Original article

The role of somatic factors in early childhood and adolescent psychosomatic disorders

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Abstract

Objective. This study aimed to establish practical evidence of the leading role of somatic factors in psychosomatic health disorders in the early stages of the mental development of children and adolescents. ***Materials and methods.*** An interview method was used to obtain complete and reliable historical data for children and youth who applied for primary medical care. In addition, an anonymous questioning method was implemented. It allowed gathering of a reliable database of basic information on the psychosomatic health of children and adolescents in the Western European region. A study enrolled a sample of 1000 children, including 498 girls and 502 boys, aged 13 to 18 years. ***Results and Discussion.*** Psychosomatic pathologies were detected in 54% of cases, of which 63% were female. The influence of somatic factors on psychosomatic pathology progression was found to be greater in the early stages of mental development. ***Conclusion.*** The study's findings may serve as a primary basis for understanding the role of somatization factors on psychosomatic disorders in children and adolescents in the early stages of mental development. The study also highlights the need to enhance the methodological basis for preventing psychosomatic disorders in children and adolescents.

Keywords: ontogeny; psychosomatic disorders; psychosomatic health; stressors of somatization development

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Introduction

Assessing the psychosomatic health status of children and adolescents is problematic in worldwide practice. The science that studies psychosomatic health problems (psychosomatics) lacks a complete knowledge base. The term "psychosomatic" is somewhat controversial. Although criteria exist to define psychosomatic disorders and link them to the nosological categories of ICD-11 (World Classification of Diseases, 11th Edition).[1]

The knowledge base in the field of somatization is improving every year through the emergence of new factors in the development of psychosomatic pathology. Each new edition of the authoritative American Diagnostic and Statistical Manual of Mental Disorders includes editions in interpreting and treating a group of diseases, such as psychosomatic disorders.[2] The first edition, developed and published in the postwar years, focused on war stress disorders, so the factors had a general and political character.[3] The perception of anxiety and fear is very important for patients at risk of psychological stress.[4] Similarly, the biotic component includes the family, the surrounding environment, and educators.

For each period of the body's development, separate

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a group of factors causing somatization. The authors single out trauma caused by increased pressure from teachers and peers as the main trigger in childhood, as well as deviant behavior at the family level.[5] The peculiarity of the nervous system is that its development occurs during intrauterine and extrauterine development.This factor's influence threshold correlates with the level of mental development in children and adolescents. That is, the younger the body, the lower the influence threshold.[6]

This study is unique because, in addition to the conventional etiology approach, the major influence of early factors in the development of mental health was considered. It can serve as the basis for an extensive study of psychosomatic disorders.

Literature Review

Somatization, the manifestation of childhood mental disorders in the form of somatic symptoms, has been the focus of many studies. Some signs of etiological dependence between symptoms and the physical state of the body are used for diagnosis in the absence of an organic disorder, as well as the absence of a pathogenic connection with a physiological component.1 Therefore, it is problematic to identify factors that influence the development of somatization.Also, the relationship between mental health and physical education deserves special attention. To improve physical and mental health, as well as to increase academic performance, exercises obtained as a result of game play are effective activities.[7]

The general trend for global practice is to consider that there is a dependency on the emergence of somatization on the social and daily conditions of children and adolescents.[8-10] School education is one factor in the development of psychosomatic pathology. Many children's psyches are not ready for such changes as the transition to preschool and the subsequent transition to middle and high school. Stress can manifest physical symptoms and emotional symptoms that are psychiatric symptoms. It is important to consider somatization to cope with stress.[11] Under stress, the child's body cannot adequately respond to the nervous system. Subsequently, that causes problems in other vital systems: cardiovascular, digestive, respiratory, etc.[8]

Psychosomatic health disorders are also affected by teachers' inappropriate behavior toward students, peer intimidation during the learning process, and lack of protection against adult authority figures. The primary causes of peer bullying are external defects (stigma, obesity, congenital disabilities) and low social adaptation and academic ability levels. Researchers at Descartes University in Paris Hospital have found a correlation between the incidence of psychosomatic diseases in obese children.[9] The study found that 88 out of 155 obese children suffered from anxiety disorders leading to somatization. These figures are explained by the peculiarities of the French mentality and the culture of food consumption. Mainly, it is about the modeling business, which has high appearance standards, and the food culture for low-calorie organic food consumption. However, other countries, such as the United States, have the exact correlation between somatization and excess weight in children and adolescents.[10]

Thus, the above authors indicate that identifying the following major factors before the onset of the pathology makes it possible to avoid psychosomatic disorders in children and adolescents.

