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REVIEW ARTICLE

Exploring Ayurvedic Solutions for Insomnia: *Jatamansi* Transdermal Patch as a Therapeutic Approach

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ABSTRACT

Insomnia is a widespread sleep disorder that significantly affects physical and mental well-being, leading to fatigue, cognitive dysfunction, and mood disturbances. Ayurveda offers a holistic approach to managing insomnia, focusing on natural remedies, herbal formulations, and lifestyle modifications, including *Shodhana, Shirodhara, Nasya karma*, and *Murdhani Chikitsa*. Among the various Ayurvedic treatments, *Jatamansi (Nardostachys jatamansi)* is highly regarded for its sedative, cooling, and restorative properties that help pacify vitiated *Pitta* and *Vata doshas*, which are often associated with sleep disturbances. In modern medicine, transdermal drug delivery systems have gained attention for their ability to provide controlled drug release through the skin. This paper explores the potential of a *Jatamansi*-based transdermal patch for treating insomnia, leveraging its calming and balancing effects on the body and mind. The preparation of the transdermal patch involves the use of key ingredients such as liners, adhesives, membranes, and backing, alongside a controlled drug release mechanism. The therapeutic potential of *Jatamansi,* with its multi-dimensional action on *Rakta* and *Majja dhatus*, is highlighted as an effective, natural remedy for improving sleep quality.

1. INTRODUCTION

Insomnia is a common sleep disorder characterized by difficulty falling asleep, staying asleep, or waking up too early and not being able to go back to sleep. It can lead to various negative impacts on health, including fatigue, mood disturbances, and reduced cognitive function.[1] Ayurveda concentrates on calming disease pathology with *Shodhana, Shirodhara, Nasya karma*, *Murdhani Chikitsa,* natural herbs use, and Ayurvedic formulations.[2] *Nidra* was regarded by the ancient Ayurvedic Acharayas as one of the *Trayopastambhas* for maintaining a healthy existence. *Aahar, Nidra*, and Brahmacharya are three aspects that are mentioned as three *Upasthambha* that play a significant part in preserving health. This is one of the most important principles. Ayurveda is considered one of the ancient systems of knowledge in India.[3] According to ancient literature, it is increasingly clear that *Nidra* is not only a significant phenomenon but also a crucial element in one's life, having a positive impact on both the body and the mind when practiced properly. *Nidra* also plays a significant part in living a healthy life.[4] Antipsychotic and sedative medications are used in modern therapeutic techniques to control insomnia, but these medications can potentially have negative effects like overuse and addiction.[5] As a result, it is imperative to have some safer methods of treating *Nidra*, and Ayurveda provides these. Ayurveda indicated a variety of methods for treating insomnia, including the use of natural medicines, preparations, *Shodhna Chikitsa,* and effective *Ahara-Vihara* conduct. Yoga exercises were also included in Ayurveda as a way to treat sleeplessness.[6]

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1.1. Types of Insomnia

1.1.1. Acute insomnia

Also known as short-term insomnia, it lasts for a few days to a few weeks. Often triggered by stress or a traumatic event.

1.1.2. Chronic insomnia
Lasts for at least 3 months, occurring at least three nights per week. Can be due to long-term stress, anxiety, or other health conditions.

1.1.3. Onset Insomnia
Difficulty falling asleep at the beginning of the night.

1.1.4. Maintenance Insomnia
Difficulty staying asleep or waking up too early and struggling to fall back asleep.

1.1.5. Co-morbid Insomnia
Associated with another condition, such as depression, anxiety or chronic pain.

1.2. Classification of *Nidra*

According to Ayurveda, 6 types of *Nidra* and their causes are mentioned in Charak Samhita Sutrasthan Adh.21/58.

