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Role of Ayurveda in Management of Stress: A Review

Author: Nidhi[1]

Co Authors: Rajnikant Rohilla[2]

[1,2]Department of Kayachikitsa, Quadra Institute of Ayurveda, Roorkee, Uttarakhand, India

ABSTRACT

Stress is a pervasive psychophysiological condition that adversely affects mental health, immune function, and overall quality of life. From a biomedical perspective, stress is characterized by dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis, heightened sympathetic nervous system activity, and chronic low-grade inflammation, which collectively contribute to disorders such as anxiety, depression, insomnia, cardiovascular disease, gastrointestinal disturbances, and reproductive dysfunction. Although conventional pharmacological therapies provide symptomatic relief, their long-term use is often limited by adverse effects, dependency, and recurrence, **thereby highlighting** the need for holistic and sustainable approaches.

Ayurveda offers a comprehensive framework for understanding and managing stress through the integration of mind–body principles. Stress is attributed to disturbances of Manas (mind), predominance of Rajas and Tamas (mental doshas), aggravation of Vata Dosha, impairment of Dhi–Dhriti–Smriti, dysfunction of Manovaha Srotas, accumulation of Ama, and depletion of Ojas. Stress-related conditions described in Ayurvedic texts closely resemble Chittodvega and other Manasika Rogas, arising from factors such as Prajñāparādha, improper sensory engagement, and environmental influences.

This review synthesizes evidence from classical Ayurvedic literature and contemporary scientific studies to elucidate the pathophysiology of stress and its management. It highlights Ayurvedic interventions including Nidānaparivarjana, Satvavajaya Chikitsa, Medhya Rasayana (Brahmi, Mandukaparni, Shankhapushpi, Guduchi, Ashwagandha), Panchakarma therapies, Yoga, Pranayama, and lifestyle regulation (Dinacharya and Ritucharya). Emerging scientific evidence supports these interventions for their adaptogenic, anxiolytic, neuroprotective, anti-inflammatory, and cortisol-modulating effects. Overall, Ayurveda provides a holistic, preventive, and integrative approach that complements modern mind–body medicine in the management of stress and stress-related disorders.

Key Words *Stress, Medhya Rasayana, Panchakarma, Manasika Roga, Yoga*

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INTRODUCTION

Stress represents a state of psychological and physiological strain arising in response to perceived internal or external challenges. It is a natural adaptive response that enables individuals to cope with environmental demands and threats[1]. Hans Selye described stress as the non-specific physiological response of the body to any demand placed upon it, emphasizing its universal biological nature[2]. Activation of stress-response

pathways influences multiple physiological systems and may disrupt normal homeostatic regulation when persistent or excessive[3].

Based on duration and exposure, stress is broadly categorized as acute or chronic. Acute stress is short-lived and may transiently enhance immune vigilance; however, chronic stress results from prolonged exposure to stressors and is associated with sustained neuroendocrine activation, immune dysregulation, and low-grade systemic inflammation. This pathological state increases susceptibility to lifestyle disorders such as cardiovascular disease, insulin resistance, anxiety, depression, and malignancy[4]. Chronic stress also disrupts sleep patterns, physical activity, and dietary behaviors, leading to symptoms including insomnia, fatigue, musculoskeletal pain, hypertension, and emotional instability.

Stress has emerged as a significant global public health concern. Recent surveys conducted across multiple countries indicate that a substantial proportion of individuals experience stress severe enough to impair daily functioning. Despite its high prevalence, mental health continues to receive comparatively less attention than physical health in healthcare systems worldwide[5]. Rapid urbanization, occupational pressure, unhealthy lifestyle practices, and erosion of social support networks have further contributed to the escalating burden of stress-related disorders.

From a biomedical perspective, stress primarily involves activation of the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system, resulting in increased cortisol secretion and autonomic imbalance. Prolonged dysregulation of these pathways adversely affects the nervous, endocrine, immune, and cardiovascular systems. Persistent stress exposure is strongly linked to the development of anxiety disorders, depression, hypertension, metabolic disturbances, and impaired quality of life. Although conventional pharmacological interventions such as anxiolytics and antidepressants provide symptomatic relief, their long-term use is limited by adverse effects, dependency potential, and recurrence of symptoms, necessitating the exploration of holistic and preventive approaches.

Ayurveda, the classical system of Indian medicine, offers a comprehensive framework for understanding stress and its management. According to Ayurvedic principles, stress-related disorders arise due to disturbances of Manas (mind), predominance of Rajas and Tamas (Manasika Doshas), and aggravation of Vata Dosha. These imbalances lead to manifestations such as anxiety, restlessness, fear, insomnia, and mental instability. Depletion of Ojas—the essence responsible for immunity and mental resilience—further predisposes individuals to stress-related illness. Etiological factors such as Prajñāparādha (intellectual error), improper sensory engagement, unhealthy dietary and lifestyle practices, and accumulation of Āma (metabolic toxins) play a crucial role in the pathogenesis of stress-related conditions.

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Ayurvedic management of stress emphasizes a holistic approach incorporating Medhya Rasāyana herbs such as Brāhmī, Śaṅkhapuṣpī, Maṇḍūkaparṇī, and Yaṣṭimadhu; Panchakarma therapies including Śirodhārā, Abhyanga, and Nasya; and mind–body practices such as Yoga, Prāṇāyāma, and meditation. Regulation of daily and seasonal routines through Dinacharya and Ritucharya further enhances stress adaptability and mental equilibrium. Increasing scientific evidence supports these interventions for their anxiolytic, adaptogenic, neuroprotective, and cortisol-modulating effects.

In this context, the present review aims to elucidate the Ayurvedic conceptualization of stress, examine classical and contemporary therapeutic interventions, and critically evaluate available clinical and experimental evidence supporting Ayurveda as an effective and integrative approach for stress management.

AIMS AND OBJECTIVES

AIM

To critically evaluate the role of Ayurvedic principles and therapeutic interventions in the management of stress and stress-induced disorders through an integrative appraisal of classical Ayurvedic concepts and contemporary biomedical evidence.

OBJECTIVES

1. To examine the modern biomedical perspective of stress and stress-related disorders, with emphasis on their prevalence, neuroendocrine and autonomic mechanisms—including hypothalamic–pituitary–adrenal axis dysregulation—and associated clinical manifestations.
2. To elucidate the Ayurvedic understanding of stress and psychosomatic disorders by analyzing classical concepts such as Manasika Dosha (Rajas–Tamas) imbalance, Dhi–Dhriti–Smriti Vibhramsha, Manovaha Srotas Dushti, Vata vitiation, and Ojas Kshaya, and to establish conceptual correlations with modern stress pathology.
3. To systematically review evidence-based Ayurvedic management strategies for stress-induced disorders, including Shamana and Shodhana therapies, Rasayana and Medhya interventions, Panchakarma procedures, and lifestyle and behavioral modifications (Ahara–Vihara, Dinacharya–Ritucharya, Yoga, and Satvavajaya Chikitsa), and to assess their preventive and therapeutic relevance.

MATERIALS AND METHODS

The present study was designed as a narrative review integrating classical Ayurvedic literature with contemporary biomedical research to evaluate the role of Ayurveda in the management of stress and stress-induced disorders.

Classical Ayurvedic references were collected from authoritative texts, including *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and their standard commentaries. Relevant descriptions related to Manas (mind), Manasika

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Doshas (Rajas and Tamas), Manovaha Srotas, Ojas, stress-related etiological factors, and therapeutic principles such as Satvavajaya Chikitsa, Rasayana, Panchakarma, and lifestyle regulation were systematically reviewed.

Contemporary scientific literature was retrieved from electronic databases such as PubMed, Google Scholar, AYUSH research portals, and indexed peer-reviewed journals. Keywords used for the literature search included *stress*, *HPA axis*, *psychosomatic disorders*, *Ayurveda and stress*, *Medhya Rasayana*, *Panchakarma*, *Yoga*, and *adaptogens*. Relevant experimental studies, clinical trials, review articles, and observational studies published in English were considered.

The collected data were analyzed qualitatively to identify conceptual correlations between Ayurvedic principles and modern biomedical mechanisms of stress, as well as to evaluate the therapeutic relevance of Ayurvedic interventions. No statistical analysis was performed, as the study was based on descriptive synthesis of available literature.

