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A COMPARATIVE STUDY TO EVALUATE THE EFFICACY OF SHIRODHARA IN THE FORM OF TAKRADHARA AND SNEHADHARA WITH JATAMANSI OIL IN THE MANAGEMENT OF ANIDRA W.S.R. PRIMARY INSOMNIA

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ABSTRACT

Background: Nidra is described in Ayurveda as one of the Trayopastambha, essential for maintenance of life, health, strength, happiness and proper functioning of body and mind. Disturbance of Nidra leads to Anidra, which closely resembles primary insomnia in contemporary sleep medicine. Primary insomnia is now understood as a disorder of persistent hyperarousal involving cortical activation, hypothalamic-pituitary-adrenal axis dysregulation, autonomic overactivity, altered neurotransmitter balance and disturbed circadian-sleep homeostatic regulation.[1-4,10-13] Shirodhara is an important Moordhni Taila procedure used in psychosomatic disorders, stress and sleep disturbances. Takradhara and Snehadhara with Jatamansi Taila are traditionally indicated for calming the mind and promoting sleep.[14-18] **Aim:** To compare the clinical efficacy of Takradhara and Jatamansi Taila Shirodhara in the management of Anidra with special reference to primary insomnia. **Materials and Methods:** A randomized, double-arm comparative clinical study was conducted on 30 completed patients of Anidra/primary insomnia. Patients were randomly allocated into two groups of 15 each. Group A received Takradhara and Group B received Shirodhara with Jatamansi Taila. The procedure was performed for 30 minutes daily for 14 days, followed by assessment up to Day 28. The Athens Insomnia Scale was used for assessment of sleep induction, awakenings during night, early final awakening, total sleep duration, sleep quality, daytime well-being, daytime functioning and daytime sleepiness.[5,19] **Results:** Both interventions produced statistically significant improvement in symptoms of insomnia. Takradhara produced 62.86% relief in sleep induction, 61.29% in nocturnal awakenings, 71.43% in total sleep duration and 63.33% in sleep quality. Jatamansi Taila Shirodhara produced 54.55% relief in sleep induction, 58.06% in nocturnal awakenings, 56.25% in total sleep duration and 58.62% in sleep quality. Takradhara showed comparatively better improvement in total sleep duration, while other parameters were broadly comparable.[19] **Conclusion:** Both Takradhara and Jatamansi Taila Shirodhara are effective and safe non-pharmacological Panchakarma interventions for Anidra/primary insomnia. Takradhara appears more effective in improving total sleep duration, whereas Jatamansi Taila Shirodhara shows broad improvement in sleep-related symptoms. The findings support the Ayurvedic understanding of Anidra as a Vata-Rajas dominant psychosomatic condition and correlate with the modern neurobiological concept of insomnia as a hyperarousal disorder.

KEYWORDS: Anidra; Nidra; Primary insomnia; Takradhara; Shirodhara; Jatamansi Taila; Neurobiology of sleep; Panchakarma; Athens Insomnia Scale.

INTRODUCTION

Sleep is a highly organized neurobiological state essential for physical restoration, emotional regulation, cognitive consolidation, immune balance, metabolic homeostasis and neuroendocrine stability. Modern sleep science classifies sleep into non-rapid eye movement sleep and rapid eye movement sleep. Non-rapid eye movement sleep is particularly related to physical restoration, energy conservation, immune regulation and growth hormone secretion, whereas rapid eye movement sleep is associated with memory processing, emotional regulation and neural plasticity.[1,2]

The regulation of sleep depends mainly on two interacting biological processes: the circadian rhythm and the homeostatic sleep drive. The circadian rhythm is largely regulated by the suprachiasmatic nucleus of the hypothalamus, which synchronizes sleep-wake timing with the light-dark cycle. The homeostatic drive increases with duration of wakefulness and is partly mediated through sleep-promoting substances such as adenosine.[1,2] The transition between wakefulness and sleep is controlled by a complex interaction between wake-promoting systems, including orexin/hypocretin, histamine, noradrenaline, serotonin, dopamine and acetylcholine, and sleep-promoting regions such as the ventrolateral preoptic nucleus and median preoptic nucleus, which utilize inhibitory neurotransmitters such as gamma-aminobutyric acid and galanin.[1,2]

