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Anxiety Disorders & Generalized Anxiety Disorder (GAD): A Neuro-Hormonal Perspective of *Shirodhara* – An Ayurvedic Review

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Abstract

Background:

Anxiety disorders, particularly Generalized Anxiety Disorder (GAD), represent one of the most prevalent psychiatric conditions globally, significantly impacting quality of life and productivity. The neuro-endocrine mechanisms underlying anxiety involve hyper-activation of the hypothalamic–pituitary–adrenal (HPA) axis, cortisol exhaustion, and dysregulation of neurotransmitters such as GABA and serotonin. Ayurveda describes anxiety in terms of *Chittodvega*, a *Manas vyadhi* involving *Vata-prakopa, Rajas-Tamas* aggravation, and *Oja-kshaya. Shirodhara* is traditionally indicated for disorders of mind and stress-related psychic disturbances.

Aim/Objectives:

To evaluate *Shirodhara* through modern neuro-hormonal mechanisms and classical Ayurvedic principles in the management of anxiety disorders and GAD.

Methods:

A narrative review of Ayurvedic treatises (*Bruhatrayee, Laghutrayee, Nighantu, Rasashastra texts*) and modern biomedical literature was conducted. Data were extracted from PubMed, Scopus, Cochrane, and Google Scholar using keywords: *Anxiety, GAD, Shirodhara, neuroendocrine, cortisol, GABA, melatonin, HPA axis*.

Key Review Findings: *Shirodhara* modulates HPA axis activity, decreases cortisol, enhances GABA and serotonin levels, increases parasympathetic tone, and improves sleep architecture. Ayurvedically, it pacifies *Vata*, balances *Rajas-Tamas*, nourishes *Ojas*, and stabilizes *Prana-Vyana-Sadhaka Pitta.*

Conclusion:

Shirodhara offers a promising integrative therapy for GAD through a dual framework neuro-hormonal regulation and Ayurvedic mind–body balancing. Further randomized, neuro-biochemical studies are required for stronger clinical validation.

Keywords: Anxiety disorders, GAD, *Shirodhara*, HPA axis, cortisol, GABA, *Manovaha* srotas, Ayurveda, neuro-hormonal modulation, *Rasayana* therapy.

Introduction

Anxiety disorders are the most common mental health illnesses worldwide, with lifetime prevalence reaching nearly **16–20%** and rising due to urbanization and psychosocial stressors (1). Generalized Anxiety Disorder (GAD) is characterized in **DSM-5** by excessive worry lasting ≥6 months, associated with restlessness, muscle tension, sleep disturbance, irritability, fatigue, and impaired concentration (2).

Neurophysiologically, anxiety results from dysregulation of the **HPA axis**, increased **CRH-ACTH-cortisol activity**, imbalance in **serotonin, GABA, dopamine, noradrenaline pathways**, and reduced limbic inhibitory control (3)(4). Cortisol hyper-secretion leads to autonomic over-arousal, sympathetic excitation, and reduced neuroplasticity (5).

Ayurveda describes anxiety under *Chittodvega*, *Udvega*, *Manodhukha*, linked to *Vata prakopa, Rajo-Tamo dushti,* derangement of *Manovaha Srotas*, impairment of *Sadhaka Pitta*, and depletion of *Ojas* (6)(7). *Prana and Vyana Vayu* govern mental processing, while *Tarpaka Kapha* stabilizes emotional tolerance (8). Thus, anxiety is a *Manas-Vikriti* arising from *Mano-dosha imbalance* and *Oja-kshaya.*

Materials & Methods

This is a **qualitative narrative review** synthesizing Ayurvedic and neuro-physiological evidence.

Sources Reviewed:

Ayurvedic Sources:

Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, Ashtanga Sangraha, Sharangadhara Samhita, Bhavaprakasha, Nighantus, Rasashastra classics, and contemporary Ayurvedic psychiatry literature.

Modern Databases:
PubMed, Google Scholar, Scopus, ResearchGate, Cochrane Library.

Eligibility Criteria:
Included peer-reviewed clinical studies, conceptual research, neuro-hormonal studies related to stress, insomnia, *Shirodhara*, anxiety, and Ayurvedic physiology.