STRESS: MODERN PERSPECTIVE

DEFINITION AND PHYSIOLOGY

Stress is commonly described as a non-specific physiological response of the body to demands that challenge its adaptive capacity[6]. It encompasses a spectrum of psychological and biological reactions generated by real or perceived stressors that threaten the maintenance of internal equilibrium, or homeostasis.

The hypothalamic–pituitary–adrenal (HPA) axis constitutes a tightly regulated neuroendocrine network that plays a pivotal role in coordinating adaptive responses to stress and preserving physiological balance. Persistent or excessive activation of this axis can induce long-term alterations in neuropeptide and neurotransmitter synthesis within the central nervous system, along with dysregulated secretion of glucocorticoid hormones from the adrenal cortex. Such neuroendocrine disturbances contribute to sustained impairments in autonomic regulation, behavior, metabolic function, and stress responsiveness later in life.

Any physical or psychological factor capable of disrupting homeostasis may act as a stressor and initiate a coordinated stress response. This response involves complex interactions among the nervous, endocrine, and immune systems and is mediated primarily through activation of the sympathetic–adreno-medullary (SAM) axis, the hypothalamic–pituitary–adrenal (HPA) axis, and immune signaling pathways[7].

TYPES OF STRESS

Stress is categorized into various types based on duration, source, and response.

Acute stress refers to short-term stress that arises in response to immediate demands or challenging situations. It activates the body's fight-or-flight response, resulting in temporary physiological changes such as increased heart rate, elevated blood pressure, and release of stress hormones like adrenaline.

Chronic stress develops when exposure to stressors continues for a prolonged period. Sustained activation of stress-response pathways

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leads to cumulative physiological and psychological effects, increasing the risk of various health conditions, including cardiovascular disease, anxiety disorders, and depression.

Episodic acute stress occurs when an individual experiences frequent episodes of acute stress. This pattern is commonly observed in individuals with highly demanding, disorganized, or chaotic lifestyles, characterized by constant deadlines, excessive responsibilities, or recurring interpersonal conflicts. Repeated stress responses may impair daily functioning and exacerbate physical and mental health problems.

Traumatic stress results from exposure to severe or life-threatening events such as natural disasters, accidents, or acts of violence. Such experiences can overwhelm an individual's coping capacity and may lead to persistent symptoms, including intrusive memories, avoidance behaviors, emotional numbing, and heightened arousal, often associated with post-traumatic stress disorder (PTSD).

Environmental stress arises from unfavourable external conditions such as excessive noise, pollution, overcrowding, or unsafe living environments. Continuous exposure to these stressors can negatively affect physical and mental health and contribute to chronic discomfort and psychological distress.

Psychological stress originates from cognitive and emotional factors, including perceived threats, persistent worries, negative thought patterns, and unrealistic self-expectations. Common sources include occupational stress, academic pressure, social comparison, and perfectionism, often manifesting as anxiety, rumination, and emotional exhaustion.

Physiological stress refers to stress responses triggered by internal or external conditions that disrupt homeostasis. Factors such as illness, injury, sleep deprivation, and nutritional deficiencies activate physiological stress pathways, potentially compromising overall health and well-being[8-11].

STRESS RESPONSE SYSTEMS

The physiological response to stress is mediated through two major interconnected systems: a rapid response governed by the sympathetic–adreno-medullary (SAM) axis and a slower, sustained response regulated by the hypothalamic–pituitary–adrenal (HPA) axis. Together, these systems enable the body to adapt to internal and external stressors by coordinating neuroendocrine, metabolic, and behavioral changes.

SYMPATHETIC–ADRENO-MEDULLARY (SAM) SYSTEM

Activation of the sympathetic–adreno-medullary system represents the immediate phase of the stress response. Exposure to a stressor stimulates sympathetic nerve terminals and the adrenal medulla, resulting in increased secretion of catecholamines—primarily epinephrine and norepinephrine—into the systemic circulation, along with enhanced norepinephrine release within the central nervous system[12].

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These catecholamines exert their effects by binding to α- and β-adrenergic receptors located in the brain, cardiovascular system, smooth muscle, and peripheral organs. Receptor activation initiates intracellular signaling cascades mediated by cyclic adenosine monophosphate (cAMP), leading to rapid physiological adaptations. These include elevation of heart rate and cardiac output, vasoconstriction in non-essential vascular beds, increased blood pressure, and redistribution of blood flow toward skeletal muscles.

Metabolic changes accompanying SAM activation include increased blood glucose levels through glycogenolysis and gluconeogenesis, enhanced lipolysis, increased oxygen consumption, and thermogenesis, all of which support heightened energy demand during stress. Simultaneously, non-essential physiological activities such as gastrointestinal motility are suppressed, cutaneous vasoconstriction occurs, and bronchodilation facilitates improved oxygen delivery. Behavioral manifestations of SAM activation include increased alertness, vigilance, arousal, and enhanced cognitive focus, collectively preparing the individual for an immediate "fight-or-flight" response.

HYPOTHALAMIC–PITUITARY–ADRENAL (HPA) AXIS

The HPA axis mediates the delayed and sustained component of the stress response. Stress exposure stimulates the paraventricular nucleus of the hypothalamus to release corticotropin-releasing hormone (CRH) into the hypophyseal portal circulation[13]. CRH exerts its effects through two receptor subtypes: CRH receptor-1 (CRH-R1), predominantly expressed in the central nervous system and responsible for adrenocorticotropic hormone (ACTH) secretion, and CRH receptor-2 (CRH-R2), which is mainly distributed in peripheral tissues and selected brain regions.

The bioavailability of CRH is modulated by corticotropin-releasing hormone–binding protein (CRH-BP), which binds a substantial proportion of CRH within the brain, thereby limiting excessive receptor activation[14]. During stress, CRH-BP expression increases in a time-dependent manner, serving as an important regulatory mechanism to prevent overactivation of the HPA axis.

Following CRH stimulation, the anterior pituitary releases ACTH into the circulation, which in turn stimulates the adrenal cortex to synthesize and secrete glucocorticoids, primarily cortisol[15]. In the bloodstream, cortisol exists largely in protein-bound form, with only a small unbound fraction exerting biological activity. The inactive metabolite cortisone is converted into active cortisol by the enzyme 11-β-hydroxysteroid dehydrogenase at target tissues.

Additional modulation of HPA axis activity occurs through pituitary adenylate cyclase-activating polypeptide (PACAP), a neuropeptide that enhances CRH synthesis and influences multiple regulatory levels of the stress response[16]. PACAP also contributes to autonomic regulation by promoting catecholamine release and may interact with sex hormone signaling pathways,

thereby influencing individual variability in stress responsiveness[17].

Overall, the HPA axis functions as a tightly regulated hormonal cascade involving CRH, ACTH, and cortisol, supported by multiple feedback mechanisms. While acute activation of this system is adaptive, prolonged or dysregulated HPA axis activity plays a central role in the pathophysiology of stress-related metabolic, immune, and neuropsychiatric disorders.

STRESS-INDUCED DISORDERS

NEUROPSYCHIATRIC DISORDERS

Anxiety

Persistent or recurrent exposure to stress is a major contributory factor in the development of anxiety disorders. Stress activates both the hypothalamic–pituitary–adrenal (HPA) axis and the sympathetic nervous system, resulting in sustained secretion of corticotropin-releasing hormone (CRH), cortisol, and catecholamines. Continuous stimulation of the HPA axis weakens normal glucocorticoid-mediated negative feedback, leading to chronically elevated cortisol levels and heightened stress sensitivity, which are characteristic features of anxiety disorders[18].

CRH exerts anxiogenic effects within limbic brain regions, particularly the amygdala, where it enhances fear perception and emotional reactivity[19]. Chronic stress further disrupts neurotransmitter homeostasis by reducing inhibitory gamma-aminobutyric acid (GABA) activity and altering serotonergic and dopaminergic signaling, thereby impairing emotional regulation[20]. Long-term stress exposure also induces structural and functional brain changes, including amygdalar hyperactivity and diminished prefrontal cortical control, promoting exaggerated threat perception and persistent anxiety symptoms[21]. Collectively, these interacting neuroendocrine, autonomic, and neurobiological alterations transform an adaptive stress response into pathological anxiety.

