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Review

Sleep Paralysis from the Viewpoint of Persian Medicine

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Abstract

Sleep paralysis, described as *Kabus* in Persian medicine (PM), is a state during sleep in which a person senses heaviness on the chest without the ability to speak or move. This study aims to review sleep paralysis from the viewpoint of Persian medicine. Five original reference books on PM were reviewed and data about the definition, etiology, and clinical features of sleep paralysis were extracted. Two main etiologies have been mentioned: evaporation of vapor to the brain and brain dystemperament due to cold reaching the brain; both of which cause weakness and dysfunction of the brain. PM recommends low-cost and available remedies for sleep paralysis such as dietary modification, oral and topical herbal medications, and manual interventions like "Fasd" (phlebotomy). Recent studies have shown the neuroprotective effect of these herbal drugs which can improve cognition and memory. Further studies are needed to evaluate the efficacy of the recommended remedies for sleep paralysis.

Keywords: Persian medicine; Phlebotomy; Rapid eye movements; Sleep disorders; Sleep paralysis

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Introduction

Sleep paralysis is a condition in which the body cannot move involuntarily, affecting both the trunk and limbs. It can occur when falling asleep or waking up from sleep and is often accompanied by hallucinations and intense fear reactions [1]. It is a phenomenon that occurs during the transition between sleep and wakefulness and is most commonly associated with rapid eye movement (REM) sleep [2]. Throughout the periods of REM sleep, there is total muscle atonia (except for the eyes and respiratory system) [3]. Indeed, it is considered a medical challenge because of the complexity of the sleep context and its disturbances [3].

Silas Weir Mitchell was credited with discovering sleep paralysis in 1876, using terms such as "nocturnal hemiplegia", "nocturnal paralysis", and "sleep numbness". Later, S. Wilson introduced the term "sleep paralysis" in 1925 [4,5]. The prevalence of sleep paralysis has been found to vary in different countries and ethnic and racial groups. This disparity has been linked to different methodologies in determining the prevalence and/or different definitions of sleep paralysis [5,6]. Research has indicated that between 8-40% of individuals in the general population have encountered sleep paralysis at some point in their lives [7,8]. Some theories have been developed to describe the etiology of sleep paralysis disorder but none of them are fully confirmed. According to previous studies, sleep paralysis develops through the interaction of elevated hyperarousal and impaired fear extinction. Some parts of the brain, including the amygdala, medial, prefrontal cortex, hippocampus, and anterior cingulate cortex, are involved in sleep paralysis [9,10]. It is also proven that during sleep paralysis, the pons and ventromedial medulla are activated, which may be due to the inhibition of motor neurons by GABA and glycine [11].

Sleep paralysis is associated with hypnagogic hallucinations and phobia [7]. Hallucinations have two neurobiological bases; the first will be created by altered neural processing in temporoparietal cortex areas, and the second has been linked to abruptly going in and out of rapid-eye-movement sleep (REMS) [12].

Sleep paralysis is often accompanied by visual hallucinations, sensations of suffocation or chest pressure, and the perception of movement that lasts from a few seconds to several minutes [7,8]. These episodes are usually self-limiting and resolve spontaneously or upon sensory stimulation like alarm clock sounds or touch by someone else. Recurrent isolated episodes of sleep paralysis, in the absence of other medical conditions such as narcolepsy, are also well described [9].

Certain factors are believed to make people more prone to experiencing sleep paralysis. These factors include drinking alcohol, irregular sleep patterns, lack of sleep, smoking, mental stress, high body mass index, low systolic blood pressure, and sleeping on one's back [5,7,13]. Isolated sleep paralysis is usually self-limited and does not require drug treatment. However, in cases where medication is necessary, tricyclic antidepressants (TCA) and selective serotonin reuptake inhibitors (SSRI) are commonly used to suppress REM sleep [5,9].

Persian medicine (PM) is an ancient holistic medical school with rich literature about sleep disorders [14]. Previous studies have evaluated some of its recommendations for sleep disorders [15-18]. Similar to sleep paralysis, the term "*Kabus*" is often mentioned in PM's main books. This condition is characterized by a sensation of a heavy weight on the chest, which makes it hard to breathe [13].

