretic + ACEI or ARB, followed by 14.7% were diuretics + CCB + ACEI or ARB. The results of this present study were almost similar to Oluseyi *et al* results (Oluseyi Adejumo *et al.* 2019).

**Details of Antihypertensive drugs prescribed (Monotherapy):**

**Table No.8: Details of Antihypertensive drugs prescribed (Monotherapy)**

S.No	Drug name	Generic Name	Number	Percentage (%)
1	Ramipril	Ramipril	1	1
2	Telmisartan	Telmisartan	31	31
3	Losartan	Losartan	7	7
4	Nifedipine	Nifedipine	1	1
5	Amlodipine	Amlodipine	7	7
6	Cinod	Cilnidpine	22	22
7	Carvedilol	Carvedilol	1	1
8	Atenolol	Atenolol	2	2
9	Furosmide	Furosmide	1	1
	Total		73	73

**Details of Antihypertensive drugs prescribed (Dual therapy):**

**Table No.9: Details of Antihypertensive drugs prescribed (Dual therapy)**

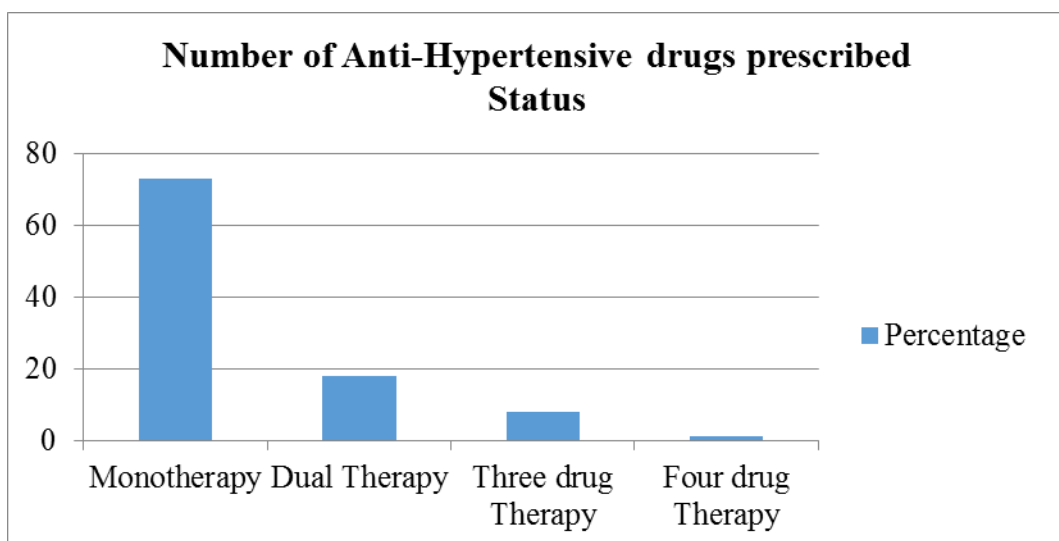
S.No	Drug name	Generic Name	Number	Percentage (%)
1	Ramipril + Cinod	Ramipril + Cilnidipine	1	1
2	Benazepril + Hydrochlorothiazide	Benazepril + Hydrochlorothiazide	1	1
3	Telma + Cinod	Telmisartan + Cilnidipine	2	2
4	Telma + Clonidine	Telmisartan + Clonidine	1	1
5	Losar + Metoprolol	Losartan + Metoprolol	1	1
6	Losar + Hydrochlorothiazide	Losartan + Hydrochlorothiazide	1	1
7	Nadolol + Furosemide	Nadolol + Furosemide	1	1
8	Losar H	Losartan + Hydrochlorothiazide	5	5
9	Telma H	Telmisartan + Hydrochlorothiazide	3	3
10	Telma AH	Telmisartan + Amlodipine	1	1
11	Telmed AM	Telmisartan + Amlodipine	1	1
	Total		18	18

**Details of Antihypertensive drugs prescribed (Three and Four Drug Therapy) status:**

**Table No.10: Details of Antihypertensive drugs prescribed (Three and Four Drug Therapy)**

S.No	Drug name	Generic Name	Number	Percentage (%)
1	Enalapril +Dytor plus	Enalapril + Torsemide + Spironolactone	1	1
2	Telma + Losar H	Telmisartan +Losar + Hydrochlorothiazide	1	1
3	Losar + Losar H	Losar +Losar + Hydrochlorothiazide	3	3
4	Amlodipine + Amlovas M	Amlodipine+Amlodipine + Metoprolol	1	1
5	Amlodipine +Amlokind	Amlodipine +Amlodipine + atenolol	1	1
6	Benidine + Carvedilol + Clonidine	Benidine + Carvedilol + Clonidine	1	1
	<b>More than 3 drugs</b>			
1	Bisoprolol fumarate + Triforge	Bisoprolol fumarate + Amlodipine+ Valsartan + Hydrochlorothiazide	1	1
	Total		9	9

**Number of anti-Hypertensive drugs prescribed Status:**



**Fig. No.2.: Anti-Hypertensive drugs prescribed Status**

Oluseyi reported majority of patients were on multi-drug therapy and only 20% were on monotherapy. This present study results were contrary to Oluseyiadjemo et al results (Oluseyi adjemoet al 2019).

Oluseyi reported that the most frequently prescribed antihypertensive medications were thiazide diuretics, CCBs and ACEIs. This present study results were contrary to Oluseyi adjemo et al results (Oluseyi adjemoet al 2019).

Oluseyi reported that the most widely prescribed antihypertensive drug combinations were diuretics + ACE or ARBs, diuretics + CCBs + ACEIs and diuretics + CCBs + ARBs. This pattern of antihypertensive medication use was in accordance with the Eight Joint National Committee Guidelines on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC 8). This present study results were similar to Oluseyi et al results (Oluseyi adjemo et al 2019).

Oluseyi reported that alpha-1 blockers and centrally acting alpha-2 agonists were the least prescribed antihypertensive medications. This present study results were similar to Oluseyi adjemo et al results (Oluseyi adjemoet al 2019).

All the prescriptions of this present study were assessed for prescription pattern as per JNC-8 guidelines (Oluseyiadjemo et al 2019). Out of 100 prescriptions, 92 prescriptions were as per the JNC-8 guidelines. However, 2 patients age was between 75-80years and they were prescribed beta blockers. These two prescriptions were irrational because Beta blockers are contraindicated in the age group above 60years. Out of 100, only 6 prescriptions could not be assessed according to JNC-8 guidelines. Data related to their past medical history and medication history was not available for these 6 patients and they were not able to provide details.

## **CONCLUSION:**

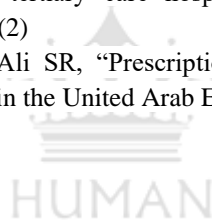
Based on the results of this present study, it was observed that the majority of the people suffering from hypertension were in the category above 40 years of age. The most common co-morbid condition found among these patients was type 2 diabetes mellitus. The most frequently prescribed category of antihypertensive drugs was ARB followed by CCB. Majority of the prescriptions were according to JNC-8 guidelines. In future pharmacists need to educate patients with hypertension to maintain the medical records properly to promote rational treatment. Thus, such studies in future by involving of

pharmacists along with prescribers can promote rational use of drugs. In future such studies need to be carried out for longer durations including larger sample size.

**Limitation:** As this present study was conducted for short duration in out-patient department. Thus, follow up of these patients to assess blood pressure control could not be done.

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