

STRESS PHYSIOLOGY AND DOSHA IMBALANCE: BRIDGING AYURVEDA AND MODERN PSYCHONEUROIMMUNOLOGY

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ABSTRACT

Background: Stress is a multifaceted physiological and psychological response that occurs when an individual encounters internal or external challenges threatening homeostasis. While acute stress serves an adaptive function, chronic stress can lead to dysregulation of the nervous, endocrine, and immune systems, resulting in various psychosomatic and systemic disorders. Modern Psychoneuroimmunology (PNI) provides a scientific framework for understanding the bidirectional interactions between psychological processes, neural pathways, endocrine responses, and immune function. **Objective:** The present study aims to explore the relationship between stress physiology and *Dosha* imbalance by integrating the principles of *Ayurveda* with the modern concept of Psychoneuroimmunology. It seeks to understand the physiological mechanisms involved in the stress response, particularly the role of the hypothalamic-pituitary-adrenal (HPA) axis, sympathetic nervous system, and immune modulation. The study further aims to examine the *Ayurvedic* perspective of stress in terms of *Tridosha*, *Manasika Doshas*, and *Ojas*, and to correlate these concepts with neuroendocrine and immunological changes observed during stress. **Methodology:** The present study is a narrative review based on a comprehensive analysis of classical *Ayurvedic* literature and contemporary scientific publications. Relevant *Ayurvedic* concepts related to stress, *Tridosha*, *Manasika Doshas* (*Rajas* and *Tamas*), *Ojas*, and *Kriya Sharir* were collected from classical texts such as *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and their commentaries. Modern scientific information regarding stress physiology, the Hypothalamic-Pituitary-Adrenal (HPA) axis, autonomic nervous system, immune responses, and Psychoneuroimmunology was obtained from standard medical textbooks, peer-reviewed journals, and published research articles. The collected data were critically reviewed and analyzed to identify similarities and correlations between *Ayurvedic* concepts and contemporary scientific understanding of stress. A comparative and integrative approach was adopted to bridge traditional *Ayurvedic* knowledge with modern biomedical evidence, thereby providing a holistic perspective on the relationship between stress physiology and *Dosha* imbalance. **Results and Discussion:** The review revealed significant conceptual similarities between *Ayurvedic* descriptions of *Dosha* imbalance and the modern understanding of stress physiology. Stress activates the Hypothalamic-Pituitary-Adrenal (HPA) axis and the sympathetic nervous system, leading to the release of cortisol, adrenaline, and other stress mediators. These physiological changes closely resemble the manifestations of aggravated *Vata* and *Pitta Doshas* described in *Ayurveda*. *Vata* aggravation is associated with anxiety, restlessness, insomnia, and disturbed neural functions, while *Pitta* imbalance is linked to irritability, anger, hypermetabolism, and inflammatory responses. Chronic stress was found to affect immune regulation, resulting in increased susceptibility to infections and inflammatory disorders, which can be correlated with *Kapha* disturbance and depletion of *Ojas*, the *Ayurvedic* essence responsible for vitality, immunity, and overall well-being.

Conclusion: Stress is a complex physiological and psychological phenomenon that influences the nervous, endocrine, and immune systems, ultimately affecting overall health and well-being. The present review demonstrates that several concepts of modern stress physiology and Psychoneuroimmunology have notable parallels with *Ayurvedic* principles of *Tridosha*, *Manasika Doshas*, and *Ojas*. Activation of the HPA axis and sympathetic nervous system during stress can be correlated with the aggravation of *Vata* and *Pitta Doshas*, while stress-induced immune dysfunction resembles *Kapha* imbalance and *Ojas* depletion. *Ayurveda* emphasizes the interconnectedness of the mind and body and provides a holistic approach to maintaining health through the preservation of *Doshic* balance and mental equilibrium. The integration of *Ayurvedic* concepts with modern scientific understanding offers valuable insights into the mechanisms underlying stress-related disorders and highlights the potential of *Ayurvedic* interventions such as Yoga, Meditation, *Satvavajaya Chikitsa*, and *Rasayana* therapy in promoting stress resilience. Therefore, bridging *Ayurveda* and Psychoneuroimmunology may contribute to the development of comprehensive and integrative strategies for stress prevention, management, and overall health promotion.

KEYWORDS: Stress, *Tridosha*, *Vata-Pitta-Kapha*, Psychoneuroimmunology, HPA axis.