Family relations and mental flexibility among children and youth are not negligible components. Research from the Department of Psychiatry at the University of Texas shows that the presence of chronic disease in the family influences the development of somatization in children and teenagers. The authors attribute this model to the child's mind automatically transferring family problems. By observing the disease of a close relative, children begin to complain of pain which, after further examination, has no organic etiology and is a classic manifestation of somatization. Furthermore, pain as the main symptom of psychosomatic disorder begins with exacerbating the parent's chronic disease. It enables an emphasis to be placed on the role of automatic transfer pathology in children and adolescents.[12]

The authors who study somatization highlight the influence of the hygiene culture in the family.[13,14] Children developing a culture of self-care have two negative extremes that lead to somatization. In the first case, excessive concern for health leads to a certain number of hypochondriacal somatizations. The second extreme negative, which has negative consequences in the form of somatization, is the absence of a hygienic culture in the family or non-recognition of the family as a child. In these cases, children suffer from psychosomatic disorders due to feelings of alienation and indifference to the state of their psychosomatic health.[14]

A contradiction in the authors' work is that most theories and methodologies regard to school and

preschool age as the most important in the development of somatization.[15] However, studies have shown that the lowest level of environmental resistance is observed in childhood. During the first weeks of life, the infant nervous system, which will later be the basis of all neurocognitive processes, is most sensitive to the influence of adverse environmental factors. Few authors insist on this point. For example, Grossman, Greenberg, and Nachman point to the relationship between the perinatal period and the development of the psychosomatic health of children and adolescents.[15]

A review of the literature indicates that key somatization factors include:

- low levels of family well-being;[16]

- inappropriate care received in early childhood;[17]

- poor hygiene culture or excessive emphasis on own hygiene;[17]

- the presence of external defects arising from bullying in school years;[17]

Low level of intellectual capacity due to the inability to adapt to high educational standards and pressures from teaching staff.[18]

Problem Statement

The research is driven by the undeniable role of early periods of mental development in the emergence of psychosomatic pathologies in children and adolescents. The special feature of the nervous system is that it is the only system in the human body that continues to develop and grow throughout ontogenesis. That makes the nervous system more vulnerable to the influence of negative factors. From the first days of life, after the intrauterine period, the nervous system of children adjusts to new living conditions. Several adjustments occur, after which the child's psyche is formed under the influence of the environment. It is, therefore, essential to determine precisely the causes and effects of the factors affecting the formation of psychosomatic health.

This study aims to identify the main factor influencing somatic development in children and adolescents. The uniqueness of this study is focusing on the factors that affect the development of children from a very young age.

Considering the problem of psychosomatic health in children and adolescents, the following objectives have been set:

- analyzing the literature showing the causal links between the different periods of mental development and their relation to the development of somatization;

- identifying the major drivers of early mental development that play a role in psychosomatic health disorders in children and adolescents;

- creating a database of primary information, which will highlight early periods as having a major role in the emergence of somatization;

Methods and Materials

Initially, the data on children with psychosomatic pathologies over the last eight years were collected from 10 medical institutions in Eastern Europe. Samples for the study were formed according to the following criteria: age 13-18 (498 girls and 502 boys), presence of medical treatment, presence or absence of psychosomatic disorders (to compare two samples), and presence of anamnesis data. These sampling criteria were selected to establish logical and etiologic links between early childhood care and the development of somatization in adolescents later in life.

The method of interviewing and analysis of the patient's anamnesis was applied to obtain primary information and accumulate facts. It allowed for establishing logical connections in the future. In addition, an anonymous questionnaire was used to collect reliable information from the sample (children aged 13 to 18 requiring medical attention, with or without a psychosomatic disorder). The questionnaire consisted of two parts. Part one was to confirm that there was a psychosomatic disorder. The second part sought to identify the negative factors during early childhood, as well as the fact of bullying in school and the inability to bear the excessive burden of the educational system.

