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Relationship between Cardiovascular Diseases and Psychic Distress in Schoolchildren

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Abstract

The article presents the results of psychic distress analysis in schoolchildren, diagnosed with arterial hypertension (AH) and ischemic heart disease (IHD). In accordance with the obtained results, the directions were outlined of a complex of measures for psychological correction of the schoolchildren, suffering from these cardiovascular diseases, that will make it possible to increase the effectiveness of prevention and therapy.

Keywords: cardiovascular diseases, arterial hypertension, ischemic heart disease, psychic distress.

INTRODUCTION

Cardiovascular diseases occupy the leading place in the structure of overall morbidity and disability of the population. In this connection, the need for a comprehensive, multifactorial approach to the study of chronic diseases of the organs of the cardiovascular system of the body has become recently especially important. The increased level of the demands of the modern life, the daily state of a modern person, who is under constant pressure from the society, cause a significant increase in the number of chronic diseases, the aetiology of which is closely connected with the peculiarities of the psychic and psychological sphere of an individual.

The relationship of AH and IHD with various cases of psychoemotional overpressure and personal peculiarities of patients was demonstrated in a number of works of domestic scientists, which became classical: G. F. Lang (1950); P. K. Anokhin (1965); A. L. Myasnikov (1965), E. I. Chazov (1975). According to many modern foreign and domestic researchers [1, 2, 3]. AH and IHD are not just body disorders, but the factor that changes the whole future of a person, the person itself and breaks the stereotypes of existence that were created by the person throughout his/her life, and under such circumstances psychic changes are observed in most patients with AH and IHD.

IHD and AH — are psychosomatic diseases, and the essential role in their development belongs to psycho-traumatic factors. These diseases are still insufficiently studied in terms of individual-typological characteristics of persons most prone to cardiovascular diseases formation, as well as in terms of psychological mechanisms definition, the knowledge of which can provide access to specific methods of psychological intervention for patients' rehabilitation, in particular, can help to reveal the motivational attitudes of the personality of these patients, peculiarities of their psychological disadaptation in the "personality-disease" system.

The modern conditions of the world, under which children live – information overloading, stressful situations, educational process modernisation require great efforts from a child's body. This, together with other factors (restriction of physical activity, use of computer technologies, inadequate natural and artificial lighting, constrained working posture together with wrongly fitted furniture and lack of sensible nutrition) leads first of all to functional disorders and later to organic pathology formation.

Cardiovascular diseases among all other pathologies confidently keep the leadership regarding the level of morbidity, disability and mortality in the population both in Russia and all over the world. The human body constantly changes throughout life. Such changes are called individual development, which is understood as a number of consistent and irreversible changes directed to body formation from the moment of zygote appearance that is, from the moment of ovum fertilisation to the death of the individual. During this process of development anthropometric and physiological changes occur in the body.

Adaptation to the factors that accompany the process of learning, such as hypodynamia, mental and emotional tension, stress, etc., cannot help attracting the attention of physiologists and teachers. In fact, the state of children's health, as well as success in learning activities ultimately depend on the level and effectiveness of adaptation of all the systems of the child's body. Children's educational activity can be attributed to mental work, which is characterised by impairment of visual analyzer functioning and the supreme degree of intensive attention. Stress, low motor activity and constrained monotonous posture during mental work cause weakening of metabolic processes, the phenomenon of stagnation in the muscles of legs, abdominal organs. With regard to the cardio-respiratory system, in particular, the limited motor activity leads to a decreased pulmonary ventilation, vital capacity. Hence, the change in oxygen consumption, insufficient oxygen supply to the vital organs – the brain, heart is easily observed. And as a result, a decrease in the functional and adaptive capabilities of the body occurs [4, 5].

In Russia the prevalence rate of cardiovascular diseases both in children and adolescents has increased by more than twice over the last 10 years [6]. The most common ones include arterial hypertension (AH) and ischemic heart disease (IHD). The morphological cause of IHD in most cases is coronary atherosclerosis, that begins in childhood and which initial stages are asymptomatic as a rule [4, 7].