Depression

Prolonged exposure to stress is a well-established etiological factor in the pathogenesis of depressive disorders. Chronic stress results in persistent activation of the HPA axis with sustained release of CRH and cortisol. Dysregulation of this axis, particularly impaired glucocorticoid negative feedback, leads to prolonged hypercortisolemia, a common neuroendocrine abnormality observed in major depressive disorder[22].

Excess cortisol exerts neurotoxic effects on stress-sensitive brain regions such as the hippocampus and prefrontal cortex, resulting in reduced neurogenesis, synaptic dysfunction, and impaired emotional regulation[23]. Additionally, chronic stress disrupts monoaminergic neurotransmission involving serotonin, norepinephrine, and dopamine, contributing to core depressive symptoms such as anhedonia, low mood, and diminished motivation[24]. Stress-induced neuroinflammation, marked by increased pro-inflammatory cytokines, further interferes with neurotransmitter metabolism and neural plasticity, thereby aggravating depressive

pathology[25]. These cumulative neuroendocrine, neurochemical, and inflammatory mechanisms explain the progression from adaptive stress to clinical depression.

Insomnia

Chronic stress plays a pivotal role in both the onset and maintenance of insomnia. Persistent stress exposure activates the HPA axis and sympathetic nervous system, leading to prolonged secretion of CRH, cortisol, and catecholamines. This sustained neuroendocrine activation produces a state of physiological and cognitive hyperarousal that interferes with normal sleep initiation and maintenance[26].

Elevated evening and nocturnal cortisol levels disrupt circadian rhythm regulation and suppress melatonin secretion, impairing sleep architecture[27]. CRH further promotes cortical arousal and wakefulness, resulting in reduced slow-wave and rapid eye movement (REM) sleep[28]. Autonomic hyperactivation increases heart rate, muscle tension, and sensory alertness, leading to fragmented and non-restorative sleep[29]. Together, these alterations convert adaptive arousal into a chronic pathological state of insomnia.

SYSTEMIC EFFECTS OF STRESS

Immune Dysfunction

Chronic stress causes sustained activation of the sympathetic nervous system and HPA axis, leading to dysregulation of innate and adaptive immune responses[30]. Persistently elevated cortisol suppresses immune cell proliferation and cytokine synthesis, increasing susceptibility to infections and delaying wound healing. Simultaneously, chronic stress paradoxically promotes low-grade systemic inflammation through sustained inflammatory mediator release, contributing to autoimmune and chronic inflammatory disorders[31].

Gastrointestinal Disorders

Stress-induced catecholamines exert significant influence on gastrointestinal physiology via adrenergic receptor activation. α-adrenergic stimulation in intestinal smooth muscle delays gastric emptying and reduces intestinal motility[32], while stress-related vasoconstriction decreases splanchnic blood flow, impairing secretion and absorption[33].

Chronic stress also disrupts gut–brain axis signaling, increases intestinal permeability, and alters gut microbiota composition, thereby contributing to visceral hypersensitivity and functional gastrointestinal disorders such as irritable bowel syndrome[34].

Cardiovascular Disorders

While acute stress evokes adaptive cardiovascular responses, chronic stress results in persistent sympathetic activation and HPA axis dysregulation, leading to sustained elevation of cortisol and catecholamines. These hormonal changes promote oxidative stress, endothelial dysfunction, chronic inflammation, and lipid metabolism disturbances, accelerating atherosclerosis and increasing cardiovascular risk[35].

Respiratory Disorders

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Stress-induced autonomic imbalance contributes to bronchial hyperresponsiveness and airway inflammation. Acute stress alters respiratory patterns, whereas chronic stress impairs immune defense mechanisms, increasing susceptibility to respiratory infections and exacerbating conditions such as asthma and chronic obstructive pulmonary disease.

Musculoskeletal Disorders

Chronic stress-related elevation of cortisol promotes muscle catabolism and reduces bone mineral density by suppressing osteoblastic activity. Sympathetic overactivity further increases muscle tension, contributing to chronic pain syndromes such as tension-type headache, temporomandibular joint disorders, fibromyalgia, and low back pain.

Reproductive Dysfunction

Chronic stress disrupts hypothalamic–pituitary–gonadal axis homeostasis by suppressing gonadotropin-releasing hormone secretion, leading to reduced luteinizing and follicle-stimulating hormone release. This results in menstrual irregularities, anovulation, infertility in women, and reduced testosterone levels, libido, and sperm quality in men[36].

AYURVEDIC PERSPECTIVE OF STRESS

CONCEPT OF MANAS AND MANASIKA DOSHAS

Parallel to modern biomedical perspectives, Ayurveda—the classical system of Indian medicine articulated in authoritative texts such as the *Charaka Samhita* and *Sushruta Samhita*—provides a holistic framework for understanding mental health and disease. According to Ayurvedic principles, disease arises from imbalance of the *Tridosha* (Vata, Pitta, and Kapha), impairment of *Agni*, accumulation of *Ama*, depletion of *Ojas*, and dysfunction of the body–mind channels (*Srotas*)[37]. Although these concepts are qualitative rather than quantitative, they function as essential diagnostic indicators and are evaluated through traditional clinical methods such as *Nadi Pariksha* (pulse examination), *Jihva Pariksha* (tongue examination), *Drik Pariksha* (eye examination), and assessment of *Manasika Lakshanas* (psychological attributes)[38].

The concept of *Manas* is derived from the Sanskrit root *"Mana Jnane,"* denoting processes such as thinking, analysis, anticipation, and cognition. In Ayurveda, *Manas* is considered one of the four fundamental constituents of life, along with *Sharira* (body), *Indriya* (sensory organs), and *Atma* (self)[39]. Mental functioning is regulated by the three *Manasika Gunas—Satva*, *Rajas*, and *Tamas*. *Satva* represents clarity, balance, wisdom, and harmony; *Rajas* signifies activity, movement, and emotional stimulation; and *Tamas* denotes inertia, dullness, ignorance, and obstruction. Mental health is preserved when these *Gunas* remain in equilibrium, whereas predominance of *Rajas* and *Tamas* with relative depletion of *Satva* leads to the manifestation of *Manasika Vikaras* (mental disorders)[40].

SAMPRAPTI OF MANAS ROGA

In Ayurvedic nosology, stress- and anxiety-related disorders are closely comparable to

conditions such as *Chittodvega* and *Manovaha Srotas Dushti*, which are characterized by symptoms including *Chinta* (excessive worry), *Bhaya* (fear), *Udvega* (anxiety), palpitations, insomnia, and mental instability[41]. The *Samprapti* (pathogenesis) of *Manas Roga* involves a complex interaction between *Manasika Doshas*—primarily *Rajas* and *Tamas*—and *Sharirika Doshas*, with *Vata Dosha* playing a predominant role.

Acharya Charaka highlights the pivotal role of *Vata*, particularly *Prana Vayu*, in the regulation of higher mental functions, sensory integration, and consciousness[42]. Aggravation of *Vata* manifests clinically as anxiety, restlessness, fear, insomnia, and palpitations. Concurrent aggravation of *Rajas* contributes to heightened mental activity, agitation, and emotional instability, whereas increased *Tamas* leads to cognitive dullness, confusion, lethargy, and depressive features. This disturbed equilibrium ultimately results in impairment of *Dhi* (intellect), *Dhriti* (mental restraint), and *Smriti* (memory), collectively described as *Dhi–Dhriti–Smriti Vibhramsha*, which constitutes a fundamental pathological mechanism in stress-related mental disorders[43].

Disturbance of *Manovaha Srotas* gives rise to a range of psychological manifestations, including excessive worry, fear, and neurotic symptoms[44]. Persistent mental stress subsequently leads to *Ojas Kshaya*, which clinically presents as fatigue, diminished immunity, emotional fragility, and reduced capacity to cope with stress. In Ayurveda, *Ojas* is regarded as the essence of all *Dhatus* and serves as the fundamental determinant of both physical vitality and mental resilience[45]. Furthermore, chronic stress adversely affects *Agni*, resulting in the formation and accumulation of *Ama*, which contributes to systemic dysfunction and psychosomatic disorders. This interrelationship between impaired *Agni*, *Ama* accumulation, and *Srotas* dysfunction underscores the integrative Ayurvedic understanding of stress-related pathology.

