

## Sleep Paralysis, a Medical Condition with a Diverse Cultural Interpretation

### Abstract

Sleep paralysis (SP) is a state associated with the inability to move that occurs when an individual is about sleeping or just waking. It could occur in healthy individuals as isolated SP. It has also been linked with other underlying psychiatry, familial, and sleep disorders. Statistics show that 8% of the general population suffers from SP. Although this value has been described inaccurately, there is no standard definition or etiology to diagnose SP. There are several speculations describing SP in the current literature. These descriptions can be viewed as either cultural-based or medical-based. The disparity among cultural or ethnic groups and medical professionals in identifying SP has led to the various approaches to managing the condition. This review aims to medically describe SP and how it is interpreted and managed among various cultural groups.

**Keywords:** Culture, dream, fear, ghost, rapid eye movement, sleep paralysis

### Introduction

Sleep paralysis (SP) can occur as an isolated, familial, or tetrad of narcolepsy.<sup>[1,2]</sup> SP was first accredited to Silas Weir Mitchell in 1876. Golzari *et al.* believed that Heinrich Fussli's painting of SP in the art "Der Nachtmahr" (The Nightmare) in 1781 was incomparable to the experience in world literature.<sup>[1]</sup> SP has been thought not to affect ocular and respiratory movements, though the limb, head, and trunk movements are affected.<sup>[1]</sup> It is one of the most common types of rapid eye movement (REM) parasomnia encountered by the neurologists. The physiology of REM sleep is associated with increased blood pressure, heart rate, and breathing. The activities of neurons in REM sleep are usually similar when an individual is awake, and sometimes, REM sleep may be associated with more neuronal firing, especially in the pons, lateral geniculate nucleus, and occipital cortex.<sup>[3]</sup>

Earlier researchers have described SP as nightmares since it ranges from seconds to a few minutes and involves episodes of vivid hallucinations and feelings of suffocation or chest pressure.<sup>[4]</sup> Dating back, the term nightmare and SP have been described to be associated with various causes, including science, race, culture,

and in fact, superstitions. For instance, Themison of Laodicea (1<sup>st</sup>-century BC) described SP "nightmare" to be associated with the supernatural being called "Incubus." Furthermore, a Greek physician Galen assumed SP was in connection with gastric disturbances.<sup>[1]</sup> Akhawayni, Philip Barrough (Elizabethan surgeon and physician during the Renaissance period), Johann Wier, and Isbrand Van Diemerbroeck also postulated that SP was associated with rising vapors from the stomach to the brain. Theologians also stated SP was due to evil powers that causes an individual to have nightmares.<sup>[1]</sup>

Hundreds of years ago, SP was traditionally defined as "not a bad dream," but rather, the nocturnal visit of an evil being that threatens to press the very life out of its terrified victim.<sup>[5]</sup> People who experienced SP claimed they felt paralyzed, could not speak, felt helpless, and were overwhelmed by extreme fear and terror.<sup>[5]</sup> Modern-day victims describe the incidents as "I imagined that somebody was lying in bed with me, but I could not see them because I was struggling to turn over but could not move."<sup>[6]</sup> These spells typically end when the victims suddenly gain the use of some part of their body, roll-off the bed, or are awakened by someone entering the room. SP has been estimated to affect approximately 1.7% to 40% of the general population, with the victims predominately

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student.<sup>[7]</sup> It typically peaks at the age of thirty and appears to be associated with posttraumatic stress disorder (PTSD), narcolepsy, and panic attacks.<sup>[8]</sup> Some other contributing factors to SP episodes include sleep deprivation, fatigue, and stress.<sup>[9]</sup> Likewise, there are supporting evidence of the association between SP, bipolar disorder, and schizophrenia.<sup>[6]</sup> From over hundreds of years ago till date, the term SP has been multifactorial; scientific explanation has broken down SP for what it is, for some, as a symptom for very serious illnesses, while for others, just a nightmare with the manifestation of evil.

