

**Research Article**

**The Metabolic and Psychological Correction of Psychosomatic  
 Pathology for Children and Adolescents**

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[Received: 22/11/2018; Accepted: 11/02/2019; Published: 13/02/2019]

**ABSTRACT:**

The article presents data on the clinical features of the course of psychosomatic pathology of children and adolescents. An aim of research is to define efficiency of metabolic and psychological correction at treatment of psychosomatic pathology for child's and adolescents. 194 children aged from 7 to 17 years (mean age  $13.8 \pm 0.5$  years) with asthmatic (NOS) and duodenal ulcer disease (PUD) was examined. The diagnoses are verified according to ICD – 10. Psychological testing was carried out according to the methods of Raymond Bernard Cattel. To clarify the nature and extent of vascular changes, the state of cerebral hemodynamics was studied using the method of Rheoencephalography (REG) according to the standard technique.

To determine the state of neuronal activity, we determined the spectral - coherent characteristics of electroencephalogram (EEG) with mapping of brain zones. All patients were recorded background EEG from the anterior and posterior frontal, central, parietal, occipital and temporal regions of the brain according to the generally accepted international system.

The analysis of psychological examination data allowed us to establish high levels of personal and reactive anxiety (Spielberger-Khanin test), low self-esteem and high anxiety and emotional liability indicators (R.Kattel test), low work capacity and high deviations from the autogenously norm ("Good" projective tests) and evil "and" My future "with the choice of color).

The use of a neurophysiological study of the functional state of the brain (spectral-topographic analysis of EEG and REG) revealed a reduced level of activity of the processes in the subcortical structures - over excitation, functional blockade of thalamic – cortical connections and impaired perfusion of the brain

Psychological aspects and signs of asthenia at asthmatic (NOS) and duodenal ulcer disease are revealed. The necessity of metabolic correction therapy and psychological correction of asthenia in psychosomatic pathology in child's and adolescents has been scientifically substantiated. The effectiveness of the complex use of metabolic agents and psychological methods for the correction of asthenia in psychosomatic pathology has been determined.

**Keywords:** psychosomatic pathology, asthmatic (NOS), metabolic correction therapy, adolescents.

**[I] NTRODUCTION**

The life of modern man is characterized by cultural, economic and social transformations that

require extraordinary mobilization of cognitive, emotional and personal resources [20], the

constant readiness to solve problems that are accompanied by chronic stress and internal psychological conflict. Such a reality causes considerable growth the role of neuropsychological factors in the development of somatic diseases with the further development of psychosomatic pathology (PSP) [1, 2, 6, 11, 14, 15, 21].

Despite significant advances in the treatment of PSP, its effectiveness is not always sufficient, since not all patients are provided with stable remission. This necessitates the search for new, more effective approaches, both to the treatment of PSP, and the prevention its recurrence and progression [4, 10, 16, 19, 21].

PSP, in a broad sense, concerns conversion symptoms, functional syndromes (organic neuroses), bad habits that affect somatic health. And in a narrower sense, the term "psychosomatic pathology" (psychosomatosis) includes a group of diseases based on the primary bodily reaction to conflict experience associated with morphologically determined changes and pathological disorders in organs. These include: asthmatic (NOS), ulcerative colitis, essential (primary) hypertension, peptic ulcer disease (PUD), diabetes mellitus [7, 8, 12, 13, 21].

It is known that in childhood, with unfavorable passage of one of the phases of the development of object relations and the aggravation of central conflict, certain features of personal characteristics are formed - distrust excessive shyness, self-doubt, and feeling of aggression, guilt or even inferiority. This leads to a violation of interpersonal relations, the development of socially-maladaptive behaviors, asthenia, the formation of dominant intellectual patterns, and subsequently PSP [1, 2, 9, 17, 18].

Note that the peculiar stereotype of children's mental and emotional response is a persistent stereotype, which can be identified with the help of a drawing. Currently, there is no doubt that the objectification of the inner world of a person is realized through verbalization and is reflected in the external results of the activity. In this regard,

the drawing process gives the child the opportunity to eliminate tension and allows realizing his / her true feelings [4, 5, 9].

