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PSYCHOSOMATIC DISEASES AND THE IMPACT OF EMOTIONAL STRESS ON THE HUMAN ORGANISM

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Annotation: This article examines the influence of emotional stress on the development and progression of psychosomatic diseases. Modern scientific studies confirm that chronic emotional stress affects the nervous, endocrine, immune, and cardiovascular systems, thereby contributing to the emergence of psychosomatic disorders. The article analyzes the physiological mechanisms of stress, the role of cortisol and catecholamines, and the relationship between psychological factors and somatic pathology. Particular attention is paid to diseases such as hypertension, bronchial asthma, peptic ulcer disease, irritable bowel syndrome, and dermatological disorders. The paper also discusses diagnostic approaches, preventive strategies, and psychotherapeutic interventions aimed at reducing psychosomatic manifestations. The study is based on evidence from international scientific literature and clinical observations.

Keywords: Psychosomatic diseases, emotional stress, cortisol, autonomic nervous system, психophysiology, hypertension, anxiety, depression, immune system, psychosomatic medicine, chronic stress, neuroendocrine mechanisms.

Introduction

Psychosomatic medicine is a multidisciplinary field that studies the interaction between psychological processes and physical diseases. The term “psychosomatic” originates from the Greek words *psyche* (mind) and *soma* (body), reflecting the inseparable relationship between emotional and physiological states [1]. Emotional stress has become one of the most significant health-related problems of the modern era due to rapid social, economic, and technological changes.

The World Health Organization has identified stress-related disorders as a major public health concern because chronic stress contributes to cardiovascular diseases, gastrointestinal disorders, metabolic syndrome, depression, and immune dysfunction [2]. Emotional stress activates neuroendocrine pathways involving the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system. Persistent activation of these systems causes physiological imbalance, increasing susceptibility to psychosomatic diseases [3].

Studies demonstrate that prolonged stress exposure elevates cortisol secretion and sympathetic activity, leading to increased blood pressure, inflammatory reactions, altered immune responses, and disturbances in gastrointestinal motility [4]. Psychosomatic disorders often arise when unresolved emotional conflicts manifest through physical symptoms. Clinical observations indicate that individuals exposed to chronic anxiety, depression, workplace stress, or traumatic experiences have a higher risk of developing somatic illnesses [5].

The aim of this article is to analyze the scientific evidence concerning the influence of emotional stress on the organism in psychosomatic diseases and to evaluate the mechanisms through which psychological stress contributes to physical pathology.

Methodology

The study employed a qualitative analytical methodology based on a review of international scientific literature, clinical guidelines, and peer-reviewed articles published in medical journals

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between 2000 and 2024. Data were collected from sources indexed in PubMed, Scopus, Web of Science, and Google Scholar databases.

The selection criteria included:

- scientific articles focusing on psychosomatic diseases;
- studies examining stress physiology and neuroendocrine responses;
- clinical investigations related to emotional stress and chronic disease;
- meta-analyses and systematic reviews in psychosomatic medicine.

The collected materials were analyzed using comparative, descriptive, and evidence-based approaches. Physiological and psychological mechanisms were evaluated according to current clinical and experimental findings.

Results

Scientific evidence demonstrates that emotional stress significantly affects the human organism through neuroendocrine and immunological mechanisms. Stress responses are primarily mediated by activation of the HPA axis and the sympathetic-adrenal-medullary system [6].

Under stressful conditions, the hypothalamus secretes corticotropin-releasing hormone (CRH), stimulating the pituitary gland to release adrenocorticotropic hormone (ACTH). ACTH subsequently activates cortisol secretion from the adrenal cortex [7]. Cortisol is essential for short-term adaptation; however, chronic elevation produces harmful effects including immune suppression, insulin resistance, hypertension, and metabolic disturbances [8].

Research indicates that chronic stress increases inflammatory cytokines such as interleukin-6 (IL-6) and tumor necrosis factor-alpha (TNF-α), which contribute to chronic inflammatory diseases [9]. Emotional stress also alters autonomic nervous system activity, causing excessive sympathetic stimulation and reduced parasympathetic regulation. This imbalance is associated with tachycardia, elevated blood pressure, and endothelial dysfunction [10].