In Ayurveda, Nidra is not merely a passive state of unconsciousness but a physiological and psychological necessity. Acharya Charaka has described Nidra as one of the three supporting pillars of life, along with Ahara and Brahmacharya.[10] Proper Nidra promotes happiness, nourishment, strength, fertility, knowledge and longevity, whereas improper sleep produces misery, emaciation, weakness, infertility, ignorance and even death-like deterioration.[11] This reflects the holistic Ayurvedic understanding that sleep maintains both Sharira and Manas.

Anidra is described in Ayurveda as a disorder of disturbed sleep, commonly associated with Vata aggravation and Manasika factors such as Chinta, Bhaya, Krodha, Shoka and mental overactivity. Charaka has included Anidra among Vataja Nanatmaja Vikara, indicating the central role of Vata in sleep disturbance.[12] Vata, due to its Chala, Ruksha, Laghu and Sukshma qualities, when aggravated, produces instability of mind, restlessness, sensory overactivity and inability to enter a calm sleep state. Mental factors such as Kama, Shoka and Bhaya are also described as provoking Vata, while Krodha deranges Pitta.[13] Sushruta also indicates that increase of Vata may lead to sleeplessness.[15]

In contemporary terminology, primary insomnia is characterized by difficulty in initiating sleep, difficulty in maintaining sleep, early morning awakening, non-restorative sleep and associated daytime dysfunction. The modern concept of insomnia closely resembles the Ayurvedic concept of Anidra because both recognize the involvement of mental overactivity, stress, sensory disturbance, irregular lifestyle and disturbed biological rhythm.

The neurobiology of insomnia is now largely explained through the hyperarousal model. According to this model, insomnia is not simply a lack of sleep but a state of excessive activation of arousal systems during both day and night. Patients with insomnia may show increased cortical activity, increased sympathetic tone, increased metabolic rate, elevated cortisol levels and impaired deactivation of wake-promoting networks.[3,4] This modern understanding resembles the Ayurvedic explanation of Anidra caused by aggravated Vata and disturbed Manas.

Shirodhara is a classical Panchakarma procedure in which a continuous stream of medicated liquid is poured over the forehead or scalp in a rhythmic manner. It is described under Moordhni Taila and is traditionally indicated in Nidranasha, Shiroroga, stress-related conditions and psychosomatic disorders. Moordhni Taila is classically described as beneficial for the head, sense organs, hair, sleep and mental comfort.[14] Snehana is also described as producing Snigdhata, Mriduta, Vishyandana and Kleda, which supports Vata-shamana.[16]

The procedure may act through tactile stimulation, thermal regulation, rhythmic sensory input, relaxation response, parasympathetic activation and reduction of sympathetic arousal. Psychophysiological research has shown that Shirodhara may reduce heart rate, respiratory rate, diastolic blood pressure and stress scores, and may produce electroencephalographic changes suggestive of a relaxed-alert state.[6]

Takradhara uses medicated buttermilk as the Dhara medium. Its Sheeta, Laghu and Pitta-pacifying qualities may help reduce mental heat, irritability, restlessness and disturbed sleep continuity. Jatamansi Taila Shirodhara combines the mechanical and sensory effects of Shirodhara with the pharmacological properties of Jatamansi. Jatamansi is traditionally considered Medhya, Manas-shamaka, Nidrajanana and Vata-pacifying.[17,18] Experimental studies suggest that Nardostachys jatamansi may possess anxiolytic and central nervous system depressant activity, possibly involving GABAergic and monoaminergic pathways.[7,8]

Therefore, the present study was undertaken to compare the efficacy of Takradhara and Jatamansi Taila Shirodhara in patients of Anidra with special reference to primary insomnia.