Fundamental patterns between different-quality energies of color and symbol and certain mental processes that underlie the projective drawing method help to identify mental and physical disorders in a child. The test reflects the conscious and unconscious aspects of the mental structure of a child's personality (level of personal reactivity, self-esteem, zones of frustration, dominant intellectual patterns, motivations) and the ability to identify signs of asthenia (asthenia - powerlessness), which significantly reduces the quality of life of a child, leads to persistent and severe maladjustment, reduces the effectiveness of therapy.

The most significant in the pathogenesis of asthenia are cerebral hypo perfusion, neurotransmitter disorders, autonomic dysfunction caused by an increase in the level of lactate and ammonia. As a result of these violations, there is an increase in glycolysis, a blockade of the first stage of neoglucogenesis, with a decrease in the supply of pyruvate to the Krebs cycle; inhibition of neurotransmitter synthesis, delayed synaptic response with the formation of clinical manifestations of asthenia, in the form of symptoms of autonomic dysfunction, sleep disturbances, irritability, and sometimes anxiety, and even depression.

For symptoms of asthenia when PSP require specific therapeutic approaches with the inclusion of psychotherapy and metabolic drugs – the so-called aktoprotectors [3]. This group of drugs includes a variety of complexes including the amino acid L – citrulline, malate (drug STIMOL) and affect the synthesis of lactate and urea.

The effect of amino acids is fast and stable normalization of metabolism, does not cause mental and physical dependence and withdrawal effect, is well tolerated, practically does not cause adverse reactions and, therefore, is safe when used in children and teenagers. An important advantage of citrulline malate is the possibility of

its use in various psychosomatic pathologies, including diabetes.

## [II] MATERIALS AND METHODS

### 2.1. Research designs and methodologies

194 children aged from 7 to 17 years (mean age  $13.8 \pm 0.5$  years) with asthmatic (NOS) and duodenal ulcer disease (PUD) was examined. The diagnoses are verified according to ICD – 10. Psychological testing was carried out according to the methods of Raymond Bernard Cattell (identifying personality traits - Factor A - "isolation - openness"; factor B - "intellect"; factor C - "emotional lability - emotional stability"; factor E - "subordination - dominance"; factor F - "restraint - expressiveness"; factor G - "dependence on feelings - high normativity of behavior"; factor H - "indecision - courage"; factor L - "credulity - suspicion"; factor M - "practicality - developed imagination"; factor N - "straightness - diplomacy"; factor O - "self-confidence - anxiety"; factor Q1 - "conservatism - radicalism"; factor Q2 - "conformism - non-conformism"; factor Q3 - "low self-control - high self-control"; Q4 factor - "relaxation - tension"; factor D - "the adequacy of self-esteem"), the projective drawing "My future", "Good and evil" with the choice of color. Reactive anxiety and personal anxiety (RA and PA) was assessed using a self-assessment scale according to the method of C. D. Spielberger - Yu. L. Khanin (up to 31 points - the level of anxiety is low, 31 - 45 points - moderate, more than 45 - high).

To clarify the nature and extent of vascular changes, the state of cerebral hemodynamics was studied using the method of Rheoencephalography (REG) according to the standard technique.

To determine the state of neuronal activity, we determined the spectral - coherent characteristics of electroencephalogram (EEG) with mapping of brain zones. All patients were recorded background EEG from the anterior and posterior frontal, central, parietal, occipital and temporal regions of the brain according to the generally accepted international system. The brain bio

potentials reactions were investigated during functional tests: opening - closing of eyes, hyperventilation for 3 min. and discrete light stimulation. The power spectra were analyzed in the frequency range from 1 to 30 Hz with a survey frequency of 100 Hz, for 60– second intervals artifact-free potentials EEG (10 epochs of analysis for 6 seconds each).

An approximate reaction (AR) on EEG was determined - the ratio of latent periods of synchronization reactions (replacement of fast and irregular oscillations of bio potentials by a slower and time-ordered wave activity of greater amplitude) and resynchronization when applying the sample with closing - opening eyes.

