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Research Article

IMPACT OF CLINICAL PHARMACY SERVICES IN MEDICATION ADHERENCE AMONG HYPERTENSIVE PATIENTS

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ABSTRACT

A Prospective observational study was conducted in 105 hypertensive patients for a period of 6 months in Vivekanandha Medical Care Hospital, Elayampalayam. The enrolled patients were assessed for knowledge and awareness about hypertension using KAP questionnaire. They were divided into two groups. The adherence was assessed using Hill-Bone Adherence to Blood Pressure Therapy Scale. The collected BP levels were analyzed using GraphPad InStat 3 software. Medication adherence of 105 patients was analyzed in two groups A and B. The BP levels of both groups were collected in all review. Counseling was given for group B from baseline to review II. They showed significant reduction in BP levels. The most prescribed drug class was found to be Furosemide. The study also observed increase in number of medication results in decreased medication adherence. The association of medication adherence and BP level with respect to co-morbidities showed that patients with satisfactory BP control had low percentage of having long term co-existing conditions. In this study, forgetfulness was the most commonly observed reason for non-adherence. The increase in number of medication results in decreased adherence to the therapy. Patients with poor BP control seen to have more co-morbidities associated with hypertension. Maintaining optimal BP level and medication adherence together is essential for preventing co-morbidities. Focusing on the lifestyle modification will help patients to achieve an optimal BP control. The presence of pharmacist will play an essential role in maintaining medication adherence and optimal BP control in hypertensive patients by counseling.

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INTRODUCTION

The World Health Organisation defines Adherence as the degree to which the person's behaviour corresponds with the agreed recommendations from a healthcare provider.¹ The five dimensions of medication adherence are Social/ economic factors, Provider-patient/ health care system factors, Condition-related factors, Therapy- related factors, Patient- related factors. Patients with antihypertensive therapy and other associated co-morbidities are at an increased rate of adherence issue.²

In India HTN is considered the most attributable cause for 57% of stroke and 24% of Coronary Heart Disease (CHD) deaths. Around 25-30% urban and 10-20% rural adults had reported with HTN in India. This converts to an approximate proportion of 100-110 million persons with increased blood pressure (BP). Also, the report shows that about half to two-thirds of these are stage I HTN and the rest have stage II-III disease.³ Increased medication cost, unbalanced living conditions, limited gain to

health care, financial status, inconvenient work schedules have all been related to decreased adherence rates.⁵ The possible causes of non-adherence have to be assessed by the health care professionals and increase the medication adherence by achieving a better health-outcome.⁶ Reasons for non-adherence in hypertensive patients include poor knowledge of disease, ignorance of long term treatment, religious beliefs, cultural practices, ADR, patient not believing that health depends on medicine, worrying about taking medicine, forgetfulness and drug out of supply. Several other factors like poor communication/ insufficient patient information, expenses (doctor's fees, transport, medicine and hospitalization), interruptions of daily routine, lack of reminders and being busy or late for work may also affect the adherence of the patients.⁸ The key-points in improving medication adherence are motivational interviewing, understanding of disease and medications, simplifying regimen, patient reminders and dressing cost issues. So, the study was planned to assess the impact of clinical pharmacy services in the adherence of the therapy.

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METHODS

A Prospective observational study was planned to assess the variations in medication adherence among hypertensive patients by drug class and co-morbidities and the impact of clinical pharmacy services in a 300 bedded multi-specialty tertiary care teaching hospital with the approval (Ref. No.: VMCH/IEC/FEB/2018/04) of the institutional ethical committee. The study was carried out in general medicine department over a period of 6 months (January 2018- June 2018). A patient consent form was prepared and obtained written consent from all the patients after providing the information.

A separate data entry form incorporating inpatient details were designed and the format contains provision to enter patient demographics, medical/medication history, biochemical and other laboratory investigations. The drug chart covers drug name, dose, frequency and route of administration, days of treatment and any interventions. Provision was given for entering the scores by face to face interview using KAP questionnaires and Medication adherence scale.

