HYPERTENSION MEDICATION ADHERENCE AND ASSOCIATED FACTORS IN ADULT HYPERTENSIVE PATIENTS

[1]Dr. Abhi Patel, [2]Dr. Sarita Mulkalwar, [3]Dr. Krushal Pabari, [4]Dr. A. V. Tilak, [5]Dr. B. T. Rane

1. Third Year Resident, Department of Pharmacology, Dr. D.Y. Patil Medical College, Hospital, and Research Centre, Pune, Maharashtra, India
2. Professor, Department of Pharmacology, Dr. D.Y. Patil Medical College, Hospital, and Research Centre, Pune, Maharashtra, India
3. Third Year Resident, Department of Pharmacology, Dr. D.Y. Patil Medical College, Hospital, and Research Centre, Pune, Maharashtra, India
4. Professor and Head of Department, Department of Pharmacology, Dr. D.Y. Patil Medical College, Hospital, and Research Centre, Pune, Maharashtra, India
5. Assistant Professor, Department of Pharmacology, Dr. D.Y. Patil Medical College, Hospital, and Research Centre, Pune, Maharashtra, India

Corresponding author:
Dr. Krushal Pabari, Third Year Resident, Department of Pharmacology, Dr. D.Y. Patil Medical College, Hospital, and Research Centre, Pune, Maharashtra, India
Email id- dr.krushalpabari@gmail.com

ABSTRACT

Background: The inability to effectively regulate high blood pressure makes it the most difficult public health issue in the world. For better blood pressure control, medication adherence is crucial. Treatment adherence can be influenced by various factors like patient behaviour, the presence of comorbid illnesses, awareness of the disease severity, and also factors like patients' age, gender, and education level. To improve treatment adherence, it is important to comprehend the factors that affect patient adherence.
Aim: The aim of the present study was to estimate the level of medication adherence in hypertensive patients and to determine the factors associated with it.
Methods: All adults who were diagnosed as hypertensive patients for more than one month and willing to participate in the study were included in this study, however pregnant mothers and lactating women were excluded. Patients' medication adherence was noted by using Morisky Green Levine Medication Adherence Scale (MGL).
Results: Out of 217 patients, 78 (35.94%) had high adherence, while 55 (25.35%) had low adherence, patients' forgetful nature was a major factor (57.60%) contributing to low adherence. High adherence was noted in, females (43.14%); in patints age <30 years (43.33%), with postgraduate education (48.28%), checking blood pressure monthly (51.61%), taking medication for >5 years (49.02%), without any comorbidity (57.47%) and in patients who were aware of complications of hypertension (41.44%).
Conclusion: Patients' forgetful nature was more responsible for low adherence than their carelessness. Patients' education level has a significant impact on medication adherence. Patients' awareness of their blood pressure level and complications of hypertension makes them more adherent to treatment.

Keywords: Hypertension, medication adherence, Morisky Green Levine Medication Adherence Scale, factors.

INTRODUCTION

Hypertension is the most challenging public health problem worldwide as the control of high blood pressure is often unsatisfactory. Many studies have found a trend of the high prevalence of uncontrolled hypertension all over the world [1-3]. Medication adherence is essential to achieve a target blood pressure level and better control of it. Poor adherence may occur accidentally (forgetfulness of patient) or knowingly (patients opting out of therapy based on their own beliefs) [4]. Treatment adherence can be influenced by various factors like patient behavior, the presence of comorbid illnesses, awareness of the disease severity, and also factors like patients' age, gender, and education level. Complex regimens involving several medications, particularly when they require numerous daily doses, are known to hinder adherence [5]. A study suggests that almost 90% of hypertensive patients do not adhere to medication and approx 50% of patients stop taking medication within one year after being diagnosed as hypertensive [6]. Chronic long-term illnesses, like diabetes mellitus, are frequently accompanied by a gradual loss in adherence to therapy over the course of months and years. To improve treatment adherence, it is important to comprehend the factors that affect patient adherence. Adherence to not only pharmacological treatment but also the diet, recommendations given by health care providers and lifestyle changes should be implemented. Healthcare providers need to address drug adherence as a major issue for better management of hypertension. Awareness of the complications of hypertension and the sequelae of uncontrolled hypertension plays an important role in treatment adherence. This study aimed to estimate the level of medication adherence in hypertensive patients and to determine the factors associated with it.