Cardiovascular diseases are among the most common psychosomatic conditions linked to stress. Studies reveal that individuals experiencing chronic psychological stress have a significantly higher risk of hypertension and coronary artery disease [11]. Emotional stress promotes vasoconstriction, platelet aggregation, and inflammatory responses, increasing cardiovascular morbidity [12].

Gastrointestinal disorders also demonstrate strong psychosomatic associations. Stress influences gastric acid secretion, intestinal permeability, and gut microbiota composition [13]. Irritable bowel syndrome and peptic ulcer disease frequently worsen during periods of emotional distress [14].

Respiratory diseases such as bronchial asthma are affected by psychological factors. Stress-related autonomic imbalance can induce bronchoconstriction and inflammatory activation in susceptible individuals [15]. Dermatological diseases including psoriasis, eczema, and urticaria are also aggravated by emotional stress due to immune dysregulation and neurogenic inflammation [16].

Psychological stress additionally affects the immune system by decreasing natural killer cell activity and impairing host defense mechanisms [17]. Patients exposed to chronic stress exhibit increased vulnerability to infections and slower wound healing processes [18]

Analysis and Discussion

Modern psychosomatic medicine recognizes emotional stress as a multidimensional biological and psychological phenomenon capable of influencing nearly every organ system within the human body. Scientific investigations over recent decades have demonstrated that psychosomatic diseases emerge through continuous interactions between neuroendocrine

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regulation, immune responses, emotional experiences, and environmental stressors [19]. Emotional stress is no longer interpreted solely as a psychological condition; instead, it is considered a systemic physiological process capable of disrupting homeostasis and accelerating pathological changes throughout the organism.

One of the most influential theoretical frameworks explaining stress physiology is Hans Selye's General Adaptation Syndrome. According to Selye, the human organism responds to prolonged stress through three major stages: alarm, resistance, and exhaustion [20]. During the alarm stage, the sympathetic nervous system becomes activated, preparing the organism for immediate survival responses commonly referred to as "fight or flight." Catecholamines such as adrenaline and noradrenaline increase heart rate, blood pressure, and glucose mobilization to support rapid adaptation [21]. While these responses are protective during acute stress exposure, persistent activation gradually leads to physiological imbalance.

The resistance stage develops when stress exposure continues for prolonged periods. At this stage, the hypothalamic-pituitary-adrenal axis remains chronically stimulated, resulting in sustained cortisol secretion. Cortisol initially serves adaptive purposes by regulating energy metabolism and suppressing excessive inflammatory responses. However, chronic hypercortisolemia produces harmful physiological consequences, including insulin resistance, visceral obesity, endothelial dysfunction, and immune suppression [22]. Eventually, prolonged stress exposure results in the exhaustion stage, characterized by decreased adaptive capacity, chronic fatigue, hormonal imbalance, and increased susceptibility to psychosomatic diseases.

Neuroscientific research has provided substantial evidence that chronic emotional stress induces structural and functional changes within the brain. The hippocampus, a region associated with memory formation and emotional regulation, demonstrates reduced neurogenesis under prolonged stress conditions [23]. Elevated glucocorticoid exposure damages hippocampal neurons and impairs synaptic plasticity, leading to cognitive dysfunction, concentration difficulties, and emotional instability. Simultaneously, chronic stress enhances activity within the amygdala, the brain structure responsible for fear processing and emotional reactivity. Increased amygdala activation intensifies anxiety responses and perpetuates psychosomatic symptom development.

The prefrontal cortex, which regulates decision-making and emotional control, is also negatively affected by chronic stress. Studies using neuroimaging techniques demonstrate reduced prefrontal cortical activity among individuals experiencing persistent psychological distress [24]. This reduction weakens emotional regulation mechanisms and increases vulnerability to impulsive behavior, depression, anxiety disorders, and maladaptive coping strategies. These neurobiological findings confirm that emotional stress exerts measurable physiological effects on the central nervous system rather than functioning as an abstract psychological experience alone.

