

# The Relationship Between Personality Traits and Adherence among Patients with Hypertension

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## Abstract

**Aims:** Hypertension is a serious health problem that requires lifelong treatment. The patient's nonadherence with antihypertensive medications is the major factor in treatment failure. Previous studies have suggested that adherence may be related to psychological factors consisting of personality traits. **Materials and Methods:** This cross-sectional study included 194 hypertensive patients referred to Alzahra Cardiovascular Clinic. The patients were asked to complete two questionnaires, including the NEO Big Five and adherence questionnaire. **Results:** Statistical analyses showed a significant negative correlation between neuroticism and medical adherence (CC = -0.148, PV = 0.002, CI = -0.240/-0.056), and extroversion had a significant positive correlation (CC = 0.161, PV = 0.001, CI = 0.260/0.052). The other aspects of personality traits had no significant correlation with medical adherence. **Conclusion:** Neuroticism may be a negative predictor and extroversion may be a positive predictor of medical adherence in hypertensive patients.

**Keywords:** Adherence to medication, hypertension, personality traits

## INTRODUCTION

Hypertension (HTN) is a severe threat to health and leads to cardiovascular diseases, strokes, and renal insufficiency. Suitable treatment of HTN greatly reduces cardiovascular disease-induced death.<sup>[1]</sup> The basis of treating HTN is to control it in physiological variation. The benefits of blood pressure adjustment have been well established in many studies, but it is inefficiently controlled for many patients, and the major cause of such treatment failure is that patients do not follow their recommended treatments.<sup>[2,3]</sup> The World Health Organization reports that at least 50% of patients diagnosed with HTN will not receive recommended treatments.<sup>[4]</sup>

Adherence to treatment is the match of individual behavior (i.e. taking medication, changing a diet, and changing lifestyle) with recommendations made by a member of the health system.<sup>[5]</sup>

Because it has been frequently revealed that psychological factors are associated with increased HTN risk, cardiovascular disease, and patient-related health behavior, they may be essential determinants of adherence to treatment of HTN.<sup>[6]</sup>

Many studies have been conducted on adherence to treatment and the factors affecting it, but few studies have investigated the relationship between adherence to treatment and personality traits.<sup>[7]</sup>

One model typically employed to describe personality traits in clinical studies is the Big-Five Model or the five-factor model, which incorporates a five-aspect pattern of personality traits, including neuroticism that represents the stability of feelings, extroversion which describes interpersonal relationships,

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openness to experience that assesses willingness to accept new ideas, agreeableness that demonstrates interpersonal tendency, and conscientiousness that assesses goal-leading motivation.<sup>[8]</sup>

Studies have shown that adherence to treatment may be associated with personality traits.<sup>[9]</sup>

Many studies have shown various correlations between personality traits and adherence to treatment in chronic diseases.<sup>[10-12]</sup>

Two studies suggested that adherence to treatment was only related to extroversion among major depressive disorder patients and survivors of cancer.<sup>[13,14]</sup>

Considering the limited studies and unstable results in different populations, such studies are required to be repeated. This study aims to complete this chain in an Iranian population.

## MATERIALS AND METHODS

This study was a correlational cross-sectional study conducted on 194 patients referring to Alzahra Cardiovascular Clinic in Isfahan in 2011. The major criteria for individuals to be included in the study were over 20 years and at least 1 year of HTN treatment history.

Researchers randomly visited the patients who were referred to Alzahra Cardiovascular Clinic on different days of a week to describe the study to eligible individuals, attempting to persuade them to participate in the study. After receiving their written agreement, they were explained how to complete the questionnaire, receiving the questionnaires. The author was available to patients during the questionnaires to complete any ambiguity. Any patient who was unwilling to participate in any stage of the study was excluded from the study.

The participants' personality traits were assessed using the NEO Big-Five Questionnaire. It involved sixty questions to investigate five major personality factors, including neuroticism (N), extroversion, openness to experience (O), agreeableness (A), and conscientiousness (C), and 12 articles for each factor. The questions were scored on a five-point scale from "completely disagree" to "completely agree." The scores of each factor varied between 0 and 12, and the total score of the questionnaire varied between 0 and 60.

