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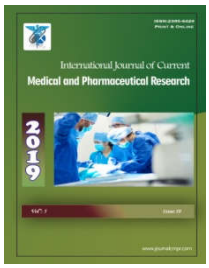

Research Article

STUDY ON MEDICATION ADHERENCE AMONG PATIENTS WITH HYPERTENSION FOR EFFECTIVE THERAPEUTIC OUTCOMES

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ABSTRACT

Hypertension is the leading public health challenge globally, due to its high prevalence, morbidity and mortality with its devastating consequences on the heart and cardiovascular system. The effectiveness of antihypertensive agents must be achieved by optimal adherence to prescribed medications according to health care providers instructions. The purpose of the study is to assess patient's health status and medication adherence among the hypertensive patients. The total study population was 127 and gender categorization had revealed that 55.11% were male population and 44.88% were female population. About 37.5 % people come under 50-59 age group. In the study population 125(98.43%) had past medical history. About 122(96.06%) patients had co-morbid conditions. Most common are diabetes and cardiovascular diseases. According to JNC-7 guidelines, in our study we found that most of the patients were in stage 1 hypertension. The study observed medication adherence through the Morisky Medication Adherence Scale (MMAS -8) and Hill-Bone High Blood Pressure Compliance Scale. According to Morisky scale 29 (22.83%) patients were less adhered, 65(51.18%) were moderately adhered and 33(25.98%) were highly adhered to the medication. During the patients hospital stay we found that adherence to medication increases and the blood pressure of the patients has reached the goal and the health status of the patients were found to be improved.

INTRODUCTION

Hypertension is one of the most important chronic non communicable diseases with increasing trend worldwide[1].It is defined as the pressure exerted by the blood on the walls of blood vessels or a condition in which arterial BP is chronically elevated. Hypertension (defined as a blood pressure ≥ (systolic/ diastolic) 140/90mmHg) is an internationally common disease and an important treatable public health problem. High blood pressure is an important modifiable risk factor for cardiovascular morbidity and mortality[2].

The Seventh Report of the Joint National Committee (JNC7) on Detection, Evaluation and Treatment of High BP classifies blood pressure based on systolic and diastolic values.

Prehypertension: 120–139 mm Hg systolic or 80–89 mm Hg diastolic.

Stage 1 hypertension: 140–159 mm Hg systolic or 90–99 mm Hg diastolic.

Stage 2 hypertension: ≥160 mm Hg systolic or ≥100 mm Hg diastolic[3].

JNC 8 is unique in the sense, as the clinical recommendations by this guideline were based on randomized controlled trials (RCTs) which are considered 'gold-standard' in representing the scientific evidence generated .As there was no further evidence to make a change to the previously established definition of high blood pressure or hypertension, the Panel members of JNC 8 support in continuing with the precious JNC 7 guidelines definition.[4]

Effective management of hypertension requires a holistic approach, based on the identification of those at highest cardiovascular risk and the use of multifactorial interventions, targeting not only BP but all modifiable cardiovascular risk factors[5].

Medication adherence may be defined as the extent to which patients behaviors coincide with health care provider's recommendations for health and medical advice. It can be defined as the extent to which a patient's behavior, with respect to taking medication, corresponds with agreed recommendations from a health care provider.The effectiveness of antihypertensive agents must be achieved by optimal adherence to prescribed medications according to health care provider's instructions. Although the control of

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blood pressure has improved considerably, poor adherence with medication treatment remains a major problem among hypertensive patients, and has been identified as one of the main causes of failure in achieving blood pressure control[6-9].

Medication adherence can be measured by subjective, direct and indirect methods. Subjective methods include self report. Direct method includes serum or urine drug level. Indirect method includes pharmacy database records, pharmacy refill rates or pill counts. Patients who were adherent to the regimen of the hypertension treatment were often significantly less likely to have elevated blood pressures[10-12]. Poor adherence to AHT is usually associated with a bad outcome of the disorder and wastage of limited health care resources.

The medications prescribed should enable the process, but become complicating factors for the treatment, which often compromises compliance itself and does not guarantee the reduction of BP values, interfering in control of the disease, prevention of complications, and in worsening of the disease[13-15].

