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Association between Temperament Pattern and Hypertension in Adult Population: A Case-Control Study

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ABSTRACT

Introduction: Hypertension is one of the main causes of morbidity and illness in the world. Until now, although the exact casualty of hypertension is not well established but Personality type can be considered as one of the effective factors in hypertension development as effects various aspects of the patient's life style. In the current study, the relationship between hypertension and temperament has been investigated. **Methods**: This case-control study was performed on 65 patients with hypertension and 65 people with normal blood pressure. Temperament patterns were examined by the TCI standardized questionnaire with 125 questions that examines temperament and character dimensions. Collected data were analyzed by SPSS 20 software using statistical tests. **Results**: In this study, there was no significant difference in average age and level of education between two groups include hypertensive and non-hypertensive (P-Value=0.22). However hypertensive group the prevalence of diabetes (P<0.001), hyperlipidemia (P<0.001), and cardiac disease (P=0.001) were significantly higher than non- hypertensive group. High blood pressure had a significant relation with harm avoidance temperament but there was not this relation with other temperament models such as average number for novelty seeking, reward dependent and persistence temperament. **Conclusion**: Evaluation temperament with the questionnaire can provide important information to predict the risk of hypertension in primary care. Regarding the temperament side effects on the health issue, new educational programs for medical students in this field are suggested.

Keywords: Hypertension, Temperament, Personality, Cloninger's questionnaire, Case-Control.

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INTRODUCTION

Hypertension (HTN) is one of the main global public health concerns. Elevated blood pressure (BP) impress more than one billion individuals and causes to nearly 9.4 million deaths each year (1). Hypertension redouble the risk of cardiovascular diseases (CVD), containing coronary heart disease (CHD), congestive heart failure (CHF), ischemic and hemorrhagic stroke, renal failure, and peripheral arterial disease (PAD) (2). The prevalence of HTN has been reported to be 44% in Western Europe and 28% in North America (1). Based on Kearney et al, by 2025 about 75% of the world's hypertensive patients would be from developing countries (3). The exact etiology of HTN is unknown but genetics, environmental factors and underlying disease can lead to HTN (2).

Awareness of human personality can prevent many chronic diseases by predicting life style associated factors affecting physical, mental and social health. Cloninger is one of the character bio-theorists with an emphasis on biological parameters who has created one of the strongest theoretical questionnaire (4). The use of this questionnaire in clinical practice can be helpful for many diagnostic problems. In other words, the Cloninger's personality and character questionnaire, temperament and character inventory (TCI), was developed to measure personality traits and characteristics that are available either through inheritance or through the environment (4). One of the applications of this questionnaire is the mental and personality disorders associated with neurodegenerative and cardiovascular diseases. Research on multiple sclerosis (MS) patients showed that patients with MS had higher mean scores for novelty behavior, vulnerability, and self-efficacy, and had lower mean scores for dependency, Cooperation, and self-di-

rected reward behavior than the control group (5). In another study of Alzheimer's disease, personality changes in patients with depression were greater than in the control group (6). This questionnaire was used to assess the psychiatric symptoms and mood dimensions observed in patients undergoing coronary artery bypass grafting or heart valve disease. The results were very different and important to healthy people (7).

Nowadays, physical and personality differences have led to the creation of a new branch called Personalized. Personalized medicine explains about unique specification in person in the world. samples of personalized medicine are including pharmacogenomics, metabolomics and nutrigenomics that note to body reaction to drugs usage, body metabolism and nutrition (8).

Studies have shown that there has been no research into the direct use of Cloninger's theory in examining the temperament of people with hypertension. Regarding to the importance of blood pressure control, temperaments, and obtained results about the relation between temperaments and health issues from previous articles (9,10), we decided to find relation between hypertension and different form of temperaments using temperament and character inventory (TCI) standardized questionnaire.

MATERIAL AND METHODS

TThis is a case-control study consisted of patients with hypertension and a control group of people with no history of hypertension. A sample size of 65 subjects per group was determined for this study. Inclusion criteria were hypertension (systolic above 14 and diastolic over 9 or either of the two) for the case group and no hypertension in the control group, consent of persons to participate in the study, and people over the age of 20 years. Exclusion criteria included patients who refused to answer questions because of not understanding the concepts of questions, incomplete questionnaires, and patients with mood disorders.

Totally, 65 patients who met the inclusion criteria with primary hypertension diagnosed by an internist and introduced for participation, and 65 non-hypertensive individuals were included in the study. The objectives of the study were explained to the participants in detail and they were assured that their personal information would not be published in any way. Written consent was obtained from all participants and participants who refused to continue the interview were excluded from the study. Initially, demographic information of patients including age, gender, occupation, and education level, were recorded in a special checklist prepared for this purpose. History of hypertension, family history of underlying diseases (diabetes, hyperlipidemia) and history of mental illness were also asked and recorded in the form. Temperament patterns were examined by the TCI standardized questionnaire with 125 questions that examines temperament and character dimensions. This questionnaire was validated and standardized in a study on a sample of 1212 males and females in different age groups (11). Since this questionnaire had a large number of questions, those related to temperaments were selected in a questionnaire of 60 questions and distributed among the case and control groups.