Many studies reported NEO Big-Five Questionnaire as a valid and reliable tool.<sup>[15]</sup> The Persian version of this questionnaire was evaluated in an Iranian population, and Cronbach's alphas of 0.79, 0.73, 0.42, 0.58, and 0.77 with test-retest reliabilities of 0.84, 0.86, 0.78, 0.65, and 0.86 were obtained for N, E, O, A, and C, respectively. Moreover, the Persian version's validities of N, E, O, A, and C were calculated to be 0.75, 0.91, 0.71, 0.78, and 0.75, respectively.<sup>[16]</sup>

Patient adherence to treatment was assessed by a researcher-made questionnaire based on the Medication Adherence Self-efficacy Scale questionnaire<sup>[17]</sup> after applying a cultural modification to the questions. It was developed and employed in Turkey and had

an acceptable validity. In the evaluation of the Turkish version of psychometrical traits, reliability and item-total correlations were reported to be 0.92 and 0.26–0.72, respectively.<sup>[18]</sup> This questionnaire was completed by face-to-face interviews with patients, and various treatment cooperation aspects were investigated following medication orders, being on a diet, performing exercises, blood pressure measurement, and smoking.

Adherence to treatment of participants was divided into four levels: (1) individuals who cooperated in two adherence to treatment items, (2) individuals who cooperated in two adherence to treatment items, (3) those who cooperated in three adherence to treatment items, and (4) those who cooperated in four or five adherence to treatment items.

Other possible harmful psychological factors affecting adherence to treatment, anxiety, depression, and stress were assessed and included in the statistical analysis using the Depression Anxiety Stress Scales questionnaire.

After the data were collected, they were entered into a computer and were analyzed using the SPSS version 16 software (IBM Corporation, Armonk, New York, U.S.A).

Categorical variables (related to treatment cooperation) and continuous variables were reported in percentage and mean  $\pm$  standard deviation. Factors influencing treatment cooperation were analyzed by ordinal logistic regression.

## RESULTS

One hundred and ninety-four HTN patients participated in this study, of which 127 (64%) individuals were female and the remaining 71 (36%) were male with an average age of  $60 \pm 13$  years.

Table 1 provides the full specifications of the population.

As shown in table 2, neuroticism has an inverse significant relationship with the patients' adherence to treatment, whereas extroversion had a direct significant relationship with adherence to treatment. The relationships of openness to experience, agreeableness, and conscientiousness with adherence to treatment level were not significant. There was no significant relationship between any of the evaluated demographic factors (i.e., age and gender) and adherence to treatment level. The variables such as anxiety, depression, stress, age, and gender of the participants were controlled in the model fitting [Table 2].

## DISCUSSION

This study was conducted on 194 HTN patients in Isfahan Alzahra Cardiovascular Clinic in 2011. Given the high prevalence of not following treatments among HTN patients, the necessity to control their blood pressure to prevent consequences, and the suggestions of the previous studies on the relationship between personality traits and psychological factors, the goal of this study was to investigate the relationship between personality traits and adherence to treatment by employing the NEO Big-Five Questionnaire.

**Table 1: Frequency distribution and demographic percentages of the hypertension patients**

	<i>n</i> (%)
Gender	
Female	123 (63)
Male	71 (37)
Marital status	
Married	6 (3.1)
Unmarried	126 (64.95)
Divorced	31 (15.98)
Widow	31 (15.98)
Education degree	
Illiterate	33 (17.01)
Elementary and junior	72 (37.11)
Diploma and associate	79 (40.72)
Bachelor and higher	10 (5.15)
Employment	
Unemployed	3 (1.55)
Housekeeper	106 (54.64)
Retired	30 (15.46)
Others	55 (28.35)
Income level	
Low	76 (39.17)
Medium	76 (39.17)
High	42 (21.65)
Insurance	
Insured	172 (88.66)
Uninsured	22 (11.34)

**Table 2: Summary of ordinal logistic regression test results for the effects of different personality dimensions on adherence to treatment level while controlling anxiety, depression, stress, age, and gender of the participants**

Variables	Regression coefficient	<i>P</i>	Confidence level 95%
Neuroticism	-0.148	0.002	-0.240-0.056
Extroversion	0.161	0.001	0.052-0.260
Openness	-0.044	0.478	0.062-0.077
Agreeableness	0.034	0.524	-0.165-0.139
Conscientiousness	0.018	0.788	-0.071-0.150

The results indicate that only 17% of the participants completely followed their treatment, 16% had no cooperation, and the remaining 77% had a medium level of cooperation.<sup>[19]</sup>

A study conducted in Shiraz, Iran, stated that 60.4% of the HTN patients had a cooperation level below 90% (as a desirable cooperation index).<sup>[20]</sup>