There are three main factors related to the REM parasomnia and cultural narratives. The first factor is associated with the intruder linked with sensed presence, fear, and auditory and visual hallucinations. It is presumed to originate in a hypervigilant state initiated in the midbrain.<sup>[9]</sup> The second factor, called “Incubus” is associated with pressure on the chest, breathing difficulties, and chest pain. During REM sleep, there is a reduction in respiratory muscle activity, which is caused by inhibition of motor neurons; this could be attributed to the effects seen in Incubus. The third factor is the vestibular–motor experience, which is typically associated with unusual out of bodily experiences, consisting of floating/flying sensations, and is related to body position, orientation, and movement.<sup>[9]</sup>

Many factors are related to the cause of SP; some cultural beliefs state supernatural to account for the hallucinated intruder. The neurological hypothesis is that in SP, the mechanisms, which usually coordinate body movements, are activated, but there is no actual movement, except the individual feeling like they are “floating.”<sup>[10]</sup>

### **Cultural Interpretation of Sleep Paralysis and the Impact on Its Epidemiology**

The prevalence of SP varies from countries and ethnic groups, and these disparity has been linked to different methodologies in determining the prevalence;<sup>[11-13]</sup> other reasons include the different definitions of SP [Table 1], thereby influencing the results.<sup>[12]</sup>

The occurrence of SP in the general population is about 8%; 28% in students and 32% in psychiatric patient.<sup>[25]</sup> Some studies have shown that early onset of SP is an indication of more frequent episode.<sup>[16]</sup> So far, the effects of age and gender have been verified.<sup>[11]</sup> However, Stefani *et al.* mentioned in their study that the onset is usually in the adolescence.<sup>[16]</sup> Furthermore, SP appears to increase from junior high school to senior high school for both genders.<sup>[17]</sup> Possible explanations for the onset of SP in an adolescent can be attributed to identity conflicts from peer influence, resulting in the depression and anxiety associated with the developmental phase.<sup>[17]</sup> Comparative studies have shown that SP is lower among Chinese adolescents compared to Japanese adolescent.<sup>[17]</sup>

The causes of SP are unknown, but studies have identified the potential risk factors such as substance use, stress, trauma, genetic influences, physical illness, and irregular sleeping habit among others.<sup>[11]</sup> Moreover, studies have shown that SP is particularly prevalent in adults who have the past histories of childhood sexual abuse (CSA), people with PTSD and panic disorder in the African-American society.<sup>[14]</sup> A study done in Japan revealed that approximately 40% of the general population experiences SP, which were attributed to their active nightlife and diversified lifestyle.<sup>[26]</sup>

The highest prevalence is seen reportedly in Cambodians, who are also said to have a high history of severe trauma, PTSD, and panic disorder.<sup>[27]</sup>

Studies have shown that SP may be more common in certain populations, certain ethnic and cultural group.<sup>[28]</sup> In a survey conducted among Chinese adolescents, SP was found to be higher in the rural areas compared to urban settlements.<sup>[11]</sup> Reports also support the fact that the highest rate of SP is found among individuals with an African and Asian descent.<sup>[28]</sup> Similarly, Asian college students also reported the highest rates of SP compared to other ethnic groups.<sup>[28]</sup> Likewise, the most populous African nation, Nigeria has also reported an increased rate of SP.<sup>[23]</sup>

Some studies have shown that 30% of individuals will experience at least one episode during their lifetime and 5% will have one episode with visual, auditory, and tactile hallucinations.<sup>[14]</sup> Other studies have shown the possibility of anxiolytics to increase the risk of SP by five times.<sup>[29]</sup>

SP occurring in an otherwise healthy individual is termed isolated SP. The difference between SP and isolated SP is unclear because individuals are having conditions such as narcolepsy and seizure disorder were often not documented and excluded from the sample population.<sup>[30]</sup> However, Awadalla *et al.* mentioned that 30% to 50% of individuals with narcolepsy have SP. This disparity could be due to different definitions of SP, thereby influencing the results [Table 1]. Episodes of SP could be accompanied by hallucinations and 70% of Czech students have reported this experience.<sup>[25]</sup>