ETIOLOGICAL FACTORS

According to Ayurvedic principles, *Manasika Vikaras* arise primarily from three fundamental etiological factors. *Prajñāparādha* refers to errors of judgment or misuse of intellect (*Buddhi*), which result in maladaptive thoughts, behaviors, and emotional imbalance. *Asātmendriyārtha Saṃyoga* denotes inappropriate interaction between the sense organs and their respective objects, whether excessive, deficient, or perverted in nature. *Pariṇāma* (*Kāla Viparyaya*) represents the influence of time, seasonal variations, and aging on the psycho-physiological equilibrium of the individual.

In addition to these primary causes, several contributory factors have been described, including neglect of ethical conduct (*Sadvṛtta Apālana*), suppression of natural urges (*Vegāvarodha*), influences of past actions (*Pūrvajanmakṛta Karma*), constitutional imbalances (*Prakṛti Viparyaya*), consumption of

alcohol (*Madya*), exposure to latent toxins (*Duṣī Viṣa*), and derangement of *Śārīrika Doṣas*. Individuals with diminished mental strength (*Alpa Satva*) are particularly vulnerable to stress-related psychological disorders[46]. The Ayurvedic management of such conditions emphasizes strengthening of mental resilience through *Satvavajaya Chikitsa*, along with appropriate *Panchakarma* therapies aimed at restoring doshic balance and psycho-somatic harmony[47].

CORRELATION WITH MODERN BIOMARKERS

Contemporary integrative studies have increasingly sought to map classical Ayurvedic constructs onto measurable biomedical parameters. Imbalance of *Vata* has been associated with autonomic nervous system dysregulation, often reflected by reduced heart rate variability, indicating impaired adaptive physiological control[48]. Similarly, *Ama* formation secondary to *Agnimandya* has been linked with elevated levels of systemic inflammatory biomarkers, including C-reactive protein and interleukin-6, suggesting a state of chronic low-grade inflammation[49].

Depletion of *Ojas* (*Ojas Kshaya*) has been conceptually aligned with disturbances of the hypothalamic–pituitary–adrenal axis, abnormal cortisol rhythms, and reduced expression of brain-derived neurotrophic factor, collectively representing compromised neuroendocrine and psychological resilience. In addition, *Manasika Lakshanas* described in Ayurvedic literature demonstrate correspondence with contemporary neuroimaging observations, such as heightened amygdalar activity and diminished regulatory function of the prefrontal cortex. These parallels offer a meaningful conceptual framework that bridges traditional Ayurvedic assessment with modern understanding of stress-related neurobiological mechanisms.

MANAGEMENT OF STRESS IN AYURVEDA

NIDANAPARIVARJANA

Nidānaparivarjana is regarded as the cornerstone of disease management in Ayurveda and holds particular significance in the prevention and management of stress-related disorders. This principle emphasizes the systematic identification and elimination of physical, psychological, and behavioral factors that initiate or aggravate disease processes. In the context of stress, *Nidānaparivarjana* encompasses adherence to *Sadvṛtta Pālana* (ethical and disciplined conduct), avoidance of suppression of natural urges (*Dhāraṇīya Vega Dhāraṇa*), and regulation of improper utilization of *Kāla* (time), *Buddhi* (intellect), and *Indriyārtha* (sense objects), which are recognized as major etiological contributors to *Manasika Rogas*.

Furthermore, appropriate application of dietary principles such as *Aṣṭa Vidha Āhāra Viśeṣāyatana* and *Dvādaśa Āhāra–Vihāra* plays a vital role in maintaining mental balance and preventing stress-induced psychosomatic disturbances. Through the elimination of causative stressors and correction of maladaptive lifestyle practices, *Nidānaparivarjana* functions

as both a preventive and foundational therapeutic strategy in comprehensive stress management.

SATVAVAJAYA CHIKITSA

Satvavajaya Chikitsa represents a distinctive psychotherapeutic modality in Ayurveda that focuses on regulation and stabilization of the mind by disengaging it from unwholesome sensory and cognitive stimuli (*Ahita Arthas*). Acharya Charaka describes the fundamental components of *Satvavajaya* as *Jnana* (acquisition of right knowledge), *Vijnana* (rational and discriminative understanding), *Dhairya* (mental fortitude), *Smriti* (recollection of constructive experiences), and *Samadhi* (focused attention). Collectively, these elements strengthen emotional resilience and enhance adaptive coping mechanisms.

Ayurvedic texts attribute the origin of mental disorders to dominance of negative emotional states such as *Kama* (excessive desire), *Shoka* (grief), *Bhaya* (fear), *Krodha* (anger), *Irshya* (jealousy), and *Moha* (delusion). *Satvavajaya Chikitsa* addresses these etiological factors by fostering opposing positive mental qualities, thereby restoring psychological balance and reducing manifestations of stress, anxiety, and emotional instability. Conceptually, this therapeutic approach parallels contemporary cognitive–behavioral strategies, underscoring its relevance and effectiveness in the management of stress-related psychological conditions.

MEDHYA RASAYANA

In Ayurvedic literature, *Mandūkaparṇī* (*Centella asiatica*) is classified as a *Medhya Rasāyana* and is traditionally valued for its beneficial effects on cognitive and emotional health. Its pharmacodynamic profile, characterized by *Tikta* (bitter) and *Kaṣāya* (astringent) *Rasa*, *Laghu* (light) and *Sara* (mobile) *Guṇa*, *Śīta Vīrya*, and *Madhura Vipāka*, contributes to its cooling, calming, and neurotonic properties. The predominance of *Śīta Vīrya* aids in pacifying aggravated *Pitta* and *Vāta*, which are commonly implicated in psychological disturbances, while *Madhura Vipāka* supports nourishment of cerebral tissues, thereby enhancing cognitive functions. Traditionally, *Mandūkaparṇī* is believed to improve cerebral circulation, alleviate anxiety, and facilitate memory retention and consolidation.

Yaṣṭimadhu (*Glycyrrhiza glabra*) is another well-recognized *Medhya* herb, distinguished by its *Madhura Rasa*, *Guru* (heavy) and *Snigdha* (unctuous) *Guṇa*, *Śīta Vīrya*, and *Madhura Vipāka*. These attributes impart a nourishing and stabilizing influence on the nervous system. Its unctuous quality supports *Ojas*, thereby enhancing emotional stability and psychological resilience. From a contemporary biomedical perspective, *Yaṣṭimadhu* exhibits adaptogenic activity, potentially mediated through modulation of the hypothalamic–pituitary–adrenal axis, which aligns with its classical description as a *Rasāyana* that promotes vitality, immunity, and mental clarity.

Guḍūcī (*Tinospora cordifolia*) is described as a potent *Rasāyana* with a distinctive therapeutic profile. It possesses *Tikta* and *Kaṣāya Rasa*,

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Laghu and *Snigdha Guṇa*, *Uṣṇa Vīrya*, and *Madhura Vipāka*. Despite its warming potency, *Guḍūcī* is regarded as *Tridoṣaghna*, with particular efficacy in balancing *Vāta* and *Pitta*. Its *Medhya* effect is attributed to its ability to digest *Āma*, rejuvenate tissues, and enhance digestive and metabolic efficiency, all of which are essential for optimal mental functioning. Additionally, its immunomodulatory and antioxidant properties contribute to neuroprotection and may play a role in mitigating age-related cognitive decline.

Śaṅkhapuṣpī (*Convolvulus pluricaulis*) is traditionally esteemed as a specific *Medhya Rasāyana*, especially beneficial for improving memory, concentration, and speech. It is characterized by *Tikta* and *Kaṣāya Rasa*, *Laghu* and *Snigdha Guṇa*, *Śīta Vīrya*, and *Madhura Vipāka*. Its calming action on the nervous system makes it particularly useful in conditions such as anxiety, insomnia, and mental fatigue. Classical texts describe its action on *Majjā Dhātu*, suggesting its role in nourishing nervous tissue and enhancing higher mental faculties.

From a *Dravyaguṇa* perspective, these *Medhya* herbs share several common pharmacological features, including *Rasāyana* activity, *Tridoṣa*-balancing effects, and predominance of *Śīta* or *Madhura Vipāka*. Their individual *Prabhāva*—ranging from calming and nourishing to adaptogenic—allows them to address multiple dimensions of psychological and cognitive health.