Each scale has some questions that are assigned a score and the score of each dimension is obtained from the sum of its subscales. Questions were designed in such a way that, depending on the phrase content, true and false answers could increase the score of a scale. This design was intended to reduce the effect of row response on the results. The scales did not have the same number of questions. Although manual test scoring is simply done by the scoring keys, it can be performed with further ease, accuracy, and speed through a simple computer program. T-adjusted scores were obtained after raw scores. The normative profiles of men and women were determined separately. Thus, the profile was ready for interpretation after converting the scores (12).

This test content illustrates the characteristics of people with extreme scores at high and low limits of each scale or dimension, which is always true in the interpretation of test results. Interpretation in the form of a more comprehensive diagnosis and description is called compound analysis, which establishes an important link between test dimension information and a variety of behavioral and emotional disorders. Various personality disorders can be deduced from the interaction of three main dimensions, viz. harm avoidance, novelty seeking, and reward dependence. The avoidance dimension reflects the character perfection, maturity, and growth. Two basic points has to be considered before addressing the diagnostic test guide. First, raw scores have to be converted to T scores, which is actually related to the test norm because T scores originate from the mean and standard deviation of scale scores obtained from the statistical population. The second point is that arbitrary limits for determining low, medium, and high levels of status in each dimension and scale are determined on the first one-third, second one-third, and third one-third of bottom-up scores. In addition, distinction is important between very low and very high levels. For this purpose, the scores of 0-16.7, 16.7-33, 67-83.3, and 84-100 can be considered as very low, low, high, and very high, respectively. The very high and the very low scores clearly show stronger and more stable emotional and character attributes than the characteristics obtained from high or low scores.

When using the test in clinical assessments, it is better to obtain an estimation of the subject's levels of mood and anxiety because evidence demonstrates that the scores of harm avoidance have a poor correlation with subject's depression and anxiety levels. The same holds true to a lesser extent for the subscale of an exciting adventurer in the novelty seeking and collaboration dimensions. Chronic psychiatric disorders (e.g., alcoholism) that lead to secondary depression also decrease the scores of harm avoidance. In addition to the mood factor, age also affects the scores of some indices. The scores of harm avoidance decrease with growing age (about 10%). These changes reflect one's mental maturity through the course of life. In view of these points, subject's mood status and age should be taken into account in the profile interpretation. As with other tests, clinical information and evidence should be kept in mind in the interpretation of results.

There are some important recommendations about test validity based on which the honesty and correctness of the subject' answers can be verified. First, the number of true and false answers is close together in honesty cases. The second is to consider the order of the answers as some people mark a relatively considerable number of rows and then do the same procedure

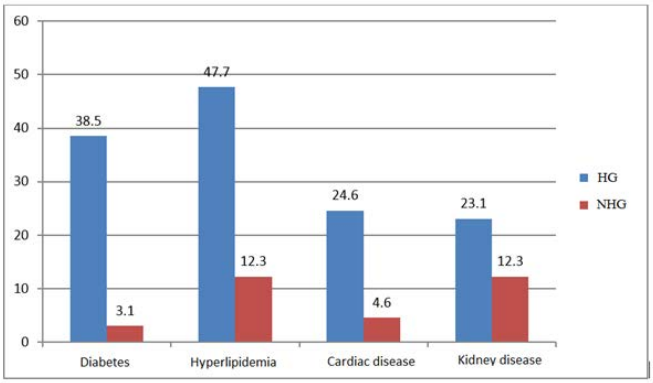

Figure 1. Frequency distribution of medical illness history

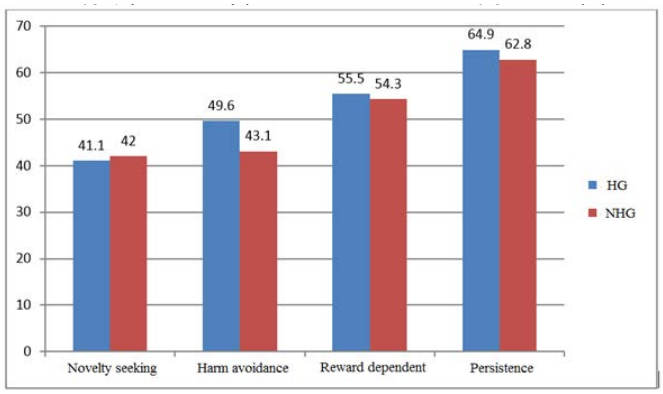

Figure 2. The mean score of temperament patterns

for the next row. As such, the number of true and false answers is close together, but the response was given inaccurately and randomly (13).

Collected data were analyzed by SPSS 20 software using statistical tests including Chi-square test, independent t-test, and Mann-Whitney test.

