

Medication Adherence of Hypertensive Patients: Impact of Clinical Pharmacist Intervention in Treatment of Hypertension in a Tertiary Care Hospital

D Sharma¹, DK Mehta², R Das³, K Bhatti⁴, K Mehta⁵, RM Chidurala⁶, A Petekar⁷

¹Research Scholar, Pharm D, ²Professor, ³Associate Professor, M.M.College of Pharmacy, Maharishi Markandeshwar (Deemed to be) University, Mullana, Ambala, HR, ⁴Hospitalist, Department of Medicine, Medstar southern Maryland hospital, 7503, Surratts Rd, Clinton, Maryland, 20735, USA, ⁵Professor, Chitkara Business School, Chitkara University, Chandigarh, India, ⁶Associate Chief Hospitalist, Department of Medicine, Hospitalist Medicine Physicians of Ohio, Mount Carmel East Hospital, 6001 E.broadstreet, Columbus, Ohio, USA., ⁷Assistant Professor, M.M.College of Pharmacy, Maharishi Markandeshwar (Deemed to be) University, Mullana, Ambala, HR

Abstract

Hypertension is well recognized as an important health risk factor. Adherence to medication is critically important for controlling blood pressure and reducing associated risk of cardiovascular complications in patients with hypertension. Patient counseling is instructing the patient about various aspects of prescribed medicines like; how to take, how long to take, what to avoid, precautions, common side effects, storage & any other relevant information about the illness. In order to achieve pharmaceutical care, pharmacists provide individualized care to patients. Hypertensive patients can benefit from interventions that focus on improving knowledge and adherence to drug treatment. Therefore, this study aims to assess the impact of an educational intervention provided to hypertensive patients from rural and urban areas in a tertiary care hospital by clinical pharmacists with the objective of improving their knowledge on hypertension and their adherence to the medication prescribed.

Key words: Hypertension, Patient counseling, Clinical pharmacist, Medication adherence, Intervention, Morisky Medication Adherence Scale

Introduction

Hypertension is well recognized as an important risk factor for cerebrovascular accidents (CVA), congestive heart failure (CHF) coronary artery disease (CAD), end-stage renal failure (ESRF) and sudden death.¹⁻⁷ It is a major health problem throughout the world because of its high prevalence and its association with increased risk of cardiovascular disease (1). According to the 7th report of

joint national committee, in age ≥ 60 years' patients who don't have diabetes or chronic kidney disease, the goal blood pressure level is $<150/90$ mmHg and in age <60 years' patients' blood pressure goal is $<140/90$ mmHg, though risk appears to increase even above $120/80$ mm Hg.⁸

Hypertension is a common chronic disease amenable to control by appropriate medication or adopting relevant lifestyle modifications. However, a lack of knowledge about the severity of the disease and the importance of adhering to the prescribed treatment, long term drug regimens, complex regimens that require numerous medications with varying dosing schedules, cost and a lack of motivation to make some lifestyle changes in terms of diet and physical exercise may constitute barriers to compliance behavior. Various studies conducted worldwide have documented non-adherence

Corresponding author:

Dr. Rina Das,

Associate Professor,

M.M.College of Pharmacy,

Maharishi Markandeshwar (Deemed to be) University,

Mullana, Ambala, HR, India.

e-mail ID: rinammu@gmail.com

to recommended medication therapy.⁹⁻¹⁸ In patients with hypertension, adherence to medication is critically important for controlling blood pressure and reducing associated risk of cardiovascular complications.¹⁹⁻²⁵ Poor medication adherence, patients' beliefs about hypertension and its treatment, low health literacy and lack of social support are major patient-related barriers to achieving the desired control of blood pressure.²⁶

In India patients receive medication as part of their treatment and due to heavy patient load; many prescribers have little time to explain the proper use of medication to their patient. Patient Counseling is instructing the patient about various aspects of prescribed medicines like; how to take, how long to take, what to avoid, precautions, common side effects, storage & any other relevant information about the illness. *The concept of patient counseling in its modern form originated in India in the mid 1990s. Since then, considerable growth and development occurred in the country in the area.* In order to achieve pharmaceutical care, pharmacists provide individualized care to patients.²⁷

It has been reported that hypertensive patients can benefit from interventions that focus on improving knowledge and adherence to drug treatment.²⁸ Therefore, this study aims to assess the impact of an educational intervention provided to hypertensive patients from rural and urban areas by clinical pharmacists with the objective of improving their knowledge on hypertension and their adherence to the medication prescribed.