The KAP QUESTIONNAIRE was used to assess the knowledge, attitude and practice of the patients. It included 16 questions out of which 8 questions related to knowledge about hypertension, 2 questions to assess the attitude of the patient toward the disease, 6 questions regarding the practices. Adherence to medication was assessed using hill bone adherence to blood pressure therapy scale. It consists of 14 questions to assess medication adherence among hypertensive patients. The scale used to assesses patient behaviors for three subscales under behavioral domains of high blood pressure treatments are reduced sodium intake, appointment keeping, and medication taking. Score ranging from 14 (perfect adherence) to 56 (non adherence) was observed. Higher score indicate poor adherence to medication and lower score reflect better medication adherence. A patient information leaflet was designed to make aware the patients on various aspects of hypertension and counseling were given after assessing patient's adherence to medication. Approximately 105 patients were randomly selected after getting the patient's consent form informally. Patients of either sex, with a systolic blood pressure (SBP) above 140 mmHg and /or diastolic blood pressure (DBP) above 90 mmHg with physician-diagnosed hypertension and patients knowing Tamil or English language were included in the study.

Pregnant women, patients who were newly diagnosed with hypertension, geriatric patients of age >70yrs, who were not able to answer to the questionnaire, patients who refuse to participate in the study and mentally incompetents were excluded from the study.

A regular ward round participation was carried out in the department of general medicine. All the information of patients aged 18 years and above was recorded. During data collection, patients were informed about the study using patient information format and obtained their written consent. Adherence to medication of these patients was then assessed by face to face interview by using KAP questionnaire and medication adherence scale. Data were entered through Graph pad INSTAT PRISM 3 software. Blood pressure values were compared through repeated measures ANOVA. The p value

<0.05 was considered as statistically significant. Association of medication adherence level with respect to co-morbidities was assessed with one way ANOVA. The knowledge, attitude and practice of the patients were assessed by using KAP questionnaire. Medication adherence was assessed with the help of hill-bone compliance high blood pressure therapy scale.

RESULTS

The study included 105 hypertensive patients from both inpatient and outpatient department.

An overall gender distribution of the study population was indicates a predominant male population (61%).

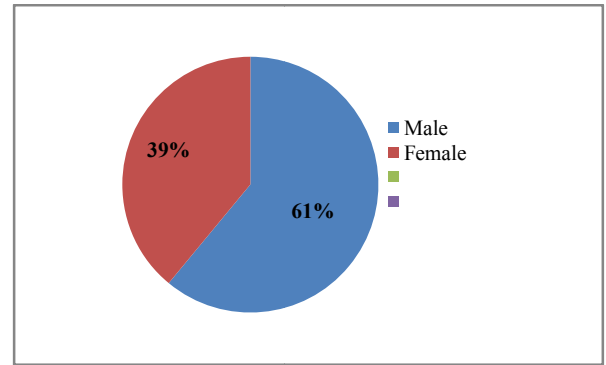


Figure I Gender Wise Distribution of Patients

Pattern of Social History

The social history of the patient shows that 31% of the total population had both alcohol and smoking habits of population.

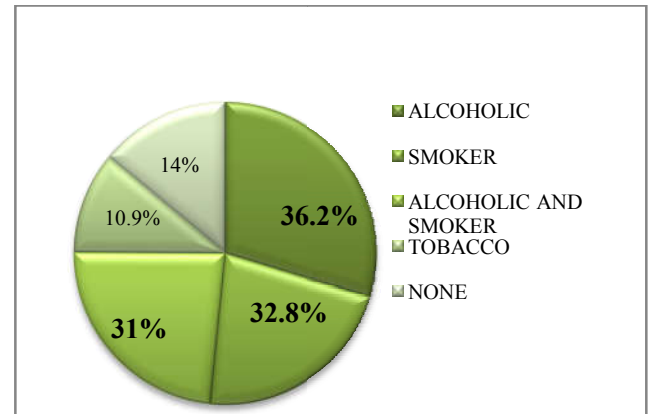


Figure II Pattern of Social History

Percentage of Patients with and Without Comorbidities

Among the 105 patients, 23(21.9%) patients were without co-morbidities and 39(37.1%) patients have one co-morbidity whereas 43(41%) patients were having more than one co-morbidities.