### **Medical Perspective of Sleep Paralysis**

The phenomenon of a dream happens in the REM phase of sleep, where there is no motion or muscle activity.<sup>[31]</sup> We tend to have our most emotional dreams during REM sleep, and to stop us from acting out these dreams, the brain keeps us temporarily paralyzed. This paralysis (postural atonia) is as a result of the suppression of the skeletal muscle tone by the pons and the ventromedial medulla, effected by the neurotransmitters  $\gamma$ -Aminobutyric acid and glycine which inhibits the motor neurons in the spinal cord.<sup>[32]</sup> A serious condition where we start to wake up mentally and become aware while still under REM paralysis is termed SP. The victim is left “feeling trapped,” not able to move

**Table 1: Reported geographical regions and their interpretation of sleep paralysis**

| Geographic area                  | Interpretation of SP   |
|----------------------------------|--|
| African Americans                | Being bedridden, being attacked by witches, or other paranormal phenomena <sup>[12]</sup>  |
| Cambodia                         | Identified as an impaired bodily function and frozen body. It is called “ <i>khyâl</i> .” They are also reported to experience hallucinations of supernaturals<br><br>They describe it as having their soul scared out from their body by a demon. When they are depressed, they consider being at risk of being visited by ghosts of individuals killed in Pol Pot. Cambodians also experience compression by a ghost when lying down and facing up <sup>[1,14]</sup> |
| Canada                           | Interpreted as a dream but can be easily affected by an individual’s cognitive attitudes <sup>[15]</sup>   |
| Chinese                          | Believe SP is usually caused by ghost visitation, which can be unfortunate to the person and sometimes warrant help from spiritualists. Also called “Ghost oppression” <sup>[16-19]</sup>  |
| Egyptians                        | Caused by “ <i>Jinn</i> ” which is a spiritual creature. They call it the “ <i>Jinn</i> attack.” It is associated with extreme fear with the belief that SP may result in death <sup>[18,20]</sup>   |
| Germany                          | Identified as “ <i>Hexendruckem</i> ,” which means “witches passing” <sup>[6]</sup>  |
| Iran                             | Identified as “ <i>Kabus</i> ,” which is a feeling of heavy presence sitting on the chest and pressing down, therefore, causing difficulty in breathing <sup>[21]</sup>  |
| Italy (Abruzzo region)           | Italians believe SP can stem from visitations of witches or a supernatural being called “ <i>Pandafeche</i> ,” which often attacks when individuals lie facing upward<br><br>“ <i>Pandafeche attack</i> ” is when a person feels a presence of a supernatural being immobilizing the person by sitting on his/her chest <sup>[18,22]</sup>   |
| Japan                            | Identified as a “ <i>kanashibari</i> ” (clear cognitive framework) experience where the person feels helpless in coping with the externally impinging forces on the body <sup>[23]</sup>   |
| Korea                            | Identified as “ <i>Ha-wi-nulia</i> ” which means “being squeezed by scissors” <sup>[6]</sup>   |
| Mexico                           | It is described as “A nightmare or a dead body of someone” <sup>[16,18,24]</sup>   |
| Newfoundland                     | “ <i>Old hag</i> ” can put it on you like a charm <sup>[6]</sup>   |
| Nigeria                          | Nigerians describe it as “visitation of an evil spirit, witches, or some form of spiritual attack.” Others have beliefs that it may be due to anxiety or emotions associated with family problems. It is described as “Oppression” among Christian faith healers <sup>[23]</sup>   |
| Saint Lucia                      | It is described as “ <i>Kokma</i> ,” which is “attacks by dead spirits or unbaptized babies that jump into a body and squeeze the throat” <sup>[6]</sup>   |
| Thailand                         | Identified as “ <i>Phi um</i> ” which means “enveloped by a ghost” <sup>[6]</sup>  |
| The United Kingdom               | Defined as the disappearance of spirit during sleep and failure to get in the body when an individual is waking <sup>[6]</sup>   |
| Southern region of United States | Described as a witch riding you while sitting on the chest or being bedridden <sup>[6,22]</sup>  |
| West India                       | Identified as “ <i>kokma</i> ,” which is in a trance, during which the sleeper cannot move. It is also described as a spirit or ghost passing through one’s body <sup>[12]</sup>   |