Method

A prospective, observational study was conducted in the outpatient department of Medicine at Maharishi Markandeshwar Institute of Medical Science and Research (MMIMSR), Mullana, Ambala, Haryana, India. The study duration was one year and was conducted from December 2018 to May 2019. The sampling method was convenient and sample size (n=300) included hypertensive patients surveyed during the study period.

Study participants

The study population consisted of 300 diagnosed hypertensive patients (147 men 153 women). The patients were recruited from medicine outpatient department after being diagnosed as hypertensive by the physicians as per JNC 7 guidelines. All the patients were screened for eligibility of inclusion and exclusion criteria designed

for this study. The patients were informed and clarified about the purpose of study in the language understood by the patient, prior to enrollment. All patients provided written informed consent to participate in the study after full explanation of the study. Patient's demographic details were noted in case record form.

Hypertension control status

According to the 7th report of joint national committee in age ≥ 60 years' patients who don't have diabetes or Chronic Kidney Disease the goal blood pressure level is $<150/90$ mmHg and in age <60 years' patients' blood pressure goal is $<140/90$ mmHg, though risk appears to increase even above $120/80$ mm Hg.⁸

Ethical Considerations

This study was designed to study the effect of counselling and pharmacist intervention on medication adherence of hypertensive patients. The clinical protocol was approved by institutional ethics committee (project No: IEC-1323) on 19/12/18 and was performed in accordance with the declaration of Helsinki and the code of Good Clinical Practice.

Qualification criteria

• Inclusion Criteria:

1. Patient newly and previously diagnosed hypertensive
2. Age >18 years
3. Patient initiated on therapy by the treating physician as per the routine clinical practices.
4. Patient able and willing to give written informed consent.
5. All the patients will be investigated under following: Fasting Lipid Profile, Random Blood Sugar, Fundus Examination, Liver Function Test, and Kidney Function Test & X-ray Chest

• Exclusion Criteria:

1. Patient with pre-existing renal failure, liver failure and cardiac disease.
2. Pregnant and lactating mothers.
3. Patients with the history of peptic ulcers,

pulmonary tuberculosis, uraemia, vitamin deficiency, and patients on steroid therapy were excluded.

Research tools

Blood pressure was measured with the help of Sphygmomanometer (Atico Sphygmomanometer) along with the stethoscope. Morisky Medication Adherence Scales MMAS-8 questionnaire was used to evaluate the impact of patient counselling provide by the pharmacists to the patients.²⁹

Baseline analysis and randomization

At baseline, current knowledge on hypertension, and medication adherence was measured for all patients in addition to socio-demographic data. Blood pressure readings were taken from medical records. As baseline data were obtained and analyzed, patients attending the medicine and cardiology units for routine follow-up were randomly allocated either to a control group [(CG) usual care, where no pharmaceutical care was provided] or to an intervention group [(IG) pharmaceutical care, consisting of follow-up by the trained clinical pharmacist during a month period]. Participants were allocated to groups following simple randomization procedures using a computer generated list. The pharmaceutical care provided to the IG by a clinical pharmacist took approximately 15 min during the first visit, and the follow-up visits took approximately 10 min. The intervention was conducted with each patient once per week (or in accordance with their appointment schedule). At each visit, the hospital pharmacist conducted a thorough interview with the patient, identified problems leading to poor medication adherence and provided patient education. The CG had no clinical pharmacist involvement, and control patients received the traditional service provided by the hospitals (receiving prescription orders, counseling about medication use and information about follow-up visits).

Assessment of medication adherence

The patient adherence was assessed by using standard questionnaires, i.e. Morisky medication adherence scale (MMAS-8).²⁹ MMAS-8 is an 8-item questionnaire with 7 yes/no questions while the last question was a 5-point Likert scale. Based on the scoring system of MMAS, adherence was rated as follows: high adherence (=0 score), medium adherence (=1 to 2 score) and low adherence (=3-4 score). The patient's blood

pressure values were noted at baseline and each time patient came for the follow-ups. Patients who had a low or a moderate rate of adherence were considered as non-adherent. Mean adherence scores at baseline and for each group (IG and CG) were calculated and presented for the final analysis.

Statistical analysis

Data recorded was entered in Microsoft excel version 2016. The Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) was used for data analysis.