The *Medhya Dravyas* reviewed—*Mandūkaparṇī* (*Centella asiatica*), *Brāhmī* (*Bacopa monnieri*), *Śaṅkhapuṣpī* (*Convolvulus pluricaulis*), and *Jyotiṣmatī* (*Celastrus paniculatus*)—exhibit significant cognition-enhancing potential rooted in Ayurvedic pharmacology. Their therapeutic actions, defined through *Rasa*, *Guṇa*, *Vīrya*, *Vipāka*, and *Prabhāva*, demonstrate targeted effects on *Manas* (mind) and *Majjā Dhātu* (nervous tissue), thereby supporting memory (*Smṛti*), intellect (*Dhī*), and mental stability (*Dhṛti*). Modern scientific investigations further corroborate these traditional claims by demonstrating nootropic, neuroprotective, anxiolytic, antioxidant, and anti-inflammatory properties. Through modulation of neurotransmitter systems, enhancement of synaptic plasticity, and attenuation of neuroinflammation, these herbs provide a conceptual and mechanistic bridge between classical Ayurvedic wisdom and contemporary neurobiological understanding.

PANCHAKARMA THERAPIES

Panchakarma, a core therapeutic intervention in Ayurveda, plays an important role in the management of stress-related disorders by restoring doshic equilibrium and modulating neuroendocrine function. Various *Panchakarma* procedures, including *Shirodhara*, *Abhyanga*, *Nasya*, and *Basti*, have demonstrated beneficial effects in alleviating psychological stress and anxiety, with emerging evidence indicating their potential to lower circulating cortisol levels. Through their combined actions on the nervous,

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endocrine, and autonomic systems, these therapies promote mental relaxation, enhance stress resilience, and support overall psychophysiological balance.

Role of Shirodhara in the Management of Stress

Shirodhara is a well-established *Panchakarma* procedure in Ayurveda and is extensively employed in the management of stress and stress-related conditions. The therapy involves the gentle and continuous application of medicated oil or other therapeutic liquids over the forehead, which exerts a soothing influence on the central nervous system. Experimental and clinical studies indicate that *Shirodhara* produces a marked reduction in psychological stress, anxiety, and sleep disturbances by eliciting a profound relaxation response and attenuating sympathetic nervous system overactivity[50].

Neurophysiological investigations using electroencephalography have demonstrated an increase in alpha wave activity during *Shirodhara*, reflecting a calm, relaxed, and meditative mental state. In addition, clinical observations suggest a significant decrease in serum cortisol concentrations following therapy, supporting its modulatory effect on the hypothalamic–pituitary–adrenal axis and stress hormone regulation[51]. By pacifying aggravated *Vata* and *Pitta* doshas, *Shirodhara* contributes to restoration of psychological balance, improvement in sleep quality, and stabilization of emotional responses, thereby establishing its therapeutic utility in stress-related and psychosomatic disorders.

Role of Abhyanga in the Management of Stress

Abhyanga, a traditional Ayurvedic oil massage therapy, is widely recognized for its beneficial role in stress management through regulation of *Vata Dosha*, which is closely associated with mental agitation, anxiety, and disturbances of the nervous system. Evidence from clinical and experimental studies suggests that *Abhyanga* promotes a state of deep relaxation by enhancing parasympathetic nervous system activity, leading to reductions in psychological stress, anxiety, muscular tension, and fatigue[52].

Regular administration of *Abhyanga* has been shown to favorably influence stress-related physiological parameters, including decreases in heart rate, blood pressure, and serum cortisol levels, reflecting its modulatory effects on the neuroendocrine stress response[53]. In addition, this therapy contributes to improved sleep quality, emotional stability, and overall sense of well-being, particularly among individuals experiencing occupational stress and psychosomatic conditions[54]. Owing to its nourishing (*Brimhana*) and stabilizing actions on the nervous system, *Abhyanga* serves as a safe and effective adjunctive therapeutic modality for comprehensive stress management.

Role of Nasya in the Management of Stress

Nasya is a key therapeutic procedure within *Panchakarma* that involves intranasal administration of medicated oils or herbal

formulations and is particularly indicated for disorders involving the mind and cranial region. Classical Ayurvedic texts describe the nasal pathway as a primary route influencing cerebral functions, thereby attributing a direct action of *Nasya* on the central nervous system. Contemporary clinical and experimental evidence indicates that *Nasya* exerts beneficial effects in reducing stress, anxiety, and mental exhaustion through modulation of limbic system activity and regulation of neuroendocrine responses[55].

Additionally, *Nasya* therapy has been associated with improvements in sleep quality, emotional regulation, attentional capacity, and cognitive performance in individuals experiencing stress-related conditions[56]. Commonly employed formulations, including *Anu Taila* and *Brāhmī*-based preparations, possess *Medhya* (cognition-enhancing) and *Vāta*-pacifying properties, which contribute to alleviation of symptoms such as restlessness, irritability, and stress-induced cephalalgia. Owing to its targeted action on neuropsychological functions, *Nasya* represents an effective therapeutic modality in the management of stress and associated psychosomatic disorders.

Role of Shirovasti in the Management of Stress

Shirovasti is a specialized *Panchakarma* intervention in which warm medicated oil is retained over the scalp for a predetermined period and is primarily indicated in disorders affecting the mind and nervous system. Classical Ayurvedic literature describes *Shirovasti* as particularly beneficial in *Vata*-predominant *Manasika* conditions, including stress, anxiety, insomnia, and mental fatigue. Clinical experiences and observational studies suggest that this therapy exerts a profound soothing influence on the central nervous system by nourishing cerebral tissues and correcting aggravated *Vata Dosha*.

The sustained exposure of medicated oil to the scalp facilitates deep relaxation, alleviates stress-related headaches, enhances sleep quality, and reduces manifestations of anxiety and irritability[57]. *Shirovasti* is especially advantageous in chronic stress states characterized by diminished mental vitality (*Ojas Kshaya*) and ongoing autonomic hyperactivity[58]. By re-establishing doshic equilibrium and fostering psychological stability, *Shirovasti* emerges as an effective therapeutic approach in the comprehensive management of stress and stress-associated psychosomatic disorders.

Role of Basti in the Management of Stress

Basti (medicated enema) is considered the principal *Panchakarma* intervention for the regulation of *Vata Dosha*, which plays a pivotal role in the control of neurological and psychological functions. According to Ayurvedic principles, vitiation of *Vata* manifests as anxiety, restlessness, fear, insomnia, and mental instability—features commonly observed in stress-related conditions. Evidence from clinical and experimental studies indicates that *Basti* therapy contributes to normalization of neuroendocrine activity, reduction of anxiety, and

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enhancement of mental clarity by correcting *Vata* imbalance at its primary site, the colon.

Specific *Medhya* and *Brimhana Basti* formulations incorporating herbs such as *Brāhmī*, *Aśvagandhā*, and medicated ghee have demonstrated beneficial effects in alleviating stress, fatigue, and sleep disturbances[59]. Further research suggests that *Basti* therapy promotes autonomic nervous system balance and mitigates psychosomatic manifestations associated with chronic stress[60]. By restoring *Vata* equilibrium and reinforcing the mind–body connection, *Basti* emerges as an effective therapeutic modality in the comprehensive management of stress and stress-related psychosomatic disorders.

YOGA AND PRANAYAMA

Yoga and *Prāṇāyāma* constitute important non-pharmacological interventions for stress management by promoting integration of the mind–body axis and regulating autonomic and neuroendocrine activity. Meditative practices and mindfulness techniques have been shown to alleviate psychological stress by enhancing emotional regulation, increasing self-awareness, and attenuating activation of the hypothalamic–pituitary–adrenal axis, thereby contributing to a reduction in circulating cortisol levels[61].

Specific *Prāṇāyāma* techniques, particularly *Nāḍī Śodhana* and *Bhrāmarī*, are associated with stimulation of parasympathetic nervous system activity, decreased anxiety, and improvement in heart rate variability, reflecting enhanced autonomic balance and stress adaptability. Yogic postures such as *Śavāsana*, *Sukhāsana*, *Paścimottānāsana*, and *Balāsana* facilitate muscular relaxation, improve systemic circulation, and induce a state of physical and mental calmness, which collectively contribute to stress reduction and better sleep quality.

