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Somatisation as a manifestation of emotional disturbance in children

Somatyzacja jako przejaw zaburzeń emocjonalnych u dzieci

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Abstract

Somatisation is a phenomenon consisting in signalling complaints originating "from the body" (pain, discomfort, disturbances of physiological functions), whose cause is not explained on the basis of physical examination and additional examinations, and whose basis is usually an unconscious emotional factor. The most common somatic manifestations of negative emotions include abdominal pain, headache, palpitations or stabbing sensation in the chest, dizziness, shortness of breath, cough, squeezing sensation in the throat, numbness of limbs, as well as diarrhoea, vomiting or fainting. Although the described type of disorder occurs particularly often in people burdened with other mental problems, such as anxiety, depression or personality disorders, nowadays it is observed more and more often in children not showing any psychogenic abnormalities so far. A significant influence on the development of such symptoms has the environment of upbringing, from which the developing person draws behavioural patterns. In addition, the entire general social context with all its conditions, both positive and negative, is important. In the case of children, due to the lack of possibility of regular and constructive self-observation, developed abstract thinking and conscious, consistent verbalisation of inner experiences by the patient, the process of diagnosis and therapy of such disorders often requires diagnostic hospitalisation, multi-specialist consultations, long-term treatment in the outpatient mode, as well as at least partial modification of environmental relations, including the educational process. The fundamental issue remains the protection of mental health in the form of preventive measures aimed at creating existential conditions that have a positive impact on the mental development of children, which is particularly true of relations between generations.

Keywords: somatisation, emotional stress, differential diagnosis, psychotherapy, psychoprophylaxis

Streszczenie

Somatyzacja jest to zjawisko polegające na sygnalizowaniu dolegliwości pochodzących „z ciała" (ból, dyskomfort, zaburzenia czynności fizjologicznych), których przyczyna nie zostaje wyjaśniona na podstawie badania przedmiotowego oraz badań dodatkowych, u ich podłoża tkwi zaś najczęściej nieuświadomiony czynnik emocjonalny. Do najpowszechniej spotykanych somatycznych przejawów negatywnych emocji należą: ból brzucha, ból głowy, uczucie kołatania serca lub kłucia w klatce piersiowej, zawroty głowy, duszność, kaszel, wrażenie ściskania w gardle, drętwienia kończyn, jak też biegunka, wymioty czy omdlenia. Choć opisywany rodzaj zaburzenia występuje szczególnie często u osób obciążonych innymi problemami natury psychicznej, takimi jak stany lękowe, depresja czy zaburzenia osobowości, to w obecnym czasie obserwuje się go coraz częściej u dzieci dotychczas niewykazujących żadnych nieprawidłowości psychogennych. Znaczący wpływ na rozwój tego rodzaju objawów ma środowisko wychowania, z którego rozwijający się człowiek czerpie wzorce behawioralne. Ponadto istotny jest cały ogólny kontekst społeczny ze wszystkimi swoimi uwarunkowaniami, zarówno pozytywnymi, jak i negatywnymi. W przypadku dzieci, z racji braku możliwości regularnej i konstruktywnej autoobserwacji, rozwiniętego myślenia abstrakcyjnego oraz świadomej, konsekwentnej werbalizacji przeżyć wewnętrznych przez pacjenta, proces diagnostyki i terapii takich zaburzeń często wymaga hospitalizacji diagnostycznej, konsultacji wielospecjalistycznych, długotrwałego leczenia w trybie ambulatoryjnym, jak również przynajmniej częściowej modyfikacji relacji środowiskowych, w tym procesu wychowawczego. Fundamentalną kwestią pozostaje ochrona zdrowia psychicznego w formie działań profilaktycznych, ukierunkowanych na tworzenie warunków egzystencjalnych pozytywnie wpływających na rozwój psychiczny dzieci, co w szczególny sposób dotyczy relacji międzypokoleniowych.

Słowa kluczowe: somatyzacja, stres emocjonalny, diagnostyka różnicowa, psychoterapia, psychoprofilaktyka

INTRODUCTION

The term "somatisation" was probably first used in 1920 by the German psychoanalyst Wilhelm Stekel. The author described the phenomenon as a "physical disorder on the basis of deep neurosis" and believed that the treatment should be based on "internal conflict therapy"[1] . Similar views were expressed by the American psychiatrist and psychologist Peter Sifneos, who claimed that physical symptoms represented an individual's inability to define his or her own feelings, and introduced into medicine and psychology the concept of alexithymia referring to an inability to identify or understand, name and express one's own emotions, resulting in the lack of ability to distinguish between emotional and physiological arousal, and thus difficulty in relieving internal tensions and concentrating on the accompanying physical sensations[2,3].

In the practice of paediatricians and primary care physicians (PCPs), there are frequent cases of children and adolescents reporting symptoms suggestive of a somatic disorder or disease, but without a causal diagnosis on the basis of physical examination and additional tests. Although the symptoms described are usually of low intensity and transient, short-lived nature, they can be a source of significant discomfort and additional anxiety for patients and their caregivers. If such complaints are found to impair the quality of everyday life and make social functioning difficult, either on a long-term or recurrent basis, a diagnosis of somatisation disorder may be established[1,3,4]. The complaints reported by somatisation patients belong to the group of disorders known by the abbreviation MUPS (medically unexplained physical symptoms)[1]. The 10thth revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) distinguishes somatoform disorders, which, in addition to somatisation disorders, also include hypochondriacal disorders, autonomic disorders occurring in the somatic form, and persistent psychogenic pain, encountered mainly in adults[1,3]. In turn, the general division of disorders manifesting somatically can be presented according to the criterion of patterns: disorders with a dominant somatic or sensory pattern (somatisation disorders and pain syndromes), dissociative pattern disorders (conversion disorders), and disorders with a dominant obsessive or cognitive pattern (dysmorphophobia and hypochondria)[3]. Symptoms and illnesses shaped by psychological factors as their secondary effects[3], rather than a form of manifestation (e.g. stress-induced hypertension[5]), are a separate phenomenon. Symptoms emerging in the course of somatisation, unlike factitious and simulation disorders, are not intentionally produced[1].