MATERIALS AND METHODS

The proposed work titled "A study on medication adherence among patients with hypertension for effective therapeutic outcomes" was carried out in a 1000 bedded multispecialty tertiary care teaching hospital. The department selected for the study is Cardiology. The reason for selection of this department is more prevalence of hypertensive cases. The Department of Pharmacy Practice provides services to these departments and also has a good cooperation from medical team added up reasons for selecting this department for conducting the study. Knowledge on prescribing patterns, potential drug interactions, and ADRs especially in geriatric population will help the health care professionals to ensure safer and better treatment outcomes. An extensive literature review was done regarding the medication adherence in hypertensive patients diagnosed along with other co morbid conditions. A protocol of the study which includes the objectives, methodology and probable outcome was prepared and submitted to the institutional Ethical Committee. The approval from the committee was procured through the ethical committee clearance letter. The study was conducted with the expert guidance of senior and junior physicians of the study departments. The authors were allowed to utilize the hospital facilities to make a follow up of the cases, in the selected departments. All the healthcare professionals of the study site were well informed through Dean's official circular.

Inclusion criteria

- Patients of age 40 years and above of either gender
- Hypertensive patients who receives multiple medications for their co-morbid conditions
- Patients who are willing to participate

Exclusion criteria

- Pregnant patients.
- People who are not willing to participate have been omitted from the study.

Patient Information Form

A patient information form has been prepared, to inform the patient or the caregivers about the purpose and the necessity of the study. The patients were assured that the confidentiality will be strictly maintained.

Patient Consent Form

A patient consent form has been prepared and written consent was obtained from the patient or from the caregivers. The format contains details like address, date, place, provision for signature of the patient or caregivers, investigator and supervisor.

Data Entry Form

A specially designed data entry format was prepared and used to record the patient's details. Data entry format has the provision to record patient details such as name, age, sex, height, weight, IP no., date of admission and discharge, reason for admission, patient medical and medication history, vital signs, laboratory investigations, comorbidities, diagnosis, drug chart, drug interaction monitoring chart ,Morisky Medication Adherence Scale and Hill-Bone High Blood Pressure Compliance Scale.

Data Collection

Data was collected from Cardiology department on a regular basis during the ward rounds. Each patient's medication profile was reviewed. Patients who met the inclusion criteria were briefed on the project with the help of patient information form. The consents were obtained from the willing participants. The data from the medical charts were recorded in the customized data entry form.

Data Analysis

The data obtained from the case sheets were collected and analysed in a systematic format. The collected data includes demographic details of the study population such as name, age, gender, height, weight, BMI and IP number. The case sheets also includes details such as past medical and medication history, length of stay, vital signs, social history, laboratory investigations, diagnosis, comorbid conditions, drugs prescribed and dosage regimen. The appropriateness of each prescription was analysed with the help of WHO core prescribing indicators. The prescriptions with problems like drugs without indication, conditions where appropriate drugs were not prescribed, drug interactions, adverse drug reactions and contraindications were identified.All the patients who were diagnosed with hypertension alone and with co morbidities are considered. By performing a complete medication review, medication adherence of the drug therapy was obtained .Medication adherence was calculated through The Morisky Medication Adherence Scale and Hill-Bone High Blood Pressure Compliance Scale given to patients.

RESULTS

Gender Ratio in Patient Population

Table 1 Distribution of the patients in the study on the basis of their gender. Values are expressed as numbers and percentages of the patients.

(n=127)

Gender	No. of patients	Percentage (%)
Male	70	55.11
Female	57	44.88

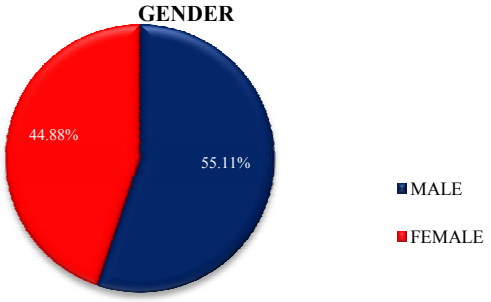

Fig 1 Distribution of the patients in the study on the basis of their gender. Values are expressed as percentages of the patients

Age Wise Distribution

Table 2 Distribution of the patients in the study on the basis of their age. Values are expressed as numbers and percentages of the patients

(N – 127)

Age in ratio(years)	No. of patients	Percentage(%)
<40	3	2.36
40 - 49	15	11.81
50 - 59	34	26.77
60 - 69	43	33.85
70 - 79	29	22.83
>80	3	2.36

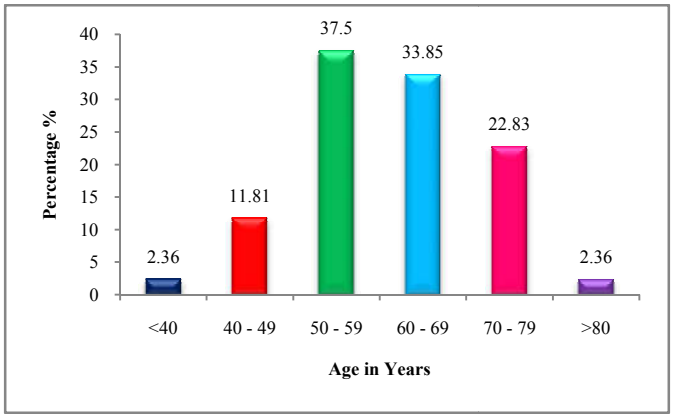

Fig 2 Distribution of the patients in the study on the basis of their age Values are expressed as percentages of the patients

Past Medical History

Table 3 Distribution of the patients in the study on the basis of their past medical history. Values are expressed as numbers and percentages of the patients.