SP: Sleep paralysis

or speak upon falling asleep or upon awakening, however, the individual can breathe and is properly aware of his surroundings.<sup>[33,34]</sup>

The parietal lobe functions in sensation and perception and integrating sensory inputs to the visual system. The parietal lobe is likely to play a role in the intruder hallucinations, especially the superior parietal lobule.<sup>[10]</sup>

Pathophysiology of REM sleep disorders is due to flawed brainstem structures.<sup>[35]</sup> In SP, the intruder (sense of a stranger in the room accompanied by fear), the increased awareness for a sense of threat or danger is due to the brainstem activation of the amygdala.<sup>[9,13,32]</sup>

In REM dreams, another structure that has a major role to play is the limbic system. The limbic system consists of the hypothalamus, hippocampus, amygdala, septal nuclei, cingulate, different thalamic nuclei and portions of the reticular activating systems, orbital frontal lobe, certain

cerebellar nuclei, among others. Amygdaloid complexes according to research have shown to process memory, decision-making, and emotional reactions. The lateral amygdala sends impulses to the rest of the basolateral complexes.<sup>[36]</sup> This is preceded by the activation of the amygdala through projections from the thalamus, anterior cingulate, and structures in the pons. This gives the individual the idea that an intruder is in the room.<sup>[9]</sup> This complex pathway (subthalamo-amygdala pathway) is responsible for ensuring that in moments of danger there is an appropriate response in the body without the need for in-depth analysis by the sensory cortex.<sup>[37]</sup>

SP can also be related to hypnagogic and hypnopompic. Hypnagogic occurs before sleep, while hypnopompic occurs while waking from sleep. Researchers have argued that the word fear may not have been a major factor to hypnagogic and hypnopompic experiences (HHEs), but others suggested that the feeling of fear, auditory, and visual

hallucination which is termed “intruder” could produce the first factor. Previous research suggested that the “intruder” starts at the brainstem-induced amygdaloid complexes.<sup>[37,38]</sup> Persons who experienced HHEs also admitted to being aware of SP.<sup>[6]</sup>

Individuals with SP might also have images of body distortion.<sup>[10]</sup> Normally, in an active individual, parietal lobe receives input through the frontal lobe or cerebellum, and this gives information about the individual’s position of body part and movement. The superior parietal lobule is responsible for human visual/functional imaging based on various sensory stimulations.<sup>[39]</sup> In SP, it is hypothesized that individuals continuously receive input from the motor cortex to the inactive limbs.<sup>[10]</sup> When an individual gets up during REM, the forebrain neuronal system activating proprioception becomes activated, and at that moment, a spinal motor mechanism that activates tonicity of muscles is inactive. Hence, there is SP.<sup>[33]</sup>

SP can also be due to the on/off regions in the pons. This involves the induction of cholinergic receptors and repression of noradrenergic or serotonergic receptors. A study involving monozygotic and dizygotic twins and siblings revealed a variable amount of genetic predisposition in SP. Some certain genes have also been implicated in SP; these genes play a role in the sleep and wake cycle.<sup>[40]</sup> These genes include PER2, PER3, PER1, ABCC9, CACNA1C, ARNTL2, CLOCK, and DBP.<sup>[11,40,41]</sup>

### Sleep paralysis and other psychiatry disorders

Spells of SP have been associated with medical conditions such as narcolepsy, seizure disorders, and hypertension. Similarly, sleep disturbances, insomnia, jet lag, African descent, student status, and occupation have been associated with SP.<sup>[42]</sup> SP has been associated with some psychiatry disorders, as well as in individuals who have experienced one form trauma or the other. These includes as follows:

#### Childhood sexual abuse

SP has been reported according to some researchers to be connected to some CSA, which is often accompanied with frightening episodes of visual, tactile, and auditory hallucinations.<sup>[31]</sup> Individuals who had CSA based their conclusion of SP to be nightmare with symptoms of depression. Adults who were victims of CSA have been shown to develop posttraumatic disorders and freighting episodes of SP.<sup>[31,43]</sup>