Cases of patients with somatisation currently represent an increasing percentage of hospitalisations in general paediatric wards. In the analysis of the populational significance of such disorders, one cannot ignore the fact that they generate enormous costs, which are mainly due to the extensive and complex causal diagnostics as one of the conditions for their diagnosis.

The aim of this paper is a general review of the problem of somatisation in children and adolescents, emphasising the importance of the differential diagnostic process in its diagnosis, and the role of psychotherapy and psychoprophylaxis as elements of patient management aimed at treating and preventing psychogenic disorders manifesting somatically.

EPIDEMIOLOGY

It is estimated that approximately 15% of school children and adolescents experience increased somatic symptoms with a psychological basis[4]. Statistically, such symptoms are more common in females[1–3]. Significant variation is observed across age groups.

Younger children usually present with a single symptom, the nature of which largely depends on age. Preschool and early elementary school children usually report abdominal pain[6]. Upper primary school students additionally report a headache. The younger the children are, the more difficult it is for them to describe the nature and location of the complaint. They are often unable to choose the right words, so the content of their reported complaints becomes vague, unclear or even contradictory. Parental observations turn out to be helpful; they should concern not so much the complaints themselves as the situations in which they appear and disappear, and observations relating to the child's behaviour accompanying their occurrence.

Among adolescents, there is a greater diversity of reported complaints than among younger children[4]. Adolescents not only experience symptoms affecting different body organs and systems, but are also able to describe them in more detail than young children. Moreover, in this group of patients the symptoms may affect several systems simultaneously, change location and character, and occur not only in the form of pain but also present as disruption of physiological processes. It is characteristic that the percentage of somatisation cases is significantly higher among adolescents than among pre- and early school-aged children, which is related to the problems that accompany sexual, emotional and social maturation.

Somatisation disorders may coexist with other psychiatric disorders, especially with anxiety syndromes or depression[1,3,7,8]. The so-called masks of depression may include: decreased energy, sleep disorders, pain complaints, and symptoms manifested in the cardiovascular, gastrointestinal or genitourinary systems (e.g. absence of menstruation in teenage girls)[9]. Moreover, somatisation disorders are statistically more common in young people with developing personality pathologies (especially paranoid, obsessive-compulsive, and histrionic)[10] than in adolescents without such abnormalities[1]. The association of somatisation with post-traumatic stress disorder (PTSD), the experience of which in childhood causes recurrence of such symptoms also in adulthood, is also important[1,3].

Experiencing negative emotions in the form of somatisation disorders contributes to impaired social functioning

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(at school, in peer relationships), while on the other hand, deterioration of social relationships promotes increased somatisation[11].

PHYSIOLOGY OF EMOTIONAL STRESS

The body affected by stressful stimuli perceives them and responds to them via the nervous system[12]. The appropriate adaptive response, which is the essence of the state of emotional stress, develops as a result of stimulation of limbic structures[13]. Information about stimuli reaching the nervous system, before they reach the cerebral cortex, goes to the sensory fields of the thalamus[14,15]. From there, it is transmitted to the amygdala in two ways: indirect (thalamus – cerebral cortex – amygdala) or direct (thalamus – amygdala). The second way of transmitting the signal is the primary route, in which the stimulus – without passing through the cerebral cortex – is not consciously realised. The direct (*explicite*) pathway, which leaves the stimulus outside the consciousness, is shorter, while the stimulus passes through it more quickly. Acting simultaneously with adrenergic stimulation from the nucleus accumbens, it is instrumental in triggering the primary stress response. On the other hand, a more complex analysis of stressful stimuli, integrating all the information and putting it into context, takes place via the hippocampus, where signals from the memory centres of stimuli and aversive events arrive[13,15]. Due to this structure of neural pathways, the hippocampus is involved in initiating a stress response in reaction to the memory of a threatening situation. Signals in the process of stress activation are transmitted from the hippocampus, as with the two previously mentioned neural pathways, to the amygdala. Neuronal outputs from the amygdala can activate distinct autonomic, neurohormonal and behavioural responses. Signal projections to the lateral hypothalamus mediate the activation of the sympathetic-adrenomedullary system (SAM), signals directed to parts of the brainstem are responsible for the appearance of appropriate behavioural reactions, while direct projection pathways (to the paraventricular nucleus, PVN) and indirect projection pathways (to the nucleus basalis) participate in stimulating neurohormonal reactions involving steroid hormones[14]. Stimulation of two of the aforementioned pathways is crucial in the development of the stress adaptive response[16]. The sympathetic-adrenal system is responsible for the release of catecholamines into the bloodstream by the adrenal medulla. In turn, stimulation of the hypothalamic–pituitary–adrenocortical axis (HPA), whose sequence of action begins with the secretion of corticoliberin by PVN cells, leads to the secretion of glucocorticosteroids by the adrenal cortex.

