Adherence to therapeutic regimens in patients with hypertension

Roghayeh Esmaili Zabihi[(1)], **Tahereh Ashktorab**[(2)],
Homayoon Banaderakhshan[(3)], **Farid Zaeri**[(4)]

Abstract

BACKGROUND: Based on epidemiological research, there is a close relationship between cardiovascular problems and hypertension. Thus, the present study aimed to determine the rate of adherence to therapeutic regimens and its related factors in hypertensive outpatients admitted to teaching hospitals affiliated to Urmia University of Medical Sciences, Iran.

METHODS: In this descriptive study, 120 hypertensive outpatients who were admitted to four outpatient clinics in Urmia were selected during 2010. Demographic and disease-related data was collected by a researcher-made questionnaire. Patients' level of adherence was determined by the Hill-Bone Compliance to High Blood Pressure Therapy Scale. After assessing the validity and reliability of the questionnaires, they were filled out through interviews.

RESULTS: The participants' mean scores of adherence to medication, diet, and appointment keeping were 94.77 ± 6.65 percent (range: 72-100%), 91.53 ± 9.60 percent (range: 50-100%), and 86.56 ± 17.76 percent (range: 12-100%), respectively. There were significant relationships between patients' drug adherence and different levels of income, number of pills taken each day, and the frequency of blood pressure control.

CONCLUSION: As adherence to therapeutic regimens is an important factor in blood pressure control among hypertensive patients, adherence rates in different age groups and different locations should be evaluated. Furthermore, investigations on inpatients can reveal other factors affecting rates of adherence to treatment.

Keywords: Adherence, Hypertension, Therapeutic Regimens

Introduction

Hypertension is one of the most important and modifiable risk factors in the morbidity and mortality of cardiovascular and cerebrovascular diseases. Epidemiological studies have indicated that cardiovascular problems are largely in linear relationship with blood pressure.[1] In fact, the relation between blood pressure and cardiovascular complications seems to be permanent, stable, and independent from other factors.[2]

Based on recent statistics reported by the Iranian Disease Management Center, in one hundred thousand male and female 50-69 year-old patients, cardiovascular complications, kidney diseases, and heart and kidney diseases resulting from hypertension accounted for 2286, 77, and 196 deaths, respectively.[3]

Appropriate prescription of treatments and adherence to treatment regimens are important factors in controlling blood pressure in hypertensive patients.[4] According to previous research, out of 187 million hypertensive patients in the world, 34% are not diagnosed at all and 41% are diagnosed but not treated. Moreover, treatment of 62% of the diagnosed patients was not adequate and 70% of the patients were not committed to taking their medication.[2] Banning different populations and reported medication adherence in a range of 0-65%.[5]

In addition to medication, lifestyle modification is essential for almost all patients with hypertension. Reducing weight, refraining from smoking, and having at least 30 minutes of daily aerobic activities can reduce blood pressure by about 4-9 mmHg.[6]

A healthy diet is beneficial in the treatment of hypertension.[2] having a low-salt diet can decrease systolic blood pressure by 2-8 mmHg. Dietary Approaches to Stop Hypertension (DASH) emphasize that using fruits and vegetables, low-fat diets, and reduced saturated fats can decrease systolic blood pressure by about 8-14 mmHg.[6]

Dietary treatment is recommended for a wide

1- Lecturer, Department of Nursing, School of Nursing and Midwifery, Urmia University of Medical Sciences, Urmia, Iran
2- Associate Professor, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences and Health Services, Tehran, Iran
3- Lecturer, Department of Nursing, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran
4- Assistant Professor, Department of Biostatistics, School of Paramedicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
Correspondence To: Tahereh Ashktorab, Email: t_ashktorab@sbmu.ac.ir

range of diseases. While in some diseases such as diabetes and hypertension, a low-cholesterol diet can help prevent future complications, in some others like celiac disease, diet has immediate effects. Dietary interventions are usually considered as the first therapeutic choice because of their lower economic burden and side effects compared to drug interventions. However, patients do not usually adhere to dietary interventions without immediate effects. Therefore, patients and health professionals prefer to take secondary treatments such as medications or even surgery.[7]

Low drug adherence causes both high costs of medical care and high rates of cardiovascular diseases. Identifying non-adherent patients at outpatient clinics is important for controlling the level of blood pressure.[8]

Poor lifestyle habits play a major role in the disease progression. Although lifestyle modification is difficult, individuals who continue long-term anti-hypertension treatment or try to monitor their blood pressure level can protect themselves against cardiovascular diseases.[6]

Treatment adherence and its related factors have not been addressed in outpatient clinics in Urmia, Iran. As the relationship between adherence to therapeutic regimens and mortality in cardiovascular patients is clear, interventions without adequate knowledge on adherence will not be effective.