(N: 127)

Past Medical History	No. of patients	Percentage (%)
K/C/O	125	98.43
N/K/C/O	2	1.57

Table 4 Distribution of the patients in the study on the basis of their comorbid conditions. Values are expressed as numbers and percentages of the patients

(N=127)

	Comorbid conditions	No.of patients	Percentage (%)
1.	Diabetes mellitus	62	48.8
2.	Congestive Heart failure	6	4.7
3.	Chronic Renal Failure	18	14.1
4.	Angina	1	0.7
5.	Myocardial Infarction	3	2.3
6.	Coronary Artery Disease	18	14.1
7.	Cellulitis	7	5.5
8.	LRTI	5	3.9
9.	Hypothyroidism	4	3.14
10.	Acute Gastroentritis	2	1.5
11.	Anemia	6	4.7
12.	Seizure	4	3.14
13.	Pulmonary edema	3	2.3
14.	Urinary Tract Infection	4	3.14
15.	Ischemic heart disease	25	19.6
16.	Chronic Obstructive pulmonary Disorder	8	6.2
17.	Dyslipidemia	3	2.3
18.	Peptic Ulcer Disease	1	0.7
19.	Hypokalemia	3	2.3

Table 5 Distribution of patients with one additional co morbidity

N= 127

Comorbid conditions	No.of patients	Percentage
HTN+ DM	28	22.04
HTN+ IHD	6	4.72
HTN+ CRF	4	3.14
HTN+ MI	8	6.29
HTN+ CAD	7	5.51
HTN+ CHF	4	3.14
HTN+ ANGINA	3	2.36
HTN+ SEIZURE	2	1.57
HTN+HYPERTHYROIDISM	1	0.787
HTN+ COPD	1	0.787
HTN+HYPOTHYROIDISM	1	0.787

Table 6 Distribution of patients with two additional co morbidities

N =127

Comorbid conditions	No. of Patients	Percentage
HTN+DM +IHD	12	9.44
HTN+DM+CRF	9	7.08
HTN+DM+ANGINA	2	1.57
HTN+DM+COPD	2	1.57
HTN+CRF+CAD	5	3.93
HTN+DM+CAD	3	2.36
HTN+IHD+CRF	2	1.57
HTN+DM+CHF	1	0.787
HTN+DM+SEIZURE	1	0.787
HTN+DM+HYPERTHYROIDISM	1	0.787
HTN+DM+HYPOTHYROIDISM	1	0.787
HTN+COPD+CRF	1	0.787
HTN+CHF+IHD	1	0.787

Table 7 Distribution of patients with 3additional co morbidities

N=127

Comorbid conditions	No.of Patients	Percentage
HTN+DM+CHF+HYPOTHYROIDISM	1	0.787
HTN+DM+IHD+CHF	1	0.787
HTN+DM+IHD+HYPOTHYROIDISM	1	0.787
HTN+DM+CHF+CRF	1	0.787
HTN+DM+COPD+MI	1	0.787
HTN+DM+CAD+CRF	1	0.787
HTN+DM+IHD+CAD	1	0.787

Assessment of Patients Medication Adherence

Table 8 Response of patients to Morisky Medication Adherence Scale. Values are expressed in numbers and percentages.

(N=127)

Questions	No.of patients		Percentage (%)	
	Yes	No	Yes	No
1. Do you sometimes forget to take your medicine?	109	18	85.82	14.17
2. People sometimes miss taking their medicines for reasons other than forgetting. Over the past 2 weeks, were there any days when you did not take your medicines?	68	59	53.54	46.45
3. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?	87	40	68.50	31.49
4. When you travel or leave home, do you sometimes forget to take your medicines?	93	34	73.22	26.77
5. Did you take all your medicines yesterday?	109	18	85.82	14.17
6. When you feel like your symptoms are under control, do you sometimes stop taking your medicines?	81	46	63.77	36.22
7. Taking medicines everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?	86	41	67.71	32.28
8. How often do you have difficulty remembering to take all your medicines?				
a. Never or rarely	8	-	6.29	-
b. Once in a while	35	-	27.55	-
c. Sometimes	68	-	53.54	-
d. Usually	16	-	12.59	-
e. All of the time	0	-	0	-

Table 9 Distribution of the patients in the study on the basis of MoriskyMedication Adherence Scale. Values are expressed as numbers and percentages of the patients.

