

# Drug Compliance Among Hypertensive Patients; an Area Based Study

Amal M Al-Mehza, Fatma A Al-Muhailije, Maryam M Khalfan, Ali A Al-Yahya

Primary Health Care, Hadiya Clinic, Kuwait.

---

**Aim:** To estimate the compliance rate, associated factors, status of blood pressure control and reasons for non-compliance among patients on treatment for hypertension.

**Methods:** Patients attending the hypertension clinic of Hadiya center were followed up for at least 6 months. They are labeled as uncontrolled if the mean of three consecutive measures of systolic blood pressure was  $\geq 140$  mm Hg and /or mean diastolic blood pressure was  $\geq 90$  mmHg. Hadiya family practice center in Ahmadi health district in Kuwait. One hundred fifty four hypertensive patients were included in the study. Compliance, demographic variables, duration of hypertension, presence of complications, patient knowledge of hypertension, status of blood pressure control and reasons for non-compliance.

**Results:** Out of 154 subjects recruited, 132 completed follow-up of 6 months, of whom 84 (64%) had uncontrolled hypertension. Seventeen percent of the uncontrolled hypertensives were non-compliant by pill count as compared to 2% of the controlled hypertensives ( $p < 0.05$ ). The compliance rate was 88.6%. Non-compliance was associated with lack of knowledge about hypertension ( $p < 0.05$ ). There was no statistically significant difference in the demographic variables, duration of hypertension and presence of complication rates between compliant and non-compliant hypertensives. Reasons for non-compliance included forgetfulness, drugs side effects, shortage of drugs, poly pharmacy and the asymptomatic nature of hypertension.

**Conclusion:** The compliance rate was high in this study and was accompanied by inadequate blood pressure control among non-compliant subjects. Non-compliance was associated with lack of knowledge about hypertension. This calls for increasing the patient's awareness of the diagnosis and the need for compliance with medication to achieve control of hypertension in the community.

**Key words:** Blood pressure control, compliance, hypertension.

*Eur J Gen Med 2009;6(1):6-10*

---

## INTRODUCTION

Hypertension (defined as a blood pressure  $\geq$  (systolic/ diastolic) 140/90mmHg) (1-3) is an internationally common disease (4) and an important treatable public health problem (5-7). It is a major risk factor and a powerful predictor of cardiovascular morbidity and mortality (7-10) with proven benefits after treatment (11-13). Control of hypertension protects against stroke, congestive cardiac failure, and all other causes of mortality (8, 9). In Kuwait, the most recent data on hypertension showed a prevalence rate of 26.3% (14). The percentage of blood pressure control in Kuwait was ranging from 27% - 40% in different primary health care centers (15) which can be improved by pharmacological means and modifications of life style (11). Developments in antihypertensive therapy have been associated with marked reductions in morbidity and mortality from hypertension (11-13, 16-19). But the effectiveness of

treatment for hypertension is hampered greatly by the problem of non-compliance with ingestion of drugs (20-34). In one study a drug non-compliance rate was 34% and this was the strongest predictor of poor blood pressure control (20). In Eastern Sudan it was found that 92% of compliant patients had controlled blood pressure in comparison with 18% of non-compliant patients (35).

The objective of this study was to estimate the compliance rate, factors associated with it and reasons for non-compliance among hypertensive patients.

## MATERIAL AND METHODS

### Subjects

Hypertensive patients (n=154) attending the hypertension clinic of Hadiya center and receiving medications were included in the study. This number represents 75% of the total hypertensive patients registered in the clinic. Hadiya center is the only family medicine center in Ahmadi health district. It has an established hypertension clinic with a registry. These subjects were followed for at least 6 months.

---

**Correspondence:** Dr. Amal M. Al-Mehza, RCGP (Ku), primary Health care, Hadiya clinic, Kuwait. P.O.Box: 32/889 Rumaithiya, Kuwait.  
Tel: (965) 3949537 / 8, 3962154. Mobile: 9394995, 9088126, Fax: 3962154

**Table 1. Compliance rate according to demographic variables**

Variables	Total (n:132), (%)	Compliant (n:117), (%)	Non-compliant (n:15), (%)	p- value
Age mean (SD)		54.4 (9.9)	55.1 (9.8)	0.739
Sex				
Female	79 (59.8)	72 (61.5)	7 (46.7)	0.269
Male	53 (40.2)	45 (38.5)	8 (53.3)	
Marital status				
Currently married	28 (21.2)	25 (21.4)	3 (20)	0.903
Unmarried (single, widow, divorced)	104 (78.8)	92 (78.6)	12 (80)	
Nationality				
Kuwaiti	115 (87.1)	103 (78)	12 (9.1)	0.382
Non Kuwaiti	17 (12.9)	14 (10.6)	3 (2.3)	

All above p-values were based on chi-square test, except in Age, the independent t-test was used.