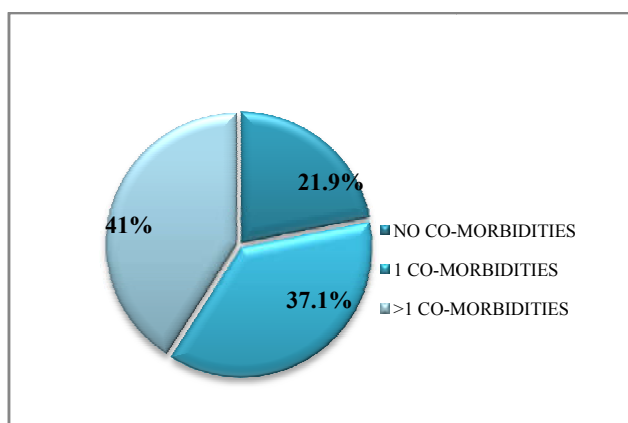


Figure III Percentage of Patients with and Without Co-morbidities

Pattern of Comorbidity Among Hypertensive Patients

In the 105 study population clinical conditions, number of patients and percentage were determined. 56 (44.8%) patients with DM, 26(20.8%) patients with CKD, 11(8.8%) patients with CVD, 7(5.6%) patients with heart diseases, 9(7.2%) patients with lipid disorders and 16(12.8%) patients have other clinical conditions.

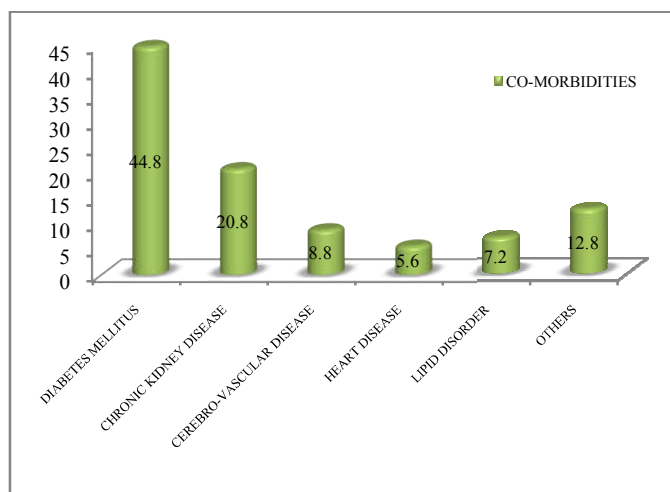


Figure IV Pattern of Co-morbidities among Hypertensive Patients

Proportion of Subjects Having Co-Morbidities By Adherence And Blood Pressure Control

When compared with hypertensive patients having poor control, those with satisfactory BP control had lower percentage of having co-existing long term conditions. Figure 14 shows the graphical presentation of the above.

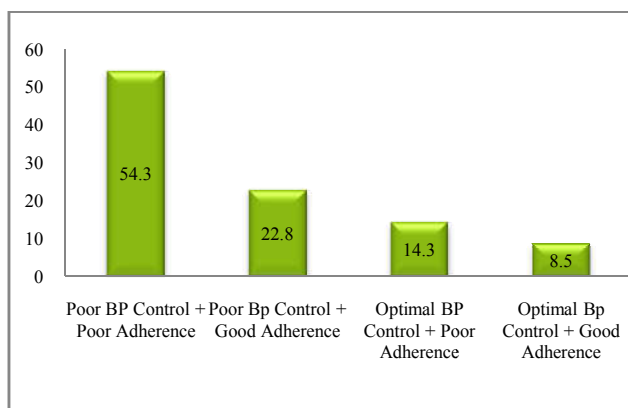


Figure V Proportion of Subjects Having Co-Morbidities by Adherence and Blood Pressure Control

Anti-Hypertensive Drugs Prescribed

The study populations were treated with different class of antihypertensive drugs which are shown in the table. Furosemidewith total of 40 patients was the most prescribed drug among hypertensive patients followed by Amlodipine- 37 patients, Metoprolol - 19 patients and Telmisartan - 16 patients.

Table 1 Anti-hypertensive Drugs Prescribed

Class of antihypertensive	Drugs prescribed	Number of patients
ACE Inhibitors	Enalapril	3
	Lisinopril	3
	Telmisartan	16
ARB	Metasartan	4
	Metoprolol	19
Beta Blockers	Atenolol	9
	Amlodipine	37
Calcium Channel Blockers	Nifedipine	4
	Clinidipine	11
	Hydrochlorthiazide	5
Diuretics	Mannitol	3
	Furosemide	40
	Torsemide	2
Alpha-Blockers	Prazosin	3

Number of Anti-Hypertensive Drugs Prescribed Per Patient

Out of 105 patients, 52 patients were treated with two classes of antihypertensive drugs and more than 2 classes were prescribed for 15 patients.

Table II Number of Anti-hypertensive Drugs Prescribed Per Patient

Number Of Antihypertensive Drugs	Number Of Patients	Percentage (%)
1	38	36.2
2	52	49.5
>2	15	14.3

Blood Pressure Values of Group-A

P-Value is considered not significant which suggests that there was no significant change observed in each follow-up.

