

Are blood pressure values compatible with medication adherence in hypertensive patients?

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Abstract

Background and Aim: In the management of hypertension (HT), maintaining the medication adherence with treatment is as important as starting treatment. Studies have shown that the majority of patients taking medication do not reach their target values. This study aimed to investigate the relationship between the patient medication adherence and blood pressure (BP) values and reflection to general well-being.

Material and Methods: The study included 259 primary HT patients. The patients with BP measurements completed the Medication Adherence Self-Efficacy Scale-Short Form 13 and the World Health Organization-5 (WHO-5) well-being index. A Holter device was attached, and 24 h BP monitoring was completed.

Results: The mean points for medication adherence scale was 29.2 ± 10.3 (1–40) and mean WHO-5 points was 13.7 ± 4.6 (4–25) for patients. Clinical mean systolic BP was 140.0 ± 12.6 and diastolic 84.8 ± 9.0 mm Hg, while 24 h mean BP was systolic 119.5 ± 10.6 and diastolic 73.3 ± 8.1 mm Hg. While there was negative correlation between medication adherence scale scores and clinical systolic BP ($r = -0.171$; $P = 0.006$), there was no correlation with other BP readings. There was no correlation with the WHO-5 score and clinical readings, though there was a positive correlation between ambulatory mean systolic and diastolic BP ($r = 0.141$; $P = 0.023$ and $r = 0.123$; $P = 0.049$, respectively). There was positive correlation between the patient's medication adherence scores and the WHO-5 scores ($r = 0.141$; $P = 0.023$).

Conclusion: When clinicians assess medication adherence of patients, they should benefit from objective BP measurements and scales. Subjective and objective findings are important while making clinical decision.

Key words: Ambulatory blood pressure, hypertensive patients, medication adherence, treatment, well-being

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Background


High blood pressure (BP) is one of the most significant health problems. In developed countries, hypertension (HT) affects 30–40% of the adult population.^[1] Treatment is recommended as lifestyle changes and use of antihypertensive

medication. Uncontrolled HT is one of the most significant causes of mortality in the world.^[2] Roughly, 50% of individuals with HT only become aware of it after they are hypertensive. Of these, 50% take antihypertensive treatment and of those receiving antihypertensive treatment, only 50% manage to control HT.^[3] In our country, the HT control rates are 14% of all hypertensives and 27% of those receiving antihypertensive treatment.^[2] In the management of HT, maintaining the patient's medication adherence is as important as starting treatment. Studies on the factors

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affecting achievement of target values have shown that one of the leading causes is low medication adherence.^[4,5]

The World Health Organization (WHO) assessed factors affecting medication adherence under five main headings; the patient themselves, the patient's situation, treatment, socioeconomic situation, and health care system-related barriers.^[6] There are about 51 instruments assessing these dimensions in the literature.^[7]

This study aimed:

- To compare the BP values and medication adherence of hypertensive patients, and
- To determine the effect of BP values on well-being.

Material and Methods

This cross-sectional study included patients between the ages of 18 and 65 years at the outpatient polyclinic, Family Medicine, Medical Faculty, Çanakkale Onsekiz Mart University, between January and December 2013 who used stable antihypertensive medication for the previous 2 months. While the patients continued treatment, their BP was measured with a sleeve sphygmomanometer. A total of 259 primary HT patients were included in the study. Patients using antihypertensive treatment for <2 months, those with impaired ability to assess reality, secondary HT, taking medication that may affect BP such as steroids and pregnant women were excluded from the study.

The patients in the study completed a survey prepared by the researchers inquiring about sociodemographic information and patient history along with the Medication Adherence Self-Efficacy Scale-Short Form 13 (MASES-SF) and the WHO-5 well-being index. In the polyclinics, we measured the BP with sphygmomanometer and then Holter device was performed for monitoring 24 h BP.