In addition to interviews with the sample, an anonymous questionnaire was selected to ensure anonymity. This means the likelihood of getting reliable information will be greater than when only the interview is used. Furthermore, all of the questionnaire questions were closed-ended. This has facilitated the processing of the results, as well as allowed comparing the results qualitatively and identifying the main factor on the somatization development.

The results are expected to confirm the role of unfavorable factors in the onset of somatization and the role of early periods in relation to other factors.

The study's second phase involved the analysis and processing of the information obtained in the first stage. Also, the deduction method was used to achieve a result consistent with the study's objectives. Within the framework of deductive reflection and the establishment of logical links, the authors intend to confirm the theory on the principal role of the negative factors of the perinatal period in comparison with other factors of the occurrence of somatization.

Results

The study processed 1,000 medical cards of children aged 13 to 18 (498 girls and 502 boys) for the past 8 years, provided by 10 medical facilities in Eastern Europe. The study of the psychosomatic health of children and young people shows that this problem concerns the Slavonic population. When forming the sample (children 13-18 years old, m (mean age) = 14 years old, seeking medical care, with or without the psychosomatic disorder), the correlation of somatization development factors at different periods of mental development and psychosomatic pathology was compared. According to the data obtained, the psychosomatic health problem was deemed relevant in Eastern Europe. Thus, 543 (302 girls and 221 boys) of the 1,000 children between 13 and 18 who sought primary care showed psychosomatic symptoms (Figure 1).

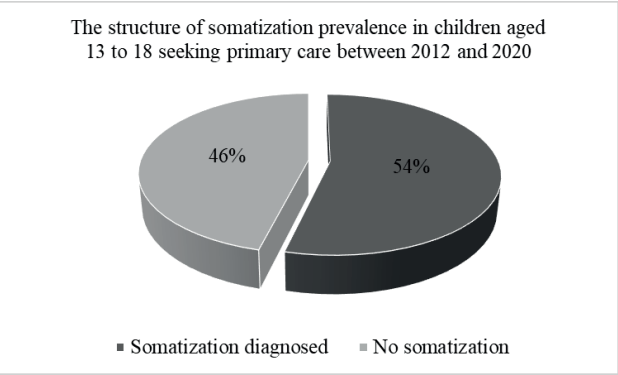

Figure 1. Prevalence pattern of somatization in children aged 13 to 18 who requested primary care between 2012 and 2020.

Furthermore, of the 543 children with signs of somatization, the percentage by gender showed that girls were more likely to develop psychosomatic disorders. The data indicate that the prevalence of somatization is 54.3%, and that the proportion of female children in the structure of psychosomatic disorders is 62.9% (Figure 2).

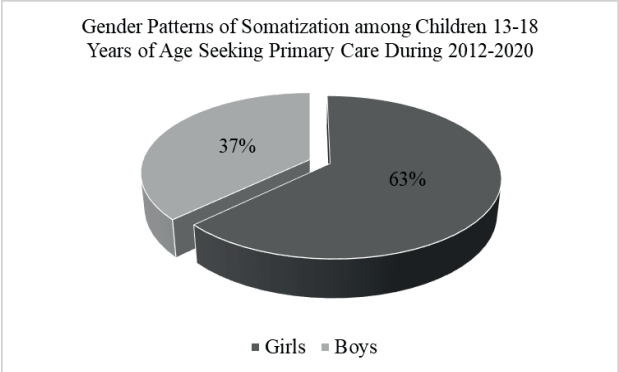

Figure 2. Gender Patterns of Somatization Among Children 13-18 Years of Year Seeking Primary Care During 2012-2020.

Several factors have also been confirmed to influence the development of somatization in children. The influence of these factors in the following stages of mental development was investigated:

- neonatal period (the first 4 weeks of life - 28 days);
- infancy (from day 29 to 1 year of age);
- toddler period (1 to 3 years old);
- preschool period (ages 3 to 7);
- elementary school age (ages 7 to 12);
- adolescence (13-14 to 17-18 years old).[19]

During the neonatal, infant, and toddler periods, i.e., the early periods of mental development, the human nervous system continues to grow outside the uterus and is already facing environmental factors. Following these influences, attitudes are formed, and the factors which lead to the development of somatization are presented. The early childhood period is significant because it is the child's first personality crisis, known as the "three-year crisis".[20] This time is particularly important in forming psychosomatic health. Because it is at these steps that self-identification takes place, the child's understanding of the relationship with the external world is formed. Factors in somatization development include: low level of family well-being, inadequate care received in early childhood;

When analyzing the information obtained, all those without adequate care during the neonatal period, who were artificially nourished, had no possibility to contact the mother, or this contact was limited, had psychosomatic pathologies in the future despite the favorable atmosphere in later periods of development.