In a state of stress caused by factors of psychological nature, excessive activation of both these neurohormonal systems, resulting in an increase in the concentration of stress hormones (adrenaline, cortisol), contributes to biochemical changes within different body organs. This is reflected in the blood supply to tissues and an increase or decrease in tension of specific muscle fibres. In this situation, organs with a poorer blood supply are inadequately supplied with oxygen and nutrients; in addition, their concentrations of carbon dioxide and other metabolic products increase, and their pH decreases. An intensified, recurrent or chronic state of increased stress activation is an indirect cause of such changes in the biochemical balance of organs such as the stomach and intestines. In addition, due to increased emotional tension, arterial pressure rises and the circulation becomes centralised, resulting in increased blood flow in certain organs, including the brain or lungs, and decreased blood distribution, e.g. to distal parts of the limbs. At the same time, adrenergic activation occurs in the tissues of muscle groups responsible for performing rapid and extensive movements (trunk, girdles, and proximal parts of the limbs). In the adaptive response, the cells of the nervous system tend to reduce the threshold of excitability, which applies not only to the sensory sphere, but also to the receptors for pain stimuli. In addition, stimulation of sympathetic neuronal centres results in quantitative and qualitative changes in secretions produced by the glands (saliva, sweat), which is manifested, for example, by a cough-provoking feeling of dryness in the mouth and throat, as well as sweating of the hands.

Some authors also distinguish the psychoneuroimmunological perspective (central nervous system, CNS – immune system), according to which proinflammatory cytokines play a role in increasing sensitivity to pain stimuli in a state of emotional stress; they play a role in triggering states and behavioural changes indicative of the disease and ailments, such as pain, fatigue, anhedonia or lowered mood[3]. Thus, chronic stimulation of the immune system or reactivation of the cytokine system after previous sensitisation may be factors inducing the occurrence of non-specific somatic complaints in the course of somatisation[3].

The combination of biochemical and physiological changes characteristic of a state of increased stress, consisting of an increase in arterial pressure, a decrease in blood supply, local hypoxia and acidification of some organs, changes in muscle tone, an imbalance in the distribution of body fluids and increased sensitivity to pain stimuli, explains – at least in part – the occurrence of physical discomfort in children subjected to negative psychogenic factors[17].

While pain and functional dysregulation of physiological processes may be perceived as an indirect effect of an increased level of emotional stress, due to the neurobiological design of the individual neural pathways responsible for the development of the adaptive response, they are not always accompanied by an awareness of experiencing a state of emotional stress. This contributes to a lack of conscious association of complaints with psychological stress, and inadequate and disproportionate interpretation by patients. As a result, there may be an excessive focus on the physical sensations themselves, with a distraction from their actual root cause[1,3,7,8].

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PATHOGENESIS

The causes of psychological disorders manifesting themselves somatically can be divided into several groups, and they are usually complex, with not one, but several overlapping factors being involved in the development of a particular ailment[1,3]. The basic division of sources of this type of disorders is as follows:

- **individual phenotype** as a result of genetic make-up determining the sensitivity of the nervous system to external stimuli and its structure providing the possibility for effective discharge of emotional tension;
- **ontogenetic development** referring not only to the course of physiological changes during developmental age, but also the quality of intrauterine life (length and course of pregnancy and nature and course of childbirth) and the defects and illnesses which affect it;
- **living and upbringing environment** i.e. the space in which the child's relationships, reactions and behaviour are shaped by parental, family, educational (nursery, school, society) and peer attitude patterns.

Factors interacting negatively in the above-mentioned spheres may be the underlying cause of psychogenic disorders which take the form of somatisation.

When focusing on the environmental conditions as the space potentially most susceptible to modification in the context of this type of disorder, it should primarily be noted that children learn to recognise, express and cope with their own emotions mainly from the people closest to them (parents, siblings, grandparents, etc.). Parents' attitudes towards minimising the manifestation of their children's emotions often amount to an excessive focus on their children's behaviour, ignoring the feelings that result from it. In this way, the child fails to develop any insight into the nature and cause of emotions: he/she concentrates on the external signs, while the emotions themselves remain unrecognised. Then there is a tendency to focus on the manifestations accompanying the emotions, including bodily sensations that are associated with discomfort, and consequently may be interpreted as undesirable and "pathological." Both parents and educators often (usually not fully consciously) practise a kind of penalisation of bad emotions in children. It may take a form that is not necessarily physical. It is common to try to calm a child or a teenager down with messages that may be perceived as threats (e.g. "If you don't calm down, mummy will be sad," "If you want me to be healthy, then stop whining!," "You're feeling sorry for yourself, but I've had enough and you're going to make me sick!," etc.). The stereotypical perception of a person with emotional difficulties as weak, "inferior," less valuable, strange, infantile or clumsy is still pervasive in society. Children, especially in their teens, are at risk of being stigmatised and isolated by their peers if they cannot cope with their difficulties. The child's exposure to attitudes and practices such as punishment or ridicule in similar situations may partially reduce the external behavioural signs of their negative emotions, but in fact it contributes to their internalisation and, at the same time, reinforcement, which results in the lack of conscious contact with their own inner experiences and in an increase in psychological discomfort. Experiencing it in the form of negative bodily sensations becomes a seemingly new problem, but in actual fact it is a symptom of unrecognised and repressed emotions: the essence of somatisation[4,7,8,18].