The examined patients were divided into 4 representative groups, depending on the treatment option used: control group (C) - 50 patients receiving basic therapy of the underlying disease according to protocols approved by the Ministry of Health of Ukraine, as well as 3 treatment groups: Tr1 - 43 children who underwent psychological correction against the background of basic therapy, the second treatment group (Tr2) - 50 patients who received a metabolic agent against the background of basic therapy (actoprotectors STIMOL®) and group Tr3 - 51 patients, to baseline therapy. Whose psycho-correction means and STIMOL® are included. The drug was administered 1-2 sachets 2-3 times a day for 14 days. Individual psychological correction was carried out using the proposed author's technique. Before starting a psychotherapy session, the child was asked to present his future - harmonious, joyful, without diseases, and then draw (that is, display as a symbol) the concepts: "My future", "Good and evil" and choose a color association for each displayed object. In the medical complex, such a session was conducted three times (1, 7 and 14 days). The results of the effectiveness of treatment were assessed according to the dynamics of psychological indicators (Spielberger - Khanin, R. Cattell tests, clinical and anamnestic,

neurophysiological (EEG with brain zone mapping)) data.

To assess the clinical efficacy of therapy, the method of Makeev S.M. was used with the definition of the integral index of pathology (IIP) and the coefficient of comparative efficacy of therapy.

Statistical processing of the results was carried out by the method of variation statistics using the Math CAD software package with the calculation of the arithmetic mean (M), standard deviation ( $\sigma$ ) and mean errors (m). To assess the differences in the indices in the compared groups, Student's t-test was used. Differences were considered significant at  $p < 0.05$ .

## 2.2. The polymorphism of complaints and clinical syndromes

The clinical picture in the examined patients was characterized by the polymorphism of complaints and clinical syndromes. The main syndromes in children with PSP were abdominal pain (91.7%), dyspeptic (58.4%), chronic intoxication syndrome (38.7%) and asthenic-neurotic (95.9%). Asthenic-neurotic syndrome was manifested by irritability, capriciousness, increased fatigue, sleep disorders and tearfulness.

The analysis of psychological examination data allowed us to establish high levels of personal and reactive anxiety (Spielberger-Khanin test), low

self-esteem and high anxiety and emotional lability indicators (R.Kattel test), low work capacity and high deviations from the autogenously norm ("Good" projective tests) and evil "and" My future "with the choice of color).

The use of a neurophysiological study of the functional state of the brain (spectral-topographic analysis of EEG and REG) revealed a reduced level of activity of the processes in the subcortical structures - over excitation, functional blockade of thalamic - cortical connections and impaired perfusion of the brain (Tab. 1). After the end of inpatient treatment (2 weeks with asthmatic (NOS) and 3 weeks with duodenal ulcer disease), the following psychological test results were found.

## [III] RESULTS

### 3.1. Dynamics of reactive and personal anxiety

In the dynamics of treatment, there was a significant decrease in reactive and personal anxiety (RA and PA) from a high level to the average in children 1, 2 and 3 treatment groups who received improved therapy, in contrast to the control group, where the initial level of both types of anxiety was maintained.

The most effective was the complex use of psychotherapeutic methods and the correction of metabolic disorders by the actoprotectors.

|           | Mean value of the index |               |            |            |            | Reliability |
|-----------|-------------------------|---------------|------------|------------|------------|-------------|
|           | Before therapy          | After therapy |            |            |            |             |
|           |                         | C (n=50)      | Tr1 (n=43) | Tr2 (n=50) | Tr3 (n=51) |             |
| <b>RA</b> | 54,32±1,5               | 45,25±1,5     | 34,42±1,5  | 38,12±1,5* | 31,14±0,5* | p < 0,05    |
| <b>PA</b> | 50,01±1,2               | 49,34±1,2     | 38,93±1,2  | 39,14±1,2* | 33,12±0,5* | p < 0,05    |

**Table: 1.** Dynamics of reactive and personal anxiety according to the Spielberger-Khanin test before and after therapy of children with PSP (n = 194)

In the study of the emotional-volitional sphere in children from Tr2 and Tr3 - groups (Tab. 2), a decrease in the aggravation of such features as emotional instability, anxiety, self-doubt, fearfulness can be traced.