In this quantitative study, we used questionnaires that are an indirect measurement method both economic and easy to use. The MASES-SF is used to assess patients' confidence in their ability to take their antihypertensive medications. The Turkish validation scale showed that the MASES-SF presents excellent psychometric properties of medication adherence of in Turkish hypertensive patients. This scale aims to measure the confidence in some situations in hypertensive patients such as busy at home or busy at work. The suggestion of our aim should describe the patient's well-being relation with medication adherence. The WHO-5 well-being index is so easy to practice and comprehensible tool.

Medication Adherence Self-Efficacy Scale-Short Form 13

This scale was developed by Ogedegbe *et al.*^[8] to assess medication adherence and compliance. Validity-reliability

studies for the short form Turkish version have been completed by Hacıhasanoğlu *et al.*^[9] in Turkey. The 13 questions on the short form have a 4-point Likert format and reliability of 0.94. Higher scores reflect the higher self-efficacy.

World Health Organization-5 well-being index

The validity-reliability studies of the Turkish scale, initially developed by the WHO, were completed by Eser *et al.*^[10,11] The index questions the well-being of an individual over the previous 2 weeks. Raw scores are calculated by adding the answers to five questions. Raw scores are in the interval 0–25. Taking 0 is worst with 25 representing the best quality of life.

Blood pressure measurement

We performed using Erka sphygmomanometer with adult cuff according to the standards published by Turkish Cardiology Society. We measured the BP through sleeve sphygmomanometer with both arms with 5 min intervals. The average value of the measured BP was taken.

24 h ambulatory blood pressure monitoring

The patients wore a Microlife Watch-BP Analyzer O₃ Holter device to monitor ambulatory BP over 24 h. BP values for the study data were taken as daily mean and nightly mean.

Permission and consent

Permission was granted by Çanakkale 18 Mart University Medical Faculty Clinical Research Ethics Committee. All patients were invited to participate in the study and were given verbal information about the study and gave written consent; patients who did not give consent were excluded from the study.

Statistics

After data were uploaded to a digital environment, distribution and frequencies were examined. The means of collected demographics, scales, and 24 h ambulatory BP were individually and collectively investigated. The relationship between variables was assessed with the Kendall tau-B correlation analysis. $P < 0.05$ was accepted as statistically significant.

Results

Of the 259 patients participating in the study, 198 (76.4%) were female and 61 (23.6%) were male ($\chi^2 = 7.220$; $P = 0.027$). The mean age of participants was 56.0 ± 5.9 (41–65) years. There was no significant difference between the mean age of female participants (55.6 ± 5.7 years) compared with the mean age of male participants (57.2 ± 6.4 years) ($t = 1.902$; $P = 0.058$). The mean duration of hypertensive treatment protocols of the patients was 37.6 ± 40.5 (1–240) months. The demographic data of patients are shown in Table 1.

Table 1: The demographic and disease characteristics of the participants

	Male	Female	Statistical tests*	P*
Gender	61 (23.6%)	198 (76.4%)	$\chi^2=7.220$	0.027
Mean age in year	57.2 ± 6.4	55.6 ± 5.7	t=1.902	0.058
Married	58 (24.9%)	175 (75.1%)	$\chi^2=3.211$	0.201
Education level (year)	9.3 ± 5.0	6.2 ± 3.7	t=2.191	0.000
Per capita income (TL)	570.2 ± 322.7	727 ± 552.4	t=4.255	0.040
Smoker	19 (7.4%)	25 (9.7%)	$\chi^2=44.780$	0.000
Regularly alcohol consumption	28 (9.7%)	14 (5.4%)	$\chi^2=53.458$	0.000
Duration of hypertension (year)	5.2 ± 5.3	7.4 ± 6.0	t=2.622	0.009
HT drug treatment protocol duration (months)	23.1 ± 26.8	42.0 ± 43.0	u=3.196	0.002
Total number of hypertensive drugs	1.2 ± 0.5	1.3 ± 0.5	t=0.758	0.449
Sistolic blood pressure-outpatient clinic (mm Hg)	139.8 ± 12.6	140.3 ± 12.7	t=0.224	0.823
Diastolic blood pressure-outpatient clinic (mm Hg)	84.3 ± 9.0	86.7 ± 8.6	t=1.848	0.066
Ambuluar sistolic blood pressure (mm Hg)	118.6 ± 10.5	122.4 ± 10.3	t=2.538	0.012
Ambuluar diastolic blood pressure (mm Hg)	72.8 ± 8.0	74.9 ± 8.3	t=1.727	0.085