Another important issue is the manner in which the conditions themselves and somatic complaints in general are perceived by members of the child's immediate environment. If in a given home environment there is a tendency to pay excessive attention to bodily complaints and stereotypically associate their causes with potential somatic diseases, then a similar model of perceiving one's own experiences is also gradually adopted by the child, which becomes the reason for the routine omission of the emotional factor as their possible cause[1,3,8]. Indeed, in the social space there is a widespread characteristic tendency to focus primarily on the physical causes of various symptoms and attach far more importance to somatic diseases than to psychological disorders, which are viewed by part of the population as seemingly less significant.

Some authors consider the defence function of somatic symptoms against experiencing excessively difficult emotions as an essential factor in the development of somatisation[1]. The psychodynamic approach sees it as a defence mechanism which seeks to transform emotional discomfort into physical symptoms[1,19]. The child's unconscious shifting of the burden of emotional difficulties to somatic symptoms may be the only manifestation of an existing, albeit imperceptible to those around him or her, psychological problem. In such situations, the child attracts the attention of the surroundings, which may have been lacking before, and the fear of losing it may additionally intensify negative emotions, and thus perpetuate and aggravate somatic symptoms[1,4] .

According to one theory, the causes of somatisation are also related to immature social adaptation, as the fact of reporting ailments may in a way facilitate the realisation of needs

Risk factors for somatisation in children and adolescents		
Non-modifiable	**Relatively modifiable**	**Modifiable**
• Female sex • Teenage years • Genetic susceptibility	• Traumatic events • Coexistence of physical disorders • Coexistence of other psychiatric disorders • Excessive sensitivity to pain • Low economic status	Negligence during upbringing Social problems Educational negligence Perception of secondary benefits of the disease

Tab. 1. Risk factors for somatisation in children and adolescents (author's own elaboration based on[1,3])

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Symptom	Differential diagnosis	Suggestions for additional studies (to be considered)
Abdominal pain	• Surgical causes (acute appendicitis, intussusception, perforation, hernia, trauma, bleeding, etc.) • Acute gastrointestinal infections (*Salmonella* sp., *Campylobacter* sp., rotavirus, adenovirus, etc.) • Inflammatory bowel disease • Cancer • Allergies and food intolerances • Functional disorders • Parasitoses • Gynaecological causes (adnexal torsion, ectopic pregnancy, menstrual pain, etc.) • Urinary tract infections • Kidney stones • Viral diseases (hepatitis, infectious mononucleosis, etc.) • Diabetes and other endocrinopathies • Pathological conditions outside the abdominal cavity (tonsillitis, lower lobe pneumonia, arthritis, etc.) • Undesirable effects of medicines	• CBC with white blood cell smear • Inflammatory parameters • Urinalysis with urine sediment examination • Transaminases • Creatinine • Glucose • Ionogram • Bilirubin • Amylase • GGTP • LDH • Blood coagulation parameters • TSH • Total IgE • Faecal examination (bacteriology, viruses, parasites) • Urine culture • Virological tests (hepatitis, EBV) • Abdominal and pelvic ultrasound • X-ray of the abdominal cavity • CT/MRI of the abdomen • Food allergy test panel • Food tolerance tests • Faecal calprotectin • Faecal occult blood • Endoscopic examination with possible histopathological bowel evaluation • Surgical consultation • Gynaecological consultation
Headache	• Cancer • Injuries • Neuroinfections (including meningitis and neuroborreliosis) • Hypertension • Sinusitis • Ophthalmic diseases • Migraine • Anaemia • Cranial nerve inflammation • Vasculitis • CNS vascular malformations • CNS malformations • Blood coagulation disorders • Organic sleep disorders • Deficiency conditions (e.g. poor diet) • Use of psychoactive substances and/or drugs • Effects of other toxins	• CBC with white blood cell and reticulocyte smear • Inflammatory parameters • Glucose • Ionogram • Ferritin • LDH • Blood coagulation parameters • Gasometry • Tests for Lyme disease • General and serological examination of CSF • CSF culture • Blood culture • RR measurement/Holter RR • Drug test • X-ray of paranasal sinuses • CT/MRI of the head (with angio option) • EEG • Polysomnography • Neurological consultation • Ophthalmic consultation • Otolaryngology consultation

Tab. 2. Differentiation and suggestions for additional tests in the causal diagnosis of potentially psychogenic somatic symptoms in children and adolescents (author's own elaboration based on[17], with own modifications)

for which the child has not developed "more mature" ways of satisfying[1,20].

Tab. 1 summarises the most relevant risk factors for somatisation in children and adolescents, divided into potentially modifiable and non-modifiable.

DIAGNOSTICS

The diagnosis of the psychogenic basis of somatic symptoms, as a rule, requires the exclusion of non-psychological causes, including primarily acute surgical conditions, neoplastic diseases, and organic and functional pathologies affecting vital body organs and systems[1,3]. The procedure leading to a definitive diagnosis is therefore complex, often arduous, and it requires increased vigilance. Tab. 2 presents relevant conditions and disease entities from the point of view of the diagnostic process, which should be taken into account in differentiating the causes of individual symptoms, as well as selected proposals for additional tests and specialist consultations helpful in establishing the diagnosis[17]. It should be emphasised that the nature and severity of symptoms may vary. Therefore, the selection of specific detailed diagnostic examinations and tests must always be made on a case by case basis, taking into consideration the patient's history, results of preliminary examinations, possible comorbidities and other burdens.