1.3. Types of *Nidra*

1. *Tamobhava* (Excess of *tamas* quality)
2. *Shleshmasamudbhava* (Excess of *kapha dosha)*
3. *Shariramanahshramsamudbhava* (Mental and physical fatigue)
4. *Agantuki* (Adventitious)
5. *Vyadhianuvartini* (Sequelae to diseases)
6. *Ratri swabhavaprabhava* (Occurring during night physiological sleep)

1.4. Causes of Insomnia

1.4.1. Stress
Life stresses such as work, school, health, finances, or family issues can keep your mind active at night, making it difficult to sleep.

1.4.2. Irregular sleep schedules
Erratic sleep patterns due to shift work or travel can disrupt the body's circadian rhythm.

1.4.3. Poor sleep habits
Using electronic devices before bed, irregular sleep schedules, and uncomfortable sleep environments can all contribute to insomnia.

1.4.4. Mental health disorders
Conditions such as anxiety, depression, and PTSD can lead to insomnia.

1.4.5. Medical conditions
Chronic pain, heart disease, asthma, GERD, and other health issues can disrupt sleep.

1.4.6. Medications
Certain medications, such as those for asthma, depression, or high blood pressure, can interfere with sleep.

1.4.7. Substances
Caffeine, nicotine, and alcohol can all negatively impact sleep quality.

1.4.8. Age
As people age, changes in sleep patterns and health conditions can increase the likelihood of insomnia.

1.5. Current Events on Insomnia

1.5.1. Advancements in treatment
Recent research has focused on the development of new pharmacological treatments targeting specific pathways in the brain. These include drugs that act on orexin receptors, which play a role in wakefulness and arousal.

Cognitive Behavioral Therapy for Insomnia continues to be a leading non-pharmacological treatment. Studies show its long-term effectiveness compared to medication.

1.5.2. Impact of the COVID-19 pandemic
The COVID-19 pandemic has significantly impacted sleep patterns globally, with an increase in reported cases of insomnia. Stress, anxiety, and changes in daily routines have contributed to this rise. Healthcare workers and individuals who have experienced severe COVID-19 symptoms are particularly at risk for sleep disturbances.

1.5.3. Technological innovations
The use of wearable technology and sleep tracking apps has grown, providing individuals with tools to monitor and improve their sleep habits. These technologies are also valuable for researchers studying sleep patterns and the effectiveness of treatments.

Artificial intelligence and machine learning are being applied to personalize treatment plans for individuals with insomnia based on their specific sleep data.

1.5.4. Importance of Nidra
Similar to a healthy diet, getting enough sleep is crucial for bodily maintenance. The three *upastambha* (sub pillars), namely *aahara, Nidra*, and *bramhacharya,* are crucial to the preservation of a living organism, according to Acharya Charaka. Depending on the *Nidra*, different things can happen, such as happiness, unhappiness, sustenance, emaciation, strength, weakness, knowledge, ignorance, sterility, life, and death. According to Acharya Kashyapa, a healthy man has the ability to sleep well and for the appropriate length of time.[7]

2. TRANSDERMAL PATCH[7-10]

A transdermal patch is defined as adhesive medicated patch that is placed on the skin to deliver an exact dose of drug through the skin into the bloodstream with a predetermined rate of release to reach in the body. Today, the most common transdermal system present in the market is mainly based on semi permeable membranes which were called as patches. Transdermal drug delivery systems (TDDS), also known as "Transdermal patches" or "Skin patches" are dosage forms designed to deliver a therapeutically effective amount of drug across a patient's skin and in the bloodstream.

3. MAIN INGREDIENTS USED FOR THE PREPARATION OF TRANSDERMAL DRUG DELIVERY SYSTEM[11,12]

3.1. Liners

It provides the protection of patches during storage and the liner should be removed previous to use.

3.2. Adhesive

It served to adhere the components of the patch together along with adhering the patch to skin.

3.3. Membrane

Its controls the drug release from the multi-layer patches. It is also known as the permeation enhancer.

3.4. Drug

Drug reservoir is in direct contact with release liner.

3.5. Backing

Protects the patches from outer environment.