Given the above, the objective of this work was to study psychic distress in schoolchildren with AH and IHD to determine the targets for psychotherapeutic work.

Study hypothesis: patients with AH and IHD have both general individual psychological characteristics, that indicate psychic distress and contribute to cardiovascular diseases development, and specific ones, which become a psychological component of a pathogenesis of a certain disease.

STUDY METHODS

To achieve this objective and to confirm the hypothesis, 163 adolescents aged 12-16 years were allocated to three groups and observed; both the children and their parents provided their informed consent for participation in the study.

The 1st main group included 68 adolescents with AH. The 2nd main group included 65 adolescents with IHD. The control group included 30 healthy adolescents.

According to gender characteristic males dominated in the main study groups: 67.7 % and 62.9 %, respectively; the percentage of females was 32.3 % and 37.1 %, respectively. The control group included 66.9 % of males and 33.1 % of females.

The study was conducted on the base of the following institutions: the vascular department of the Republican clinical hospital of the city of Makhachkala, the medical centre "Center-

M" (Makhachkala), cardiology center of the out-patient hospital "Nadezhda" (Makhachkala).

The examination was conducted according to the principle of random sampling when all the items of the population had an equal opportunity to be included in the sample. The study population was uniform according to all the basic parameters, which made it possible to consider the study results as the ones that representatively reflected the population.

The procedure of psychic distress investigation included the use of the following psychodiagnostic methods:

a) K. Leonhard - G. Shmishek questionnaire of dominant character traits [8];
b) Individual typological questionnaire (ITQ) [9];
c) K. Thomas test for behaviour description in conflict situations[8];
d) Toronto Alexithymia Scale (TAS) by G. J. Taylor (1985) [10];
e) "Risk of coronary-prone behaviour" test by D. Jenkins [10].

Analysis, processing and calculation of percentage characteristics and correlation coefficients were performed using the program SPSS 10.0.5 for Windows.

STUDY RESULTS AND THEIR DISCUSSION

To determine temperamental peculiarities of the study subjects the questionnaire of K. Leonhard - G. Shmishek was used, which was designed to diagnose the type of accentuated personality traits. The questionnaire contained ten scales according to the types of accentuated personality traits, developed by K. Leonhard, and included 88 questions. The authors established the following types of accentuated personality traits:

- hyperthymic (such individuals are characterized by high mobility, talkativeness, excessive independence, inflated self-esteem, increased irritability, inadequate approach to responsibilities);
- stuck (characterized by tendency towards moralization, supposed injustice in themselves, that leads to distrust and wariness towards others, sensitivity to hurts and grief, suspicion, tendency to affective response);
- emotive (characterized by emotionality, sensitivity, anxiety, vulnerability, tearfulness, desire to avoid conflicts, inner sufferings);
- pedantic (the following characteristics prevail: rigidity, torpidity, perseverance, long-term suffering of traumatic events, punctuality, accuracy, attention to details, commitment to cleanliness and order, strict adherence to a plan, avoiding leadership positions);
- anxious (minor mood, shyness, lack of self-confidence, exposure to alien influence, susceptivity, sensitivity);
- cyclothymic (characterized by frequent changes of mood, dependence on external events);
- demonstrative (demonstrative behaviour, mobility, inflated self-esteem in terms of ambitions);
- excitable (inadequate control, impulsiveness, rudeness, anger, tendency to conflicts, provoked on their initiative, weakened control over appetency and motivation, indifference to the future);
- distimic (the following characteristics dominate: seriousness, despondency, pessimism, low level of sociability and self-esteem, tendency to fixate on negative experiences);
- affect – exalted (high contact capabilities, talkativeness, amorousness, panicking, exposure to momentary moods, impetuosity, emotional lability).

In the adolescents of the 1st main group (patients with AH) the following types of accentuations dominated: emotive (70.59±4.6 %), anxious (51.47±5.0 %), demonstrative (38.24±4.9 %), stuck (58.46±4.9%) and hyperthymic (30.88±4.6%).