INTRODUCTION

Stress has become an unavoidable component of modern life due to rapid urbanization, changing lifestyle patterns, occupational demands, and psychosocial pressures. It is now recognized as a major contributing factor in the rising burden of non-communicable diseases, including hypertension, diabetes mellitus, cardiovascular disorders, anxiety, and depression. Stress is not merely a psychological state but a complex physiological response involving coordinated interactions among the nervous, endocrine, and immune systems that aim to restore homeostasis.^[6]

From a biomedical perspective, the stress response is primarily regulated by the Hypothalamic-Pituitary-Adrenal (HPA) axis and the sympathetic-adrenal-medullary system. Acute stress leads to adaptive physiological changes such as increased alertness, enhanced energy availability, and improved survival response. However, when stress becomes chronic or repeated, persistent activation of these systems leads to allostatic load, resulting in hormonal imbalance, immune suppression, neurochemical alterations, and systemic inflammation. Psychoneuroimmunology (PNI), an emerging interdisciplinary field, further explains how psychological stress influences neural signaling, endocrine secretion, and immune function in a bidirectional manner, thereby affecting disease susceptibility and progression.^[11]

In *Ayurveda*, health is defined as a state of equilibrium among *Doshas*, *Dhatus*, *Agni*, *Mala*, and a balanced state of mind and senses. *Kriya Sharir* describes the functional aspects of the human body based on *Tridosha* theory—*Vata*, *Pitta*, and *Kapha*—which govern all physiological and psychological processes. Stress-related conditions can be interpreted through the disturbance of these *Doshas*, particularly *Vata* (responsible for neural and movement functions) and *Pitta* (responsible for metabolic and transformative processes), along with secondary involvement of *Kapha* in chronic stages leading to emotional and physical inertia.

Ayurvedic texts also emphasize the role of *Manasika Doshas*, namely *Rajas* and *Tamas*, in influencing mental stability and perception. Excessive *Rajas* contributes to restlessness, anger, and overactivity, while dominance of *Tamas* leads to confusion, lethargy, and depressive states. Stressful conditions are often associated with an imbalance of these mental qualities, along with impairment of *Ojas*, which represents the essence of all bodily tissues and is considered essential for immunity, vitality, and psychological resilience.

Furthermore, classical *Ayurvedic* concepts such as *Pragyaparadha* (intellectual error), *Asatmya Indriyārtha Samyoga* (improper sensory interaction), and *Kala Parinama* (effect of time and environmental changes) provide an explanatory framework for stress-related disorders. These factors, when combined with lifestyle irregularities, contribute to progressive *Dosha* vitiation and disease manifestation.^[1]

In this context, drawing parallels between modern stress physiology and *Ayurvedic* principles offers a valuable integrative perspective. Such an approach not only enhances conceptual understanding but also highlights the potential role of *Ayurvedic* preventive and therapeutic strategies, including *Dinacharya* (daily regimen), *Ritucharya* (seasonal regimen), Yoga, Meditation, *Satvavajaya Chikitsa* (psychotherapy), and *Rasayana* therapy in maintaining neuroendocrine balance and immune resilience.^[3]

Therefore, this review aims to critically analyze and correlate the mechanisms of stress described in modern Psychoneuroimmunology with the *Ayurvedic* framework of *Dosha* imbalance, thereby contributing to a more holistic understanding of stress and its management in contemporary healthcare.^[5]

Concept of Stress in Modern Science

In modern physiology, stress is understood as a state of threatened homeostasis that triggers coordinated responses across multiple body systems. The central mechanism involves activation of the Hypothalamic-Pituitary-Adrenal (HPA) axis and the sympathetic nervous system. The release of cortisol and catecholamines such as adrenaline and noradrenaline helps the body adapt to acute stress by increasing energy

availability, enhancing alertness, and improving survival response. However, prolonged or repeated activation of these systems leads to allostatic overload, resulting in metabolic imbalance, immune suppression, neurochemical disturbances, and structural changes in brain regions such as the hippocampus and amygdala.^[7]

Psychoneuroimmunology and Stress Response

Psychoneuroimmunology (PNI) is an interdisciplinary field that explores the interactions between psychological processes, the nervous system, the endocrine system, and the immune system. It provides evidence that stress is not only a mental experience but also a biological event that affects immune regulation and inflammatory processes. Chronic stress has been associated with increased levels of pro-inflammatory cytokines, reduced natural killer cell activity, and impaired immune surveillance. These changes explain the link between long-term stress and increased susceptibility to infections, autoimmune disorders, and chronic inflammatory diseases.^[10]

Stress in Ayurvedic Perspective

Ayurveda does not describe stress as a single disease entity; instead, it explains stress-related conditions through the imbalance of *Doshas* and disturbance of mental faculties. According to *Kriya Sharir*, the functional integrity of the body depends on the balance of *Vata*, *Pitta*, and *Kapha*, along with proper functioning of *Agni*, *Dhatu*s, and *Mala*. Stress is primarily associated with *Vata* aggravation, which governs nervous system activity and mental functions, and *Pitta* imbalance, which is responsible for metabolic and emotional transformation. In prolonged conditions, *Kapha* may also become disturbed, leading to emotional heaviness and lethargy.^[2]