SD= Standard deviation.

### Setting and measurements

During this time three blood pressure (BP) measures were taken in an interval of at least 4 weeks after patients being maintained on their medication for at least 3 months. Measurements began after 5 min of quiet rest and were made with a mercury sphygmomanometer with the patient seated. A cuff, of suitable size, was used. The systolic blood pressure was taken at korotkoff phase I and the diastolic blood pressure was taken at korotkoff phase V (1). Patients were labeled as uncontrolled hypertensives if the mean of three measures of systolic blood pressure (SBP) was  $\geq 140$  mmHg and /or diastolic blood pressure (DBP) was  $\geq 90$  mmHg (1-3). Factors of non-compliance studied include demographic information, age, sex, marital status, nationality, duration of hypertension, patient knowledge of hypertension and whether they had complications (such as neurological, cardiac or renal ones). Patient's non-compliance with antihypertensive drugs, was measured at the end of follow-up, by asking the patient and by doing a pill count. Subjects who had consumed less than 80% of the prescribed drugs were labeled as being non-compliant (20). Non compliant patients were asked about the reasons for their non-compliance with drugs. Compliant patients with uncontrolled blood pressure were asked about their attitude towards the change of their medication and whether they were informed by their treating doctor about the need for such a change.

### Statistical analysis

Data were collected and analyzed using the statistical package for social sciences (SPSS). The chi-square test was used to compare

categorical variables like sex, marital status, nationality and knowledge of BP in the two groups of compliant and non-compliant hypertensives. The two sample t-test was used to compare the mean of age.  $P \leq 0.05$  was used as the cut-off level for statistical significance.

### RESULTS

Of the 154 subjects recruited into the study, 132 completed follow-up period of 6 months. Of the 132 subjects who completed follow-up, 84 (64%) subjects had uncontrolled hypertension. The mean age of subjects was 54 (SD $\pm$ 9.8) years and the female to male ratio was 1.3:1. Married patients amounted to 21.2% of the total sample; the rest were single, divorced or widowed. Kuwaiti nationals constituted 87.1% of the sample (Table 1). The duration of hypertension was less than 5 years for 51 (38.6%) patients and 5 years or more for the rest. Fourteen (10.6%) patients had complications (such as neurological, cardiac or renal ones). Patient knowledge of hypertension was good in 90 (68.2%) patients; while it was poor in the rest (Table 2). There was no statistically significant difference in the mean age, sex distribution, marital status, nationality, duration of hypertension or presence of complications in compliant and non-compliant subjects (Table 1-2). There was significant difference in the patient's knowledge of hypertension in compliant and non-compliant hypertensives ( $p < 0.05$ ) (Table 2). Non compliant hypertensives were ignorant about the fact that hypertension is a chronic disease.

The overall compliance rate was 117 (88.6%). One out of 48 (2%) of controlled hypertensives was non-compliant by pill

**Table 2. Compliance rate according to illness factors**

Variable	Total (n:132)	Compliant (n:117)	Non-compliant (n:15)	p- value
Duration of hypertension				
< 5 years	51 (38.6)	44 (33.3)	7 (5.3)	0.497
≥ 5 years	81 (61.4)	73 (55.3)	8 (6.1)	
Complications				
Present	14 (10.6)	13 (9.8)	1 (0.8)	0.599
Not present	118 (89.4)	104 (78.8)	14 (10.6)	
Patient knowledge of hypertension				
Good	90 (68.2)	84 (71.8)	6 (40)	0.013
Poor	42 (31.8)	33 (28.2)	9 (60)	

Values are expressed as numbers (percentages).

count as compared with 14 out of 84 (17%) of uncontrolled hypertensives. This difference was statistically significant ( $p < 0.05$ ). Reasons for non-compliance included forgetfulness, drug side effects, shortage of drugs, polypharmacy and the asymptomatic nature of hypertension and the frequency of each is shown in Table 3. 38.2% of compliant patients with uncontrolled blood pressure were hesitant to any change in their medication, 32.4% were informed by their doctors for the necessity to change the medication and only 23.5% of patients their medication was changed by the treating doctor for better control.

## DISCUSSION

Our study investigated the status of blood pressure control among compliant and non-compliant subjects. Non-compliance was a significant predictor for uncontrolled hypertension. This finding is to be expected, because non-compliance tends to be associated with poor control of hypertension. This result is supported by different studies that considered compliance to be the most important factor for poor BP control (20-34). We found a drug compliance rate of 88.6% at the end of follow-up and this was high compared with other studies (36,37). Nevertheless the population of non-compliant and uncontrolled hypertension formed about

17% of our study population and would be an ideal target for health education.

