Perceived awareness of sleep paralysis phenomenon (old hag syndrome) and its most common risk factors among people from Al-Ahsa, Saudi Arabia

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ABSTRACT

Objectives: To assess prevalence and perception of sleep paralysis and its relationship with socioeconomic determinants, and risk factors in a cross-sectional sample of Saudi general population from Al-Ahsa city.

Methods: A cross-sectional sampling survey was conducted during 2020 to 2021. The targets were aged above 18 and belonged to Al-Ahsa. Patients were sent self-reported anonymous questionnaires to complete.

Results: A total of 524 participants, whose ages ranged from 18 to 60 years, were analyzed. Among 85.7% of participants aged 55 years and over, compared to 65.8% of those who were aged under 35, 379 (72.3%) respondents were females. Moreover, 438 (83.6%) participants were university graduates, 271 (51.7%) were students and 40.8% had psychological disorders including anxiety (25.2%) and depression (5.7%). Family history of sleep paralysis was reported by 369 (70.4%) participants. A total of 97.5% study participants were aware of sleep paralysis.

Conclusion: Sleep paralysis is a common occurrence in people residing in Al-Ahsa, Saudi Arabia. A considerable number of the society held wrong beliefs regarding sleep paralysis. Therefore, raising public identity of sleep paralysis is crucial. We recommend applying the study in other cities within Saudi Arabia to identify common risk factors and perceptions among the society.

Keywords: sleep paralysis, psychological disorders, movement disorder, Saudi Arabia

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Sleep paralysis (SP) is a common conflict phenomenon currently under research with unknown causes. Sleep paralysis is characterized as a transient period during which voluntary muscle movement is inhibited, yet respiratory and ocular movement remain intact. These episodes can occur at the onset of sleep or upon awakening in the morning or during the night. Commonly, women suffer from SP, which is more likely to occur when individuals sleep in the supine position. It is a type of rapid eye movement (REM) parasomnia that causes an increase in the blood pressure, breathing rate and heart rate. Only under 8% of the general population are affected by SP during their lifetime, and is known as isolated SP if it occurs in healthy individuals. A study held in Japan shows that SP was prevalent in more than 2% of the Japanese population. Sleep paralysis is more ubiquitous in people with Chinese background with prevalence of 41% and African American background with prevalence of 37%. With respect to Saudi Arabia, a study by Wali et al shows that 16% of Saudi healthcare workers suffered from SP symptoms. Even though only 7.6% of the general population are affected by SP, students and patients who have psychiatric manifestations, such as trauma history, posttraumatic stress disorders, anxiety sensitivity, and panic disorders, are the majority suffering from SP at 28.3% and 31.4%, respectively. In addition, sleep-related factors, such as sleep deprivation, shift work, jet lag, and a few medical conditions, such as hypertension, seem to have a connection with SP. The presence of nightmares play a core role factor for more frequent episodes of SP. Nevertheless, people’s perceptions of SP as a supernatural power can be a risk factor of SP. In Saudi Arabia, SP is described as Al-Jathoum, and a case study in which a Saudi patient, who at first complained of sleep disruption due to driving long distances and nightmares, described it as a type of alien power, likely to be jin that squeezed his chest for a period of time.

There is an ultimate need to conduct this study due to the significance of the prevalence of SP worldwide, and the importance of identifying SP as a medical condition rather than cultural misconceptions. Despite the progress of studies regarding SP in Saudi Arabia, no study has reported the attitudes of Saudi people with respect to SP. Therefore, this present study is designed to assess the perception of SP and its relationship with socioeconomic determinants, risk factors associated with SP and its prevalence in a cross-sectional sample of Saudi general population from Al-Ahsa city, the most populated city in the eastern province of Saudi Arabia.