MATERIALS AND METHODS

Study Design: The study was designed as a randomized, double-arm comparative clinical trial. A total of 31 patients were registered, out of which 30 patients completed the study. The patients were randomly divided into two groups of 15 patients each. Group A received Takradhara, while Group B received Shirodhara with Jatamansi Taila. The intervention was given for 14 days and follow-up assessment was carried out up to Day 28.[19]

Ethical Clearance and Registration: The study was conducted after obtaining Institutional Ethics Committee approval vide Memo No. 351, dated 04/02/2023. The trial was registered under CTRI number CTRI/2024/06/068545.[19]

Diagnostic Criteria: Patients were diagnosed on the basis of clinical features of Anidra and assessment by the Athens Insomnia Scale. The Athens Insomnia Scale is a validated tool based on ICD-10 criteria and includes eight items assessing sleep induction, nocturnal awakening, early final awakening, total sleep duration, sleep quality, daytime well-being, daytime functioning and daytime sleepiness.[5]

Inclusion Criteria: Patients of either sex between 20 and 70 years of age, presenting with reduced sleep time, difficulty in sleep initiation, disturbed sleep maintenance, wakefulness during normal sleeping time, symptoms persisting for three months or more, and Athens Insomnia Scale score of 6 or above were included in the study.[19]

Exclusion Criteria: Patients with serious systemic illness, diabetes mellitus, cancer, tuberculosis, AIDS, epilepsy, stroke, hemorrhagic disorders, major psychiatric disorders, pregnancy, lactation, alcohol or drug dependence, and those involved in night-shift duties were excluded.[19]

Intervention: Group A received Takradhara using 2 litres of Takra per sitting. The procedure was performed for 30 minutes daily for 14 days. Group B received Shirodhara with 2 litres of Jatamansi Taila per sitting for the same duration. Standard principles of Purvakarma, Pradhana Karma and Paschat Karma were followed in both groups.[19]

Assessment Criteria: Assessment was done using the eight domains of the Athens Insomnia Scale: sleep induction, awakening during night, final awakening earlier than desired, total sleep duration, overall sleep quality, sense of well-being during the day, physical and mental functioning during daytime, and daytime sleepiness. Assessment was performed at baseline, Day 7, Day 14 and Day 28. Statistical analysis was done using paired t-test for intra-group comparison and unpaired t-test for inter-group comparison.[5,19]

AIM AND OBJECTIVES

Aim: To evaluate and compare the clinical efficacy of Takradhara and Jatamansi Taila Shirodhara in the management of Anidra with special reference to primary insomnia.

Objectives: (1) To assess the effect of Takradhara on clinical features of Anidra/primary insomnia. (2) To assess the effect of Jatamansi Taila Shirodhara on clinical features of Anidra/primary insomnia. (3) To compare the efficacy of both therapies using the Athens Insomnia Scale. (4) To observe any complications or adverse effects during the intervention period.

RESULTS

Both interventions produced statistically significant improvement in clinical parameters of Anidra/primary insomnia. Takradhara showed marked improvement in total sleep duration, while Jatamansi Taila Shirodhara showed broad improvement in sleep induction, sleep maintenance and daytime symptoms.