Materials and Methods

This study was a part of a larger research with a descriptive approach. Purposive quota sampling was used to select 120 subjects from all hypertensive men and women who attended clinics of the hospitals affiliated to Urmia University of Medical Sciences (Urmia, Iran). The inclusion criteria were aging 40-60 years old, having at least one year history of hypertension, using at least one antihypertensive drug, and having no other diseases.

All participants had been trained about the effects of low-salt and low-fat diet and walking at least three days a week on controlling high blood pressure.

Data collection and analysis

Demographic and disease-related information was collected through a researcher-made questionnaire. Treatment adherence was evaluated by the Hill-Bone Compliance to High Blood Pressure Therapy Scale which was developed by Kim et al. in 2000.[9] It comprised 14 questions in three subscales of adherence to diet, medication intake, and appointment keeping. Each question was answered based on a four-point Likert scale. The developers of this scale granted us the permission to use it in the

present study. Since the original scale did not contain a certain classification for adherence scores, the scores of patients in each subscale were calculated, divided by the total score of the same subscale, and finally multiplied by 100. The collected data was analyzed using SPSS for Windows version 16.0 (SPSS Inc., Chicago, IL, USA).

Validity and reliability

Content and face validity were used to validate the scale. The reliability of the scale was confirmed by calculating Cronbach's alpha ($\alpha = 0.71$).

Results

Most of the participants were married, female, housewives, 56-60 years old, and high school graduates. The role of patients was found to be very important in adherence to therapeutic regimens. Monthly blood pressure check and daily consumption of anti-hypertensive drugs (1-2 tablets) were the most frequently practiced activities among the patients (Table 1).

The mean systolic and diastolic blood pressure of the participants on the day appointment at the clinic were 136.43 ± 15.26 and 87.85 ± 10.18 mmHg, respectively. The mean duration of hypertension was 6.20 ± 5.26 years.

The mean scores of adherence to drugs, diet, and medical appointment keeping are reported in table 2. There was a significant relationship between drug adherence and level of income (P = 0.019), number of medicines (P = 0.016; r = 0.220), and frequency of blood pressure checks (P = 0.025; r = -0.200). There were no significant differences in adherence between men and women (P = 0.980), different age groups (P = 0.820), different levels of education (P = 0.520), and duration of disease (P = 0.99; r = -0.001).

Discussion

Drug adherence scores in the present study ranged from 72 to 100 percent. In a retrospective review of 76 studies in 2008, the adherence was reported as 34-97%.[10] In 1999, Kyngas and Lahdenpera found poor diet adherence and good drug adherence among patients.[11] Gohar et al. calculated hypertensive patients' drug adherence as 50-70% and mentioned that adherence range depends on participants, duration of diagnosis, and method of assessment.[12]

In our study, the scores of diet adherence ranged from 50 to 100 percent. Albert reported a range of 24-87% for diet adherence.[13] Thomas concluded that patients with heart failure were adherent to their dietary program.[14] Moreover, we found adherence to appointment keeping to range between 12 and 100 percent. Albert reported a similar range of 16-84%.[13]