The endocrine system represents another major target of stress-related pathology. Activation of the hypothalamic-pituitary-adrenal axis results in increased secretion of corticotropin-releasing hormone, adrenocorticotropic hormone, and cortisol [25]. Persistent cortisol elevation contributes significantly to psychosomatic pathology because glucocorticoids influence carbohydrate metabolism, lipid metabolism, immune activity, and cardiovascular regulation. Chronic stress has therefore been strongly associated with metabolic syndrome, obesity, hyperlipidemia, and type 2 diabetes mellitus.

Furthermore, prolonged cortisol exposure suppresses immune surveillance mechanisms and alters inflammatory regulation. Research in psychoneuroimmunology demonstrates that chronic stress stimulates the production of pro-inflammatory cytokines including interleukin-1,

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interleukin-6, and tumor necrosis factor-alpha [26]. Persistent low-grade inflammation contributes to endothelial damage, atherosclerosis, autoimmune disorders, and neurodegenerative diseases. Elevated inflammatory markers have also been identified in patients suffering from depression and anxiety, illustrating the bidirectional relationship between psychological disorders and somatic pathology.

The autonomic nervous system also plays a fundamental role in psychosomatic disease development. Chronic sympathetic activation increases heart rate, peripheral vascular resistance, and catecholamine secretion [27]. Simultaneously, parasympathetic activity becomes suppressed, reducing the organism's ability to restore physiological balance. This autonomic imbalance contributes to hypertension, arrhythmias, gastrointestinal dysfunction, and respiratory disorders.

Cardiovascular diseases are among the most extensively studied psychosomatic conditions associated with emotional stress. Epidemiological evidence demonstrates that chronic occupational stress, social isolation, financial instability, and traumatic life experiences significantly increase the risk of hypertension, coronary artery disease, myocardial infarction, and stroke [28]. Emotional stress induces vasoconstriction, increases platelet aggregation, and promotes endothelial injury, all of which accelerate atherosclerotic processes.

Clinical studies indicate that individuals exposed to prolonged emotional distress frequently exhibit elevated blood pressure and abnormal heart rate variability [29]. Excessive sympathetic stimulation also contributes to increased myocardial oxygen demand, thereby worsening ischemic heart disease. Psychological factors such as hostility, anxiety, and depression are now recognized as independent cardiovascular risk factors comparable to smoking and obesity.

Stress-induced inflammatory mechanisms additionally contribute to cardiovascular pathology. Chronic inflammation damages vascular endothelial cells and enhances plaque instability, increasing the probability of thrombosis and acute coronary syndromes [30]. Consequently, psychosocial stress management has become an essential component of modern cardiology and preventive medicine.

The gastrointestinal system is highly sensitive to emotional influences because of the complex bidirectional communication network known as the gut-brain axis. This system integrates neural, endocrine, and immune pathways connecting the central nervous system with the enteric nervous system [31]. Emotional stress alters gastrointestinal motility, secretion, intestinal permeability, and microbiota composition.

Functional gastrointestinal disorders such as irritable bowel syndrome demonstrate particularly strong psychosomatic associations. Patients with irritable bowel syndrome frequently report higher levels of anxiety, depression, and chronic stress compared to healthy individuals [32]. Stress-related autonomic imbalance disrupts intestinal motility and increases visceral hypersensitivity, producing symptoms including abdominal pain, bloating, diarrhea, and constipation.

Peptic ulcer disease also illustrates the relationship between stress and gastrointestinal pathology. Although *Helicobacter pylori* infection remains a major etiological factor, emotional stress contributes to increased gastric acid secretion, impaired mucosal defense, and delayed tissue healing [33]. Stress-induced changes in gastrointestinal blood flow and immune activity further increase susceptibility to mucosal injury.

The respiratory system is another important target of psychosomatic influences. Bronchial asthma is strongly affected by emotional and psychological factors. Stress activates autonomic and inflammatory pathways that contribute to bronchoconstriction and airway hyperresponsiveness [34]. Anxiety and panic states may exacerbate asthma attacks by increasing respiratory rate and sympathetic nervous system activation.

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Clinical observations demonstrate that psychological distress often worsens asthma control and reduces treatment adherence [35]. Children exposed to family conflict, parental stress, or traumatic experiences have been shown to experience more severe asthma symptoms and increased hospitalization rates. These findings emphasize the importance of psychological assessment in respiratory disease management.