RESULTS

In order to find relation between high blood pressure and temperaments, two groups include hypertensive and non-hypertensive individuals between 28-81 years old were selected. Average age for hypertensive group (HG) 54.3±12.1 years and non-hypertensive group (NHG) were 51.5±14.3 years. Among 65 persons in HG, there were 6 persons with the age ranges between 26-40 years old, 22 persons 41-55 years old, 31 persons 56-70 and 6 persons 71-85 years old while among 65 persons in NHG, there were 20 persons with the age ranges between 24-40 years, 30 persons 41-55 years old, 14 persons 56-70 years old and 1 person was between71-85 years old. The results show that statistically there was no significant difference in average age between two groups (P-Value=0.22).

In HG 14 persons between 65 individuals graduated from middle school or lower, 25 persons finished high school, 7 persons had associate degree and 19 persons were Bachler or higher. In NHG 10 persons among 65 persons graduated from middle school or lower, 24 persons finished high school, 9 persons had associate degree and 22 persons had Bachler or higher. Therefore there were no significant difference in level of education between two groups (P=0.37).

Past medical history in HG between 65 persons showed 25 persons were diabetic and 31 persons were affected by hyperlipidemia.16 persons were affected by cardiac disease and 15 individuals were affected by kidney disease while in NHG 2 persons were diabetic, 8 persons were affected by hyperlipidemia, 3 individuals affected by cardiac disease and 8 persons were affected by kidney disease. The difference in the data showed in HG the prevalence of diabetes (P<0.001), hyperlipidemia (P<0.001), and cardiac disease (P=0.001) were significantly higher than NHG (Fig1.). On the other hand, in HG the prevalence of kidney disease were higher than NHG but it was not significantly different (P=0.11).

Average number for temperaments model in HG were as following, 41.1 novelty seeking temperament, 49.6 harm avoidance temperament, 55.5 reward dependent temperament, and 64.9 persistence temperament while the average score for temperaments model in NHG were 42.02 novelty seeking temperament, 49.6 harm avoidance temperament, 54.3 reward dependent temperament, and 62.8 persistence temperament. Due to the differences in the data obtained from the two groups of NHG and HG in this study, there is a significant relationship between temperament and hypertension (P-Value= 0.04).

The reported research by Goldestoe and Shapeier (2007) showed that the hostile, defensive and anxious families had the higher blood pressure which the highest level was during the workdays (18). The above features are represented of the nature dimension of injury avoidance HA which in this study, the relation between HA dimension and high blood pressure was showed.

Speilberger (2000) indicated that angry mood increases the risk of high blood pressure (14). As previously mentioned, anger has a close correlation with novelty seeking (NS) (15). However, there was no significant correlation between high blood pressure and novelty seeking in the present study (P=0.71). Steele et al. (1997) showed that the level of external anger expression has a significant correlation with diastolic blood pressure in women under 40 years old (16). There was a reverse correlation between systolic blood pressure and the level of external anger expression in the study carried out by Spilberger et al. (17). Regarding the close correlation between novelty seeking with the anger (15), the results of two recent studies were not confirmed by the present research (P=0.71). Some researchers believe that the correlation of personality with the initial blood pressure is indefensible. Randall S. Jorgensen (18) indicated that the rational correlation between blood pressure and personality traits is due to some factors such as the status of blood pressure, gender, occupation, and evaluation of diastolic against cytosolic blood pressure. However, this study showed that high blood pressure is correlated with personality dimensions harm avoidance (P=0.04). The frequency of irritable temperament was measured by Eroy and colleagues (19) in individuals with high blood pressure. They showed that the individuals with this temperament are at high risk of cardiovascular diseases in response to stressful life events. As previously mentioned, stress mood and being nervousness are some characters of harm avoidance temperament, and the present study is in agreement with the research carried out by Eory and colleagues (P= 0.04). Janis Williams and colleagues (20) studied 12990 individuals at the risk of atherosclerosis for cardiovascular diseases. They showed that the temperament of individu-

als with normal blood pressure, who are irritated with the least stimulation, correlates with combined CHD (M1 acute, CHD fatal, M1 coronary revascularization). Regarding the evaluation of the correlation between temperament and high blood pressure in the present study, it is necessary to independently study the correlation between heart diseases and temperament in another research.

CONCLUSION

Evaluation temperament with the questionnaire can provide important information to predict the risk of hypertension in primary care. Considering the formation of temperaments during childhood, it is recommended that parents control and treat kinds of temperaments in childhood in order to prevent physical issues such as hypertension in the future. Regarding the temperament side effects on the health issue, new educational programs for medical students in this field are suggested.

ETHICAL CONSIDERATION

This study was registered at Research Committee of Islamic Azad University, Najafabad branch of Medical Sciences, Isfahan, Iran. A written informed consent was taken from patients for participating in this study. All the personal information remained anonymous.

CONFLICT OF INTRESETS

There are no conflicts of interest in terms of the present manuscript.

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