Table 1: Percentage relief in Athens Insomnia Scale parameters after intervention.[19]

Parameter	Takradhara Group A (% relief)	Jatamansi Taila Shirodhara Group B (% relief)
Sleep induction	62.86	54.55
Awakening during night	61.29	58.06
Early final awakening	65.38	62.50
Total sleep duration	71.43	56.25
Overall sleep quality	63.33	58.62
Sense of well-being during day	63.33	51.52
Physical and mental functioning	50.00	58.06
Daytime sleepiness	63.33	62.96

Based on individual patient outcome scoring, Group A showed 66.67% moderate and 33.33% mild improvement. Group B showed 46.67% moderate, 46.67% mild and 6.67% marked improvement. No patient in either group remained unchanged or achieved complete remission during the short study duration.[19]

DISCUSSION

The present study demonstrates that both Takradhara and Jatamansi Taila Shirodhara are effective in improving symptoms of Anidra/primary insomnia. The improvement in sleep induction, sleep maintenance, sleep quality and daytime functioning suggests that Shirodhara-based therapies may have a multidimensional effect on sleep physiology.

From an Ayurvedic perspective, Anidra is primarily related to aggravated Vata, disturbed Manas, increased Rajas and impaired natural dominance of Tamas required for sleep. Vata aggravation produces instability, restlessness and sensory hyperresponsiveness. Rajas produces mental excitation, excessive thinking and emotional disturbance. These factors prevent the withdrawal of Manas from Indriyas and obstruct the onset of physiological Nidra.[12,13,15] Shirodhara, through continuous rhythmic stimulation over the forehead, may pacify Vata, reduce Rajas, stabilize Manas and facilitate the natural process of Nidra.

From a neurobiological perspective, insomnia is increasingly understood as a disorder of hyperarousal.[3,4]

In healthy sleep, the ventrolateral preoptic nucleus inhibits wake-promoting systems such as orexinergic, histaminergic, noradrenergic and serotonergic pathways.[1,2] In insomnia, this inhibitory sleep-promoting mechanism may be insufficient, while wake-promoting systems remain overactive. This results in delayed sleep onset, fragmented sleep and poor restorative quality.

The effect of Shirodhara may be understood through its potential influence on the autonomic nervous system and central arousal networks. The continuous stream of liquid over the forehead provides repetitive tactile and thermal stimulation, especially over the frontal region and nearby sensory nerve endings. This may reduce sympathetic discharge and enhance parasympathetic tone. Reduction in heart rate, respiratory rate, diastolic blood pressure and stress scores after Shirodhara has been reported in psychophysiological studies.[6] Such effects are relevant in insomnia because sympathetic overactivity is a major component of hyperarousal.[3,6]

The hypothalamus is an important common area in both sleep regulation and stress response. It regulates circadian rhythm, autonomic activity, endocrine responses and sleep-wake transitions.[1,2] Stimulation of the forehead and scalp during Shirodhara may influence hypothalamic-limbic circuits indirectly through sensory pathways, relaxation response and autonomic modulation. This may help reduce HPA-axis activation, thereby supporting sleep initiation and continuity. Elevated cortisol has been reported in chronic insomnia, supporting the role of stress-axis activation in sleep disturbance.[4]

Takradhara produced greater improvement in total sleep duration. In Ayurvedic terms, Takra possesses properties that may pacify Pitta and stabilize Vata when used appropriately. In patients where sleep is disturbed due to mental heat, irritability, stress, restlessness and Pitta-associated overactivity, the cooling and soothing nature of Takradhara may be particularly beneficial. The improvement of 71.43% in total sleep duration in Group A indicates that Takradhara may be more useful in patients where reduced sleep duration is the dominant complaint.[19]

Jatamansi Taila Shirodhara also produced significant improvement in all domains. Jatamansi is a well-known Medhya and Manas-shamaka drug in Ayurveda.[17,18] Its oil-based administration through Shirodhara may add Vata-shamana, Snigdha and calming effects. Modern experimental studies suggest that Nardostachys jatamansi has anxiolytic and central nervous system depressant activity, possibly mediated through GABAergic mechanisms and modulation of brain monoamines.[7,8] GABA is the principal inhibitory neurotransmitter in the central nervous system and plays a major role in sleep initiation by reducing neuronal excitability. Therefore, Jatamansi Taila Shirodhara may act through both procedural relaxation and pharmacological neurocalming effects.