*t;independent t test, χ^2 ;chi-square test . **P<0.05

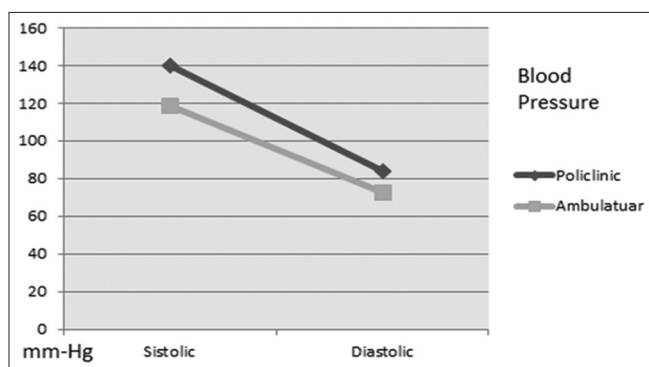


Figure 1: Measurements of blood pressure

The most frequently used HT medications were angiotensin receptor blocker diuretic combinations (26.1%), angiotensin converting enzyme inhibitor (ACEI) (11.6%), and ACEI diuretic combination (11.6%).

The mean points for the medication treatment adherence scale were 29.2 ± 10.3 (1–40) and the mean WHO-5 points were 13.7 ± 4.6 (4–25). Clinical mean BP measurements were systolic 140.0 ± 12.6 and diastolic 84.8 ± 9.0 mm Hg, while 24 h mean BP was systolic 119.5 ± 10.6 and diastolic 73.3 ± 8.1 mm Hg. The measurements of BP are shown in Figure 1.

While there was negative correlation between treatment adherence scale scores and clinical systolic BP ($r = -0.171$; $P = 0.006$), there was no correlation with other BP readings. There was no correlation with the WHO-5 score and clinical readings, though there was a positive correlation between ambulatory mean systolic and diastolic BP ($r = 0.141$; $P = 0.023$ and $r = 0.123$; $P = 0.049$, respectively). There was positive correlation between the patients' medication adherence scores and the WHO-5 scores ($r = 0.141$; $P = 0.023$).

Discussion

In our study as the medication adherence of patients with treatment deteriorated, the systolic BP measured in the clinic increased; however, Holter monitoring did not reflect the same findings. This situation may mean that daily pressure monitoring does not reflect deteriorating medication adherence but leads us to believe it may reflect the effect of increasing anxiety in the hospital environment. The general well-being scale showed an improvement with increasing BP. This situation may be due to the fact that as the body adjusts to HT, the return of BP to normal values may leave patients feeling uncomfortable. The treatment adherence scores correlated with increased well-being of patients, showing that when they completed the requirements for treatment they felt more comfortable.

There are many factors defined as medication adherence barriers. Being young and depression were found the patient-level factor for nonadherence in black with HT.^[12] The most commonly reported medication adherence barriers had too much medication to take and forgetting whether the medication was taken at a particular time. Furthermore, those who were not employed increased risk 1.32, or did not have someone to help with tasks increased risk 1.66 for nonadherence in patients with cardiovascular risk factors.^[13] There are defined living in a village compared with a city, dissatisfaction with treatment, forgetfulness, fear of getting used to the medication, adverse effects are associated with lower medication adherence. Evaluating health status as very good, good, or poor compared with excellent also was found associated with lower adherence.^[14] In our study, the WHO-5 scores which defined the well-being of patient was positive correlation with medication adherence score.