There is a second period of crisis at preschool and college called the "seven-year crisis".[20] Following personal development, the experiences and events

in the child's life are carried through the prism of personal experiences.

At this stage, several factors strongly influence the unformed child's personality and, consequently, the development of diseases. These include:

- low level of hygiene culture or too great importance given to hygiene;
- the presence of external defects arising from bullying in school years;
- low intellectual capacity due to the inability to adapt to high educational standards and pressure from teaching staff;

However, these factors are superimposed on the "foundation" laid at earlier stages, which stresses the role of early periods in the violation of psychosomatic health in children.

Adolescence is the last period in the child's psychic development. At this time, the psyche is sufficiently formed to counter the impact of negative factors. And the threshold of reaction to somatic developmental factors is high enough. The elements are similar to those of the first-year period, but the body's resistance to them is much greater.

Results from the questionnaire showed that those who received adequate care during early childhood and a low level of influence of negative factors during ontogenesis had no somatization in the adolescent period.

This dependence is illustrated by the diagram of the probability of somatization development on the presence of factors during the first periods of life. Percentages reflect the percentage of questionnaires in which this factor was recorded (Table 1).

Table 1. Effects of factors in early childhood mental development on psychosomatic health disorders in children and adolescents

Factor in the development of somatization	Structural percentage of children with psychosomatic disorders.
Low level of well-being in the family	73%
Inadequate care and low level of hygiene culture	94%
Bullying	31%
Low degree of intellectual capacity.	20%
Pressure from academic staff.	22%
Evidence of external defects.	27%
Deviant family system, poor care during early childhood.	95%

The following correlation is observed: children who received adequate early care were less likely to develop somatization than children diagnosed with somatization factors at the beginning of their lives, based on an anonymous questionnaire.

Discussion

The study highlighted the preponderance of early mental development in the emergence of somatization in children and adolescents. The results of the survey are not substantially different from the results of similar studies.[20-23] The information obtained was evaluated by calculating the Student's reliability criterion under Formula (1), corresponding to 3.8 of the study sample. This indicates a high degree of confidence in this research. The second independent sample included a similar study.[22]

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{m_1^2 + m_2^2}} \quad (1)$$

where t-test is the Student's t-test

$\bar{x}_1$ - arithmetic mean of the first sample

$\bar{x}_2$ - arithmetic mean of the second sample

m_1^2 - error of representativeness in the first sample

m_2^2 - error of representativeness in the second sample

The novelty of this study is that, for the first time, attention is focused on the role of the first developmental periods in the child's psyche and factors which may affect the nervous system within these time intervals.

Similar factors affecting the development of somatization were found in other works. This is due to the fact that all organisms, regardless of their living conditions, face the same stimuli in the biosphere. It has also been observed that the development of somatization is more sensitive to women.19 Women are more receptive to empathic reactions, experiences and suggestions, which makes them more prone to psychosomatic disorders in the early stages of life. The psyche of boys develops in the direction of formal and logical thinking, which makes them more resistant to the development of psychosomatic disorders. The structure of psychosomatic disorders does not differ by gender, which eliminates the role of gender in this problem. The period of factor's influence differs in this study from the findings obtained by other authors. For instance, the study results published in the journal

"Clinical Medicine" highlight the predominant role of conflict in the family as a factor of the somatization in peptic ulcer disease. The diagnostic coefficient for this factor in the article is specified as 10.48, and the research topics were primary school children and adolescents.[24] This factor is undoubtedly important in the onset of peptic ulcer somatization. However, the study contains no information on the early stages of mental development. As such, this factor may only trigger the progression of psychosomatic pathology in the early stages of child psyche formation.[25]