Previous studies have briefly investigated sleep paralysis from the viewpoint of some Persian scholars [19,20]. But, this review delves into the causes, symptoms and treatment of sleep paralysis, as viewed by renowned physicians such as Rhazes (865-935 AD) [21], Avicenna (980-1037 AD) [22], Jorjani (1042-1136 AD) [23], Akhawayni (?–983 AD) [24], and Aghili Alavi Shirazi (Aghili) (1670-1747 AD) [25].

Methods

In this qualitative study, we reviewed printed editions of five original reference books of PM namely "Liber Continens" by Rhazes [26], "Canon of Medicine" by Avicenna [27], "The Treasure of Kharazmshah" by Jorjani [28], "The Students' Handbook of Medicine" by Akhawayni [29] and "Aghili's Treatments" by Aghili Alavi Shirazi (Aghili) [30]. These books are highly valued as references for traditional medicine schools in Iran, particularly in the field of PM. In PM literature, sleep paralysis is referred to as *Kabus* and is considered a type of head or brain disease. Our research focused on the chapters about head and brain diseases in these books and we searched for information about sleep paralysis (*Kabus*) to compile a comprehensive understanding of its definition, causes, and clinical features.

Results

Sleep Paralysis Definition in Persian Medicine

Sleep paralysis is called *Kabus* in PM books. According to Avicenna [27], Rhazes [26], Aghili [30], and Jorjani [28], it is considered a diseased state with the sensation of suffocation and heaviness that sometimes occurs in sleep. The afflicted person thinks that something heavy is pressing on his/her chest and he/she cannot move or speak.

Sleep Paralysis Etiology in Persian Medicine

PM has a holistic approach toward diagnosis and treatment based on the temperament of the patient and the

disease. The temperament or Mizaj is the result of the interplay between four fundamental qualities, namely hotness, coldness, wetness, and dryness. It denotes the average quality arising from this interaction [31]. This important index could be scientifically evaluated using standard tools [32,33]. Avicenna and most PM scholars believed that the ingested foods would pass through four stages of digestion including; gastric, hepatic, vascular, and organic digestion [34]. After the second digestion, four humors are produced: blood (hot and wet), phlegm (cold and wet), yellow bile (hot and dry), and black bile (cold and dry). Avicenna, Akhawayni, and Aghili have mentioned two main causes of sleep paralysis:

1. Evaporation of vapors to the brain: It is caused by the rising of vapors from other organs, especially the stomach to the brain [29]. Ascending vapors to the brain may lead to the suffocation sensation of the sleeping patient [27,30]. Vapors are divided into three categories based on the dominant humor in the body:

1.1.Blood humor dominance in the body which causes humidity and heat in the brain.

1.2.Phlegm humor dominance in the body causes an increase in cold and moisture in the brain.

1.3.Black bile humor dominance in the body which causes coldness and dryness in the brain [27]

2. Cold reaching the brain in subjects with brain dysfunction: In PM, most of the brain disorders are considered as the result of excessive coldness (*borudat*) [35]. Thus, it mostly affects people with cold temperaments in the brain [29]. This may gradually disturb the temperamental balance of the brain and result in its dysfunction.

Sleep Paralysis Clinical Signs and Symptoms

According to PM scholars, each person has a general temperament that is determined by the dominance of humor in their body, as well as an organic temperament specific to each of their body organs. From their perspective, patients experiencing sleep paralysis exhibit varying symptoms based on the root cause of their condition.

Some specific signs and symptoms can help diagnose the type of brain condition that causes sleep paralysis. Patients who experience sleep paralysis due to an excess of blood humor in the body often have redness in the face and eyes, lethargy, and a feeling of heaviness. Phlegm humor dominance, on the other hand, may lead to excessive sleep, head heaviness, runny nose, watering eyes, an altered pulse rate, and white-colored urine. Meanwhile, individuals with an excess of black bile humor may experience symptoms such as darkening of the skin and sclera, signs of obsession or psychosis, insomnia, and dryness of nasal mucus, mouth, and eyes. Elderly individuals who have sleep paralysis due to cold brain dysfunction (*Za'fe Demagh*) typically experience additional symptoms such as numbness and vertigo [36,37]. Also, Akhawayni believed that in patients with phlegm humor dominance in their body, if the sleep paralysis attacks continue, the nightmare may result in epilepsy [29].

Sleep Paralysis Remedies in PM

In PM, treatment protocols are individualized based on different types of sleep paralysis, the etiology of sleep paralysis, and the estimated efficacy of each method on each person [30]. It means that there are common therapeutic plans but they can differ from one person to another [38].