It is expected that the BP values of patients with good medication adherence will reflect this situation.

However, studies have found different relationships between scale scores and BP readings. A study by Schoenthaler *et al.*^[15] identified a positive correlation between medication adherence and BP, and defended the requirement to use 24 h measurement devices such as the Holter to provide more objective data on BP. Breaux-Shropshire *et al.*^[16] determined that the increase in BP was higher in individuals with high adherence. Contrary to these two situations, Hong *et al.*,^[17] in a study of hypertensive patients with chronic renal failure, showed that the BP values of patients with bad medication adherence were worse. The difference in this study may be due to the effect of another chronic disease apart from HT. In our study, there was no relationship between 24 h pressure values and medication adherence while there was a positive relationship with clinical systolic BP measurements. The difference in the reflection of medication adherence on BP values leads to the consideration that the validity and reliability of the instruments used should be reexamined. In a review assessing the relationship of the medication adherence scales in the literature with the multidimensional adherence model, the necessity to evaluate the reliability of the scale was emphasized. They stated that the scale was insufficient in terms of encompassing all the factors affecting medication adherence according to the WHO.^[18,19]

The majority of clinical applications comprise patients monitored for chronic disease. One of the most important stages in monitoring disease treatment by clinicians is assessing medication adherence. In our study, the BP measurements were not concordance with the medication adherence scale. One of the major causes of the uncontrolled HT is nonadherence medication in the hypertensive population. Solving for this problem, researchers try to find out many intervention methods such as education, self-monitoring BP for increasing the medication adherence. In one meta-analysis; while self-monitoring BP may contribute to improvements in medication adherence, lifestyle change, and medication persistence is scarce, of poor quality, and suggests little clinically relevant benefit in hypertensives.^[20] Glynn *et al.* declared that self-monitoring and appointment reminders may be useful adjuncts to improve BP control but require further evaluation in primary care settings.^[21] A randomized controlled study of primary health care in Spain found that education and providing documents to patients with low medication adherence did not affect medication adherence.^[19]

In clinics, asking the patients about their well-being is always using. Taking the subjective data about patient's well-being may not be sufficient alone according to this study. Our findings suggest that increased BP had positive correlation with the well-being scores.

Conclusion

When clinicians assess medication adherence of patients, they should benefit from objective BP measurements and scales. Subjective and objective findings are important while making clinical decision about the hypertensive patients for medical adherence and well-being. The clinicians should confirm both objective and subjective data in each patient.

Ethical approval

For this study, we declared that: All procedures followed were in accordance with the ethical standards of responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study.

Limitations

Although the majority of participants were females, it would be better to compare the adherence and BP values in both genders.

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Conflicts of interest

There are no conflicts of interest.

References

1. Burt VL, Whelton P, Roccella EJ, Brown C, Cutler JA, Higgins M, *et al.* Prevalence of hypertension in the US adult population. Results from the Third National Health and Nutrition Examination Survey, 1988-1991. *Hypertension* 1995;25:305-13.
2. Cushman WC, Ford CE, Cutler JA, Margolis KL, Davis BR, Grimm RH, *et al.* Success and predictors of blood pressure control in diverse North American settings: The antihypertensive and lipid-lowering treatment to prevent heart attack trial (ALLHAT). *J Clin Hypertens (Greenwich)* 2002;4:393-404.
3. Onat A, Sansoy V, Soydan I, Tokgozoglu SL, Adalet K: TEKHARF: Heart Health in Turkish Adults: According to the results of 12 years follow-up. Istanbul: Argos publications (in Turkish); 2003. ISBN:975-596-016-3.
4. Waeber B, Burnier M, Brunner HR. How to improve adherence with prescribed treatment in hypertensive patients? *J Cardiovasc Pharmacol* 2000;35 Suppl 3:S23-6.
5. Bosworth HB, Dudley T, Olsen MK, Voils CI, Powers B, Goldstein MK, *et al.* Racial differences in blood pressure control: Potential explanatory factors. *Am J Med* 2006;119:70.e9-15.
6. Gabate E; World Health Organization. Adherence to Long Term Therapies: Evidence for Action. Geneva: World Health Organization; 2003.
7. AlGhurair SA, Hughes CA, Simpson SH, Guirguis LM. A systematic review of patient self-reported barriers of adherence to antihypertensive medications using the world health organization multidimensional adherence model. *J Clin Hypertens (Greenwich)* 2012;14:877-86.
8. Ogedegbe G, Mancuso CA, Allegante JP, Charlson ME. Development and evaluation of a medication adherence self-efficacy scale in hypertensive African-American patients. *J Clin Epidemiol* 2003;56:520-9.

