



Association between compliance and personality characteristics in adolescent boys with primary arterial hypertension

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Abstract

Introduction. Psychological factors influence the morbidity and mortality from cardiovascular diseases to the same extent as demographic and clinical factors, and the effectiveness of treatment is significantly associated with the patients' adherence. Male gender is associated with poor blood pressure control.

Aim. To identify the personality characteristics that determine compliance in adolescent boys with primary arterial hypertension.

Materials and methods. 30 boys between 13 and 17 years old (average age 14.6 ± 1.1 years) with primary arterial hypertension were examined. The compliance was evaluated using Girerd Questionnaire, type D (distress type) personality - using the DS-14 test, personality features - using the Cattell's 16 Personality Factors Test (16PF). Statistical processing of the study results was conducted using dispersion, correlation and factor analysis (main components method) with the help of "Statistica" software for Windows 8.0.

Results. In 3.7% of adolescents, high compliance was noted, in 37.0% - moderate level, and in 59.3% - low. The type D personality was found in 20.0% of the examined boys. Patients with type D personality had a significantly lower ($p < 0.05$) compliance (4.67 ± 0.63 versus 2.55 ± 0.36 points). There was found a significant direct correlation between the degree of compliance reduction and the scores on "social oppression" according to the DS-14 test ($r = 0.43$; $p < 0.01$) and inverse correlation - with the value of factor N (straightforwardness-diplomacy) of the 16PF ($r = -0.43$; $p < 0.05$). There were found 3 main factors that explain almost 50% of the relationships of personality characteristics of boys with primary arterial hypertension. Factor 1 (distressing ability) was related to the degree of compliance reduction (0.60), scales "negative excitability" (0.52) and "social oppression" (0.66) of the DS-14 test. This factor was also correlated with such personality features as anxiety (0.70), independence (0.65), radicalism (0.61), hardness (0.75). Factor 2 (anxiety) was most closely associated with negative excitability (0.56), intensesness (0.81), developed reasoning (0.74), low self-esteem (0.56), tenderness (0.53), suspicion (0.51) and unsociability (0.56). Factor 3 (emotional stability) demonstrated a high factor load with emotional stability (0.80), consciousness (0.69), high self-control (0.77), practicality (0.65), self-confidence (0.50).

Conclusion. In adolescent boys, the reduction of compliance was mainly associated with a distressing type of personality, ignoring the social contacts, radicalism, which must be taken into account when developing a program of medical and psychological support for such patients.

Keywords: hypertension, adolescents, compliance, personality features

1 Background

Arterial hypertension is one of the most common chronic diseases, also known as the primary risk factor for the development of cardiovascular events, including myocardial infarction and stroke [1]. It is proved that psychological factors influence the morbidity and mortality from cardiovascular diseases to the same extent as demographic and clinical [2].

In the United States, elevated blood pressure (hypertension or prehypertension) is found in 14% of schoolchildren. Moreover, in 12% of girls and 14% of boys within two years, prehypertension is transformed into hypertension [3]. In Ukraine, elevated blood pressure is detected in 25.1% of boys and 11% of girls, in adolescents with age hypertension becomes identified more often than prehypertension [4].

It is distinguished primary (essential) and secondary (symptomatic) hypertension. The development of primary hypertension is determined by numerous factors, including the psychosocial stress [5]. The problem of the influence of personality's individual-typological properties on the genesis of hypertension is considered from several positions. On the one hand, specific features of the person can contribute to the development of hypertension, on the other, under the influence of the disease, there are changes in the personality, and some of its features become exacerbated. Several studies studied the personality traits of patients with hypertension and neurasthenia using the Cattell's 16 Personality Factors Test [6].

The patients can differently react to and fulfill physician's recommendations. The treatment effectiveness depends significantly on the patients' compliance. It is known that male gender is associated with inappropriate control of blood pressure because of low compliance [7].