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Symptom	Differential diagnosis	Suggestions for additional studies (to be considered)
Chest pain/stinging, palpitations	• Heart defects (congenital, cardiomyopathies, etc.) • Heart rhythm disturbances • Myocarditis • Infections (including *S. viridans*, cardiotropic viruses) • Vascular malformations • Injuries • Inflammatory diseases of the respiratory system • Pneumothorax • Anaemia • Blood coagulation disorders • Neuromuscular pains • Tietze syndrome • Pathologies within the abdominal cavity • Use of psychoactive substances	• CBC with white blood cell and reticulocyte smear • Inflammatory parameters • Glucose • Ionogram • Transaminases • Troponin • CPK • NT-proBNP • TSH, FT3, FT4 • Blood coagulation parameters • Ferritin • Lipid profile • ASO • Drug test • Blood culture • ECG/Holter ECG • Exercise test • Echocardiography • Measurement of RR and pulse at the extremities • Chest X-ray • Chest CT/MRI • Abdominal ultrasound • Gastroscopy • Oesophageal pH-metry • Cardiology consultation
Syncope	• Cardiovascular diseases (as above) • Neurological diseases (as above), including epilepsy, demyelinating disorders, etc. • Anaemia • Diabetes • Thyroid diseases • Vascular malformations • Respiratory diseases • Deficiency conditions (e.g. poor diet) • Infections • Sleep disorders • Metabolic disorders • Use of psychoactive substances and/or drugs • Poisoning (e.g. carbon monoxide)	• CBC with white blood cell and reticulocyte smear • Inflammatory parameters • Glucose/OGTT • Transaminases • Ionogram • Ferritin • Troponin • TSH, FT3, FT4 • Urinalysis • Gasometry • Tests for Lyme disease • General CSF analysis • Bacteriological examinations (including blood and CSF cultures) • Drug test • ECG/Holter ECG • RR measurement/Holter RR • Orthostatic test • Exercise test • Echocardiography • EEG • Ultrasound of the carotid vessels • Abdominal ultrasound • Chest X-ray • CT/MRI of the head • Polysomnography • Cardiology consultation • Neurological consultation

Tab. 2. Differentiation and suggestions for additional tests in the causal diagnosis of potentially psychogenic somatic symptoms in children and adolescents (author's own elaboration based on[17], with own modifications) (cont.)

Establishing the diagnosis of emotional disorder with somatisation does not have to be preceded by all possible examinations to determine the potential somatic cause of the complaint. The decision to order a given test should be based primarily on relevant data from the patient's history, analysis of potential benefits, optionality and usefulness, and thus the actual need for examination in each particular case. The doctor diagnosing the patient's condition should keep in mind and continuously assess the possibility and likelihood of the involvement of a psychogenic factor in triggering the observed symptoms[3]. However, it is contraindicated to suggest or imply such an aetiological possibility to the patient or his/her caregiver before the completion of the diagnostic process, as it may complicate the patient–doctor relationship[1], contributing to the emergence of additional doubts and a decrease in mutual trust, as well as paradoxical reactions on the part of the patient, and thus hindering and prolonging the path leading to the final diagnosis.

A complementary and fundamental element of the diagnostic process in a patient followed up for somatic complaints which are suspected to be related to psychological

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Symptom	Differential diagnosis	Suggestions for additional studies (to be considered)
Shortness of breath	• Acute respiratory infections • Bronchial asthma • Cardiovascular diseases (as above) • Chest injuries • Pneumothorax • Thyroid diseases • Anomalies of the nasopharyngeal cavity • Congenital diseases (e.g. cystic fibrosis) • Metabolic disorders • Skeletal defects • Tumours • Blood coagulation disorders • Foreign body • Poisoning (e.g. carbon monoxide)	• CBC with white blood cell smear • Inflammatory parameters • Ionogram • Gasometry • Transaminases • Troponin • TSH, FT3, FT4 • Blood coagulation parameters • Alkaline phosphatase • Total IgE • Allergy tests • Bacteriological examinations (including blood culture, sputum examination) • Virological tests (including influenza, COVID-19) • Specific tests for certain diseases (e.g. cystic fibrosis) • Saturation measurement • Chest X-ray • ECG/Holter ECG • Echocardiography • Spirometry • Bronchoscopy • Chest CT/MRI • Thyroid ultrasound • Pulmonology consultation • Otolaryngology consultation • Cardiology consultation
Diarrhoea	• Acute gastrointestinal infections (*Salmonella* sp., *Campylobacter* sp., rotavirus, adenovirus, etc.) • Inflammatory bowel disease • Allergies and food intolerances • Parasitoses • Functional disorders • Hyperthyroidism • Undesirable effects of medicines • Dietary imbalances (e.g. excessive intake of sweet juices)	• CBC with white blood cell smear • Inflammatory parameters • Ionogram • Glucose • Gasometry • Urinalysis with urine sediment examination • Transaminases • Amylase • Creatinine • Urea • TSH, FT3, FT4 • Total IgE • Faecal examination (bacteria, viruses, parasites) • Abdominal and pelvic ultrasound • Food allergy test panel • Food tolerance tests • Faecal calprotectin • Faecal occult blood • Colonoscopy with histopathological examination of the bowel

Tab. 2. Differentiation and suggestions for additional tests in the causal diagnosis of potentially psychogenic somatic symptoms in children and adolescents (author's own elaboration based on[17], with own modifications) (cont.)

problems is an assessment conducted by a clinical psychologist or psychiatrist specialising in children and adolescents[4,18]. Therefore, in the routine practice of paediatric wards, a specialist in psychiatric disorders of developmental age proves to be a valuable and indispensable member of the diagnostic and therapeutic team. The optimal solution involves cooperation of the paediatric ward with the counselling centre for child and adolescent mental health, to which patients can be referred when somatic causes of complaints have been definitely excluded during diagnostic hospitalisation. The specialist diagnostic and therapeutic process can be continued on an outpatient basis in this clinic. On the other hand, if an organic, functional or other somatic disorder is suspected in a patient who was initially referred to a mental health clinic, he or she may be referred from the clinic to the paediatric ward for the necessary evaluations.