#### Anxiety disorders

The rate of isolated SP has been shown to be high in individuals with anxiety.<sup>[19,44]</sup> It is not associated with the use of anxiolytics or antidepressants,<sup>[44]</sup> although some studies have suggested otherwise.<sup>[35]</sup> Isolated SP was observed more in college students and patients with anxiety, probably due to irregular sleep patterns because SP tends to occur with sleep disruptions.<sup>[44]</sup>

#### Posttraumatic stress disorder, panic disorders, and narcolepsy

The irregular pattern of sleep due to PTSD may be a contributing factor to increased episodes of SP by disrupting REM sleep patterns. Although the experience of SP itself is traumatic irrespective of whether or not the individual has had a posttraumatic experience.<sup>[43]</sup>

The percentage of African Americans with panic disorders as it relates to SP was higher compared to the general population. This could be due to genetic and environmental factors.<sup>[44]</sup> SP has been shown to be common in patients who have been diagnosed with narcolepsy.<sup>[45]</sup>

### Cultural and Medical Approach to Sleep Paralysis

There is a lot of cultural and religious influences in cases of SP seen worldwide.<sup>[46]</sup> Based on several kinds of literature, Isolated SP has not been associated with any form of long-term effect on the sufferer. Interestingly, individuals from different regions and cultural backgrounds have developed a way to manage it, although it is not ascertained if these remedies work.

In earlier times, Greek physicians managed SP though phlebotomy and also placed the individuals on some form of special diet. However, there is no documentation in modern medicine to certify phlebotomy helps in SP.<sup>[1]</sup> Chinese people usually approach SP by employing the help of a spiritualist.<sup>[19]</sup> Italians, on the other hand, believe sleeping facedown and placing a broom by the door with a pile of sand on the bed will help prevent SP.<sup>[22]</sup>

In Cambodia, rituals are often made to free of bad omen; this is more common among those who are not educated, as they ascribe SP to spiritual attacks.<sup>[27]</sup> Those who are educated usually assign SP to physical attacks. Another cultural belief is that SP is a visitation by a ghost, so rituals are also done to ensure that dead people do not become ghosts, and this involves cremation after 3 years of burial. Some visit leaders who perform curing rituals and get rid of foreign bodies from the sufferer and some are sprinkled with holy water. Some also recite the “the boddhisatva Buddha,” a Buddhist chant.<sup>[27]</sup>

African-Americans attribute SP to a variable number of factors, which includes visiting by a ghost or an evil spirit. A lot of them seek help professionally or religiously as many have fears they might be paralyzed for life.<sup>[12]</sup> Some say certain precautions are done to prevent experiencing any further attacks. Christians resolve to read the Bible and to pray. Others use relaxation methods such as listening to music, drinking water, and meditating on positive thoughts. Some also suggest having a person in the room whom they trust that can rescue them.<sup>[12]</sup> In Nigeria, there is a wide variation of theories of SP; this should not be surprising given that the nation has a diverse culture. The approach



depends on the beliefs of the individual as to the cause of SP. Some read their Quran, the Bible, and others visit their religious and traditional leaders for some special prayers.<sup>[23]</sup>

The medical approach to SP involves the effort to first identify underlying conditions. If the patient suffers from isolated SP, individuals should be made aware of the symptoms and equally educated that isolated SP is harmless to the sufferer after the episode.<sup>[27]</sup> If associated with other psychiatric diseases, underlying mental illnesses, or disorders, then the underlying cause should be treated.<sup>[27]</sup> Individuals could also be educated on proper sleep hygiene.

## Conclusion

SP has received more attention from the unscientific world. The stigma associated with individuals suffering from SP has also prevented sufferers from reporting at medical institutions. As such, most sufferers revert to other confidential means such as herbalists, religious leaders, and traditional priests for a solution. Thus, it is important to sensitize the public on what SP is and how it should be approached. However, the current knowledge on SP is somewhat limited as there is still a paucity of reports on the risk factors of SP, triggers for SP, and the long-term damage from SP.

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## Conflicts of interest

There are no conflicts of interest.

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