Chronic psychological risk factors for the development of cardiovascular disease have recently been attributed to personality type D (distressed) [8], which includes negative excitability (the tendency to experience negative distress emotions in different situations: anxiety, anger, bad mood) and social inhibition (suppression of emotions and behavioral reactions in social interactions).

The study aimed to identify the personality characteristics that affect compliance in adolescent boys with primary hypertension.

2 Materials and methods

The study was conducted at the Kyiv City Center of the Diagnostic and Correction of Autonomic Dysfunctions in Children (Pediatric Clinical Hospital No.6). A total of 30 boys aged 13-17 years old (mean age 14.6 ± 1.1 years) with hypertension were examined. Secondary nature of the disease was excluded with the help of laboratory and instrumental studies.

Compliance was evaluated using the questionnaire proposed by X. Girerd et al. (2001) [7]. In the presence of 3 or more positive responses, the affection was assessed as low, 1-2 positive replies - as moderate, in the absence of positive responses - as high. Type D personality was determined using the DS-14 test and the characterological features of adolescents - using the Cattell's 16 Personality Factors Test (16PF).

Statistical processing of the study results was conducted using dispersion, correlation and factor analysis (main component method) with the application «Statistica for Windows 8.0». For factor analysis, the following indicators were included in the primary matrix: the values of the "negative excitability" and "social depression" scales of the DS-14 test, scoring of compliance, 16PF factors score. First, a correlation matrix was obtained for the ball representation of the specified characteristics. Based on this matrix, the Cattell's scree test identified 3 factors for personal characteristics. The factor loadings (correlations) matrix of the studied indicators was constructed. Then the final matrix of factor loads was constructed by the method of the varimax output rotation.

3 Results and discussion

In 1 (3.7%) of the 27 adolescents diagnosed with primary hypertension assessed by Girerd Questionnaire was noted high compliance, in 10 (37.0%) - moderate, and in 16 (59.3%) - low.

Type D personality was detected in 6 (20.0%) out of 30 examined boys with primary hypertension. Patients with type D personality (Table 1) showed low compliance (4.67 ± 0.63 points), while other adolescents with arterial hypertension had a tendency to moderate compliance (2.55 ± 0.36 points), the difference was statistically significant ($p < 0.05$).

There was a significant direct correlation between the degree of compliance reduction and the value of the "social

inhibition” from the DS-14 scale ($r = 0.43$; $p < 0.01$); reverse correlation ($r = -0.43$; $p < 0.05$) was noted with the factor N (Forthright–Shrewd) score of the 16PF.

In the study of factor loadings (Table 2), it was found that factor 1 showed a high correlation with the degree of compliance reduction (0.60), negative excitability (0.52) and social inhibition (0.66) DS-14 test. Also, factor 1 correlated with such personality traits (according to the 16PF) as serious (0.70), dominant (0.65), radicalism (0.61), tough-minded (0.75). Factor 2 had the closest correlations with the “negative excitability” scale (0.56) and personality traits, such as stress (0.81), abstract thinking (0.74), low self-esteem (0.56), shy (0.53), suspicion (0.51) and outgoing (0.56). Factor 3 demonstrated a high factor load with emotional stability (0.80), consciousness (0.69), high self-control (0.77), practicality (0.65), placid (0.50).

The dispersion fraction from the total dispersion was highest in factor 1 (19.25%), and for factors 2 and 3 it was 17.97% and 12.70%, respectively. These three factors generally explain almost 50% of the personality characteristics relationships in adolescent boys with primary hypertension (Table 3). It is noteworthy that factors 1 and 2 are combined with high negative excitability.

Consequently, in the majority of adolescent boys with hypertension, low compliance was found, and in the rest, it was moderately lowered. High compliance was registered only in 3.7% of the sample. The degree of compliance was significantly determined by the personality characteristics of adolescents. Notably, a significant reduction of compliance was influenced by such a personality characteristic of type D, as social inhibition. From a clinical point of view, patients

with the type D personality are often anxious, have negative cognitions about life, feel stressed and unhappy. They are more easily irritated and rarely are in a state of positive mood. At the same time, they are less inclined to share negative emotions with other people due to the fear of rejection and disapproval.