Table III Blood Pressure Values of Group-A

Parameters	MEAN ± SD			P-Value
	Baseline	Review I	Review Ii	
Systolic	165.00 ± 22.09	158.37 ± 18.72	158.94 ± 19.20	0.1782
	99.61 ± 8.62	96.34 ± 8.17	96.34 ± 7.67	

P-Value is considered not significant

Blood Pressure Values of Group-B

P-Value is considered significant which suggests that significant reduction was observed in each follow-up.

Table IV Blood Pressure Values of Group-B

Parameters	Mean ± Sd			P-Value
	Baseline	Review I	Review Ii	
Systolic	157.92 ± 23.15	147.08 ± 15.94	141.32 ± 12.56	0.013
	98.67 ± 8.99	89.05 ± 7.90	82.64 ± 6.24	

P-Value is considered significant

Response to Kap Questionnaire

Using KAP Questionnaire the patient’s knowledge, attitude and practice was assessed about hypertension. The scores were recorded for both group A and group B before counselling. The responses of 105 patients are shown in the table. The patients had knowledge about salt intake, smoking, benefit of exercise, regular checking of BP level and importance of medication adherence in hypertension management. But they were not aware about obesity, alcohol and contribution of genetic factors. Most patients consider hypertension as a curable medical condition which can be understood from the data below. The patients don’t put into practice, even they have knowledge about their condition.

Table V Response to KAP Questionnaire

S.no	Questions	Yes	No	I don’t know
1.	Is diet rich in salt a risk factor for hypertension?	63	19	23
2.	Is smoking a major cause of hypertension?	39	51	15
3.	Is obesity associated with hypertension?	32	54	19
4.	Does exercise have a beneficial role in hypertension?	69	18	18
5.	Do you think regular checking of blood pressure is important?	72	12	21
6.	Should we follow with our physician regularly?	89	0	16
7.	Do you think regular medication is important in hypertension?	91	14	0
8.	Is alcohol a major cause for hypertension?	44	32	23
9.	Do you think genetic factor contributes to hypertension?	10	77	18
10.	Do you think hypertension is curable?	59	27	19

S.No	Questions	One Week To One Month Ago	2 Months To 6 Months Ago	More Than 6 Months Ago
1.	When was your BP checked last?	0	28	77
2.	When was your last visit with your physician?	0	49	56
3.	When was your last urine examination done?	0	36	69
4.	When was your lipid profile checked last?	0	24	81
5.	When your blood sugar level was last checked?	0	71	34
6.	When did you exercise last?	0	87	18

Hill-Bone Scale for Group-A

Patient Response to Hill-Bone CHBPTS was analysed. No notable improvement in adherence level was observed in group A during the follow up. Overall adherence level of group A was demonstrated below.

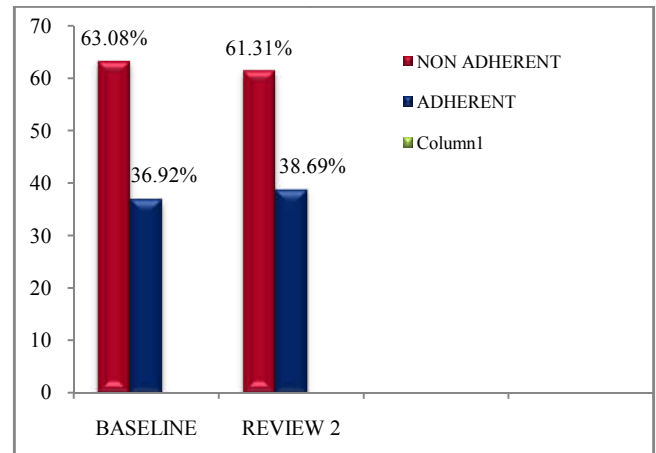


Figure VI Overall adherence of Group-A

Hill-Bone Scale for Group-B

Counselling was given to this group during the follow up. Notable improvement in adherence level was observed. Overall adherence level of group B was demonstrated.