### 3.2. Indicators of individual - psychological characteristics of children with SRP

According to the results of psychological testing, a significant decrease in personal anxiety after treatment was proved. Reactive anxiety also decreased slightly, indicating that the past psychological trauma not been actualized and the signs of the "current neurosis" disappeared while the person was "here and now". A quantitative analysis of color associative responses showed (Table 3) that, after treatment, the efficiency in patients of the Tr1, Tr2 and Tr3 groups significantly increased and was  $51.3 \pm 2.3$ ;  $52.4 \pm 2.1$  and  $53.5 \pm$

4.3 respectively, in contrast to  $35.7 \pm 4.1$  before treatment ( $p < 0.05$ ), while in the control group did not change significantly ( $45.8 \pm 3.3$ ).

| Index | Before therapy | After therapy |            |            |            | P      |
|-------|----------------|---------------|------------|------------|------------|--------|
|       |                | C (n=50)      | Tr1 (n=43) | Tr2 (n=50) | Tr3 (n=51) |        |
| MD    | 5,9±0,2        | 5,9±0,2       | 5,9±0,2    | 6,4±0,2    | 6,6±0,2    | >0,01  |
| A     | 5,4±0,2        | 5,4±0,2       | 5,4±0,2    | 5,6±0,2    | 5,6±0,2    | >0,1   |
| B     | 4,7±0,2        | 4,7±0,1       | 4,7±0,1    | 4,8±0,3    | 4,8±0,1    | >0,1   |
| C     | 4,8±0,3        | 4,9±0,1       | 5,9±0,2    | 7,1±0,3*   | 7,2±0,2*   | <0,05  |
| E     | 4,6±0,2        | 4,6±0,2       | 4,7±0,2    | 4,9±0,1    | 5,0±0,2    | >0,1   |
| F     | 5,5±0,2        | 5,5±0,3       | 5,6±0,2    | 5,7±0,2    | 5,8±0,2    | >0,1   |
| G     | 8,2±0,2        | 8,3±0,2       | 8,4±0,3    | 8,7±0,1    | 8,7±0,2    | >0,1   |
| H     | 4,2±0,2        | 4,3±0,1       | 4,8±0,2    | 6,9±0,2*   | 7,0±0,2*   | <0,001 |
| I     | 5,9±0,2        | 5,9±0,3       | 5,8±0,3    | 5,5±0,1    | 5,5±0,2    | >0,1   |
| L     | 7,2±0,2        | 7,2±0,1       | 6,2±0,3    | 5,2±0,2*   | 5,5±0,2*   | <0,001 |
| M     | 6,1±0,2        | 6,2±0,1       | 6,1±0,1    | 6,1±0,3    | 6,2±0,2    | >0,1   |
| N     | 6,7±0,2        | 6,8±0,1       | 6,7±0,1    | 6,3±0,1    | 6,1±0,2    | >0,1   |
| O     | 9,3±0,1        | 9,2±0,1       | 9,1±0,3    | 6,3±0,1*   | 6,0±0,1*   | <0,001 |
| Q1    | 5,5±0,2        | 5,5±0,3       | 5,5±0,1    | 5,6±0,1    | 5,7±0,2    | >0,1   |
| Q2    | 7,1±0,2        | 6,8±0,2       | 6,1±0,2    | 5,1±0,3*   | 5,2±0,2*   | <0,01  |
| Q3    | 6,2±0,3        | 6,3±0,2       | 6,5±0,3    | 6,8±0,3    | 6,9±0,2    | >0,1   |
| Q4    | 7,2±0,3        | 7,0±0,1       | 6,5±0,3    | 6,1±0,3    | 5,0±0,1*   | <0,01  |

**Table: 2.** Indicators of individual - psychological characteristics of children with SRP according to R. Cattell method ( $M \pm m$ ) Note: \* - the difference is significant between the data of the control and treatment groups

Before treatment, the deviation from an autogenic norm in patients with PSP was high ( $55.05 \pm 4.2$ ). After treatment, this indicator significantly decreased in groups Tr3, Tr2 and Tr1 ( $39.7 \pm 3.1$ ,  $39.9 \pm 2.1$  and  $40.1 \pm 4.2$ , respectively) ( $p < 0.05$ ). Thus, the improved treatment contributed to the harmonization and increased stability of the individual, especially in the Tr3 group.