(N- 127)

Medication Adherence	No.of Patients	Percentage (%)
Low adherence	29	22.83
Moderate Adherence	65	51.18
High adherence	33	25.98

Table 10 Response of patients to Hill-Bone High Blood Pressure Compliance Scale.(Values are expressed in numbers and percentages.)

(N=127)

Questions	No of patients				Percentage %			
	None of the time	Some of the time	Most of the time	All of the time	None of the time	Some of the time	Most of the time	All of the time
1. How often do you forget to take your HBP medicine?	19	85	22	1	14.96	66.92	17.32	0.787
2. How often do you decide not to take your HBP medicine?	45	67	15	0	35.43	52.75	11.81	0
3. How often do you eat salty food?	9	80	36	2	7.08	62.99	28.34	1.57
4. How often do you shake salt, fondor, or aromat on your food before you eat it?	21	78	27	1	16.53	61.41	21.24	0.87
5. How often do you eat fast food? (KFC, McDonalds, fat cook, fish and chips)	93	30	4	0	73.22	23.62	3.14	0
6. How often do you get the next appointment before you leave the clinic?	35	54	25	13	27.55	42.51	19.67	10.23
7. How often do you miss scheduled appointments?	54	59	14	0	42.51	46.44	11.02	0
8. How often do you leave the dispensary without obtaining your prescribed pills? (due to long line, closure of the clinic, forget)	44	55	22	6	34.64	43.30	17.32	4.72
9. How often do you run out of HBP pills?	32	70	23	2	25.19	55.11	17.32	1.57
10. How often do you skip your HBPmedicine 1-3 days before you go to the clinic?	52	64	11	0	40.90	50.39	8.66	0
11. How often do you miss taking your HBP pills when you feel better?	33	70	24	0	25.98	55.11	18.89	0
12. How often do you miss taking your HBP pills when you feel sick?	68	56	3	0	53.54	40.09	2.36	0
13. How often do you take someone else's HBP pills?	71	46	10	0	55.90	36.22	7.87	0
14. How often do you miss taking your HBP pills when you care less?	52	57	18	0	40.94	44.88	14.17	0

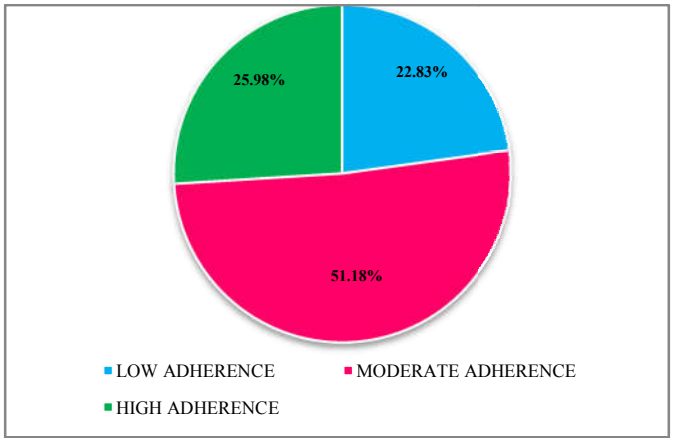

Fig 3 Distribution of the patients in the study on the basis of Medication Adherence. Values are expressed as percentages of the patients

Table 11 Distribution of the patients in the study on the basis of Hill- Bone High Blood Pressure Compliance Scale. Values are expressed as numbers and percentages of the patients.

(N – 127)

Medication Adherence	No.of Patients	Percentage (%)
Low adherence	3	2.36
Moderate Adherence	124	97.63
High adherence	0	0

Frequently Prescribed Antihypertensive Drugs

Table 12 Distribution of the patients in the study on the basis of frequently prescribed antihypertensive drugs. Values are expressed as numbers and percentages of the patients.