Different methods can be used to treat sleep paralysis, including lifestyle modification, dietary modifications, oral and topical medication, and procedures such as "Fasd" (Phlebotomy or bloodletting).

Lifestyle modification is the main part of PM scholars' approach to diseases. "Principles of health maintenance" are evaluated in each patient considering "six essential principles" including; air, nutrition, sleep and wakefulness, movement and stillness, mental states, and retention of useful substances and disposal of waste. Therefore, in patients with sleep paralysis, like other patients, it is very important to regulate these items [27,30]. Avoiding daytime sleep, oversleeping and sleep deprivation, having enough movement and exercise based on the person's temperament, avoiding stress, anxiety, and sadness, avoiding constipation, and eating meals slowly in a resting position with full attention to avoid overeating is the most important advice to the patients with sleep paralysis mentioned by Aghili and Avicenna [39].

One of the recommended dietary modifications by Avicenna for treating sleep paralysis is to consume foods such as barley soup, porridge made with starch and almond oil, apple drink, raisins, and poultry meat such as chickens, pheasants, and sparrows. These nutritional recommendations can help manage sleep paralysis symptoms [27,40]. Some of the recommended herbs for sleep paralysis treatment in PM are also listed in table 1.

Also, some compound drugs (drugs that have more than one active herb) are used in the treatment of sleep paralysis. These formulations have been mentioned in special pharmaceutical books called *Qarabadin*. Among the most important and widely used drugs, we can mention the following: *Sekanjabin, Nogho-e-Favakeh* (soaked fruits), *Jovareshat*, and *Etrifelat* [41,42]. In addition, some of the herbs are recommended to be used in special forms; for example, consumption of *Cuscuta epithymum* with fresh milk and sugar, peony (*Paeonia officinalis*) seeds, *Artemisia* absinthium, and *Euphorbia resinifera* with honey [20]. The selection of these drugs is based on the underlying cause of the disease.

Table 1. Herbal remedies suggested for sleep paralysis in Persian medicine books

Scientific name	Common name	Name in ''Persian medicine''	Indication in ''Persian medicine''	Current known effects	References
Cassia angustifolia M. Vahl	Senna	*Sana*	A, B, C	Neuroprotective effects, antioxidant activities	[43,44]
Cinnamomum zeylanicum Blume	Cinnamon	*Darcini*	B, C, D	Anti-inflammatory, improves memory performance, Increased brain activity	[45-47]
Coriandrum sativum L.	Coriander	*Kozbareh*	A	Cognition improvement	[48]
Cuscuta epithymum L.	Thyme dodder	*Aftimun*	C	Anticonvulsant, immune-stimulatory, antioxidant activity, antioxidant, and neuroprotective properties for cognitive impairment of patients with schizophrenia	[49,50]
Foeniculum vulgare L.	Common fennel	*Razianeh*	A, B	Anti-inflammatory, memory-enhancing properties	[51,52]
Fumaria parviflora Lam.	Fineleaf fumitory	*Shahtaraj*	A, C	Antioxidant effect, therapeutic effect in Alzheimer's disease, and memory deficit	[53,54]
Lavandula stoechas L.	Lavender	*Ostukhudus*	A, B, C	Memory-enhancing agent prevents the loss of memory by providing defense against neurodegeneration, improves learning, and enhances memory in animal models	[55-57]
Malus orientalis Uglitzk.	Apple	*Sib*	A	Antioxidant capacity	[58]
Melissa officinalis L.	Lemon Balm	*Badrangbuyeh*	C	Improvement effect on neurodegenerative diseases and cognitive function	[59, 60]
Pimpinella anisum L.	Aniseed	*Anisun*	B, D	Antidepressant-like, anxiolytic effects and impact on memory in animal models	[61,62]
Rosa damascena Mill.	Damask rose	*Vard*	A, B, C	Improve memory, useful therapeutic effects on depressant and anxiety-like behaviors, epileptic seizures, learning and memory impairments, sleep disturbances, and pain	[63,64]
Terminalia chebula Retz.	Myrobalan	*Halileh-Siah*	A, B, C	Antioxidant, anticholinesterase and anti-amyloidogenic activities and beneficial effect on neurodegenerative disorders, improves memory and learning in Alzheimer's model	[65,66]
Vitis vinifera L.	Grapevine	*Maveez*	B, C, D	Increasing neurocognitive and neuroprotective effects, neuroprotective actions	[67,68]
Zingiber officinale Roscoe	Ginger	*Zanjebil*	B, D	Reduces cognitive deficits induced by focal cerebral ischemia, anti-inflammation	[69,70]

A: Sleep paralysis caused by blood humor dominance in the body; B: Sleep paralysis caused by phlegm humor dominance in the body; C: Sleep paralysis caused by black bile humor dominance in the body: D: Sleep paralysis caused by cold reaching to the brain in subjects with brain dysfunction.