### 3.3. Indexes of the projective test "Good and Evil" and Neurophysiological indicators in children with PSP in the dynamics of treatment

| Index                                | Mean value index "M±m" |               |            |            |            | P     |
|--------------------------------------|------------------------|---------------|------------|------------|------------|-------|
|                                      | Before therapy         | After therapy |            |            |            |       |
|                                      |                        | C (n=50)      | Tr1 (n=43) | Tr2 (n=50) | Tr3 (n=51) |       |
| activity                             | 45,1±4,7               | 46,2±1,5      | 49,2±1,5   | 49,7±2,1   | 50,1±4,1   | >0,05 |
| working capacity                     | 35,7±4,1               | 45,8±3,3      | 51,3±2,3*  | 52,4±2,1*  | 53,5±4,3*  | <0,05 |
| the deviation from an autogenic norm | 55,1±4,2               | 53,1±4,2      | 40,1±4,2*  | 39,9±2,1*  | 39,7±3,1*  | <0,05 |

**Table: 3.** Indexes of the projective test "Good and Evil" with the choice of color in the surveyed (n = 194)

Note: \* a difference is reliable between data control and curative groups

It is known that the psychophysiological state of a person is displayed on the EEG by the activation of certain parts of the cerebral cortex and depends on the pulse blood filling. The data of neurophysiological studies are shown in tab. 4.

| P     | Index  | Before therapy | After therapy |              |              |              |
|-------|--------|----------------|---------------|--------------|--------------|--------------|
|       |        |                | C (n = 50)    | Tr1 (n = 43) | Tr2 (n = 51) | Tr3 (n = 51) |
| <0,05 | RR     | 0,82±0,03      | 0,83±0,12     | 0,92±0,02    | 1,13±0,03*   | 1,23±0,06*   |
| <0,05 | A (Om) | 0,08±0,01      | 0,08±0,01     | 0,09±0,01    | 0,11±0,02*   | 0,12±0,02*   |

**Table: 4.** Neurophysiological indicators in children with PSP in the dynamics of treatment (n = 194)

Note: \* a difference is reliable between data control and curative groups

For determination clinical efficiency of different therapeutic complexes the method of ball estimation of dynamics clinical displays of disease (table 5) is used.

| Groups of children (n = 194) | Before therapy | After therapy |      |      | C |
|------------------------------|----------------|---------------|------|------|---|
|                              |                | IEP1          | IEP2 | S    |   |
| Tr1 (n=43)                   | 6,5±0,6        | 2,9±0,1*,**   | 3,6  | 1,54 |   |
| Tr2 (n=50)                   | 6,5±0,4        | 2,3±0,4*,**   | 4,2  | 1,64 |   |
| Tr3 (n=51)                   | 6,6±0,6        | 2,9±0,3*,**   | 4,7  | 1,86 |   |
| C (n=50)                     | 7,0±0,3        | 4,9±0,1       | 2,1  |      |   |

**Table: 5.** Estimation of clinical efficiency of treatment children (in points)

\* the difference is significant between the data before and after treatment (p <0.05) \*\* the difference is significant between the data of treatment and control groups (p <0.05).

#### [IV] DISCUSSION

This is evidenced by a decrease in the average value of the factor O - from 9.3±0.1 to 6.0±0.1 (p <0.001) and an increase in factor C - from 4.8±0.3 to 7.2±0, 2 (p <0.001). The average value of the factor Q4 decreased significantly (from 7.2 70.3 to 5.0±0.1 (p <0.01), which objectifies a decrease in tension, impatience, excessive excitement and frustration. When analyzing the communicative properties and interpersonal relations, it was revealed that the average indices of factor H and E during treatment significantly increased (from 4.2±0.2 to 7.0±0.2 and from 4.60.2 to 5, 9±0.2, respectively (p <0.001). At the same time, the L factor significantly decreases (from 7.2±0.2 to 5.0±0.1 (p <0.001), which indicates a decrease in difficulties, in relations with peers, teachers, parents. That is, the interests of children and adolescents are becoming more focused on the environment.

As can be seen from table 4, a reference reaction before treatment (the ratio of latent periods of synchronization and resynchronization reactions

when applying the sample with closing - opening of the eyes) was low (less than 1) - 0.82 ± 0.03, which indicates low adaptive capacity and reduced level of activity of processes in subcortical structures (over excitation and functional blockade of thalamocortical radiations). The increase in the "RR" (1.13 ± 0.03 and 1.23 ± 0.06) (p <0.05) in children who received metabolic therapy with the actoprotector Stimol (groups Tr2 and Tr3) indicates an improvement in thalamocortical connections (synchronization takes place - replacement of fast and irregular oscillations of bio potentials by a slower and more time-ordered wave activity of greater amplitude), more pronounced effect with the inclusion of psychological correction.