CHARACTERISTICS OF PSYCHOGENIC SYMPTOMS

Somatic manifestations of mental problems can be very diverse and complex in nature and location. Although the exclusion of the somatic background is necessary for definitive diagnosis, some specific features may raise the suspicion of the psychogenic nature of symptoms. The most important is the temporal relationship between the occurrence of certain symptoms and a stressful stimulus[18]. The cause-and-effect relationship between the appearance and disappearance of symptoms, and the impact of specific stimuli, is sometimes

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Symptom	Differential diagnosis	Suggestions for additional studies (to be considered)
Vomiting	• Surgical causes (acute appendicitis, intussusception, perforation, trauma, bleeding, etc.) • Neoplastic diseases (including CNS and abdominal tumours) • Acute gastrointestinal infections • Neuroinfections • Concussion • Peptic ulcer disease • Reflux disease • Allergies and food intolerances • Acute otitis media • Functional disorders • Metabolic disorders • Diseases of the vagus • Migraine • Parasitoses • Pregnancy • Alcohol poisoning • Undesirable effects of medicines • Dietary imbalances	• CBC with white blood cell smear • Inflammatory parameters • Glucose • Ionogram • Gasometry • Transaminases • Creatinine • Urea • Bilirubin • Amylase • LDH • Food allergy test panel • Food tolerance tests • Concentration of ethyl alcohol • Toxicological tests • General and serological examination of CSF • Virological tests • Bacteriological examinations (CSF culture, rectal swab culture, blood culture) • Parasitological examinations • Abdominal and pelvic ultrasound • X-ray of the abdominal cavity • Gastroscopy with urease test • CT/MRI of the head • CT/MRI of the abdomen • Surgical consultation • Neurological consultation • Otolaryngology consultation • Gynaecological consultation
Cough	• Acute inflammatory conditions of the respiratory system • Sinusitis • Allergy • Bronchial asthma • Use of stimulants • Inhalatory exposure to toxins • Reflux disease • Vascular malformations • Structural changes in the respiratory system (e.g. fibrosis, dilatation) • Congenital diseases (e.g. cystic fibrosis) • Tumours • Foreign body • Cardiovascular diseases • Peripheral nerve irritation	• CBC with white blood cell smear • Inflammatory parameters • Gasometry • Total IgE • LDH • Saturation measurement • Chest X-ray • Sinus X-ray • Allergy tests • Bacteriological tests (including tests for atypical pathogens) • Virological tests (including influenza, COVID-19) • Specific tests for certain diseases (e.g. cystic fibrosis) • Spirometry • Bronchoscopy • Sputum examination • Drug test • Gastroscopy • Oesophageal pH-metry • Chest CT/MRI • ECG • Pulmonology consultation • Otolaryngology consultation

Tab. 2. Differentiation and suggestions for additional tests in the causal diagnosis of potentially psychogenic somatic symptoms in children and adolescents (author's own elaboration based on[17], with own modifications) (cont.)

noticed by parents or carers of the child. Often, however, especially in the case of older children, is the association is difficult to grasp. Identifying it requires a skilful conversation with the child, during which it may turn out that the child is experiencing a situation from the past or simply an imagined state, at the basis of which lies a strong negative emotion resulting from a traumatising experience and fear of its recurrence[1,3].
In addition to the inferences that can be drawn from a child's behaviour in a particular situational context, certain characteristic features of individual symptoms can help to guide the diagnostic process.

Abdominal pain – is the most commonly reported and often the only symptom in the course of somatisation in preschool children and pupils in primary education classes, though it can occur at any age. Psychogenic abdominal pain usually presents as cramps or pressure located mainly in the medial line, primarily in the mediastinum (umbilical region), or it is diffuse and does not have one specific location[6]. Older children may locate the complaints in the middle epiqgastrium as well as in the lower abdomen, often complaining of pain accompanied by urgency to defecate, bloating, constipation and/or diarrhoea and lack of appetite.

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Symptom	Differential diagnosis	Suggestions for additional studies (to be considered)
Dizziness	• Cancer • Injuries • Neuroinfections • Hypertension • Anaemia • Diabetes • Deficiency conditions (e.g. poor diet) • Otolaryngological disorders (e.g. vagus diseases, damage to the eardrum) • Cranial nerve VIII damage • Cardiovascular diseases • Use of psychoactive substances and/or drugs • Organic sleep disorders • Poisoning (e.g. carbon monoxide)	• CBC with white blood cell and reticulocyte smear • Inflammatory parameters • Glucose • Ionogram • Gasometry • Ferritin • Transaminases • Troponin • LDH • Tests for Lyme disease • Drug test • RR measurement/Holter RR • ECG • Ultrasound of the carotid vessels • CT/MRI of the head (with angio option) • Polysomnography • Neurological consultation • Otolaryngology consultation • Ophthalmic consultation
Pain in extremities	• Cancer • Injuries • Rheumatological diseases • Anatomical defects of the locomotor system • Post-infectious myositis • Lyme disease • Acute infections • Blood coagulation disorders • Vascular diseases • Vitamin D deficiency • Growth pains • Stress pains	• CBC with white blood cell smear • Inflammatory parameters • Ionogram (including Ca, ionised Ca and P) • Blood coagulation parameters • Urinalysis with urine sediment examination • Transaminases • Creatinine • Uric acid • CPK • LDH • Alkaline phosphatase • Rheumatoid factor • Immunological markers • ASO • Vitamin D • Tests for Lyme disease • Virological tests (including influenza, COVID-19) • Bacteriological tests (including blood cultures) • Targeted X-ray • Joint ultrasound • Vascular ultrasound • EMG • Rheumatological consultation • Orthopaedic consultation