In the adolescents of the 2nd main group (patients with IHD) the distribution of accentuations was a little bit different. For this group anxious (73.85±4.4 %), emotive (64.62±4.8%), stuck (58.46±4.9%) and distimic (55.38±4.9%) types of accentuations were typical. In most adolescents of the control group (80.00±4.0%) no types of accentuations were revealed at all.

Thus, according to the obtained data, 71% of patients with AH and 65% of patients with IHD have the emotive type of accentuation. They are characterized by emotionality, sensitivity, anxiety, talkativeness, fearfulness, deep reactions in the area of fine feelings. These people are vulnerable, easily moved to tears; they seldom enter into conflicts, keep insults inside, and do not demonstrate them. They are characterized by a keen sense of duty and diligence.

For the adolescents (AH — 51% and IHD — 74%) with anxious accentuation the following characteristics are typical: lack of self-confidence, heightened sense of duty, responsibility, high moral and ethical requirements. They attempt to mask their feelings of inadequacy by self-affirmation through the activities where they can reveal their abilities best of all. Fear and anxiety are typical for anxious persons. In anxious people, fear is sometimes joined by jitteriness, which is purely reflective in nature, with sudden fear development, which is rather often accompanied by a somatic reaction.

Ostentation and hyperthymicity turned out to be the specific characteristic of the patients with AH. They are characterized by demonstrative behavior, ability to force out, significant mobility, sociability, expressiveness of gestures, facial expressions, excessive independence, inflated self-esteem.

In the patients with IHD the distimic type of accentuation was observed. It appeared in despondency, slowness, weak willpower, pessimism, low level of sociability and self-esteem, tendency to fixate on negative experiences, for this reason there appeared distrust and apprehensive attitude to others, sensitivity to hurts and sorrow, suspicion, a tendency to affective response.

Thus, in the patients with AH extroversion and sociability were combined with emotive signs: emotionality, sensitivity, anxiety, vulnerability, desire to avoid conflicts, inner suffering on the background of demonstrativeness and hyperthymity. Fear of death was observed.

Table 1 – Conflict-handling models distribution among the study subjects

Conflict-handling model	Groups of adolescents					
	First main group		Second main group		Control group	
	Absolute number	%±m	Absolute number	%±m	Absolute number	%±m
Collaboration	0	0	0	0	16	53.3±5.0
Competition	42	61.8±4.9	25	38.5±4.9	4	13.3±3.4
Compromise	1	1.4±1.2	0	0	6	20.0±4.0
Avoiding	22	32.4±4.7	40	61.5±4.9	2	6.7±2.5
Accommodation	3	4.4±2.1	0	0	2	6.7±3.5
Total	68	100	65	100	30	100

Table 2 – Level of alexithymia in the study population

Level	Groups of adolescents					
	--		Second main group		Control group	
	Absolute number	%±m	Absolute number	%±m	Absolute number	%±m
High (above 74 points)	62	91.3±2.8	59	90.7±2.9	7	23.3±4.2
Average (30-72 points)	5	7.4±2.6	4	6.2±2.4	12	40.0±4.9
Low (up to 30 points)	1	1.5±1.2	2	3.1±1.7	11	36.7±4.8
Total	68	100	65	100	30	100

Table 3 – Characteristic of the coronary-prone behavior in the study population

Behavior type	Groups of adolescents					
	First main group		Second main group		Control group	
	Absolute number	%±m	Absolute number	%±m	Absolute number	%±m
Type A (18 - 30 points)	60	88.3±3.2	58	89.2±3.1	2	6.7±2.5
Intermediate type (29-42 points)	6	8.8±2.8	5	7.7±2.7	22	73.3±4.4
Type B (43-56 points)	2	2.9±1.7	2	3.1±1.7	6	20.0±4.0
Total	68	100	65	100	30	100

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In turn, in the IHD patients introversion and a high level of personal anxiety combined with the signs of emotional instability: increased emotionality, sensitivity, susceptibility, vulnerability, hesitation, uncertainty in their abilities, excessive concern about their health and future on the background of being stuck and presence of dysthymia.