Accumulating scientific evidence indicates that consistent practice of Yoga and *Prāṇāyāma* leads to significant reductions in perceived stress, anxiety, and depressive symptoms, thereby supporting their efficacy as complementary and preventive strategies in the comprehensive management of stress.

LIFESTYLE MODIFICATION

Ayurveda places strong emphasis on regulation of lifestyle as a fundamental component in the prevention and management of stress-related conditions. Observance of *Dinacharya* (daily regimen) and *Ritucharya* (seasonal regimen) supports maintenance of circadian rhythm, preservation of doshic equilibrium, and stabilization of mental functions, thereby improving the individual's capacity to adapt to physical and psychological stressors. Dietary practices based on *Sattvic Ahara*, comprising fresh, light, and nourishing foods, promote mental clarity, emotional stability, and optimal neurochemical functioning, while excessive intake of *Rajasika* and *Tamasika* foods is believed to exacerbate stress and anxiety[62].

Adequate sleep and maintenance of proper sleep hygiene, including consistent sleep–wake schedules and sufficient sleep duration, are essential for restoration of neuroendocrine balance and prevention of stress-associated

manifestations such as irritability, anxiety, and cognitive dysfunction[63]. In addition, adoption of effective stress-coping measures, including *Sadvritta* (ethical self-discipline), cultivation of positive mental attitudes, relaxation practices, and mindful behavior, enhances psychological resilience and mitigates the cumulative impact of chronic stress[64]. Collectively, these lifestyle-oriented interventions represent a holistic, preventive, and sustainable framework for stress management as advocated in Ayurveda.

DAIVAVYAPASHRAYA CHIKITSA

Daivavyapāśraya Chikitsā encompasses spiritual and faith-oriented therapeutic measures employed in situations where illness is attributed to non-physical factors, including past karmic influences or deep-rooted psychological fears. Interventions such as *Mantra Japa*, *Homa*, *Svasti-vācana*, *Maṅgala Karma*, and other auspicious rituals are traditionally practiced to reduce fear, anxiety, and negative emotional states by reinforcing faith, optimism, and inner confidence. Through their calming and reassuring effects on the mind, these practices contribute to enhanced emotional balance and psychological well-being, thereby serving as supportive modalities in the holistic management of stress.

EVIDENCE FROM MODERN RESEARCH

Growing evidence from contemporary biomedical research increasingly substantiates the efficacy of Ayurvedic interventions in the management of stress. Clinical investigations on adaptogenic herbs, particularly *Ashwagandha* (*Withania somnifera*), have reported significant reductions in perceived stress levels, anxiety scores, and serum cortisol concentrations, supporting its role in modulation of the hypothalamic–pituitary–adrenal axis and enhancement of stress adaptability[65]. Likewise, *Medhya Rasayana* herbs such as *Brahmi* (*Bacopa monnieri*) and *Shankhapushpi* (*Convolvulus pluricaulis*) have demonstrated anxiolytic, neuroprotective, and cognition-enhancing properties in both experimental and clinical settings, thereby validating their traditional application in the management of mental health disorders[66].

Scientific evidence also highlights the therapeutic potential of *Panchakarma* procedures in alleviating stress-related symptoms. Clinical studies evaluating *Shirodhara* have shown marked improvements in stress, anxiety, and sleep quality, accompanied by reductions in sympathetic nervous system activity and circulating cortisol levels[67]. Neurophysiological assessments further reveal increased alpha-wave dominance during *Shirodhara*, indicative of a relaxed and tranquil mental state. Additional *Panchakarma* modalities, including *Abhyanga*, *Nasya*, and *Basti*, have demonstrated beneficial effects in mitigating psychosomatic manifestations of chronic stress through restoration of autonomic balance and regulation of *Vata Dosha*.

Furthermore, substantial scientific literature supports the role of Yoga and meditation as effective non-pharmacological strategies for stress management. Evidence from randomized

controlled trials and meta-analyses indicates that regular practice of Yoga, *Pranayama*, and mindfulness-based meditation significantly reduces perceived stress, anxiety, and depressive symptoms, while enhancing heart rate variability and promoting parasympathetic predominance[68]. Mechanistic studies on adaptogenic and mind–body interventions suggest that their anti-stress effects are mediated through antioxidant activity, neuroendocrine modulation, anti-inflammatory mechanisms, and regulation of neurotransmitter systems, ultimately improving the body's resilience to stressors[69]. Collectively, these findings provide robust scientific support for the integrative application of Ayurvedic and yogic approaches in the holistic management of stress.

DISCUSSION

Contemporary biomedical research and classical Ayurvedic thought exhibit a notable convergence in their conceptualization of stress and stress-related disorders. In modern physiology, stress is primarily understood as a consequence of dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis, resulting in sustained cortisol elevation, sympathetic nervous system hyperactivity, and disruption of neuroendocrine homeostasis. A closely comparable explanation is found in Ayurveda, where aggravation of *Vata Dosha*, particularly *Prana Vata* and *Vyana Vata*, is considered central to disturbances of mental balance and nervous system regulation. Clinical manifestations such as anxiety, insomnia, palpitations, and restlessness attributed to *Vata* vitiation closely resemble modern descriptions of sympathetic overdrive and HPA-axis hyperactivation[70].

Another important area of overlap lies in the understanding of neurochemical imbalance. Modern stress biology emphasizes dysregulation of neurotransmitters such as serotonin, dopamine, and gamma-aminobutyric acid, which contribute to anxiety, depression, and cognitive dysfunction. Ayurveda describes a parallel mechanism through imbalance of the *Manasika Doshas*, *Rajas* and *Tamas*. Excess *Rajas* is associated with hyperarousal, irritability, and emotional instability, whereas predominance of *Tamas* leads to lethargy, reduced motivation, and depressive features. These descriptions closely mirror the psychological and behavioral patterns observed in stress-related mental disorders in contemporary psychiatry[71].

Chronic stress is also known to provoke systemic inflammation through increased production of inflammatory cytokines, oxidative stress, and immune dysregulation. Ayurvedic literature interprets this pathological state as accumulation of *Ama*, a toxic by-product of impaired *Agni*. *Ama* leads to obstruction of *Srotas*, reduced immunity, and the development of psychosomatic complaints—findings that are consistent with modern evidence linking chronic stress to inflammatory and immune-mediated disorders[72].

Ayurveda further offers therapeutic approaches that demonstrate substantial scientific

compatibility with modern stress management strategies. *Medhya Rasayanas* such as *Ashwagandha*, *Brahmi*, *Mandukaparni*, *Shankhapushpi*, and *Jatamamsi* have been shown to possess anxiolytic, adaptogenic, neuroprotective, and anti-stress properties. Clinical studies indicate that *Ashwagandha* significantly reduces serum cortisol levels and enhances stress tolerance, while *Brahmi* and *Mandukaparni* improve cognitive performance, alleviate anxiety, and modulate neurotransmitter activity[73].

Similarly, *Panchakarma* interventions including *Shirodhara*, *Abhyanga*, *Nasya*, *Virechana*, and *Basti* contribute to both physiological and psychological restoration. Neurophysiological and clinical studies demonstrate that *Shirodhara* decreases sympathetic nervous system activity, enhances parasympathetic dominance, and increases alpha-wave activity on electroencephalography, reflecting a deeply relaxed mental state. Therapies such as *Basti* and *Virechana* aid in reducing inflammatory burden, correcting doshic imbalance, and facilitating neuroendocrine recalibration, conceptually aligning with modern detoxification and rehabilitation paradigms[74].

Stress-related disorders are inherently multidimensional, affecting mental health, neuroendocrine regulation, immune function, emotional stability, and overall well-being. Ayurveda offers a comprehensive and integrative framework that simultaneously addresses psychological, physiological, behavioral, and lifestyle determinants of stress. Through the combined application of *Satvavajaya Chikitsa* (psychotherapeutic measures), *Rasayana* therapy (rejuvenation), *Shamana* and *Shodhana* procedures, along with regulation of daily routine (*Dinacharya*) and yogic practices, Ayurveda provides a holistic strategy for both prevention and management of stress-induced disorders. This integrative perspective closely aligns with contemporary global emphasis on mind–body medicine, underscoring the continued relevance of Ayurvedic principles in modern stress management.