sp. – species; **hepatitis** – viral hepatitis; **CBC** – complete blood count; **GGTP** – gamma-glutamyl transpeptidase; **LDH** – lactate dehydrogenase; **TSH** – thyroid stimulating hormone; **IgE** – immunoglobulin type E; **EBV** – Epstein–Barr virus; **X-ray** – radiography; **CT** – computed tomography; **MRI** – magnetic resonance imaging; **CNS** – central nervous system; **CSF** – cerebrospinal fluid; **RR** – blood pressure; **angio** – vascular examination; **EEG** – electroencephalography; ***S. viridans*** – *Streptococcus viridans*; **CPK** – creatine phosphokinase; **NT-proBNP** – N-terminal pro B-type natriuretic peptide; **FT3** – free triiodothyronine; **FT4** – free thyroxine; **ASO** – antistreptolysin O, antistreptolysin reaction; **ECG** – electrocardiography; **OGTT** – oral glucose tolerance test, oral glucose load test; **COVID-19** – coronavirus disease 2019; **Ca** – calcium; **P** – phosphorus; **EMG** – electromyography.

Tab. 2. Differentiation and suggestions for additional tests in the causal diagnosis of potentially psychogenic somatic symptoms in children and adolescents (author's own elaboration based on[17], with own modifications) (cont.)

Headache – mainly affects adolescents, although it is increasingly observed in younger children. It involves the frontal area, temples, occipital area or even the entire head, and it is usually symmetrical in severity, compressive and dull in character. It may persist despite the administration of painkillers. It is also characterised by recurrence with a tendency to being located in the same areas of the head. It is often accompanied by a palpable tension of the muscles of the forehead, neck and shoulder girdle[21]. Pain may occur at regular intervals (e.g. daily) or at certain times of the day and very often accompany long-term stress.

Cough – in psychogenic cases it is dry, shallow and tiring, with a tendency to intensify during the day and subside at night (which distinguishes this type of dry cough from cough associated with allergy and infections of atypical aetiology) and while speaking[22]. During respiratory infections, it may be accompanied by expectoration of secretions, but once acute inflammation has subsided, it becomes unproductive again. It generally does not resolve despite anti-infective treatment and cough suppressants. It is characteristic that it is not accompanied by any other symptoms normally occurring in the course of respiratory infections (rhinitis, fever); nevertheless, respiratory infections may provoke the emergence of psychogenic cough[22].

Diarrhoea – usually occurs a relatively short period of time before a stressful event (a characteristic association

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Types of child and adolescent psychotherapy
Cognitive behavioural therapy
Psychoanalytic therapy
Psychodynamic therapy
Humanistic-existential therapy
Systemic therapy
Eclectic therapy

Tab. 3 Types of psychotherapy for children and adolescents (author's own elaboration based on[18,19])

is observed with school situations such as tests or exams) and is a fairly common symptom of strong emotional experiences recurring repetitively in certain individuals. It is usually accompanied by lower abdominal pain and a feeling of overflowing in the abdomen[23]. The volume of stool is usually not large, and the consistency is loose, with visible mucus, without any other characteristics of infectious enteritis. In contrast to diarrhoea accompanying food poisoning, diarrhoea due to psychogenic factors (especially if it is connected to a specific event) usually lasts shorter (usually it subsides within one day) and usually does not cause dehydration.

Vomiting – may occur in situations of stress of considerable intensity[24]. In view of the fact that vomiting is often provoked by children during intense experiences and there is no obvious infectious cause, the vomit may contain no food remains but only mucus and saliva. This is especially the case when the child does not want to eat in stressful situations. Sometimes only the vomiting reflex is present, which does not cause the stomach contents to be expelled outside. An important factor provoking vomiting in the states of increased emotional tension may be vagus nerve stimulation occurring in connection with the vomiting reflex, which through parasympathetic nervous pathways contributes to a temporary decrease in vegetative tension and calming of the child.

Stinging in the chest, as well as **heart palpitations**, episodes of **dyspnoea** and **numbness of the limbs**, in many cases occur simultaneously and as such may be components of disease syndromes, such as the paroxysmal anxiety disorder, which, as it is definitely psychogenic, manifests itself as complex, strong somatic sensations[25]. These symptoms can also be a manifestation of generalised psychomotor agitation as a result of the use of psychoactive drugs. Chest discomfort, shortness of breath and **a feeling of tightness in the throat** as isolated symptoms are mostly present in adolescent girls. Similarly, **fainting spells** are characteristic of adolescent girls in particular (especially slim and tall ones), the psychological background of which may coexist with also psychologically determined malnutrition (restrictive diets, anorexia)[18,25].

It should be remembered that somatic complaints being a manifestation of emotional problems may also overlap in children with coexisting symptoms of actual somatic diseases, both acute and chronic. They may also be an effect of the child emotionally experiencing a particular somatic disease, contributing to the intensification of discomfort, and thus complicating the presentation of the disease and the appearance of additional diagnostic difficulties[1,3].