The following theory explains the findings of this research. At an early age, from the first seconds of ectopic existence, the infant organism finds itself in a new environment and suffers from stress. The anatomic particularity of the human nervous system is that it develops intrauterine and extrauterine. But during intra-uterine development, the fetus is protected from the mother's body, and the stressors meet the mother's body first and are treated by the mother's nervous system. After birth, the child's nervous system must meet and deal directly with all environmental signals.[26] Thus, the onset of extrauterine development starts with a stress shock, which can serve as a basis for future pathologies. In subsequent periods of a child's psychological development, the body is exposed to adverse environmental factors. Still, the nervous system is already more developed and capable of responding appropriately to negative impact.[27,28] Through adolescence, the cerebral cortex is in its final stage of development, and essential cognitive functions are formed. However, the role of hormonal rearrangements in the body associated with puberty comes into the foreground during adolescence. Thought is characterized by formal-logical operations that can be leveled concerning the background of emotional experiences.[29] At this point, the child's psyche is more stable than in early developmental periods. Despite negative factors in the form of excessive demand from the curriculum, somatization has not been observed in children who have completed previous developmental periods.

Despite the negative factors in the form of excessively demanding curriculum, children who have completed the previous periods of development do not experience somatization. So, if there was no factor of somatization in the previous periods, then in the teenage period negative moments are leveled and will not cause psychosomatic disorders. The conceptual patient-centered model of psychopsychiatric care for children developed by the authors is built taking into account the principles of bioethics and the moral responsibility of the doctor, and consists of four content blocks: psychodiagnostic, psychotherapeutic, and psychosomatic.[30] If there were a somatization factor during the preceding periods, they would lead to the onset of the psychosomatic disorder during adolescence. Still, they will not be the leading cause of it. At these stages, the most critical factors include deviant family structure, poor care in early childhood; poor level of hygiene culture or over-emphasis on personal hygiene; external imperfections due to bullying occurring during school years; low level of intellectual capacity due to inability to adapt to high educational standards and pressure from academic staff.

Conclusions

The study revealed that the early stages of child psyche development play a prominent role in the development of somatization. A total of 1,000 anonymous questionnaires obtained during interviews with children 13-18 years old, with or without the psychosomatic disorder, recorded as seeking medical care, were analyzed and processed. Based on survey and interview results, 54% of the children in the sample showed signs of somatization.

It has been found that the main etiologic factors of early mental development that cause psychosomatic health problems include: deviant family patterns, poor care during infancy (recorded in 95% of children with psychosomatic health disorders), low level of hygienic culture and inadequate care in the early periods of ontogenesis (recorded in 94% of children with psychosomatic health disorders), low level of well-being in the family (recorded in 73% of children with psychosomatic health disorders)

It has been demonstrated that the most sensitive periods of mental development of children and teenagers in the emergence of psychosomatic pathology are the early stages of cognitive development, namely, the period of newborn-hood, infancy, and toddler period. In these stages, the effects of somatizing factors were most remarkable relative to subsequent stages of mental development. And the ability of the child's body to adequately respond to such stimuli was minimal compared to later developmental stages.

Thus, the primary role of early stages of child mental development in the emergence of psychosomatic pathology has been demonstrated. It may be due to the immaturity of children's nervous systems in the early stages of cognitive development, such as

newborn, infant, and toddler periods. An immature nervous system is less resistant to unfavorable environmental factors than the nervous system during the latter stages of a child's mental development. The early years of a child's life provide the basis for further nervous system responses and adaptations to environmental factors. Therefore, particular attention should be given to these time intervals of the child's ontogenesis.

The study's findings can be used in the structure of medical knowledge to optimize the methodology for preventing psychosomatic health disorders in children and adolescents. Correcting these factors in the early stages of a child's mental development will reduce the percentage of somatization in the structure of childhood diseases.

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Authors's contribution.

Data gathering and idea owner of this study: Olga Malkina, and Evgeniya Shatova

Study design: Olga Malkina, Vladilena Korotun, and Evgeniya Shatova

Data gathering: Vladilena Korotun, Olga Malkina, and Alla Philippova

Writing and submitting manuscript: Alla Philippova and Evgeniya Shatova

Editing and approval of final draft: Alla Philippova, Olga Malkina, Vladilena Korotun, and Evgeniya Shatova

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