Dermatological disorders also exhibit significant psychosomatic components. Conditions such as psoriasis, atopic dermatitis, urticaria, and acne vulgaris frequently worsen during periods of emotional stress [36]. Stress-related neuroimmune interactions contribute to inflammatory activation within the skin. Neurotransmitters and neuropeptides released during stress influence mast cell activity, cytokine production, and cutaneous blood flow.

Psoriasis, for example, demonstrates strong associations with psychological distress and depression. Chronic stress increases inflammatory cytokines involved in psoriatic plaque formation and exacerbation [37]. Similarly, patients with atopic dermatitis often report symptom aggravation during emotionally stressful situations. These observations support the concept that emotional and dermatological health are closely interconnected.

Psychological disorders themselves commonly coexist with psychosomatic diseases. Depression and anxiety are highly prevalent among patients suffering from chronic somatic illnesses [38]. Persistent pain, physical disability, and reduced quality of life contribute to emotional distress, while depression simultaneously worsens disease outcomes through behavioral and physiological mechanisms.

Depression has been associated with increased inflammatory activity, autonomic dysfunction, and reduced adherence to medical treatment [39]. Anxiety disorders may intensify somatic symptom perception, increase health-related fears, and perpetuate chronic illness behavior. Consequently, psychosomatic diseases should be approached through integrative models considering both physical and psychological dimensions of health.

Modern therapeutic strategies increasingly emphasize multidisciplinary interventions in psychosomatic medicine. Cognitive behavioral therapy has demonstrated significant effectiveness in reducing stress-related symptoms and improving emotional regulation [40]. This therapeutic approach helps patients identify maladaptive thought patterns, develop healthier coping mechanisms, and reduce physiological stress responses.

Mindfulness-based stress reduction programs have also shown beneficial effects on cardiovascular regulation, immune function, anxiety reduction, and pain management [41]. Relaxation techniques including progressive muscle relaxation, breathing exercises, meditation, and biofeedback contribute to autonomic stabilization and decreased sympathetic activation.

Pharmacological interventions may be necessary in patients experiencing severe anxiety, depression, or stress-related insomnia. Antidepressants and anxiolytics can improve emotional stability and indirectly reduce psychosomatic symptom severity [42]. However, pharmacological therapy is most effective when combined with psychological counseling and lifestyle modifications.

Lifestyle factors represent another critical aspect of psychosomatic disease prevention and management. Regular physical activity improves stress resilience by regulating cortisol secretion, enhancing endorphin release, and improving cardiovascular function [43]. Balanced nutrition, adequate sleep, and social support also strengthen physiological adaptation mechanisms and reduce vulnerability to chronic stress.

Preventive medicine increasingly acknowledges the importance of emotional well-being in maintaining overall health. Early identification of chronic stress and timely psychological intervention may significantly reduce disease progression and healthcare burden [44].

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Educational programs promoting stress management skills, emotional intelligence, and healthy coping strategies are therefore essential within modern healthcare systems.

The biopsychosocial model proposed by George Engel remains highly relevant in contemporary psychosomatic medicine because it integrates biological, psychological, and social dimensions of disease [19]. According to this model, human health cannot be fully understood through biological mechanisms alone. Social environment, personality characteristics, coping strategies, and emotional experiences all contribute to disease susceptibility and progression.

Conclusion

Emotional stress has a profound influence on the human organism and plays a critical role in the development of psychosomatic diseases. Chronic activation of neuroendocrine and autonomic mechanisms disrupts physiological homeostasis and contributes to cardiovascular, gastrointestinal, respiratory, dermatological, and immune disorders. Scientific evidence confirms that psychosomatic diseases arise from complex interactions between psychological and biological factors.

Modern psychosomatic medicine highlights the necessity of integrated diagnostic and therapeutic approaches combining medical, psychological, and social interventions. Stress management, psychotherapy, and preventive healthcare strategies are essential for reducing psychosomatic morbidity and improving quality of life. Further interdisciplinary research is required to better understand the molecular and neurobiological mechanisms linking emotional stress to somatic pathology.

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