MATERIALS AND METHODS

A hospital-based cross-sectional study was conducted among adult hypertensive patients attending the medicine outpatient department in Dr. D.Y. Patil Medical College, Hospital and Research Centre in Pune from January 2022 to September 2022. All adults (≥ 18 years) who were diagnosed as hypertensive patients and willing to participate and filled out the questionnaire were included in this study, however pregnant mothers and lactating women were excluded. Patients' medication adherence was noted by using Morisky Green Levine Medication Adherence Scale (MGL) [7]. Data from case record forms were entered in Microsoft Excel and analysis was done using Epi Info (version 7.2) software. The study was approved by the Institutional ethics committee (IEC) before its initiation.

RESULTS

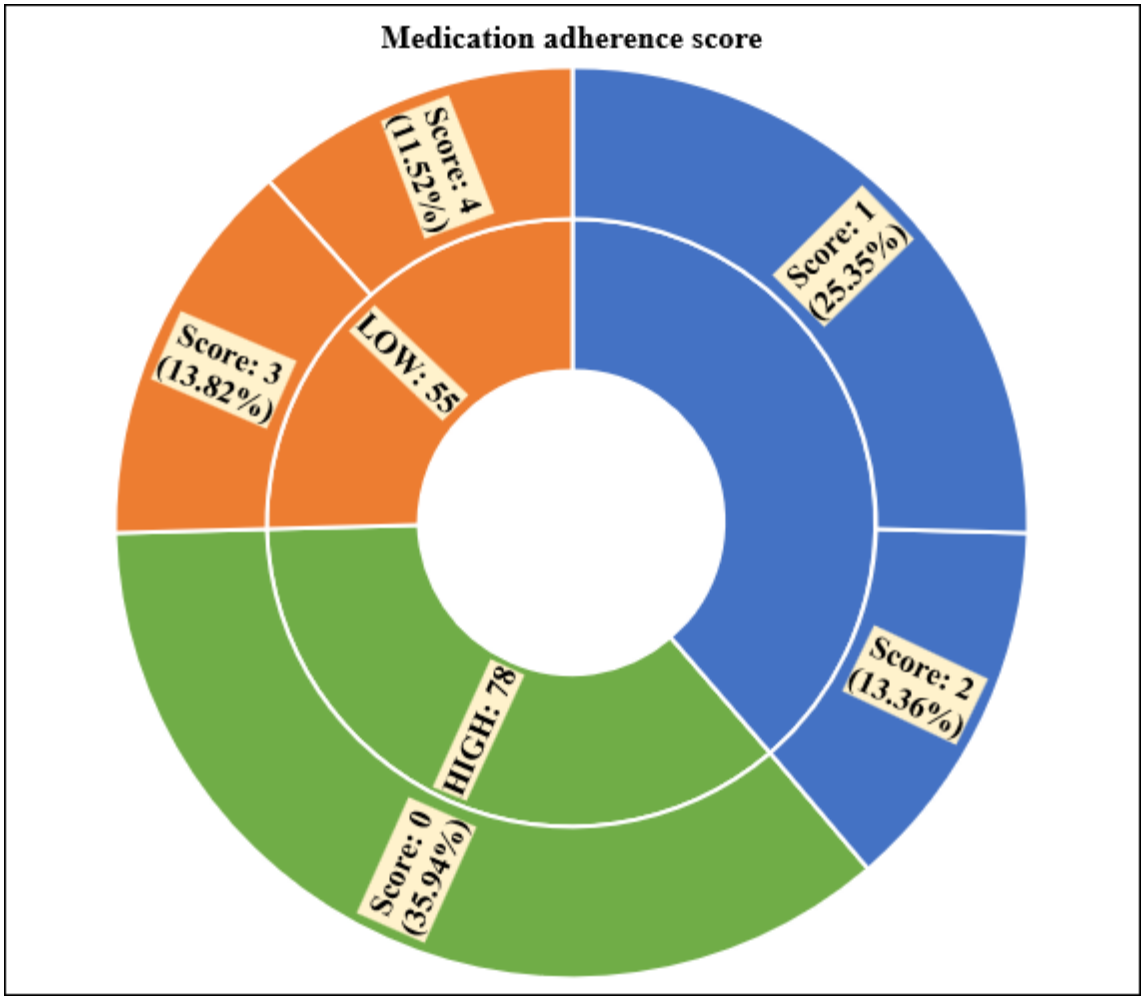
Patients' responses and adherence score according to MGL:

Among the 217 patients, 92 patients reported that they do not forget to take their hypertensive medication (42.40%). Almost two third patients stated that they are not careless about taking their hypertensive medication (65.44%). Approximately two third patients reported that they do not stop taking hypertensive medication when they feel better (64.05%), on the other hand, a large number of patients reported that they do not stop taking hypertensive medication when they feel worse (88.48%). (Table 1)

Table 1: Patients' response to MGL for adherence to hypertension medication

No.	Questions	Response: Score	Number of Patients	Percentage
Q 1.	Do you ever forget to take your hypertensive medication?	Yes (1)	125	57.60%
		No (0)	92	42.40%
Q 2.	Are you careless at times about taking your hypertensive medication?	Yes (1)	75	34.56%
		No (0)	142	65.44%
Q 3.	When you feel better, do you sometimes stop taking your hypertensive medication?	Yes (1)	78	35.94%
		No (0)	139	64.05%
Q 4.	Sometimes if you feel worse when you take your hypertensive medication, do you stop taking it?	Yes (1)	25	11.52%
		No (0)	192	88.48%
The MGL has a scoring system ranging from 0 to 4, suggesting high, medium and low medication adherence with a score of 0, 1–2, and 3–4 points, respectively.				

Figure 1: Patients' medication adherence score according to MGL.



According to MGL, 78 (35.94%) patients had high adherence scored zero points; 84 (38.71%) patients had medium adherence, among them 55 scored one point and 29 scored two points; 55 patients (25.35%) had low adherence, among them 30 scored three points and 25 (including 18 patients not taking treatment) scored 4 four points. (Figure 1)

Factors associated with medication adherence:

Table 2: Patients' adherence score in relation to their demographic characteristics

Factors	**MGL adherence score**			**p-value**
	High	**Medium**	**Low**	
Age group				
< 30 years	13 (43.33%)	7 (23.33%)	10 (33.33%)	0.215*
31- 50 years	31 (38.75%)	28 (35.00%)	21 (26.25%)	
> 50 years	34 (31.78%)	49 (45.79%)	24 (22.43%)	
Sex				

Female	44 (43.14%)	34 (33.33%)	24 (23.53%)	0.107*
Male	34 (29.57%)	50 (43.48%)	31 (26.96%)	
Education				
Secondary	9 (17.65%)	17 (33.33%)	25 (49.02%)	< 0.001*
Graduate	41 (37.96%)	45 (41.67%)	22 (20.37%)	
Postgraduate	28 (48.28%)	22 (37.93%)	8 (13.79%)	
*Chi-square test				

Table 2 shows patients' adherence scores in relation to their demographic characteristics. There was no statistically significant association between the age and gender of a patient with regard to adherence to medication. However, patients in the age group of < 30 years (43.33%) and females (43.14%) showed high adherence compared to patients in the age group of >50 years (31.78%) and males (29.57%). In patients with postgraduate education, high adherence was noted in 28 (48.28%) patients, while in patients with secondary education high adherence was noted in 9 (17.65%) patients (p <0.001).