Negative psychological peculiarities of the personality of adolescents with AH and IHD were determined using an individual typological questionnaire (ITQ), according to which the typology of individuality is based on eight trends: four main ones and four intermediate: leadership, nonconformity, proneness to conflict, individualism, dependence, conformity, compromise, communication. The result of the combination of these trends is realized in the form of eight variants of social behavior: extraversion, spontaneity, aggressiveness, rigidity, introversion, sensitivity, anxiety, lability.

Adolescents of the first main group (patients with AH), were characterized by the presence of anxiety, sensitivity, conformity, communication, lability, extraversion, combined with poor health and mood, lack of spontaneity. This indicated the presence of mental stress, low energy potential, weakness of the "personal core", confusion. Upon that the level of social activity (desire to communicate) was inadequate in terms of the existing psycho-physiological state since the communicative activity in case of poor health and suffering had an even more debilitating effect. So, in this case, physical and social activities of a person were frustrated, which contributed to increased mental stress and emergence and deepening of the psychopathological state.

It is important to note that the examined patients with AH were characterized by the presence of inadequate perception of reality, as evidenced by the increased rates on the scale of "correction" (in other words, they had a tendency to see the world and themselves the way they wanted to). That was why their expectations were, as a rule, frustrated by reality and became an additional source of psychic tension and neurotic experiences. In addition, these patients revealed a higher level of sensitivity and lability (in comparison with the patients with ischemic heart disease) with high self-exactingness. That is, in patients with arterial hypertension the internal conflict of the personality is based on the presence of incompatible trends: high motivation to act and lack of psychological capacities and psychic force to implement them. Patients' concentration on their problems, their introversion are also notable, as evidenced by the moderate level of individualism, introversion, rigidity, conformity.

Adolescents of the second main group (patients with IHD), were characterized by the combination of anxiety, sensitivity, lability, introversion, conformity and rigid fixation on traumatic memories. Thus, the adolescents of this type of personality, being fixed on their own negative experiences, had communication problems that contributed to the psychological ones.

Among personal characteristics of the second group adolescents deep patients' concentration on themselves, their own problems are notable as evidenced by the excessive level of individualism and rigidity. They are characterised by a tendency to compensatory exalted self-affirmation in communication, going beyond the disease-related problems, as evidenced by the high rates of anxiety and sensitivity in combination with a moderate level of lability, extroversion and compromise. The basis for psychological problems in this group of adolescents was a certain personal instability, emotional and volitional weakness, inability to constructive cognitive processing of life experience, inadequate assessment of themselves, other people and the existing situation.

Thus, the comparative analysis of individual-typological qualities of a person by the method of ITQ in patients of different groups was characterized by the dominance of the following personal tendencies: high level of anxiety, sensitivity, lability, conformity and low level of spontaneity with a significant tendency to rigidity.

The ways of conflict management and types of behavior were studied using K. Thomas' method. This method is based on a two-dimensional model of conflict management, the fundamental dimensions of which are the following: on the one hand, attention of a person to the interests of other people (cooperation), and on the other hand, protection of one's own interests (persistence), thus on this basis five main conflict-handling models were established: a) competition as a desire to satisfy one's own concerns at other persons' expense (competition); b) sacrificing one's own interests for the sake of another (accommodation); c) compromise; d) avoiding, which is characterized by both lack of desire for cooperation and lack of tendency to achieve own goal; e) collaboration — finding an alternative that meets the interests of both parties. The author of the method thinks that only the strategy of collaboration is the optimal one, and the use of other models can lead to neurotization of an individual and to development of non-psychotic psychic disorders of a diverse spectrum.

The results of the analysis of the conflict-handling models and types of behavior, preferred by the subjects of all the groups are presented in Table. 1.

Analysis of the main group's patients' behavior in conflict situations demonstrated that for the patients, in whom the combination of a cardiovascular disease and psychic distress was observed the conflict-handling models of competition (61.8% and 38.5%, correspondingly) and avoiding (32.4% and 61.5%, correspondingly) were typical. And the majority of adolescents with IHD were characterized by the avoiding model. On the contrary, for the adolescents with IHD, the competitive style was

typical, that made them pay increased, in most cases excessive amounts of attention to their own interests. It was interesting that the behavioral model of collaboration was absent in all the examined patients with cardiovascular diseases.