(N-127)

Drugs	No of patients	Percentage (%)
Calcium channel blockers	65	51.18
Diuretics	40	31.49
Beta blockers	46	36.22
ARB's	25	19.68
ACE-I	14	11.02
Alpha blocker	1	0.787
ARB+CCB	3	2.36
ARB+Diuretics	5	3.93
ACE+CCB	1	0.787

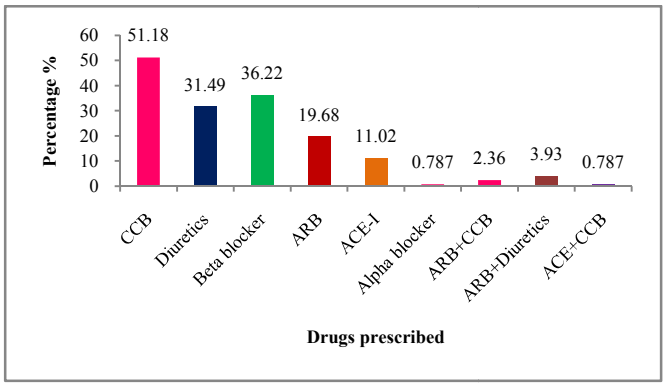

Fig 4 Distribution of the patients in the study on the basis of frequently prescribed antihypertensive drugs .Values are expressed as percentages of the patients

Table 13 Reason of Non Adherence to Antihypertensive Medication

(N=127)

Reasons	No. of Patients	Percentage
1.Intentional Non Adherence		
Fear Of Ingesting Medicines	26	20.47
Inconvenience Of Taking Medicines Outside Home	48	37.79
Fear Of Taking Too Many Drugs At Same	54	42.51
Busy Work Schedule	12	9.44
Unpleasant Taste	16	12.59
Problematic Side Effects	84	66.14
2.Non Intentional Non Adherence		
Forgetfulness	109	85.82
Cost Of Medicines	34	26.77
Unavailability Of Nearby Pharmacy	36	28.34
Unavailability Of Prescribed Medicines	14	11.02

DISCUSSION

The purpose of this study was to study the adherence profile of patient prescribed with anti-hypertensive agents and factors associated with using Morisky Medication Adherence Scale and Hill Bone High Blood pressure Compliance Scale. Hypertension is a very common disorder particularly passed middle age. It is an important risk factor for cardiovascular morbidity and mortility.JNC7 and WHO- ISH guidelines have defined it to be 140mm Hg systolic and 90 mmHg diastolic ,though risk appears to increase even above 120/80 mmHg .The epidemiological studies have confirmed that higher the blood pressure greater is the risk of cardio vascular disease and major organ damage. The effectiveness of antihypertensive agents must be achieved by optimal adherence to prescribed medications according to health care providers instructions. Although the control of blood pressure has improved considerably, poor adherence with medication treatment remains a major problem among hypertensive patients, and has been identified as one of the main causes of failure in achieving blood pressure control.

Patients who were adherent to the regimen of the hypertension treatment were often significantly less likely to have elevated blood pressures. Poor adherence to AHT is usually associated with a bad outcome of the disorder and wastage of limited health care resources.

The medications prescribed should enable the process, but become complicating factors for the treatment, which often compromises compliance itself and does not guarantee the reduction of BP values, interfering in control of the disease, prevention of complications, and in worsening of the disease.

In this study there were 127 patients of age group between 40 to 80 years of age .According to MMAS-8, 33 patients shows highly adherence ,65 shows moderate adherence and 29 shows low adherence to anti- hypertensive medications.

In this study Hill Bone compliance to high blood pressure therapy scale also was used. This scale is a reliable, validated scale and specific to hypertensive patients. This scale provides several insights into the participants compliance with regard to their medications, salt usage and appointment keeping. Hill bone scores were on the higher side which signified that the medication adherence was moderate and issues of non adherence in this study. We identified that hypertensive patients often forgot to take their medication, forgot to get their prescription refilled, usually ran out of hypertensive pills and often missed their hypertension pills when careless or when they fell sick thus contributing to moderate or low adherence. Similarly Mafuth et al using Hill Bone Medication Adherence documented that medication compliance was good but identified non adherence issues in hypertensive patients in which they often decided no to take their medication and often ran out of hypertension medicines. Various studies reported in literature with medication adherence scale (Hill Bone and MMAS – 8) documented higher proportion of non adherence. They also addressed non adherence issues of forgetting,

missing and running out of hypertension medicines. In our study 116 patients shows moderate adherence and 11 patients shows low adherence to anti hypertensive medications.

CONCLUSION

Non adherence to the therapeutic regimen remains a major limiting factor of hypertension management in India. Overall the medication adherence was moderate in hypertensive patients. Poor adherence to therapy is largely unrecognized in clinical practice. Our study suggests that, improving medication adherence in hypertensive patients can help to achieve optimal blood pressure goals and prevent further hypertension related complications. Adherence to therapeutic regimen is an important factor for optimal clinical; therefore effort should be made by the physicians to identify the reasons for non adherence and initiate steps to improve it. Hence, the pharmacist and health care professionals should work in collaboration for escalating the patients quality of life

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