Patients with type D also have fewer personal connections with other people and feel discomfort when communicating with unfamiliar persons [9]. It can be speculated that the ignorance of social contacts contributes to low motivation for following the physician’s recommendations (low level of compliance).

According to the factor analysis, we noted a particularly significant reduction in compliance in patients with excessive radical thinking. It was combined with the independence and hardness of character and distress (anxiety, social exclusion). All these changes point to the distressing nature of factor 1, and low compliance may worsen the results of the therapy in these patients.

We have also noted distress manifestations in patients with high values of factor 2 (close correlation with negative excitability, tension, lower self-esteem, tenderness and closeness with advanced reasoning). Such neurotic features may be the result of high personal anxiety in these patients, which requires further study. Factor 3 reflects the emotional stability of adolescents.

In the study of factor weights, it was found that in half of the teenagers with distress (high values of factor 1) there was an extremely low compliance (6 points). In adolescents with anxiety (high scores on factor 2) - the compliance was either moderately (1-2 points) or highly reduced (4-5 points). Teenagers with emotional stability (high scores on factor 3) showed moderate (1 point) or extremely reduced compliance (6 points). Therefore, it can be assumed that the predisposition to a distressed type D personality and/or low compliance is associated with higher scores on factors 1, 2, and 3. These data emphasize the need for appropriate psychological interventions targeted on a stress reduction and adherence promotion, which can help to increase the effectiveness of hypertension treatment in adolescent boys.

Table 1: Score for compliance with the Girerd Questionnaire for adolescents with a distressed type of personality ($X \pm SD$).

Option	Type of personality	
	Distressed (n=6)	Not distressed (n=21)
Compliance, score	4.67±0.63*	2.55±0.36

Note - The sign (*) indicates the significant difference ($p < 0.05$).

4 Additional information

4.1 Competing interests

The author declares that no competing interests exist.

Table 2: Factor loads of personality characteristics in adolescent boys, which can influence the development of arterial hypertension.

Indexes	Factor No.1	Factor No.2	Factor No.3
Negative excitability	0.52	0.56	-0.36
Social inhibition	0.66	-0.37	0.16
Compliance	0.60	0.07	0.28
MD (Level of self-confidence)	-0.11	-0.56	0.37
A (Reserved- Outgoing)	0.03	-0.56	0.13
B (Concrete thinking -Abstract thinking)	-0.09	0.74	0.16
C (Affected by feelings- Emotionally stable)	0.08	0.08	0.80
E (Submissive-Dominant)	0.65	0.46	0.03
F (Serious - Happy-go-lucky)	-0.70	0.09	-0.08
G (Expedient- Conscientious)	-0.08	0.15	0.69
H (Shy- Bold)	0.44	-0.53	-0.08
I (Tough-minded- sensitive)	-0.75	0.00	0.09
L (Trusting-Suspicious)	0.29	0.51	0.38
M (Practitical-Imaginative)	-0.34	0.10	-0.65
N (Forthright-Shrewd)	0.02	0.15	-0.15
O (Placid - Apprehensive)	0.26	0.40	-0.50
Q1 (Conservative- Radicalism)	0.61	0.01	0.33
Q2 (Group-tied- Self-sufficiency)	-0.01	-0.20	0.41
Q3 (Casual-Controlled)	0.10	-0.07	0.77
Q4 (Relaxed - Tense)	-0.05	0.81	0.00
Dispersion	3.40	3.32	3.26
Fraction	0.17	0.17	0.16

Table 3: The contribution of studied factors to the total dispersion.

Factor	Dispersion	% from total dispersion	Cumulative dispersion	Relative cumulative contribution
1	3.85	19.25	3.85	19.25
2	3.59	17.97	7.44	37.22
3	2.54	12.70	9.98	49.92

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