Table 3: Patients' adherence score in relation to treatment factors

	MGL adherence score			**p-value**
	High	**Medium**	**Low**	
Frequency of blood pressure check-ups				
Once a month	48 (51.61%)	32 (34.40%)	13 (13.98%)	< 0.001*
Every 6 months	27 (33.33%)	36 (44.44%)	18 (22.22%)	
Once a year	3 (6.97%)	16 (37.21%)	24 (55.81%)	
Duration of treatment				
< 1 year	5 (19.23%)	8 (30.77%)	13 (50.00%)	< 0.001*
1-5 years	23 (32.39%)	36 (50.70%)	12 (16.90%)	
> 5 years	50 (49.02%)	40 (39.22%)	12 (11.76%)	
Medication frequency				
Once a day	67 (42.67%)	61 (38.85%)	29 (18.47%)	0.117*

Twice a day	11 (26.19%)	23 (54.76%)	8 (19.05%)	
*Chi-square test				

In patients who checked their blood pressure once a month, high adherence was noted in 48 (51.61%) patients, whereas in patients who checked their blood pressure once a year, high adherence was noted in 3 (6.97%) patients. In patients taking medication for >5 years, high adherence was noted in 50 (49.02%) patients, whereas for patients taking medication for < 1-year, high adherence was noted in 5 (19.23%) patients ($p < 0.001$). There was no statistically significant association between per day medication frequency and medication adherence. For patients taking medication once a day, the majority of patients had high adherence (42.67%) while in patients taking medication twice a day the majority of patients had medium adherence (54.76%). (Table 3)

Table 4: Patients' adherence score in relation to the presence of comorbidity and awareness of complications

	MGL adherence score			**p-value**
	High	**Medium**	**Low**	
Comorbidity				
Absent	50 (57.47%)	21 (24.14%)	16 (18.39%)	< 0.001*
One	22 (26.19%)	43 (51.19%)	19 (22.62%)	
Multiple	6 (13.04%)	20 (43.48%)	20 (43.48%)	
Awareness of complications				
Aware	75 (41.44%)	75 (41.44%)	31 (17.13%)	< 0.001*
Not aware	3 (8.33%)	9 (25.00%)	24 (66.67%)	
*Chi-square test				

In patients without any comorbidities, 57.47% of patients showed high adherence compare to patients with one and multiple comorbidities only 26.19% and 13.04% of patients showed high adherence respectively ($p < 0.001$). Moreover, in patients who were aware of the complications of uncontrolled hypertension, 41.44% of patients showed high adherence, compared to patients who were not aware of the complications only 8.33% of patients showed high adherence ($p < 0.001$). (Table 4)

DISCUSSION

Nonadherence is linked to several groups of factors, including patient and demographic factors, healthcare system factors, socioeconomic, attitude and behaviour towards disease, and therapy-related factors. Before the World Health Organization (WHO) published the first official definition of adherence in 2003, there were numerous definitions of adherence in the literature [8,9]. In contrast to earlier ones, it was not limited to pharmacological therapy alone and incorporated all facets of disease management, including dietary and lifestyle changes, and correspond to the accepted advice from a healthcare professional. This study demonstrated a statistically significant association between medication adherence and hypertension control. High adherence was noted in 46% of the patients, in a study done by Balasubramanian A et al [10], whereas medium and low adherence was noted in 41.3% and 12.7%, respectively. In the present study, 35.94% of patients had high adherence, 38.71% of patients had medium adherence and 25.35% of patients had low adherence to hypertension medication as measured using MGL.