Review & Observations

A. Modern Perspective of Anxiety & GAD

GAD is associated with:

- HPA axis dysregulation → ↑CRH, ↑ACTH, ↑cortisol (9)
- Reduced GABAergic inhibition, ↓serotonin, altered norepinephrine turnover (10)
- Elevated inflammatory cytokines *IL-6 & TNF-α* linking anxiety to immunological stress (11)

Psychoneuroimmunology reveals bidirectional interaction between immunity, mood regulation, and endocrine signalling (12).

B. Ayurvedic Understanding of Anxiety

- *Nidana*: Chinta, Shoka, *Ativyayama, Vegavidharana* (13)

- *Dosha Dushya Samurchana*: *Vata* predominance with *Rajo-Tamasik* aggravation (14)
- *Manovaha Srotasa dushti* → cognitive instability, worry, insomnia (15)
- *Ojas depletion* leads to fear, emotional exhaustion, palpitation, and mental weakness (16)
- Management includes *Satvavajaya Chikitsa, Medhya Rasayana, Nidan Parivarjana* (17)

C. *Shirodhara* – Classical Review

Shirodhara = continuous pouring of medicated liquid on the forehead (*Shiras*).
Types (18):

1. ***Taila Dhara***
2. ***Takra Dhara***
3. ***Kwatha Dhara***
4. ***Ghrita Dhara***

Classical indications:

- *Chittodvega, Anidra, Shiro-Roga, Apasmara, Unmada, Bhrama, Daha* (19)(20)
- Mechanisms mentioned: *Vata-shamana, Nidra-utpatti, Manonigraha, Hridaya-prasādana* (21)

D. Neuro-Hormonal Mechanism of *Shirodhara*

Scientific interpretation suggests:

Neuro-Hormonal Effect	**Outcome**
↓Cortisol, normalized HPA axis (22)	Reduced stress hyperarousal
↑GABA, ↑serotonin (23)	Anxiolytic effect, improved calmness
↑Melatonin secretion (24)	Sleep regulation, circadian balance
↓Sympathetic activity, ↑Parasympathetic tone (25)	Muscle relaxation, stabilized HRV
Improved EEG alpha wave activity (26)	Deeper relaxation state

Clinical evidence reports significant reduction in GAD severity, improved sleep latency, and reduced cortisol after *Taila Dhara* therapy (27)(28).

E. Therapeutic Protocol

- ***Dravya:*** *Ksheerabala taila, Brahmi taila, Jatamansi oil, Takra for Pitta-vitiation (29)*
- **Temperature:** 39–42°C warm for *Vata-Kapha*, mildly cool for *Pitta* (30)
- **Duration:** 30–60 min for 7–14 days (31)
- **Stream Height:** 8–12 cm continuously oscillating on *Ajna chakra* (32)

Adjuvant Therapy:

Yoga (Anuloma-Viloma), Shavasana, Medhya Rasayana (*Brahmi, Mandukaparni, Shankhpushpi, Yashtimadhu*) enhance outcomes (33)(34).

Discussion

Shirodhara provides a bridge between ancient mind-body healing and controlled neuro-endocrine modulation. By lowering cortisol, enhancing GABA-serotonin activity, and activating parasympathetic response, it directly remodels the central anxiety pathway (36). Ayurvedically, it pacifies *Vata*, reduces *Rajoguṇa* excitation, nurtures *Ojas*, and stabilizes *Sadhaka Pitta*—producing mental clarity and calmness.

Current studies are promising but limited by small sample sizes and lack of biochemical monitoring. Future research should include EEG-fMRI mapping, cortisol-ACTH profiling, HRV biofeedback, randomized controlled trials to validate mechanistic pathways.

Conclusion

Shirodhara demonstrates multidirectional benefits in Anxiety and GAD via HPA axis normalization, neurotransmitter enhancement, parasympathetic activation, and *Ojas*-restoration. It offers a safe, non-pharmacological, integrative therapy aligning neuro-hormonal science with classical Ayurvedic medicine. Strengthening clinical trials and neuro-imaging documentation will accelerate its acceptance in global psychoneurotherapy.

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