Results

A total of 357 patients attended the cardiac unit of MMIMSR hospital, Mullana, India during the recruitment period (from December 2018 to May 2019), and all were assessed for eligibility. Of these, 57 were excluded (42 did not meet the criteria and 15 refused to participate), and the remaining 300 patients (153 women and 147 men) with hypertension, aged from 18 to 66 years [mean (SD) = 46.0 ± 7.1] were included for the study. Patient were randomized into two groups, control group (150 CG) and intervention group (150 IG). Baseline assessment, demographic study and current medication adherence rate study was carried out for the whole cohort of 300 patients. The IG and CG were comparable with respect to age, gender, education, locality and duration of disease. At baseline, knowledge on hypertension and medication adherence was reported as low in both the IG and CG. Table 1 describes the baseline analysis of the entire cohort (n=300), IG (n=150) and CG (n=150). Evaluation of adherence using the Scales MMAS-8 questionnaire and the MMAS-8 scale data of the study is shown in Table 2. Table 3 highlights the post-intervention analysis of Medication adherence between intervention and control group upon completion of the study. A statistically significant difference was observed, when knowledge, adherence, and blood pressure were compared between IG and CG after completion of the intervention. Medication adherence improved in the IG, as the post-intervention analysis revealed. The CG was more or less the same in terms of medication adherence, and little difference was observed compared with the baseline analysis. Lower systolic and diastolic blood pressures were observed among the IG.

Table 1: Baseline characteristics of study population

Characteristics	Entire cohort n = 300 Frequency (%)	Intervention group n = 150 Frequency (%)	Control group n = 150 Frequency (%)	P value
Age, mean (SD) = 46.0 ± 7.1				0.812
18-42	96(32%)	45(30%)	51(34%)	
42-66	199(66.3%)	102(68%)	97(64.6%)	
Above 66	5(1.6%)	3(2%)	2(1.3%)	
Gender				0.541
Male	163(54.3%)	87(58%)	76(50.6%)	
Female	137(45.7%)	63(42%)	74(49.3%)	
Area				0.276
Rural	174(58%)	96(64%)	78(52%)	
Urban	126(42%)	54(36%)	72(48%)	
Habits				
Smoker	33(11%)	15(10%)	18(12%)	
Non-smoker/Non alcoholic	144(48%)	75(50%)	69(46%)	
Alcoholic	54(18%)	24(16%)	30(20%)	
Smoker/Alcoholic	69(23%)	36(24%)	33(22%)	
Baseline SBP, mean (SD) mmHg	164.9 (12.6)	163.5 (12.1)	163.5 (1.9)	
Baseline DBP mean (SD) mmHg	96.7±10.8	95.9 (10.1)	95.7 (9.9)	

Table 2: Medication Adherence of study population

S.NO.	MMAS-8 scale	DAY 1 Frequency (%) n = 150 Frequency (%)		DAY 30 Frequency (%)	
		Control Group n=150	Intervening Group n=150	Control Group n=150	Intervening Group n=150
1.	High Adherence (0)	36(24%)	33(22%)	38(25.5%)	82 (54.6%)
2.	Medium Adherence (1-2)	75(50%)	71(47.3%)	75(50%)	44 (29.3%)
3.	Low Adherence (3-4)	39(26%)	46(30.6%)	37(24.6%)	24 (16%)

Table 3: Post-interventional analysis of medication adherence between interventional and control group

Characteristics	Intervention group (n, %)		Control group (n, %)	
	Male	Female	Male	Female
Age				
18-42				
High Adherence (0)	15(10)	11(7.3)	8(5.3)	3(2)
Medium Adherence (1-2)	6(4)	5(3.3)	13(8.6)	17(11.3)
Low Adherence (3-4)	3(2)	5(3.3)	5(3.3)	5(3.3)
42-66				
High Adherence (0)	31(20.6)	22(14.6)	15(10)	12(8)
Medium Adherence (1-2)	24(16)	9(6)	24(16)	20(13.3)
Low Adherence (3-4)	6(4)	10(6.6)	10(6.6)	16(10.6)
Above 66				
High Adherence (0)	2(1.3)	1(0.6)	0(0)	0(0)
Medium Adherence (1-2)	0(0)	0(0)	1(0.6)	0(0)
Low Adherence (3-4)	0(0)	0(0)	0(0)	1(0.6)
Area				
Rural				
High Adherence (0)	30(20)	16(10.6)	8(5.3)	8(5.3)
Medium Adherence (1-2)	25(16.6)	10(6.6)	21(14)	16(10.6)
Low Adherence (3-4)	8(5.3)	7(4.6)	13(8.6)	12(8)
Urban				
High Adherence (0)	17(11.3)	19(12.6)	11(7.3)	11(7.3)
Medium Adherence (1-2)	5(3.3)	4(2.6)	19(12.6)	19(12.6)
Low Adherence (3-4)	2(1.3)	7(4.6)	4(2.6)	8(5.3)
SBP, mean (SD) mmHg	142.6 (10.2)		158.9 (14.98)	
DBP mean (SD) mmHg	82.04 (5.39)		90.64 (5.86)	