The results of this study showed a relationship between personality traits and HTN patients' adherence to treatment, such that neuroticism negatively affects adherence to treatment (i.e., adherence to treatment reduces as the neuroticism score increases). On the other hand, extroversion positively influences adherence to treatment. The previous

studies revealed that individuals with dominant neuroticism tend to act more dangerously to their health and follow their medication orders improperly.<sup>[21-23]</sup>

Individuals with high neuroticism feel guilty in different situations; have low self-esteem; isolated; and are anxious, isolated, irrational, shy, and ambivalent. They are also predisposed to irrational beliefs and cannot desirably control their anxiety and stresses.<sup>[24]</sup>

Some of the researchers believed that fear and stress in individuals with high neuroticism reduced their medical adherence. Such individuals are more likely to experience stressful events followed by depression attacks. Therefore, it can be said that neuroticism makes individuals more disposed to experience stressful events, making depression more likely.<sup>[25]</sup> The previous studies indicated that anxious and depressed individuals do not desirably follow medication orders.<sup>[26]</sup>

In this study, the possible effects of anxiety and depression on treatment cooperation were controlled, and the obtained result on the negative effect of neuroticism on adherence to treatment was independent of such possible harmful factors.

Extraverts are energized and optimist individuals that are willing to interact with others. They have active lives, wish activities, excitement, and populated places and seek for positive excitement. Extroversion and social support motivate them to adherence to treatment, particularly in changing their lifestyles.<sup>[27]</sup>

It was reported that a high extroversion score is associated with high alcohol consumption and smoking, and higher physical activity is related to being on a diet.<sup>[28,29]</sup> In the current study, extroversion positively affected adherence to treatment in general. Other studies also proposed such a relationship.<sup>[9,30]</sup>

In the current study, no relationships were observed between openness to experience, agreeableness, and conscientiousness and adherence to treatment. Furthermore, demographic factors were not associated with the general status of adherence to treatment. A meta-analysis showed that the relationship between conscientiousness and adherence to treatment is inconsistent in various studies, and it may be because of the fact that the participants were influenced by other personality traits such as neuroticism.<sup>[31]</sup>

## CONCLUSION

Neuroticism may be a negative predictive factor and extroversion may be a positive predictive factor of medical adherence in hypertensive patients.

## Limitations

Collecting data using the self-report method and questionnaire may not be entirely reliable. Moreover, providing samples of patients in a clinic can create selection bias. The samples consisted of individuals that referred for treatment, whereas individuals with low compliance do not refer to clinics. This

method was employed because other HTN individuals were not available.

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### Conflicts of interest

There are no conflicts of interest.