The use of Athens Insomnia Scale in this study is appropriate because it assesses both nocturnal symptoms and daytime impairment.[5] Insomnia is not limited to night-time sleep disturbance; daytime fatigue, impaired functioning, low well-being and sleepiness are equally important clinical outcomes. Improvement in these parameters in both groups indicates that the therapies improved the functional burden of insomnia, not merely sleep duration.

The results also suggest that Shirodhara may be understood as a mind-body intervention. Its effects may arise from combined mechanisms: Vata-Rajas pacification, sensory withdrawal, parasympathetic activation, reduction of stress response, modulation of hypothalamic-limbic activity and improvement of sleep homeostasis. This integrative interpretation bridges the Ayurvedic concept of Nidra and the modern neurobiology of sleep.

No serious adverse effects were reported during the study period. This is clinically relevant because conventional hypnotic drugs may be associated with tolerance, dependence, next-day sedation, cognitive impairment and rebound insomnia when used long term. Current guidelines for chronic insomnia emphasize non-pharmacological approaches as first-line treatment, especially cognitive behavioural therapy for insomnia.[9] Ayurvedic therapies such as Takradhara and Jatamansi Taila Shirodhara may serve as safe adjunctive interventions, particularly in patients preferring non-pharmacological or integrative care.

However, the study has limitations. The sample size was small, the study was open-label and objective sleep measures such as polysomnography, actigraphy, heart rate variability, salivary cortisol and melatonin assessment were not used. The follow-up period was also short. Future studies should include larger sample sizes, objective sleep biomarkers, longer follow-up and comparison with standard non-pharmacological insomnia treatment.

PROBABLE MODE OF ACTION

Ayurvedic Mode of Action

Shirodhara acts through Shiro-Marma stimulation, Vata-pacification, Manas-shamana, reduction of Rajas and restoration of physiological Nidra. Takradhara may additionally pacify Pitta and reduce mental heat, while Jatamansi Taila may pacify Vata and promote Medhya and Nidrajanana effects.[14-18]

Neurophysiological Mode of Action

Rhythmic pouring over the forehead may modulate sensory pathways, reduce cortical hyperarousal, enhance parasympathetic tone and reduce sympathetic activity. This may help in sleep initiation and maintenance.[3,6]

Neuroendocrine Mode of Action

By reducing stress response and autonomic overactivity, Shirodhara may influence hypothalamic-pituitary-adrenal axis activity. Reduced hyperarousal may support normal cortisol rhythm and sleep-wake regulation.[4]

Neurotransmitter-related Action

Jatamansi may exert calming effects through GABAergic and monoaminergic modulation, while Shirodhara itself may facilitate inhibitory relaxation pathways involved in sleep initiation.[7,8]

Psychosomatic Effect

The procedure provides a structured relaxation experience, reduces sensory overload, creates mental quietness and supports withdrawal of mind from external stimuli, which is essential for Nidra according to Ayurveda.

CONCLUSION

The present randomized comparative clinical study shows that both Takradhara and Jatamansi Taila Shirodhara are effective in the management of Anidra with special reference to primary insomnia. Takradhara showed comparatively better improvement in total sleep duration, while Jatamansi Taila Shirodhara produced broad symptomatic relief and one case of marked improvement.

The findings support the Ayurvedic concept that Anidra is a disorder of disturbed Vata, Rajas and Manas, and also correspond with the modern neurobiological understanding of insomnia as a hyperarousal disorder involving autonomic, neuroendocrine and neurotransmitter dysregulation. Shirodhara may act as an integrative neuropsychological and Panchakarma-based intervention by inducing relaxation, improving autonomic balance, reducing stress response and facilitating physiological sleep.

Further large-scale randomized controlled trials with objective sleep parameters are needed to validate these findings and establish the therapeutic role of Takradhara and Jatamansi Taila Shirodhara in integrative insomnia management.

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