Table 1. Demographic characteristics of the participants

Variable		Frequency (%)
Sex	Female	92 (76.7)
	Male	28 (23.3)
Age (years)	40-45	19 (15.8)
	46-50	24 (20)
	51-55	36 (30)
	56-60	41 (34.2)
Marital status	Married	110 (91.7)
	Divorced	8 (6.7)
	Widowed	2 (1.7)
	Single	0 (0)
Education	Illiterate	16 (13.3)
	Elementary school	28 (23.3)
	Junior high school	12 (10)
	High school diploma	38 (31.7)
	Academic Degree	26 (21.7)
Occupation	Housewife	68 (56.7)
	Retired	31 (25.8)
	Employee	11 (9.2)
	Others	10 (8.3)
Frequency of blood pressure control	Daily	26 (21.7)
	Twice in a week	13 (10.8)
	Once a week	16 (13.3)
	Once every three weeks	4 (3.3)
	Monthly	32 (26.7)
	Every two months	19 (15.8)
	Whenever they felt increased pressure	9 (7.5)
	No answer	1 (0.8)
Daily intake of antihypertensive drugs	1-2 tablets	79 (65.8)
	3-4 tablets	35 (29.2)
	$\geq$ 5 tablets	5 (4.2)
	No answer	1 (0.8)

Table 2. Adherence to different dimensions of treatment among hypertensive outpatients admitted to teaching hospitals affiliated to Urmia University of Medical Sciences

	Mean ± SD	Range
Adherence to medication	94.77 ± 6.65	72-100
Adherence to diet	91.53 ± 9.60	50-100
Adherence to appointment keeping	86.56 ± 17.76	12-100
Adherence to therapeutic regimen	92.90 ± 6.14	75-100

Scores were calculated in percentages.

Different studies have reported poor adherence to hypertensive drugs. However, the calculated adherence ranges were determined by certain samples, methods, category of drugs, method of measuring adherence, data collection instruments, and definition of adherence.[8] In addition, the type of scale used for measuring adherence and classification of scores can also be involved in the obtained adherence. For example, Ross et al. used a self-report questionnaire which assessed drug adherence through four questions about forgetting, carelessness, and discontinuing drugs when symptoms are improved or worsened. Patients in this study were classified based on the number of positive answers.[15] Gohar et al. used 8 questions of the Hill-Bone Compliance to High Blood Pressure Therapy Scale to evaluate drug

adherence. If the patient answered all 8 questions, he was considered as a complete adherent and if not he was considered as an incomplete adherent.[12]

Patients' awareness about high blood pressure and factors affecting it is another determinant of their adherence to treatment. As we only enrolled individuals with knowledge on the impact of low-salt and low-fat diet and with the habit of walking 2-3 times a week, the impact of knowledge was removed in the present study.

Kim et al. reported 45% of the subjects not to be adherent to treatment. They found a significant relationship between adherence and knowledge of hypertension. They hence suggested increasing knowledge on hypertension as a logical and effective solution for reducing deliberate breaking of adherence.[16]

While psychological disorders can also affect patients' adherence, we controlled this variable. Ross et al. indicated a women to be significantly more adherent therapeutic regimens than men.[15] However, we failed to find such a significant relationship between sex and adherence to treatment. The high level of adherence in our study can nevertheless be justified by the fact that the majority of our participants were women.

We and Kim et al.[16] (whose participants aged 40-64 years old) did not find a significant relation between adherence to treatment and age. However, Ross et al. reported older individuals to be more adherent than younger subjects.[15] In contrast, Yiannakopoulou et al. indicated that participants younger than 60 years of age were more adherent to treatment than others.[17]

In the present study, there was not a significant relation between adherence to treatment and education level. The findings of Ross et al. were consistent with ours.[15] However, Dennison et al. reported higher level of education as a significant factor in reducing systolic and diastolic blood pressure or having controlled blood pressure.[18]

Our analyses indicated a significant relation between scores of drug adherence and income level. Likewise, Bosworth et al. suggested low income level as an obstacle to diet adherence.[7]

Park et al. reported that medication adherence rates were the highest when history of the disease was less than six months or more than 12 months.[19] We, however, failed to establish a significant relationship between the duration of hypertension and adherence to therapeutic regimens.

Our study revealed a significant, direct association between the number of drugs taken each day and adherence to treatment. In other words, higher number of drugs was increased drug adherence. Yiannakopoulou et al. found a significant relation between taking one drug a day and adherence to treatment.[17]

Conclusion

Adherence to therapeutic regimens is an important factor in blood pressure control among hypertensive patients. Therefore, patients' adherence should be investigated in different age groups and different locations. Furthermore, evaluating the inpatients' rate of adherence can be beneficial in identifying other factors affecting adherence.