9. Hacıhasanoğlu R, Gözüm S, Capik C. Validity of the Turkish version of the medication adherence self-efficacy scale-short form in hypertensive patients. *Anadolu Kardiyol Derg* 2012;12:241-8.
10. The clinical consequence of IRT analyses: Health-related quality of life. In: Bech P, editor. *Clinical Psychometrics*. Oxford; Wiley and Blackwell Publications; 2012.
11. Eser E. WHO (Five) Well-Being Index (1998 version). Available from https://www.psykiatri-regionh.dk/who-5/Documents/WHO5_Turkish.pdf. [Last accessed on 2015 Apr 23].
12. Lewis LM, Schoenthaler AM, Ogedegbe G. Patient factors, but not provider and health care system factors, predict medication adherence in hypertensive black men. *J Clin Hypertens (Greenwich)* 2012;14:250-5.
13. Zullig LL, Stechuchak KM, Goldstein KM, Olsen MK, McCant FM, Danus S, *et al*. Patient-reported medication adherence barriers among patients with cardiovascular risk factors. *J Manag Care Spec Pharm* 2015;21:479-85.
14. Al-Ramahi R. Adherence to medications and associated factors: A cross-sectional study among Palestinian hypertensive patients. *J Epidemiol Glob Health* 2015;5:125-32.
15. Schoenthaler A, Chaplin WF, Allegrante JP, Fernandez S, Diaz-Gloster M, Tobin JN, *et al*. Provider communication effects medication adherence in hypertensive African Americans. *Patient Educ Couns* 2009;75:185-91.
16. Breaux-Shropshire TL, Brown KC, Pryor ER, Maples EH. Prevalence of blood pressure self-monitoring, medication adherence, self-efficacy, stage of change, and blood pressure control among municipal workers with hypertension. *Workplace Health Saf* 2012;60:265-71.
17. Hong K, Muntner P, Kronish I, Shilane D, Chang TI. Medication adherence and visit-to-visit variability of systolic blood pressure in African Americans with chronic kidney disease in the AASK trial. *J Hum Hypertens* 2015. [doi: 10.1038/jhh.2015.26.] [Epub ahead of print].
18. Pérez-Escamilla B, Franco-Trigo L, Moullin JC, Martínez-Martínez F, García-Corpas JP. Identification of validated questionnaires to measure adherence to pharmacological antihypertensive treatments. *Patient Prefer Adherence* 2015;9:569-78.
19. Amado Guirado E, Pujol Ribera E, Pacheco Huergo V, Borrás JM; ADIEHTA Group. Knowledge and adherence to antihypertensive therapy in primary care: Results of a randomized trial. *Gac Sanit* 2011;25:62-7.
20. Fletcher BR, Hartmann-Boyce J, Hinton L, McManus RJ. The effect of self-monitoring of blood pressure on medication adherence and lifestyle factors: A Systematic review and meta-analysis. *Am J Hypertens* 2015;28:1209-21.
21. Glynn LG, Murphy AW, Smith SM, Schroeder K, Fahey T. Interventions used to improve control of blood pressure in patients with hypertension. *Cochrane Database Syst Rev* 2010;17:CD005182.