Methods. A cross-sectional-study was conducted in Al-Ahsa, Saudi Arabia during 2020 to 2021. Qualitative analysis was conducted to investigate the various perceptions regarding SP, risk factors related to SP, the phenomenon of SP and the relationship between SP and psychiatric disorders, depending on the participants’ answers. The sample size, which was calculated by the Raosoft sample size calculator according to the total number of the population in Al-Ahsa, was around 385 participants. However, the actual sample collected during the distribution of questionnaires was 536 participants due to high responses from people. The sample was randomly selected by distributing an electronic questionnaire through 2 social media platforms, WhatsApp and Twitter. It was the most appropriate way to reach participants from different areas within the Al-Ahsa region. This questionnaire was designed by the research authors and validated by 3 neurological consultants. The target population comprised of adults aged 18 and above and included both male and female subjects. Participants below the age of 18, or those who did not live within the Al-Ahsa region, were excluded from the study. Likewise, questionnaires, which were not fully filled out were eliminated.

Data was collected with the help of a self-administered questionnaire using Google form survey, which comprised of 26 multiple choice questions (Appendix 1). An Arabic version of this questionnaire was also produced and distributed amongst the participants (Appendix 2). The questionnaire contained 6 sections: personal data, SP phenomenon, perception regarding SP, risk factors, sleep quality, and SP relationship with different psychiatric disorders. Ethical research approval was obtain from the Deanship of Scientific Research from Imam Abdulrahman Bin Faisal University. The questionnaire was used for research purposes, and thus, the information was not used for any other goals. Participant privacy was a top priority in this research, and therefore, any questions that might lead to the discovery of the participants identity were not included. An informed consent was obtained and was an essential condition to participate in study (Appendix 3).

Statistical analysis. Data was modified, coded, and entered into the statistical software SPSS version 22 (IBM Corp, Armonk, NY, USA). All statistical analyses were carried out by employing 2 tailed tests.

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A p-value of less than 0.05 was statistically significant. In addition, a descriptive analysis based on frequency and percent distribution was done for all variables. A Pearson Chi-square test was also used to test for relations’ significance.

**Results.** The study included 524 participants, whose ages ranged from 18 to 60 years, with a mean age of 21.6 ± 11.8 years old. There were 379 (72.3%) female respondents, of which 300 (57.3%) were single, 438 (83.6%) were university graduates, 271 (51.7%) were students, and 40.8% had psychological disorders, namely anxiety (25.2%) and depression (5.7%). Family history of SP was reported by 369 (70.4%) participants (Table 1).

Table 2 & Figure 1 demonstrate the prevalence and pattern of SP among the population in Al-Ahsa. A total of 360 (68.7%) participants reported that they had SP attacks; however, only 8 (2.2%) asked for medical consultation. Attacks repeated for up to 3 times among 181 (50.3%) participants and for more than 6 times among 115 (31.9%) respondents. Majority of the participants experienced their first attacks between the age of 18-35 (95%) years.

Considering the perceived awareness of the general population towards the SP phenomenon and its related risk factors (Table 3), 97.5% of the study participants were aware of SP. 3.8% of the participants reported that during SP attacks, they felt pressure on their chest or body, and 34.4% were told that SP is a medical condition. Furthermore, visiting specialized physicians and being aware of the risk factors to avoid

| Sociodemographic data | n  | %   |
|-----------------------|----|-----|
| **Age in years**      |    |     |
| 18-35                 | 427 | 81.5|
| 36-55                 | 83  | 15.8|
| >55                   | 14  | 2.7 |
| **Gender**            |    |     |
| Male                  | 145 | 27.7|
| Female                | 379 | 72.3|
| **Marital status**    |    |     |
| Single                | 300 | 57.3|
| Married               | 224 | 42.7|
| **Educational level** |    |     |
| Below secondary       | 9   | 1.7 |
| Secondary             | 77  | 14.7|
| University / above    | 438 | 83.6|
| **Work**              |    |     |
| Not working           | 128 | 24.4|
| Student               | 271 | 51.7|
| Working               | 106 | 20.2|
| Retired               | 19  | 3.6 |
| **Had psychological disorders** | | |
| None                  | 303 | 59.2|
| Anxiety               | 129 | 25.2|
| Stress disorders      | 2   | 0.4 |
| Depression            | 29  | 5.7 |
| Others                | 49  | 9.6 |
| **Family history of sleep paralysis** | | |
| Yes                   | 369 | 70.4|
| No                    | 155 | 29.6|

| Sleep paralysis prevalence | n | %  |
|----------------------------|---|----|
| Previously had sleep paralysis | | |
| Yes                        | 360 | 68.7|
| No                         | 164 | 31.3|
| Consulted physician for sleep paralysis | | |
| Yes                        | 8  | 2.2 |
| No                         | 352| 97.8|
| How many times had sleep paralysis | | |
| 1-3                        | 181| 50.3|
| 4-6                        | 64 | 17.8|
| >6                         | 115| 31.9|
| Age at first sleep paralysis | | |
| 18-35                      | 342| 95.0|
| 36-55                      | 17 | 4.7 |
| >55                        | 1  | 0.3 |