Discussion

Uncontrolled hypertension is one of a leading cause of heart disease and stroke. Controlling hypertension can prevent cardiovascular disease. Controlling hypertension is very challenging. Effectively managing hypertension includes both lifestyle changes and long term medication use.¹³ Patient counseling and interventions generate opportunities for patients to understand their conditions better and clarify misapprehensions they have of their disease and its treatment.³⁰ Therefore, it can be hypothesized that imparting education to patients through a well designed intervention can result in better awareness of disease, and increased medication adherence and therefore better treatment outcomes. Other than reminding patients to take medication properly, regularly on time, we provided adequate knowledge regarding the weight loss and regular exercise, sodium and calorie restriction, restriction of saturated fats and increased intake of dietary fibers, total restriction of alcohol intake, leave the habit of smoking, caution while using cold remedies containing sympathomimetic, self-monitoring of blood pressure etc.

The day 1 and day 30 BP measurements are depicted in Table 1 and 3 respectively. The results of the blood pressure (both SBP and DBP values) show a very good improvement from the base line to the first follow-up. A better result was found in patients who received clinical pharmacist counselling sessions. This strongly indicated that there is a positive impact of clinical pharmacist counselling on hypertensive patients.

In our study medication adherence were found to be high in urban population compared to rural patients. Adherence to the medication were found more in male as compare to the females. As per answer given by the patient's major reasons for non-adherence are forgetfulness, cost of medication, lack of access to medication, travelling, fear of getting used to medicine. The assessment of medication adherence scores by MMAS-8 clearly showed that high adherence was found to be more in the intervention group and low adherence were found to be high in the control group. The intervention group patients were provided with counselling and frequent telephone reminding makes them too strongly adapts to think about disease management. As many of the patients were illiterate it was difficult for them to remember the name of the drug, but on repeated counseling they remembered it with the help of the strips, color, and covers of the medicines

which made them adhere to their medication properly. This study strongly suggested that there is a need of continuous education to the patients to improve their medication adherence towards disease management.

Conclusion

The study showed that clinical pharmacist interventions had positive impact in improving the medication adherence and treatment satisfaction of the hypertensive patients and the intervention program was well accepted by the study population. The one-month patient follow-up had shown enhancement in their adherence and also treatment satisfaction. It was quite proved that participants with low treatment satisfaction are more likely to have lower adherence to antihypertensive medications. The results of our study suggested that the treatment satisfaction is consistent indicators of adherence to antihypertensive medications in hypertensive patients. Patients should be educated about the benefits of self-management of diseases, and the common perception that drugs are inherently unsafe has to be eliminated. Additional research is also recommended in order to identify appropriate and targeted interventions in an effort to improve treatment satisfaction in patients with hypertension.

This study also highlights that there is a need of patient counseling services for patients especially rural population in chronic disease maintenance. This study shows that pharmacist-initiated educational interventions increase patients' knowledge about their condition in a way that positively modifies their beliefs about medicines. Such changes are expected to result in increased adherence levels. Therefore, healthcare professionals in India should develop strategies that enlist the patient as a participant in the management of his/her health through the help of patient education and counselling. Although increase in adherence levels is apparent from our study, an important aspect to be considered is the long-term impact of the educational programme on the status of medication adherence. Therefore, it is recommended that continuous medical education (CME) should be applied even after the intervention, so that patients can retain maximum knowledge and obtain benefit from it.

Acknowledgement: The authors wish to thank M.M. College of Pharmacy, Maharishi Markandeshwar (Deemed to be) University, Mullana, India for all necessary facilities.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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