## REFERENCES

- Xie X, Atkins E, Lv J, Bennett A, Neal B, Ninomiya T, *et al.* Effects of intensive blood pressure lowering on cardiovascular and renal outcomes: Updated systematic review and meta-analysis. *Lancet* 2016;387:435-43.
- Bromfield S, Muntner P. High blood pressure: The leading global burden of disease risk factor and the need for worldwide prevention programs. *Curr Hypertens Rep* 2013;15:134-6.
- Degli Esposti L, Saragoni S, Benemei S, Batacchi P, Geppetti P, Di Bari M, *et al.* Adherence to antihypertensive medications and health outcomes among newly treated hypertensive patients. *Clinicoecon Outcomes Res* 2011;3:47-54.
- Chow CK, Teo KK, Rangarajan S, Islam S, Gupta R, Avezum A, *et al.* Prevalence, awareness, treatment, and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. *JAMA* 2013;310:959-68.
- Wolf-Maier K, Cooper RS, Kramer H, Banegas JR, Giampaoli S, Joffres MR, *et al.* Hypertension treatment and control in five European countries, Canada, and the United States. *Hypertension* 2004;43:10-7.
- Altun B, Arici M, Nergizoglu G, Derici U, Karatan O, Turgan C, *et al.* Prevalence, awareness, treatment and control of hypertension in Turkey (the patenT study) in 2003. *J Hypertens* 2005;23:1817-23.
- Osamor PE, Owumi BE. Factors associated with treatment compliance in hypertension in Southwest Nigeria. *J Health Popul Nutr* 2011;29:619-28.
- Weston SJ, Hill PL, Jackson JJ. Personality traits predict the onset of disease. *Soc Psychol Pers Sci* 2015;6:309-17.
- Axelsson M, Brink E, Lundgren J, Lötval J. The influence of personality traits on reported adherence to medication in individuals with chronic disease: An epidemiological study in West Sweden. *PLoS One* 2011;6:e18241.
- Emilsson M, Berndtsson I, Lötval J, Millqvist E, Lundgren J, Johansson A, *et al.* The influence of personality traits and beliefs about medicines on adherence to asthma treatment. *Prim Care Respir J* 2011;20:141-7.
- Moran AM, Everhart DE, Davis CE, Wuensch KL, Lee DO, Demaree HA. Personality correlates of adherence with continuous positive airway pressure (CPAP). *Sleep Breath* 2011;15:687-94.
- Axelsson M, Cliffordson C, Lundbäck B, Lötval J. The function of medication beliefs as mediators between personality traits and adherence behavior in people with asthma. *Patient Prefer Adherence* 2013;7:1101-9.
- Nabolsi MM, Wardam L, Al-Halabi JO. Quality of life, depression, adherence to treatment and illness perception of patients on haemodialysis. *Int J Nurs Pract* 2015;21:1-0.
- Kongkaew C, Jampachaisri K, Chaturongkul CA, Scholfield CN. Depression and adherence to treatment in diabetic children and adolescents: A systematic review and meta-analysis of observational studies. *Eur J Pediatr* 2014;173:203-12.
- Ubbiali A, Chiorri C, Hampton P. Italian Big Five Inventory. Psychometric properties of the Italian adaptation of the Big Five Inventory (BFI). *Applied Psychology Bulletin* 2013;59:37-48.
- Anisi J, Majdian M, Joshanloo M, Gohari-kamel Z. Validity and reliability of NEO Five-Factor Inventory (NEO-FFI) on university students. *Journal of Behavioral Sciences* 2012;5:351-5.
- Fernandez S, Chaplin W, Schoenthaler AM, Ogedegbe G. Revision and validation of the medication adherence self-efficacy scale (MASES) in hypertensive African Americans. *J Behav Med* 2008;31:453-62.
- Hacihasanoglu 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.
- Dunbar-Jacob J, Mortimer-Stephens MK. Treatment adherence in chronic disease. *J Clin Epidemiol* 2001;54 Suppl 1:S57-60.
- Hadi N, Rostami N, Jafari P. Determinant factors of drug use compliance in hypertensive patients. *Arch of SID* 2004;4:223-9.
- Otonari J, Nagano J, Morita M, Budhathoki S, Tashiro N, Toyomura K, *et al.* Neuroticism and extraversion personality traits, health behaviours, and subjective well-being: The Fukuoka study (Japan). *Qual Life Res* 2012;21:1847-55.
- Bruce JM, Hancock LM, Arnett P, Lynch S. Treatment adherence in multiple sclerosis: Association with emotional status, personality, and cognition. *J Behav Med* 2010;33:219-27.
- Lahey BB. Public health significance of neuroticism. *Am Psychol* 2009;64:241-56.
- Muris P, Roelofs J, Rassin E, Franken I, Mayer B. Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Pers Individ Dif* 2005;39:1105-11.
- Yoon KL, Maltby J, Joormann J. A pathway from neuroticism to depression: Examining the role of emotion regulation. *Anxiety Stress Coping* 2013;26:558-72.
- Kretzschy IA, Owusu-Daaku FT, Danquah SA. Mental health in hypertension: Assessing symptoms of anxiety, depression and stress on anti-hypertensive medication adherence. *Int J Ment Health Syst* 2014;8:25.
- Vangeli E, Bakhshi S, Baker A, Fisher A, Bucknor D, Mrowietz U, *et al.* A systematic review of factors associated with non-adherence to treatment for immune-mediated inflammatory diseases. *Adv Ther* 2015;32:983-1028.
- Hakulinen C, Hintsanen M, Munafò MR, Virtanen M, Kivimäki M, Batty GD, *et al.* Personality and smoking: Individual-participant meta-analysis of nine cohort studies. *Addiction* 2015;110:1844-52.
- Fairbairn CE, Sayette MA, Wright AG, Levine JM, Cohn JF, Creswell KG. Extraversion and the rewarding effects of alcohol in a social context. *J Abnorm Psychol* 2015;124:660-73.
- Axelsson M. Report on personality and adherence to antibiotic therapy: A population-based study. *BMC Psychol* 2013;1:24.
- Molloy GJ, O'Carroll RE, Ferguson E. Conscientiousness and medication adherence: A meta-analysis. *Ann Behav Med* 2014;47:92-101.