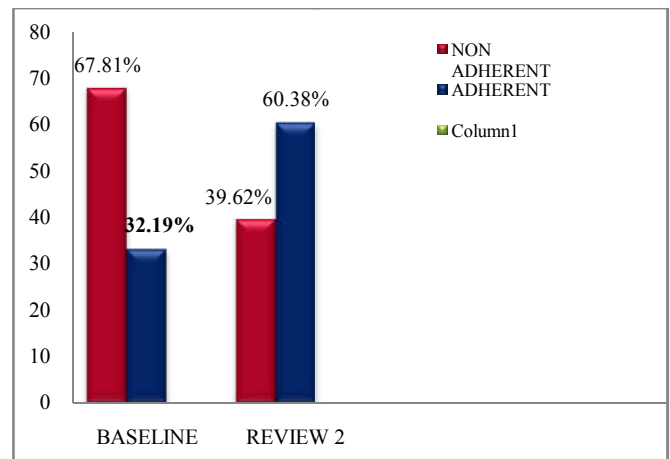


Figure VII Overall adherence of Group-B

Reasons for Non-Adherence of Drugs

In this study, forgetfulness was the most common reason for non-adherence.

Table VI Reasons for Non-Adherence of Drugs

Reasons	Numbers	Percentage (%)
Poor knowledge of disease and ignorance of long term treatment	24	35.8
Religious beliefs and cultural practices	9	13.4
Adverse drug reactions	12	17.9
Worrying about taking medicine	13	19.4
Forgetfulness	49	73.1
Poor communication/ insufficient patient information	30	44.7
Expenses (doctors’ fees, transport, medicine, and hospitalization)	40	65.6
Interruptions of daily routine	27	40.3
Lack of reminders	30	44.7
Being busy or late for work	17	25.3
Too many medications to take	25	37.3

DISCUSSION

Hypertension stays as a challenging medical condition among the non-communicable diseases. Good adherence to anti-hypertensive drugs is a key factor in achieving appropriate BP control in hypertensive patients. Endeavours to control hypertension also includes expanding knowledge about the dangers related with high BP, giving awareness in regards to the significance of adherence and importance of non-pharmacological management.⁷

In our study, patients were treated with different class of antihypertensive agents. It was observed that Furosemide was the most prescribed drug in the study population followed by Amlodipine, Metoprolol and Telmisartan. Relationship between drug class and medication adherence could not be studied with the tools that followed. But the relationship between medication adherence and number of drugs prescribed was observed in this study. The findings suggest that increasing number of medications can lead to decreased medication adherence.

The blood pressure values of group-A and group-B were collected from baseline check-up to review II. During the study the patients were asked to visit their physician regularly in order to achieve goal BP level. Patients of both groups continued to visit their physician regularly. Significant improvement was observed in the test group (Group-B), which was due to practice of recommended lifestyle modifications. Similar results were found in study conducted by Carvalho S *et al.*⁸

Medication adherence level of patients with no co-morbidities, 1 co-morbidity and >1 co-morbidity were calculated respectively. The baselines of these patients were taken to determine the association between the medication adherence level and co-morbidities. No significant association was found between adherence and presence of co-morbidities.

From the sample population relationship between medication adherence and BP level was correlated with co-morbidities of the patients. People with satisfactory BP control had lower percentage of co-existing long term conditions, when compared with hypertensive patients having poor control. The evidence from our findings suggests that the focus on achieving good BP control should not be neglected.

The study also focuses on the reasons for non adherence. Forgetfulness was the most common reasons for non adherence. Lack of reminders, hospital expenses, Poor knowledge of disease and ignorance of long term treatment, poor communication, too many medicines, busy life style and religious beliefs are the other reasons for non adherence in hypertensive patients. Similar findings were observed in a study conducted by S.Pirasath *et al.*⁹

This study indicated that hypertensive patients with poor BP control should be evaluated in meticulous manner for possible presence of other co-existing medical conditions, in particular diabetes mellitus. Our findings suggested that counseling patients about their medications and their role in management of hypertension help patients to improve their adherence. In order to get optimal BP level, the patient should focus on their lifestyle modification apart from therapeutic regimen. Counseling done by the clinical pharmacist played a vital role

in maintaining medication adherence and optimal BP control in hypertensive patients.

CONCLUSION

The study concludes that, increase in number of medication results in decreased adherence to medication. Patients with poor BP control were seen to be more prone to have co-morbidities associated with hypertension. Maintaining optimal BP level and medication adherence together is essential for preventing co-morbid conditions. So patient should focus on lifestyle modification along with medication adherence in order to achieve an optimal BP control. Forgetfulness was the common reason for medication non adherence and other major reasons include hospital expenses, busy lifestyle and insufficient patient information. Counselling done by the clinical pharmacist played a vital role in maintaining medication adherence and optimal BP control in hypertensive patients.

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