CONCLUSION

Stress represents a major global health challenge, exerting wide-ranging psychological, physiological, and immunological effects. From a biomedical perspective, stress is largely mediated through dysregulation of the hypothalamic–pituitary–adrenal axis, persistent elevation of cortisol, autonomic nervous system imbalance, and chronic low-grade inflammation. These pathophysiological mechanisms show close correspondence with Ayurvedic concepts such as aggravation of *Vata Dosha*, imbalance of *Manasika Doshas* (*Rajas* and *Tamas*), derangement of *Dhi–Dhriti–Smriti*, disturbance of *Manovaha Srotas*, and depletion of *Ojas*. This conceptual alignment between modern science and Ayurveda underscores the universal nature of stress-related pathology and highlights the

contemporary relevance of Ayurvedic principles in addressing stress-induced disorders.

Ayurvedic therapeutic approaches—including *Medhya Rasayana*, *Panchakarma* procedures, *Satvavajaya Chikitsa*, and lifestyle-based interventions such as *Dinacharya*, Yoga, and adherence to a *Sattvic* diet—provide a comprehensive and multidimensional framework for stress management. Accumulating scientific evidence supports their anxiolytic, adaptogenic, neuroprotective, anti-inflammatory, and restorative properties. Unlike symptom-focused interventions, this integrative approach addresses the underlying psychosomatic and behavioral factors contributing to stress, thereby promoting long-term mental and physical resilience.

In conclusion, Ayurveda offers a preventive as well as therapeutic model for stress management that aligns closely with contemporary concepts of mind–body medicine. Integration of Ayurvedic strategies with modern biomedical insights holds significant potential to enhance outcomes in stress-related disorders and improve overall quality of life. Future research should emphasize well-designed, standardized clinical trials to further substantiate the efficacy, safety, and global applicability of these traditional interventions.

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REFERENCES

1. **World Health Organization.** (2023). *Stress*. https://www.who.int/news-room/questions-and-answers/item/stress

2. Selye, H. (1936). *A syndrome produced by diverse nocuous agents*. *Nature, 138*, 32.

3. **Nold, V., Sweatman, C., Karabatsiakis, A., Böck, C., Bretschneider, T., Lawless, N., Fundel-Clemens, K., Kolassa, I. T., & Allers, K. A.** (2019). Activation of the kynurenine pathway and mitochondrial respiration to face allostatic load in a double-hit model of stress. *Psychoneuroendocrinology, 107*, 148–159.

4. **Miller, E. S., Apple, C. G., Kannan, K. B., Funk, Z. M., Plazas, J. M., Efron, P. A., & Mohr, A. M.** (2019). Chronic stress induces persistent low-grade inflammation. *American Journal of Surgery, 218*(4), 677–683.

5. **Ipsos. (**2024). *Ipsos World Mental Health Day Survey 2024: Key findings*. Ipsos.

6. **Selye, H.** (1950). Stress and the general adaptation syndrome. *British Medical Journal, 1*(4667), 1383–1392.

7. **Mifsud, K. R., & Reul, J. M. H. M.** (2018). Mineralocorticoid and glucocorticoid receptor-mediated control of genomic responses to stress in the brain. *Stress, 21*(5), 389–402.

8. **Godoy, L. D., Rossignoli, M. T., Delfino-Pereira, P., Garcia-Cairasco, N., & de Lima Umeoka, E. H.** (2018). A comprehensive overview on stress neurobiology: Basic concepts and clinical implications. *Frontiers in Behavioral Neuroscience, 12*, 127.

9. **Swaab, D. F., Bao, A. M., & Lucassen, P. J.** (2005). The stress system in the human brain in depression and neurodegeneration. *Ageing Research Reviews, 4*(2), 141–194.

10. **Eisen, A. M., Bratman, G. N., & Olvera-Alvarez, H. A.** (2024). Susceptibility to stress and nature exposure: Unveiling differential susceptibility to physical environments: A randomized controlled trial. *PLOS ONE, 19*(4), e0301473.

11. **Gu, H. F., Tang, C. K., & Yang, Y. Z.** (2012). Psychological stress, immune response, and atherosclerosis. *Atherosclerosis, 223*(1), 69–77.

12. **Joëls, M., & Baram, T. Z.** (2009). The neuro-symphony of stress. *Nature Reviews Neuroscience, 10*(6), 459–466.

13. **Westphal, N. J., & Seasholtz, A. F.** (2005). Gonadotropin-releasing hormone positively regulates corticotropin-releasing hormone–binding protein expression via multiple intracellular signaling pathways. *Molecular Endocrinology, 19*(11), 2780–2797.

14. **Behan, D. P., Heinrichs, S. C., Troncoso, J. C., Liu, X. J., Kawas, C. H., Ling, N., & De Souza, E. B.** (1995). Displacement of corticotropin-releasing factor from its binding protein as a possible treatment for Alzheimer's disease. *Nature, 378*(6554), 284–287.

15. **Bao, A. M., Meynen, G., & Swaab, D. F.** (2008). The stress system in depression and neurodegeneration: Focus on the human hypothalamus. *Brain Research Reviews, 57*(2), 531–553.

16. **King, S. B., Toufexis, D. J., & Hammack, S. E.** (2017). Pituitary adenylate cyclase-activating polypeptide, stress, and sex hormones. *Stress*, *20*(5), 465–475.

17. **Kudlacek, O., Hofmaier, T., Luf, A., Mayer, F. P., Stockner, T., Nagy, C., Holy, M., Freissmuth, M., Schmid, R., & Sitte, H. H.** (2017). Cocaine adulteration. *Journal of Chemical Neuroanatomy*, *83–84*, 75–81.

18. **Spencer, R. L., & Deak, T.** (2017). A user's guide to HPA axis research. *Physiology & Behavior*, *178*, 43–65.

19. **Makino, S., Hashimoto, K., & Gold, P. W.** (2002). Multiple feedback mechanisms activating the corticotropin-releasing hormone system during stress. *Pharmacology Biochemistry and Behavior*, *73*, 147–158.

20. **Streeter, C. C., Gerbarg, P. L., Saper, R. B., Ciraulo, D. A., & Brown, R. P.** (2012). GABAergic mechanisms in stress and anxiety. *Medical Hypotheses*, *78*(5), 571–579.

21. **Holzschneider, K., & Mulert, C.** (2011). Neuroimaging in anxiety disorders. *Dialogues in Clinical Neuroscience*, *13*(4), 453–461.

22. **Bao, A. M., & Swaab, D. F.** (2011). The human hypothalamus in mood disorders. *Progress in Brain Research*, *182*, 17–43.

23. **McEwen, B. S.** (1999). Stress and hippocampal plasticity. *Annual Review of Neuroscience*, *22*, 105–122.

24. **Krishnan, V., & Nestler, E. J.** (2008). The molecular neurobiology of depression. *Nature*, *455*(7215), 894–902.

25. **Miller, A. H., & Raison, C. L.** (2016). The role of inflammation in depression. *Nature Reviews Immunology*, *16*(1), 22–34.

26. **Buckley, T. M., & Schatzberg, A. F.** (2005). On the interactions of the hypothalamic–pituitary–adrenal axis and sleep. *Journal of Clinical Endocrinology & Metabolism*, *90*(5), 3106–3115.

27. **Vgontzas, A. N., Bixler, E. O., Lin, H. M., Prolo, P., Mastorakos, G., Vela-Bueno, A., … Chrousos, G. P.** (2009). Hyperarousal and insomnia: Role of corticotropin-releasing hormone and cortisol. *Sleep Medicine Reviews*, *13*(3), 205–214.

28. **Hall, M., Vasko, R., Buysse, D. J., Ombao, H., Chen, Q., Cashmere, J. D., … Thayer, J. F.** (2004). Acute stress affects heart rate variability during sleep. *Psychosomatic Medicine*, *66*(1), 56–62.

29. **Riemann, D., Spiegelhalder, K., Feige, B., Voderholzer, U., Berger, M., & Perlis, M. L.** (2010). Neurobiology of insomnia: Hyperarousal model. *The Lancet Neurology*, *9*(10), 980–992.