A significant decrease in the amplitude of pulse blood filling (0.08 ± 0.01) before treatment indicates a slightly reduced, deregulatory, perfusion of the brain. The increase in numbers, after the application of metabolic and complex metabolic and psychological correction, indicates an improvement in the working conditions of the

brain due to the normalization of its perfusion ( $0.11 \pm 0.02$  and  $0.12 \pm 0.02$ ) ( $p < 0.05$ ).

Based on the scores of the clinical examination, the value of the integral index of pathologists (IEP) for the treatment and control groups was calculated. Before treatment, IEP1 in 1, 2, 3 treatment and control groups were  $6.5 \pm 0.6$ ;  $6.5 \pm 0.4$ ;  $6.6 \pm 0.6$  and  $7.0 \pm 0.3$  points ( $p > 0.05$ ), respectively. IEP2 after treatment was  $2.9 \pm 0.1$ ;  $2.3 \pm 0.4$ ;  $2.9 \pm 0.3$  and  $4.9 \pm 0.1$  points ( $p < 0.05$ ). The obtained data testify to a significant decrease in the IEP after treatment in all treatment groups, but more significant results are observed in Tr3 - the group whose patients received the metabolic drug Stimol and psychotherapy, which confirms the more significant effectiveness of our improved therapy. To quantify the dynamics of clinical manifestations in patients, the degree of improvement of the clinical picture (S) and the integral coefficient of treatment efficacy in the treatment and control groups (C) were calculated, which amounted to 1.54, 1.64 and 1.86, respectively in Tr1, Tr2 and Tr3 - groups, respectively. The findings suggest that in children whose basic treatment included psychotherapy sessions, the drug of the metabolic series Stimol and their combination, the dynamics of reverse changes in the main clinical manifestations of the disease occurred 1.54, 1.64 and 1.86 times faster than patients who received only basic therapy.

#### [V] CONCLUSION

In children and adolescents with PSP (duodenal ulcer disease and asthmatic (NOS)) revealed emotional instability, high reactive and personal anxiety, self-doubt, fearfulness, complications in relations with peers, teachers and parents, reduced efficiency, impaired thalamocortical relations and cerebral perfusion. All patients with PSP associated with symptoms of fatigue in the form of irritability, moodiness, fatigue, disorders of sleep and tearfulness.

The use of psychological remedial actions if PSP leads to an improvement in the functioning of the

brain due to the normalization of its perfusion and to improve the thalamocortical relations by removing overstimulation and functional blockade.

The inclusion of actoprotector drug metabolic number of Stimuli effectively eliminates signs of fatigue identified in the patients examined.

The integrated use of the drug metabolic range Stimol and psychological methods of correction of psychosomatic disorders of children and adolescents hastens the regression of the clinical manifestations of asthenia and increases the effectiveness of treatment of 1.86 times.

To this end, we have developed methods for the projective pattern "My Future", "Good and Evil" with a choice of colors, the priority of which is confirmed by the Declaration of Ukraine patents for invention [4, 5].

#### REFERENCES

1. Antropov, Yu.F. (1999). Psychosomatic disorders and pathological habitual actions in children and adolescents. Moscow: Medicine.
2. Aron, I.S. (2000). Psychosomatic aspects of the personality of children suffering from somatic diseases. Kazan Medical Journal, Vol-2, pg 133 - 139.
3. Volosovets, A.P., Kramarev, S.A., Krivopustov, S.P., Moroz, T.S. (2006). Pathogenetic therapy of asthenic syndrome in viral diseases. Health of Ukraine. Vol-17, pg 123-132.
4. Mozgovaya, G.P. (2014). Psychosomatic diseases of children. Kyiv.
5. Mozgovaya, G.P., Sinyov, V.M., Beketova, G.V. (2009). Patent for Utility Model No. 22346 "Method of Correction of Persistent Stereotypes of Psycho-emotional Response of Children and Adolescents with Psychosomatic Pathology" dated 25.02.2009.
6. Mozgovaya, G.P., Sinyov, V.M., Beketova, G.P. (2009). Patent for utility model No.