The patient's knowledge and awareness of hypertension was significantly associated with compliance to medication for hypertension. This stresses the importance of health education to increase the knowledge of hypertension and its sequelae to improve patient's non-compliance behavior. The relationship between health knowledge and compliance was supported in some studies (23,36) but not in others (38,39). Data in literature suggested that patients who knew about the importance of compliance had a significantly higher compliance rate than did those who had been ignorant of that aspect (36). Other literature revealed relatively little support for a strong relationship between health knowledge and medication compliance (38,39).

Our study showed no significant relationship between demographic features and the compliance rates. Regarding this aspect reports differ on the nature of such associations. In one study compliance was associated positively with male sex, and negatively with older age (36) while in other study compliance was associated negatively with younger age and male sex (38). Other study showed no statistical significant difference in the demographic features in compliant and non-compliant subjects (29). More than half of the non-compliant patients in our study reported forgetfulness and absence of symptoms of hypertension as reasons for their non-compliance. Other reasons reported were presence of drugs side effects and drugs out of supply. These findings are similar to those of other authors (36, 40). In one study, almost one-half of the non-compliant patients reported absence of symptoms of hypertension and forgetfulness

**Table 3. Reasons for non-compliance among 132 hypertensive patients**

Reasons for non- compliance	
Forgetfulness	8 (53.3)
Presence of drugs side effects	5 (33.3)
Drugs out of supply	4 (26.7)
Polypharmacy	1 (6.7)
Absence of symptoms	1 (6.7)

as reasons for their non-compliance (36). This calls for more focus and care regarding the behavioural aspects of the management of hypertension (41) rather than restricting doctor's attention to the choice of one type of drug or another. Ignoring behavioral aspects of the management of patients could lead to unnecessary and harmful escalation of a drug regimen (37).

Regarding the compliant patients with uncontrolled BP, more than one third of them were hesitant to any change in their medication. This calls for more focus and care regarding the behavioral aspects of the management of hypertension. For the same group of patients only 23.5% of them their medication was changed by the treating doctor for better control. This reflects sub optimal medical regimen, which is considered in some studies to be the most common cause of uncontrolled hypertension (42, 43).

In conclusion, the study has revealed a high compliance rate with antihypertensive medications. It also demonstrates that compliance is an important factor related to optimal blood pressure control. This requires doctors to orient themselves towards patients' behaviors that may interfere with compliance with therapy, in order to achieve control of hypertension in the community. It is also recommended that health education should be stressed to improve the rate of compliance by improving patient's knowledge about hypertension and its sequelae.

## REFERENCES

- Chobanian AV, Bakris GL, Black HR, et.al, and the National High Blood Pressure Education Program Coordinating Committee, The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The JNC 7 report. JAMA 2003; 289: 3560-72
- 1990 World Health Organization- International Society of Hypertension Guideline for the Management of Hypertension. Guideline Subcommittee. J Hypertens 1999;17:151-83
- Primary Health Care Clinical Practice Guideline Series: Hypertension, Kuwait. Ministry of Health, central department of Primary Health Care 2001;2
- Arauz Pacheco C, Parrott MA, Raskin P. The treatment of hypertension in adult patients with diabetes. Diabetes Care 2002;25:134-47
- Joint National Committee. Fifth report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure. Arch Intern Med 1993;153:154-83
- Neaton Jo, Grimm J, Richard H, et.al. Treatment of mild hypertension study. Research group final report. JAMA 1993; 270: 713-24
- Houston MC. Hypertension strategies for therapeutic intervention and prevention of end- organ damage. Prim Care 1991;18:713-53
- Glasser SP. Hypertension syndrome and cardiovascular events; high blood pressure is only one risk factor. Post Grad Med 2001; 110:29-36
- Palmieri V, Wachtell K, Gredtsk, et.al. Left ventricular function and hemodynamics of inappropriate left ventricular hypertrophy in patients with systemic hypertension: the left study. Am Heart J 2001;141:784-91
- Pocok SJ, McCormack V, Gueyffier F, et.al. A score for predicting risk of death from cardiovascular disease in adults with raised blood pressure, based on individual patients data from randomized controlled trials. BMJ 2001;323:75-81
- The 2001 Canadian Hypertension Recommendation-what is new and what is old but still important. Can J Cardiol 2002; 18(6) .WWW.Pulsus. Com / CARDIOL/ 18\_60/ camp\_ed .htm
- Rosei EA. Assessment of pre clinical target organ damage in hypertension: Left Ventricular hypertrophy. European society of Hypertension Scientific Newsletter: Up date on Hypertension Management 2001; 2:N0.10
- Mac Machons, Rodgers A. The effect of blood pressure reduction in older patients: an overview of five randomized controlled trials in elderly hypertensives. Clinic Exp Hypertens 1993;15:967-78
- El Reshid K, Al-Owish R, Diab A. Hypertension in Kuwait: the Past, Present and Future. Suadi J Kidney Dis Transplant 1999;10(3) 357-64
- Al-Yahya AA, Al-Duwaisan HS, Al-Mehza AM. Improving the Diagnosis of Hypertension and Assessment of Vascular Risk Factors through A Clinic Audit in Kuwait Family Practice. KMJ 2003;35(2)
- Lever AF, Ramsay LE. Treatment of hypertension in elderly. J Hypertens 1995;13: 571-9
- Kaplan NM. Cardiovascular risk reduction: the role of antihypertensive treatment. Am J Med 1991;90(suppl 1A):19-20
- Collins R, Peto R, MacMahon S, et.al. Blood pressure, stroke and coronary heart disease. Part 2, short-term reductions in blood pressure: over view of randomized drug trials in their epidemiological context. Lancet 1990;335:827-38
- Neaton JD, Grimm RH, Prineas RJ, et.al. Treatment of mild hypertension study: final results. J Am Med Soc 1993;270:713-24
- Joshi PP, Salker RG, Heller RF. Determinants of poor blood pressure control in urban hypertensives of central India. J Hum Hyperten 1996;10:299-303
- Winick off RN, Murphy PK. The persistent problem of poor blood pressure control. Arch