In the present study, high adherence was noted in 43.33% of patients who were in the age group of 30 years and younger. The present study findings were consistent with other studies where it was reported that younger adults had better adherence [11]. In this study, high adherence was noted in 43.14% of female patients. This was comparable to other studies in which gender influences medication adherence behaviour, with females demonstrating better and more active health-seeking behaviour [12-14]. Additionally, those with a higher educational level had better adherence (48.28%). Higher education is associated with a higher income and higher health literacy and hence generally reports higher adherence to antihypertensive medications [15]. In the current study, there was a significant association of adherence with underlying comorbidities (p <0.001). Individuals without any comorbidities showed high adherence (57.47%) compared to patients with one or more comorbidities who showed medium (51.19%) and low adherence (43.48%). Amongst patients with comorbidities, complex regimens, polypharmacy and increased adverse drug reactions due to polypharmacy could have been the most important factors of poor adherence to medications.

As a result, this study also suggested a significant relationship between medication compliance and length of therapy, which was found to be stronger in patients receiving therapy for five years or longer (49.02%) ($p < 0.001$). In some studies, there was no correlation between the length of treatment and medication adherence [16,17]. In line with this study, Tumer A et al. (2016) found that medication adherence increased as treatment duration increased [18].

Home blood pressure monitoring, using an automated device that has been validated with a clinic-based device, is frequently advised according to general guidelines for monitoring hypertension. It has been demonstrated that blood pressure levels can be controlled by self-monitoring, particularly when co-interventions like lifestyle counselling or medication titration are used. Blood pressure readings should be taken, if possible, daily, or at least three days a week in the morning and evening. For patients on long term therapy, readings once or twice a week may be taken. For the patients on antihypertensive medications, a morning reading (in a supine position) is recommended before ingesting medicine and an evening reading before dinner. It is ideal to measure blood pressure weekly, beginning two weeks after any modification in the treatment regimen and during the week before the clinic visit [19]. The present study demonstrated that, among the patients who checked their blood pressure once a month, 51.61% of patients had high adherence, and in patients who checked their blood pressure once a year, 6.97% of patients showed high adherence. A study conducted by Trefond et al. also showed that patients who self-monitored their blood pressure reported better adherence to treatment [20]. There was no statistically significant association between medication frequency and medication adherence. High adherence was noted in

42.67% of patients, taking medication once a day and in 26.19% of patients, taking medication twice a day. This highlighted the need of minimising the number of medications prescribed by using fixed-dose combinations (FDC) and decreasing the frequency of their daily doses.

Compared to hypertensive patients with poor knowledge of the complication of uncontrolled hypertension, those with good knowledge were more likely to take their antihypertensive medications as prescribed, possibly because they were more aware of the severity and complications of hypertension. In patients who were aware of the complications of uncontrolled hypertension, 41.44% showed high adherence; compared to patients who were not aware of the complications, only 8.33 % showed high adherence ($p < 0.001$). This was also supported by various studies [21,22]. Patients tend to be more concerned about their health when relevant information is shared with them to involve them in their management of diseases. This can be accomplished by increasing interactions between patients and healthcare professionals. By training and mobilizing healthcare providers, primary health clinics can make significant progress in this area. To achieve optimal treatment benefits, improving medication adherence is crucial and efforts should always be made to identify the causes of nonadherence, through better communication between healthcare professionals and patients.

CONCLUSION

The forgetful nature of the patients was a major factor in low medication adherence. Younger people, females and highly educated patients were more adherents to treatment. Any comorbidity has a negative impact on medication adherence. Patients who take their medication for a longer period of time and have their blood pressure tested often adhere to treatment better. Patients who are aware of the complications are very adherent to their drug regimen.