The level of alexithymia was also studied as the leading parameter of the tendency towards somatization of neuropsychic tension. It should be noted that at present there are several etiological concepts of alexithymia. The hypothesis of deficiency provides a kind of a stop at the earlier stages of personality development, which provides the opportunity for "developing" psychotherapy conduction. The hypothesis of regression due to injury considers that return to the previously passed stages of development as a kind of simplification of the structure of personal response is possible. At present, most scientists consider alexithymia to be a non-specific state, which differs from both normal and purely neurotic one. [8].

In most patients of the main groups, a high level of alexithymia was revealed (Table 2). Thus, it can be concluded that the examined patients were unable to verbalize their emotions. They were adapted to their social environment, simulating to other people and to themselves the state of satisfaction and lack of significant problems for a long time.

To identify a specific tendency to a psychosomatic disease we determined the types of a coronary-prone behavior on the basis of the concept of J. Friedman, D. Jenkins and G. Rosenman [8]. According to this concept, there are three types of behavior: type A, intermediate type and type B. The presence of type A indicates that a person is exposed to stress, has an excessively tense rhythm of life, imposes too high demands on himself/herself and does not allow himself/herself to relax; such person takes risks not to estimate his/her own capabilities, that is, has the habit of living on the limit of capabilities, that is fraught with danger of collapse and rapid deterioration of health. Type B is characterized by "softness", balance, ability to lose focus on unpleasant thoughts, get along with people and relax. The intermediate type of behavior combines the traits of types A and B.

Distribution of the examined patients according to the results of coronary-prone behavior determination is presented in Table 3.

Most patients of the main groups scored 18 - 30 points, so their behavior could be ranked as type A. Thus, the adolescents with cardiovascular diseases were exposed to stress, had an excessively tense rhythm of life, imposed too high demands on themselves and did not allow themselves to relax, they took risks and did not properly assess their own capabilities, they were emotionally tense.

The analysis of psychic distress in adolescents with circulatory diseases allowed to differentiate them and to identify the ones typical for the patients with AH and IHD (the difference is statistically significant — $p < 0.01$).

Thus, the following negative characteristics are typical for the patients with AH:

- a combination of emotive, anxious, demonstrative, stuck, hyperthymic types of accentuation with a high degree of intensity;
- prevalence of sociability, lability, extroversion, anxiety, sensitivity, and conformity with poor health and mood, lack of spontaneity (which indicates the presence of mental stress); low energy potential, weakness of the "personal core", confusion;
- competitive conflict-handling model;
- high level of alexithymia;
- type A coronary-prone behavior.
- The following negative characteristics are typical for the patients with IHD:
- a combination of anxious, emotive, stuck, distimic types of accentuation with a high degree of intensity;
- a combination of anxiety, sensitivity, lability, introversion, conformity, and rigid fixation on traumatic memories.
- avoiding conflict-handling model;
- high level of alexithymia;
- type A coronary-prone behavior.

CONCLUSION

The results of the conducted study demonstrate that the patients with AH and IHD have both general individual psychological characteristics, indicating psychic distress, which contributes to cardiovascular diseases development, and the specific ones, which become a psychological component of a particular disease pathogenesis.

In our opinion, the obtained data should become the basis for the development of a system of psychological correction for the patients with AH and IHD, which will be done in the course of the further work.

In conclusion, it should be noted that one of the priorities of educational institutions is preservation and promotion of health of the younger generation. Therefore, a special attention should be paid to such issues as the development and implementation of preventive and correctional health-improving programs. In particular, parents and teachers, who usually do not have a medical education, should pay great attention to the cardiovascular system functional parameters monitoring in children in order to prevent the development of AH and IHD, as these are the most common diseases among children and adults. A solution of these issues will allow to improve the functional state of the body of educational process participants, to strengthen their physical and psychic health.

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