4. METHOD OF PREPARING TRANSDERMAL PATCHES[13]

Method of preparation of TDDS was summarized by modifying the earlier reported methods. The patches were prepared by solvent casting method. The polymer (for example PVP/HPMC) was taken in a beaker with a minimum quantity of the solvent. Then 2/3rd of the solvent was mixed with the other polymers (for example PVA) and was added firstly with stirring at lower rpm and later at a higher speed. The plasticizer was added and homogeneously mixed and the drug was included with enduring agitation and the volume was made up. The films were cast onto a suitably designed and fabricated glass mold and then dried in oven at 40°C. The films were removed using sharp blade by inserting along the edges of the film. The dried films were wrapped in butter paper and stored in a closed container away from light and in cool place.

4.1. Drug Details[14]

Jatamansi, the one with matted hair, is the essence of ascetics (*tapasvini*). Its taste is bitter *(Tikta)* and astringent *(Kashaya)*, and it imparts sweetness *(Swadvi*) and coolness (*Hima)*. It is beneficial for the balance of the three *doshas* (*Tridosha)*, and it helps treat fevers (*Daha*), *Visarpa*, and skin diseases *(Kushta).*

4.2. Jatamansi Properties

- *Rasa*- Bitter, astringent, and sweet
- *Virya*- Sheet (Cold)
- *Doshas*- Pacifies all three doshas, that is, vaata, pitta, and kapha

5. DISCUSSION

Jatamansi has dominantly *three rasas madhur, tikta,* and *kashaya* with *sheet virya*. This combination works the best on vitiated *pitta.* As mentioned in the above reference, *Jatamansi* has access particularly in *Rakta dhaatu* (*Astra, daah, visarpa, kushth,* etc.) and *Majja dhaatu (Medhya)*.[15] For *prakrit Nidra,* one needs *taamas bhaav* plus *praakrit Kapha*. In some cases due to ingestion of food items which are spicy, sour or hot in nature, *prakrit kapha* gets diminished due to increase in vitiated *pitta* and *vaata.* Similarly due to excessive anger, stress etc. too *pitta* and *vaata* get vitiated. The above *sharirik* and *maanas bhaav* lead to insomnia. *Jatamansi* with *madhur, tikta, kashya,* and *sheet virya* pacifies the vitiated *pitta* and its dominant source *rakta*. Secondly, it pacifies vitiated *pitta* and *vaat* located in *majja dhaatu* as well.[16] Thirdly synonyms like *tapaswini* indicate that *Jatamaansi* also alleviates *maanas doshas* which act as an obstruction for proper sleep. *Jatamaansi* acts particularly well on bodily heat especially in *Rakta dhaatu* and *majja dhaatu.* We have a concept in Ayurveda – "*Kala*" wherein it's written- "*Pitta dhara kala*, *Majja dhara kala*". *Jatamansi* works on this concept as well. Transdermal patch prepared from *jatamansi* delivers on the above mode of action thereby resulting in sound sleep.[17]

6. CONCLUSION

Insomnia is a complex sleep disorder with numerous physical, psychological, and emotional implications. While modern medicine often relies on pharmacological treatments, Ayurveda offers a more holistic and natural approach, emphasizing the balance of *doshas* and the restoration of harmony within the body. *Jatamansi*, with its calming and therapeutic properties, presents a promising solution for managing insomnia, particularly by addressing the underlying vitiated *Pitta* and *Vata doshas* that contribute to sleep disturbances. The development of a transdermal patch based on *Jatamansi* could offer a novel, non-invasive, and effective treatment for insomnia, providing sustained relief without the side effects often associated with conventional sedative medications. Furthermore, integrating Ayurvedic principles with modern drug delivery systems may pave the way for innovative treatments that prioritize both safety and efficacy. Overall, this approach holds great potential for improving sleep quality and overall well-being, highlighting the importance of combining traditional knowledge with contemporary scientific advancements in the treatment of insomnia.

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11. CONFLICTS OF INTEREST

Nil.

12. DATA AVAILABILITY

This is an original manuscript and all data are available for only review purposes from principal investigators.

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