REFERENCES

1. Tesfaye B, Haile D, Lake B, Belachew T, Tesfaye T, Abera H. Uncontrolled hypertension and associated factors among adult hypertensive patients on follow-up at Jimma University Teaching and Specialized Hospital: cross-sectional study. Research Reports in Clinical Cardiology. 2017;8:21-29
2. Centers for Disease Control and Prevention (CDC). Hypertension Cascade: Hypertension Prevalence, Treatment and Control Estimates Among US Adults Aged 18 Years and Older Applying the Criteria from the American College of Cardiology and American Heart Association's 2017 Hypertension Guideline—NHANES 2013–2016. Atlanta, GA: US Department of Health and Human Services; 2019.
3. Gebremichael G.B., Berhe K.K. & Zemichael, T.M. Uncontrolled hypertension and associated factors among adult hypertensive patients in Ayder comprehensive specialized hospital, Tigray, Ethiopia, 2018. BMC Cardiovasc Disord 19, 121 (2019)
4. Alsofyani MA, Aloufi AO, Al-Qhtani NS, Bamansour SO, Almathkori RS. Factors related to treatment adherence among hypertensive patients: A cross-sectional study in primary healthcare centers in Taif city. J Family Community Med. 2022;29(3):181-188.
5. Burnier M, Egan BM. Adherence in Hypertension. Circ Res. 2019;124(7):1124-1140.
6. He W, Bonner A, Anderson D. Patient reported adherence to hypertension treatment: A revalidation study. Eur J Cardiovasc Nurs. 2016;15(2):150-156.
7. Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. *Med Care*. 1986;24(1):67–74.

8. World Health Organization. Adherence to Long Term Therapies: Evidence for Action; Geneva: World Health Organization, 2003.
9. Burnier M. Drug adherence in hypertension.Pharmacol Res. 2017; 125:142–149.
10. Balasubramanian A, Nair SS, Rakesh PS, Leelamoni K. Adherence to treatment among hypertensives of rural Kerala, India. J Family Med Prim Care. 2018;7(1):64-69.
11. Hughes CM. Medication non-adherence in the elderly. Drugs Aging. 2004;21:793-811.
12. Pan J, Wu L, Wang H, et al. Determinants of hypertension treatment adherence among a Chinese population using the therapeutic adherence scale for hypertensive patients. Medicine (Baltimore). 2019;98:e16116.
13. Uchmanowicz B, Chudiak A, Uchmanowicz I, Rosińczuk J, Froelicher ES. Factors influencing adherence to treatment in older adults with hypertension. Clin Interv Aging. 2018;13:2425.
14. Thompson AE, Anisimowicz Y, Miedema B, Hogg W, Wodchis WP, Aubrey-Bassler K. The influence of gender and other patient characteristics on health care-seeking behaviour: a QUALICOPC study. BMC Fam Pract. 2016;17:38.
15. Romanelli RJ, Schiro TA, Jukes T. Disparities in blood pressure control within a community-based provider network: an exploratory analysis. Ann Pharmacother. 2011;45:1473-1482.
16. Mert H, Ozcakar N, Kuruoglu E. A multidisciplinary special study module research:treatment compliance of patients with hypertension. Turkish J Fam Pract. 2011;15(1):7–12.
17. Ramli A, Ahmad NS, Paraidathathu T. Medication adherence among hypertensive patients of primary health clinics in Malaysia. Patient Prefer Adherence. 2012;6:613–622.
18. Tumer A, Bayguga M, Dereli F, Uysal D. The compliance level of treatment of hypertensive patients. J Cardiovasc Nurs. 2016;7(13):105–113.
19. group E.Home Based Blood Pressure Monitoring in Indian Setting: A Consensus Document.J Clin of Diagn Res.2018; 12(1):OA01-OA04.
20. Trefond, J., Hermet, L., Lambert, C. et al. Home blood pressure monitoring and adherence in patients with hypertension on primary prevention treatment: a survey of 1026 patients in general medicine in the Auvergne region. BMC Prim. Care 23, 131 (2022).
21. Getenet A, Tesfa M, Ferede A, Molla Y. Determinants of adherence to anti-hypertensive medications among adult hypertensive patients on follow-up in Hawassa Referral Hospital: a case-control study. JRSM Cardiovasc Dis 2019; 8:2048004019892758.
22. Teshome DF, Bekele KB, Habitu YA, Gelagay AA. Medication adherence and its associated factors among hypertensive patients attending the Debre Tabor General Hospital, northwest Ethiopia. Integr Blood Press Control 2017;10:01–7.