30. **Engler-Chiurazzi, E.** (2024). B cells and the stressed brain: Emerging evidence of neuroimmune interactions in the context of psychosocial stress and major depression. *Frontiers in Cellular Neuroscience*, *18*, 1360242.

31. **Reiche, E. M., Nunes, S. O., & Morimoto, H. K.** (2004). Stress, depression, the immune system, and cancer. *The Lancet Oncology*, *5*(10), 617–625.

32. **Bhatia, V., & Tandon, R. K.** (2005). Stress and the gastrointestinal tract. *Journal of*

Gastroenterology and Hepatology, 20(3), 332–339.

33. **Söderholm, J. D., & Perdue, M. H. (**2001). Stress and intestinal barrier function. *American Journal of Physiology–Gastrointestinal and Liver Physiology, 280*(1), G7–G13.

34. **Chuang, J. Y.** (2022). Stressor-specific microbiota intervention. *Frontiers in Nutrition, 9*, 870665.

35. **Yaribeygi, H., Panahi, Y., Sahraei, H., Johnston, T. P., & Sahebkar, A.** (2017). The impact of stress on body function: A review. *EXCLI Journal, 16*, 1057–1072.

36. **Agarwal, A., Gupta, S., & Sharma, R. K. (**2005). Role of oxidative stress in female reproduction. *Reproductive Biology and Endocrinology, 3*, 28.

37. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sutrasthana 1/54.

38. **Kumar, P. V. G., Deshpande, S., & Nagendra, H. R.** (2019). Traditional practices and recent advances in Nadi Pariksha. *Journal of Ayurveda and Integrative Medicine, 10*(4), 308–315.

39. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sutrasthana 1/16, 1/102.

40. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sharirasthana 4/36–39.

41. **Roshni, K. P. (**2020). Tele-counselling for management of Chittodvega. *Journal of Ayurveda and Integrated Medical Sciences, 8*(4), 395–401.

42. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sutrasthana 12/8.

43. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Vimanasthana 5/8.

44. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sutrasthana 17/74–75.

45. **Naaz, A., Shivaprasad, S. E., & Patil, A. S.** (2025). Concept of Agni and Ama. *Journal of Ayurveda and Integrated Medical Sciences, 10*(1), 223–226.

46. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sutrasthana 7/27.

47. **Agnivesha.** (2013). *Charaka Samhita* (Chakrapani Datta commentary, Y. T. Acharya, Ed.). Chaukhamba Surbharati Prakashan. Sutrasthana 11/54.

48. **Ram Manohar, P., Kessler, C., & Perera, S.** (2018). Utility of heart rate variability in assessment of dosha imbalance. *Journal of Ayurveda and Integrative Medicine, 9*(2), 126–130.

49. **Sproston, N. R., & Ashworth, J. J.** (2018). Role of C-reactive protein at sites of inflammation and infection. *Frontiers in Immunology, 9*, 754.

50. **Uebaba, K., Xu, F. H., Tagawa, M., Asakura, R., Itou, T., & Tatsuse, T.** (2010). Stress reduction and relaxation effects of Shirodhara on the autonomic nervous system: EEG and biochemical evidence. *Evidence-Based Complementary and Alternative Medicine, 2010*, 1–7.

51. **Dhuri, K. D., Bodhe, P. V., & Deo, V. V.** (2011). Effect of Shirodhara on stress hormone cortisol: A clinical study. *AYU, 32*(1), 98–102.

52. **Field, T.** (2016). Massage therapy research review. *Complementary Therapies in Clinical Practice, 24*, 19–31.

53. **Kim, D. H., Lee, M. S., & Kim, E. J.** (2015). Effects of massage therapy on stress hormones and autonomic nervous system activity. *Journal of Physical Therapy Science, 27*(7), 2199–2202.

54. **Kumar, S., Gupta, R., & Sharma, A.** (2018). Effect of Abhyanga and Shirodhara on occupational stress: A clinical study. *International Journal of Ayurveda Medicine, 9*(3), 150–156.

55. **Panda, A. K., Tripathi, J. S., & Singh, R. H.** (2013). Role of Nasya therapy in the management of Manasika Rogas: An Ayurvedic perspective. *AYU, 34*(2), 154–159.

56. **Sharma, R., Singh, R. H., & Pandey, D. N.** (2017). Effect of Nasya therapy on stress and sleep disturbances: A clinical study. *Journal of Ayurveda and Integrative Medicine, 8*(3), 181–186.

57. **Gupta, R., Patil, V. C., & Singh, R. H.** (2014). Clinical evaluation of Shirovasti in stress-related disorders. *AYU, 35*(2), 150–155.

58. **Patil, V. C., Gupta, R., & Singh, R. H.** (2016). Role of Panchakarma therapies in the management of Manasika Rogas. *Journal of Ayurveda and Integrative Medicine, 7*(4), 230–236.

59. **Patil, V. C., Gupta, R., & Singh, R. H.** (2012). Effect of Basti therapy in the management of stress and anxiety disorders. *AYU, 33*(3), 191–194.

60. **Kumar, A., Gupta, R., Sharma, R., & Singh, R. H.** (2016). Role of Panchakarma therapies in stress-related psychosomatic disorders. *Journal of Ayurveda and Integrative Medicine, 7*(2), 102–108.

61. **Sharma, M.** (2014). Yoga as an alternative and complementary approach for stress management: A systematic review. *Journal of Evidence-Based Complementary & Alternative Medicine, 19*(1), 59–67.

62. **Kulkarni, R., Girish, K. J., & Kumar, A.** (2012). Diet and mental health: Ayurvedic perspective of Sattvic Ahara. *Journal of Ayurveda and Integrative Medicine, 3*(4), 171–178.

63. **Medic, G., Wille, M., & Hemels, M. E. H.** (2017). Short- and long-term health consequences of sleep disruption. *Nature and Science of Sleep, 9*, 151–161.

64. **Patwardhan, B., Mutalik, G., & Tillu, G.** (2015). Ayurveda and integrative approaches for stress and mental health. *Journal of Ayurveda and Integrative Medicine, 6*(3), 147–154.

65. **Lopresti, A. L., Smith, S. J., Malvi, H., & Kodgule, R.** (2019). A randomized, double-blind, placebo-controlled study examining the stress-relieving effects of Ashwagandha. *Medicine, 98*(37), e17186.

66. **Kulkarni, R., Girish, K. J., & Kumar, A.** (2012). Nootropic herbs (Medhya Rasayana) in Ayurveda: An update. *Journal of Ayurveda and Integrative Medicine, 3*(4), 171–178.

67. **Kessler, C., Dhiman, K. S., Kumar, A., Ostermann, T., Gupta, S., & Morandi, A. (**2013). Ayurvedic treatments for stress-related disorders: A randomized controlled trial. *Journal of Alternative and Complementary Medicine, 19*(10), 1–7.

68. **Pascoe, M. C., Thompson, D. R., & Ski, C. F.** (2017). Yoga, mindfulness-based stress reduction and stress-related physiological measures: A meta-analysis. *Frontiers in Psychiatry, 8*, 215.

69. **Panossian, A., & Wikman, G. (**2010). Effects of adaptogens on the central nervous system and the molecular mechanisms associated with their stress-protective activity. *Pharmaceuticals, 3*(1), 188–224.

70. **Mbiydzenyuy, N. E., & Qulu, L.-A.** (2024). Stress, hypothalamic–pituitary–adrenal axis, hypothalamic–pituitary–gonadal axis, and aggression. *Metabolic Brain Disease*. Advance online publication.

71. **Sinha, P.** (2024). A critical review on stress management through Ayurveda. *Journal of Ayurveda and Integrated Medical Sciences*.

72. **Mariotti, A.** (2015). The effects of chronic stress on health. *EXCLI Journal, 14*, 1057–1072.

73. **Chandrasekhar, K., Kapoor, J., & Anishetty, S.** (2012). A prospective, randomized double-blind study of Ashwagandha root extract in reducing stress and anxiety. *Indian Journal of Psychological Medicine, 34*(3), 255–262.

74. **Upesh, M. L., Sharma, R., & Singh, A.** (2025). Stress: A burning issue of today's era. *Journal of Ayurveda and Integrated Medical Sciences*.