Acknowledgments

Conflict of Interests

Authors have no conflict of interests.

References

1. Efstratopoulos AD, Voyaki SM, Baltas AA, Vratsistas FA, Kirlas DE, Kontoyannis JT, et al. Prevalence, awareness, treatment and control of hypertension in Hellas, Greece: the Hypertension Study in General Practice in Hellas (HYPERTENSHELL) national study. Am J Hypertens 2006; 19(1): 53-60.
2. Azmandian J, Abolghasemi R, Ahmadi F, Ahmadpour P, Ardalan MR, Afshar R, et al. Hypertension, pathophysiology, diagnosis and treatment. 1st ed. Tehran, Iran: Lahze Publication; 2005. [In Persian].
3. Naghavi M, Jafari N. Mortality face in twenty-nine provinces in 2004. 1st ed. Tehran, Iran: Arvich Publication; 2007. [In Persian].
4. Natarajan S, Santa Ana EJ, Liao Y, Lipsitz SR, McGee DL. Effect of treatment and adherence on ethnic differences in blood pressure control among adults with hypertension. Ann Epidemiol 2009; 19(3): 172-9.
5. Banning M. A review of interventions used to improve adherence to medication in older people. Int J Nurs Stud 2009; 46(11): 1505-15.
6. Braunwald E, Zipes DP, Libby P, Bonow R. Braunwald's heart disease: a textbook of cardiovascular medicine. 7th ed. Philadelphia, PA: Elsevier Saunders; 2004.
7. Bosworth HB, Oddone EZ, Weinberger M. Patient

Treatment Adherence: Concepts, Interventions, And Measurement. 1st ed. London, UK: Routledge; 2006.

8. Krousel-Wood M, Islam T, Webber LS, Re RN, Morisky DE, Muntner P. New medication adherence scale versus pharmacy fill rates in seniors with hypertension. Am J Manag Care 2009; 15(1): 59-66.

9. Kim MT, Hill MN, Bone LR, Levine DM. Development and testing of the Hill-Bone Compliance to High Blood Pressure Therapy Scale. Prog Cardiovasc Nurs 2000; 15(3): 90-6.

10. Ingersoll KS, Cohen J. The impact of medication regimen factors on adherence to chronic treatment: a review of literature. J Behav Med 2008; 31(3): 213-24.

11. Kyngas H, Lahdenpera T. Compliance of patients with hypertension and associated factors. J Adv Nurs 1999; 29(4): 832-9.

12. Gohar F, Greenfield SM, Beevers DG, Lip GY, Jolly K. Self-care and adherence to medication: a survey in the hypertension outpatient clinic. BMC Complement Altern Med 2008; 8: 4.

13. Albert NM. Improving medication adherence in chronic cardiovascular disease. Crit Care Nurse 2008; 28(5): 54-64.

14. Thomas CM. The influence of self-concept on adherence to recommended health regimens in adults with heart failure. J Cardiovasc Nurs 2007; 22(5): 405-16.

15. Ross S, Walker A, MacLeod MJ. Patient compliance in hypertension: role of illness perceptions and treatment beliefs. J Hum Hypertens 2004; 18(9): 607-13.

16. Kim EY, Han HR, Jeong S, Kim KB, Park H, Kang E, et al. Does knowledge matter?: intentional medication nonadherence among middle-aged Korean Americans with high blood pressure. J Cardiovasc Nurs 2007; 22(5): 397-404.

17. Yiannakopoulou EC, Papadopulos JS, Cokkinos DV, Mountokalakis TD. Adherence to antihypertensive treatment: a critical factor for blood pressure control. Eur J Cardiovasc Prev Rehabil 2005; 12(3): 243-9.

18. Dennison CR, Peer N, Steyn K, Levitt NS, Hill MN. Determinants of hypertension care and control among peri-urban Black South Africans: the HiHi study. Ethn Dis 2007; 17(3): 484-91.

19. Park JH, Shin Y, Lee SY, Lee SI. Antihypertensive drug medication adherence and its affecting factors in South Korea. Int J Cardiol 2008; 128(3): 392-8.