- Intern Med 1987;147:1393-6
22. Buck CW, Donner AP. Blood pressure control in hypertensives: a model for the study of life events. *J Chr Dis* 1984;4:247-53
23. Shea S, Misra D, Ehrlich MH, et.al. Predisposing factors for severe, uncontrolled hypertension in an inner- city minority population. *N Engl J Med* 1992;327:776-81
24. Leenen F HH. Intermittent blood pressure control: Potential consequences for out com. *Can J Cardiol* 1999;15 (supplc):13c-18c
25. Bittar N. Maintaining long - term control of blood pressure: the role of improved compliance. *Clin Cardiol* 1995;18:312-6
26. Jones J k. Discontinuation of and changes in treatment after start of new courses of antihypertensive drugs: a study of a United Kingdom population. *Br Med J* 1995;311:293-5
27. Mc Combs JS, Nichol MB, New man CM, et. al. The costs of interrupting antihypertensive drug therapy in a Medicaid population. *Med Car (US)* 1994;32(3):214-26
28. Psaty BM. Temporal patterns of antihypertensive medication use among elderly patients. *JAMA* 1993;270:1837-41
29. Shea S, Misra D, Ehrlich MH, et.al. Correlates of Non adherence to Hypertension Treatment in an Inner-City Minority population. *Am J Public Health* 1992;82(12):1607-12
30. Setaro JF, Black Hr. Refractory hypertension. *N Engl Med* 1992;327:543-7
31. Wagner EH, James SA, Beresford SAA, et.al. The Edgecomb County High Blood Pressure Program: I. Correlates of uncontrolled hypertension at base line. *Am J Public Health* 1984;74:237-42
32. Clark LT. Improving compliance and increasing control of hypertension: needs of special hypertensive population. *Am Health J* 1991;121:664-9
33. Sharkness CM, Snow DA. The patient's view of hypertension and compliance. *Am J Prev Med* 1992;8:141-6
34. Richardson MA, Simons-Morton B, Annegers JF. Effect of perceived barriers on compliance with antihypertensive medications. *Health Educ Q* 1993;20:489-503
35. Elzubier AG, Husain AA, Suleiman IA, et.al. Drug compliance among hypertensive patients in Kassala, Eastern Sudan. *EMHJ* 2000; 6(1): 100-5
36. Khalil SA, Elzubier AG. Drug compliance among hypertensive patients in Tabuk, Saudi Arabia. *Journal of Hypertension* 1997;15(5): 561-5
37. Rudd P. Clinicians and patients with hypertension: unsettled issues about compliance. *Am Heart J* 1995;130:572-9
38. Klein LE. Compliance and Blood Pressure Control. *Antihypertensive drug effects Suppl ii Hypertension* 1988;11(3):61-4
39. Klein LE, German PS, McPhee ST, et al. Aging and its relationship to health knowledge and medication compliance. *Gerontologist* 1982; 22:384-7
40. Balazovjech I, Hnilica P Jr. Compliance with antihypertensive treatment in consultation rooms for hypertensive patients. *J Hum Hypertens* 1993;7:581-3
41. Grueninger UJ. Arterial hypertension: Lessons from patient education. *Patient Educ couns* 1995;26:37-55
42. Mc Alister FA, Lewanczuk RZ, Teok K. Resistant hypertension: An Overview. *Can J Cardiol* 1996;12(9):822-8
43. Yakovlevitch M, Black HR. Resistant hypertension in a tertiary care clinic. *Arch Inten Med* 1991;151:1786-92