- 22347 "Method for diagnosing persistent stereotypes of psycho-emotional response of children and adolescents" dated 02/25/2009.
7. Isaev, D.N. (1996). Psychosomatic medicine for children. SPb.: Speech.
  8. Maksimova, N. Yu., Milyutin, E. L. (2000). Course of lectures on children's psychopathology. Rostov: Phoenix.
  9. Raygorodsky, D.Ya. (2000). Practical psychological diagnostics. Methods and Tests. "BAKHRAH-M".
  10. Smulevich, A.B. (2000). Psychosomatic disorders (clinic, therapy, organization of medical care). Psychiatry and psychopharmacotherapy, Vol. 2., pg 144-147.
  11. Odinak, M.M., Yanishevskii, S.N., Tsygan, N.V. et al. *Neurosci Behav Physi* (2015) 45: 600. <https://doi.org/10.1007/s11055-015-0118-4>
  12. Consiglio, A., Martino, S., Dolcetta, D., Cusella, G., Conese, M., Marchesini, S., ... Bordignon, C. (2007). Metabolic correction in oligodendrocytes derived from metachromatic leukodystrophy mouse model by using encapsulated recombinant myoblasts. *Journal of the Neurological Sciences*, 255(1–2), 7–16. <https://doi.org/10.1016/j.jns.2007.01.010>
  13. Park, M., Taniguchi, L. U., Noritomi, D. T., Libório, A. B., Maciel, A. T., & Cruz-Neto, L. M. (2011). Clinical utility of standard base excess in the diagnosis and interpretation of metabolic acidosis in critically ill patients: Correction. *Brazilian Journal of Medical and Biological Research*, 44(3), 267.
  14. Guerani, G., delle Chiaie, R., & di Michele, J. (1984). Psicosomatica della patologia sessuale maschile = Psychosomatics of male sexual pathology. *Medicina Psicosomatica*, 29(1), 63–97.
  15. Korkina, M. V., & Marilov, V. V. (1987). Some features in the formation and course of psychosomatic pathology of the gastrointestinal tract. *Zhurnal Nevropatologii i Psikhiatrii Imeni S.S. Korsakova*, 87(11), 1697–1700.
  16. Gaddini, R. (1979). Early psychosomatic pathology. *Psychotherapy and Psychosomatics*, 31(1–4), 121–127. <https://doi.org/10.1159/000287322>
  17. Ower, C., Kemmler, G., Vill, T., Martini, C., Schmitt, A., Sperner-Unterweger, B., & Hüfner, K. (2018). The effect of physical activity in an alpine environment on quality of life is mediated by resilience in patients with psychosomatic disorders and healthy controls. *European Archives of Psychiatry and Clinical Neuroscience*. <https://doi.org/10.1007/s00406-018-0930-2>
  18. Yazdanfar, M., Manshaee, G., Herris, M. A., Alipour, A., & Noorbala, A. A. (2015). The effectiveness of written emotional disclosure training on psychological well-being and quality of life in psychosomatic disorders. *Journal of Research & Health*, 5(1), 35–41. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=101574340&lang=ru&site=ehost-live>
  19. Yazdanfar, M., Manshaee, G., Herris, M. A., Alipour, A., & Noorbala, A. A. (2015). The effectiveness of written emotional disclosure training on psychological well-being and quality of life in psychosomatic disorders. *Journal of Research & Health*, 5(1), 35–41. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=101574340&lang=ru&site=ehost-live>
  20. Yevdokymova, N., Lunov, V., Tsekhmister, Ya., Dei, M., Muliar, G., Khovpun, O. (2019). Psychological referents of subjectness of law students. *Modern Journal of Language Teaching Methods*, Volume 9, Issue 1 (1-2019), 371-380.

21. Druz, O.V., Aimerov, K. V., Lunov, V. Ye., Chernenko, I. O. (2016.) Psychosomatic and somatopsychic disorders in the practice of a medical psychologist. Odessa: Press Courier.
22. Tsekhmister, Y., Welchinska, E. (2016). Carbon (II) monoxide as a subject for poisons studying of study on discipline Toxicological Chemistry (Criminal Analysis) at the Pharmaceutical department of the National Medical University in Ukraine. CBU International Conference Proceedings, 4, p. pp. 728-733, march 2016.  
DOI:  
<http://dx.doi.org/10.12955/cbup.v4.842>.