Role of Manas: Rajas and Tamas

Ayurvedic psychology emphasizes the role of *Manas* (mind) and its inherent qualities, *Rajas* and *Tamas*. *Rajas* is associated with activity, desire, and stimulation, while *Tamas* represents inertia, ignorance, and dullness. Stressful conditions are often characterized by excessive *Rajas* leading to anxiety, irritability, and overthinking, or excessive *Tamas* resulting in depression, lack of motivation, and mental fatigue. A balanced state of *Sattva* is considered essential for mental stability and resilience against stress.

Concept of Ojas and Stress Resilience

Ojas is described in *Ayurveda* as the essence of all *Dhatu*s and the foundation of immunity, vitality, and mental strength. It is responsible for maintaining physical endurance, psychological stability, and resistance to disease. Chronic stress is believed to deplete *Ojas*, resulting in reduced immunity, fatigue, anxiety, and decreased adaptive capacity. This concept closely parallels modern findings related to stress-induced immune dysfunction and reduced physiological resilience.

Etiological Factors of Stress in Ayurveda Integrative Perspective

Ayurvedic texts describe several causative factors for disease that can be correlated with stress-related disorders. These include *Prajnaparadha* (intellectual error or poor decision-making), *Asatmya Indriyarth* *Samyoga* (improper sensory contact or overstimulation), and *Kala Parinama* (effects of time, season, and environmental changes). These factors highlight the importance of behavior, perception, and environmental adaptation in maintaining health and preventing disease. The convergence of modern Psychoneuroimmunology and *Ayurvedic Kriya Sharir* provides a comprehensive understanding of stress as a mind-body phenomenon. While modern science explains stress through neuroendocrine and immune mechanisms, *Ayurveda* interprets it through *Dosha* imbalance and mental disharmony. Both systems emphasize the importance of maintaining internal equilibrium for health preservation. This integrative perspective also supports the use of *Ayurvedic* interventions such as Yoga, Meditation, *Dinacharya*, *Ritucharya*, *Satvavajaya Chikitsa*, and *Rasayana* therapy for stress prevention and management.

Thus, a combined approach of *Ayurveda* and modern biomedical science offers a more holistic framework for understanding stress physiology and its impact on human health.^[4]

Stress is a significant and rapidly growing concern in contemporary healthcare, recognized as a major contributing factor in the development and progression of both physical and psychological disorders. It is defined as the body's non-specific response to any demand that disrupts internal equilibrium. In modern society, stress has become almost unavoidable due to changes in lifestyle, increased occupational competition, reduced physical activity, disturbed sleep patterns, digital overstimulation, and psychosocial pressures. While short-term stress can enhance performance and survival, chronic stress leads to persistent physiological dysregulation and long-term health consequences.^[7]

Stress as a Biological Adaptation

From a biological perspective, stress is an adaptive survival mechanism designed to restore homeostasis in the presence of external or internal challenges. The central regulatory systems involved are the Hypothalamic-Pituitary-Adrenal (HPA) axis and the autonomic nervous system. Activation of these pathways leads to the secretion of cortisol, adrenaline, and noradrenaline, which prepare the body for a "fight-or-flight" response. This includes increased heart rate, elevated blood pressure, enhanced glucose availability, and heightened alertness. However, when stress becomes chronic, continuous hormonal activation leads to metabolic exhaustion, immune dysregulation, oxidative stress, and neuroplastic changes, particularly affecting memory, cognition, and emotional regulation.

Allostatic Load and Disease Development

The concept of allostatic load explains the cumulative physiological burden of chronic stress. Repeated activation of stress-response systems results in wear and tear on the body, contributing to hypertension, insulin resistance, obesity, depression, anxiety disorders, and cardiovascular diseases. It also alters immune function by increasing inflammatory mediators and reducing immune surveillance. This modern understanding highlights stress as a systemic condition rather than a localized psychological issue.

Psychoneuroimmunology and Mind–Body Interaction

Psychoneuroimmunology (PNI) provides a scientific framework that connects psychological processes with neural, endocrine, and immune system functioning. It demonstrates that emotions, thoughts, and behavior can directly influence physiological processes through neurochemical and hormonal pathways. Chronic psychological stress has been shown to increase pro-inflammatory cytokines, reduce lymphocyte activity, and impair immune response. At the same time, immune signals can affect brain function, mood, and behavior, establishing a bidirectional communication network between mind and body. This reinforces the concept that mental and physical health are deeply interconnected.