Also based on the Great Elixir (Exir Azam) and Aghili's treatments (Moalejat-e-Aghili) books, bloodletting, leg cupping and reducing the amount of food are necessary for patients with increased blood humor. Inducing diarrhea or vomiting in the phlegmatic type, and topical use of oils (like chamomile oil) in cold dominant type has been also stated in addition to the mentioned points [30].

It is noteworthy that in addition to pharmacotherapy, massage therapy is also used in PM (usually accompanied by an ointment) for the management of all types of sleep paralysis [27]. This usually includes foot massage which also has a stress reduction effect.

The procedure recommended by Akhawayni and Aghili for sleep paralysis is bloodletting from the superficial vein of the arm and from the leg vein, especially in patients with blood humor dominance in the body [19].

Discussion

Based on the literature on PM, it is believed that brain dystemperament is the primary cause of sleep paralysis. As a result, Avicenna believed that all types of sleep paralysis can lead to a weakening of the brain [27]. Dystemperament and weakness cause the dysfunction of the brain; therefore, the common approach to any type of sleep paralysis is to reinforce the brain. Several topical and herbal drugs are mentioned as being effective in brain reinforcement. Recent studies have shown the neuroprotective effect of these medicinal herbs, especially with plants that have antioxidant effects [71]. Also, improving memory and cognition, antiepileptic properties, preventing neurodegeneration, and improving sleep disturbance are reported as other therapeutic effects of these herbs (Table 1). These therapeutic effects can be helpful in the treatment of sleep paralysis because recent studies have shown the correlation of sleep paralysis with diseases of the nervous system such as Parkinson's [72], convulsion [73], and ADHD [74].

In PM, there is no clear differential description between nightmare and sleep paralysis but in current medicine, nightmare disorder is an unpleasant dream that occurs during REM sleep; while sleep paralysis is a dissociated state in which REM sleep atonia continues into wakefulness [9].

PM scholars have used several methods to take the waste material out of the brain. Firstly, they administered laxatives to the patient to make sure that the main route of waste material evacuation was working. Then, they used materials to make a sneeze for the patient. Rhazes, Avicenna, and Aghili believed that sneezing could help the brain to be clear. Moreover, phlebotomy and massage, especially massage of the foot and lower extremities were performed on the patient mainly to deviate the waste material from the brain.

Avicenna and Rhazes believed that drinking alcohol, consumption of foods with difficult digestion and high calories, low physical activity, and not taking a bath habitually were risk factors for sleep paralysis [27]. These risk factors cause the accumulation of waste material in the body from which one of the consequences in the patient can be obesity. Recent investigations have found a link between high body mass index and sleep paralysis [5]. Further, studies have reported that people who drink alcohol are more likely to experience sleep paralysis [7].

Due to the close relationship of the stomach and the brain in the viewpoint of PM, anything that affects food digestion and leads to indigestion can cause brain weakness, dystemperament, and diseases such as headache and sleep disturbances [27]. Therefore, patients with sleep paralysis have been forbidden from overeating and drinking water during eating. Consumption of foods that can evaporate vapors to the brain is also prohibited due to the mentioned mechanism of sleep paralysis, as mentioned by Jorjani, Avicenna, Akhawayni, and Aghili [27,29,30,75].

Conclusion

Sleep paralysis is rarely reported and detected in clinical practice; therefore, there is little information about its prevention, diagnosis, and treatment. The approach of PM to sleep paralysis is mainly based on the patient's health promotion and lifestyle modification by increasing physical activity, improving digestion, and eating healthy food. In addition, some treatment options can be found in the PM literature including the use of medicinal herbs, lower extremities massage, sneeze induction, and phlebotomy which could be further evaluated in future studies.

Conflict of Interest

None.

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