TREATMENT

The primary task of the paediatrician and/or primary care physician who manages a minor patient in whom a psychogenic background of the observed somatic symptoms is suspected, as already mentioned, is to try to exclude their somatic causes. Therefore, such patients, after an initial diagnostic procedure in the primary healthcare facility, are often referred to hospital for appropriate diagnostic evaluations before they are transferred, if needed, to the control of an appropriate specialist clinic.

If, in the case of the child in question, possible non-psychological causes of the complaints can be ruled out, and the consulting child and adolescent psychologist or psychiatrist confirms that they are clearly linked to factors having a negative impact on the child's mental sphere, then the patient should be referred to the child and adolescent mental health clinic. The team of specialists dealing with mental disorders of developmental age will determine and select the type of therapy appropriate in such a situation, which in principle can have two components: psychotherapy and pharmacotherapy[1,3,18].

Psychotherapy can take the form of individual therapy, but because of the need to modify the home relationships which are behind the child's poor psychosomatic state, it often also involves group therapy (family psychotherapy). The most commonly used forms of child and adolescent psychotherapy include cognitive behavioural therapy and psychodynamic therapy. Cognitive-behavioural psychotherapy is considered to be the most effective modality in the treatment of somatisation disorders, whose principle and aim is to support the patient in adapting to the environment through shaping favourable and eliminating unfavourable behaviours[1,3,18]. Tab. 3 lists selected types of child and adolescent psychotherapy.

In the treatment of emotional disorders in children, pharmacological agents are used relatively less frequently than in adults. In such situations, therapy usually includes mildly sedative herbal preparations[1] (extracts from valerian root, lemon balm leaves, hop cones), antihistamines of the first generation (hydroxyzine) and antidepressants from the group of tricyclic antidepressants (TCAs) and selective serotonin reuptake inhibitors (SSRIs) which, following a sufficiently long period of use, show anti-anxiety effects[1,3,18]. The use and dosage of antidepressants should be subject to regular review by a psychiatrist.

In the treatment of children with somatisation problems, moreover, universal and timeless health recommendations should not be forgotten, including outdoor exercise, a properly balanced diet, ensuring comfort in meeting physiological needs (such as proper sleep conditions), resting hygiene and isolation from harmful environmental factors[8,18].

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Elements of adult–child relationships relevant to good mental health hygiene
Teaching and encouraging the child to recognise and describe his/her emotions (especially negative ones), combined with acceptance of the content the child expresses
Teaching the child to accept and embrace failure
Making demands on the child appropriate to his/her age and intellectual and physical abilities
Showing the child understanding, and avoiding belittling his/her problems, even when they seem trivial or unimportant
Giving sufficient time and attention to the child, not only when he/she has a problem or complaint, but also in normal everyday situations

Tab. 4. Elements of relationships important for maintaining proper mental health hygiene of children and adolescents (author's own elaboration based on[4])

Symptomatic treatment in cases of certain somatic complaints of psychogenic origin is limited to possible temporary administration of analgesics or mildly acting drugs with diastolic effects. In case of severe diarrhoea or vomiting, water-electrolyte imbalance should be prevented. Physical relaxation methods are also of some benefit in reducing the severity of symptoms[8].

PREVENTION

While the phenotype and the course of individual development are factors responsible primarily for providing the body with optimal physical conditions for development (appropriate physical conditions in the environment, well-balanced diet, possibilities for effective fulfilment of physiological needs, consistently good quality of hygiene, promotion of physical activity, prevention of diseases, etc.), though psychosocial factors are also important here, influencing the child through specific examples of behaviour and reactions provided by the community in which he/she is growing up is the issue which, in a psychological context, is in principle likely to be subject to the most significant modifications.

In their close surroundings, the child finds examples of emotional reactions, attitudes caused by them, and ways of coping with negative emotions and the effects of stress. The role of parents and carers is to dose external stimuli both qualitatively and quantitatively, so that their intensity does not have a negative impact on the mental development of the child. The optimal form of upbringing is to organise the environment of young people in a way that stimulates their development and consolidates positive patterns of behaviour[4].

Physicians taking care of minor patients should make their parents and guardians aware of the essence and importance of health problems related to the negative impact on the psychology of children and adolescents. Optimal practice is based on a holistic analysis of the patients' health problems. At the end of the day, if children show disturbing symptoms, regardless of whether they have an underlying somatic or psychogenic cause, their parents are more likely to report them to a paediatrician or general practitioner before they are treated as symptoms of an emotional disorder. That is why it is so important in psychoprophylaxis and health prevention in general that doctors promote family, home and upbringing relationships that will contribute as much as possible to the protection of the mental health of young people. Tab. 4 presents selected elements of communication and interaction between parents, carers and educators, and children and adolescents, which can significantly contribute to optimising the hygiene of their development and mental state, and indirectly also their somatic status[4].

CONCLUSIONS

Somatic symptoms in children and adolescents can have, and increasingly do have, a psychogenic background. They are usually caused by unconscious negative emotions. The diagnosis of emotional disorders manifesting themselves somatically requires, in the first step, the exclusion of the most important organic and functional causes, followed by an assessment of the patient by a clinical psychologist or a child and adolescent psychiatrist. Psychotherapy combined with reliable and consistent cooperation of the child's parents or guardians with the therapist play a fundamental part in the treatment of somatisation. The role of the paediatrician and general practitioner is to observe juvenile patients for somatisation disorders, make the patients and their families aware of the importance of psychogenic factors in their development, and take preventive measures as an early stage in order to protect the health of the population understood as the psychosomatic well-being of its members.

Conflict of interest

The author declares no financial or personal relationships with other persons or organisations that could negatively influence the content of the publication and claim the right to this publication.

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