Ayurvedic Understanding of Stress

Ayurveda describes health as a state of equilibrium among *Doshas* (*Vata*, *Pitta*, and *Kapha*), *Dhatu*s, *Agni*, *Mala*, and a balanced state of mind and senses. Although stress is not defined as a separate disease entity in classical texts, its manifestations can be understood through disturbances in these fundamental principles. *Kriya Sharir* explains that physiological and psychological functions are governed by the dynamic balance of *Doshas*, and any disturbance leads to functional impairment and disease.

Role of Vata and Pitta in Stress

Vata Dosha governs all movement, including neural impulses, respiration, circulation, and mental activity. Stress primarily aggravates *Vata*, leading to symptoms such as anxiety, fear, insomnia, restlessness, tremors, and impaired concentration. *Pitta Dosha*, responsible for transformation and metabolic processes, is also affected by stress, resulting in irritability, anger, inflammation, hyperacidity, and excessive cognitive processing. In chronic stages, *Kapha* imbalance may develop, leading to emotional heaviness, fatigue, withdrawal, and depressive tendencies.

Manas and Psychological Factors

Ayurveda places significant importance on *Manas* (mind) and its three fundamental qualities: *Sattva*, *Rajas*, and *Tamas*. Stress is closely associated with an imbalance in these mental attributes. Excess *Rajas* leads to overstimulation, overthinking, aggression, and emotional instability, whereas excess *Tamas* results in lethargy, confusion, and depressive states. A predominance of

Sattva is considered essential for mental clarity, emotional stability, and resilience against stress.

Ojas as a Marker of Vitality and Immunity

Ojas is described as the essence of all *Dhatu*s and is responsible for immunity (*Bala*), vitality, and psychological stability. It represents the final refined product of proper digestion, metabolism, and tissue nourishment. Chronic stress is believed to reduce *Ojas*, leading to decreased resistance to disease, fatigue, anxiety, and reduced adaptive capacity. This concept strongly parallels modern immunological findings where prolonged stress results in immune suppression and increased vulnerability to infections.^[2]

Etiological Factors in Ayurveda

Ayurveda identifies several causative factors that contribute to disease development, many of which are relevant to stress-related disorders. These include *Prajnaparadha* (intellectual error or poor decision-making), *Asatmya Indriyārtha Samyoga* (inappropriate sensory exposure or overstimulation), and *Kala Parinama* (influence of time, seasons, and environmental changes) and mental health.^[4]

Integrative Significance

The integration of modern stress physiology and *Ayurvedic Kriya Sharir* provides a comprehensive understanding of stress as a holistic mind–body phenomenon. While modern science explains stress through neuroendocrine and immunological mechanisms, *Ayurveda* interprets it through *Dosha* imbalance and mental disharmony. Both systems emphasize the importance of maintaining internal equilibrium for health preservation. This convergence supports the use of *Ayurvedic* preventive and therapeutic approaches such as *Dinacharya*, *Ritucharya*, Yoga, Meditation, *Satvavajaya Chikitsa*, and *Rasayana* therapy in managing stress and improving resilience.^[3]

Therefore, an integrative approach combining Psychoneuroimmunology and *Ayurveda* offers a deeper and more holistic framework for understanding stress physiology, disease development, and health maintenance.

REFERENCES

1. Agnivesha. *Charaka Samhita*, edited by Acharya YT. Chaukhamba Publications, Varanasi. (Sutra Sthana, Sharira Sthana).
2. Sushruta. *Sushruta Samhita*, edited by Kaviraj Ambikadutta Shastri. Chaukhamba Sanskrit Sansthan, Varanasi.
3. Vagbhata. *Ashtanga Hridaya*, with Sarvanga Sundara commentary. Chaukhamba Publications, Varanasi.
4. Tripathi B. *Charaka Samhita (English Commentary)*. Chaukhamba Surbharati Prakashan, Varanasi.

5. Guyton AC, Hall JE. *Textbook of Medical Physiology*. 14th ed. Elsevier, 2021.
6. Ganong WF. *Review of Medical Physiology*. 26th ed. McGraw Hill, 2019.
7. Selye H. *The Stress of Life*. New York: McGraw-Hill, 1956.
8. Ader R, Cohen N, Felten D. Psychoneuroimmunology: interactions between the nervous system and immune system. *Lancet*, 1995.
9. Glaser R, Kiecolt-Glaser JK. Stress-induced immune dysfunction: implications for health. *Nat Rev Immunol*, 2005.
10. McEwen BS. Protective and damaging effects of stress mediators. *N Engl J Med*, 1998.