**Figure 1** - Prevalence and pattern of sleep paralysis among population in Al-ahsa, Saudi Arabia.
Table 3 - Perceived awareness of general population towards sleep paralysis (SP) phenomena and its related risk factors, Al-Ahsa, Saudi Arabia.

| Perceived awareness on SP and risk factors          | n  | %  |
|---------------------------------------------------|----|----|
| **General perceived awareness**                   |    |    |
| Heard about sleep paralysis                       |    |    |
| Yes                                               | 511| 97.5|
| No                                                | 13 | 2.5 |
| During SP attack, persons feel pressure on their chest or body |
| Never                                             | 73 | 13.9|
| Sometimes                                         | 237| 45.2|
| Frequently                                        | 37 | 7.1 |
| Usually                                           | 177| 33.8|
| **What do you think about the phenomenon of SP**   |    |    |
| Medical condition                                 | 180| 34.4|
| A visit to an evil being, witches, or elves at night | 109| 20.8|
| Nightmare                                         | 215| 41.0|
| Others                                            | 20 | 3.8 |
| **How to avoid frequent SP phenomena**            |    |    |
| Visiting specialized physician with knowing risk factors | 130| 24.8|
| Proper sleep position                             | 21 | 4.0 |
| Do some relaxation techniques, such as meditation | 94 | 17.9|
| Doing some religious things to get rid of bad omen and envy | 231| 44.1|
| Visit religious man to have some relaxation        | 14 | 2.7 |
| Had trusted person in the room to save exposed one | 13 | 2.5 |
| Others                                            | 21 | 4.0 |
| **Risk factors perceived awareness**              |    |    |
| Sleeping position is related to the occurrence of SP phenomena |
| Yes                                               | 314| 59.9|
| No                                                | 210| 40.1|
| If yes, which position                             |    |    |
| On back                                           | 234| 74.5|
| On abdomen                                        | 57 | 18.2|
| On left side                                      | 13 | 4.1 |
| On right side                                     | 10 | 3.2 |
| Medication is related to the occurrence of SP phenomena |
| Yes                                               | 58 | 11.1|
| No                                                | 466| 88.9|
| Sleep disorders is related to SP phenomena         |    |    |
| Yes                                               | 240| 45.8|
| No                                                | 284| 54.2|
| There is a link between watching horror movies and SP phenomena |
| Yes                                               | 149| 28.4|
| No                                                | 375| 71.6|
| Weak faith is related to SP phenomena              |    |    |
| Yes                                               | 181| 34.5|
| No                                                | 343| 65.5|
| Late sleep time is related to SP phenomena         |    |    |
| Yes                                               | 122| 23.3|
| No                                                | 402| 76.7|
| Psychological disorders are related to SP phenomena |
| Yes                                               | 330| 63.0|
| No                                                | 194| 37.0|

frequent SP phenomena was mentioned by 24.8% of the participants. Regarding perceived awareness of SP risk factors, 63% of the participants thought that psychological disorders are related to SP phenomena. Similarly, 59.5% thought that the sleeping position is related to the occurrence of SP phenomena, especially lying on your back (74.5%), and on your abdomen (18.2%). Nearly 88% of the participants did not hold the opinion that medications are risk factors of SP. Furthermore, 45.8% of the participants believed that sleep disorders are associated with SP phenomena, while 34.5% reported that weak faith is related to SP phenomena. Additionally, 28.4% were convinced that there is a link between watching horror movies and SP phenomena.

Table 4 illustrates the relation between public sleep patterns and SP phenomena. 18.3% of the participants with SP sleep for less than 5 hours a day, in comparison to 10.4% of those without the condition, with a recorded statistical significance ($p=0.038$). Moreover, 33.3% of the participants with SP reported waking up early in the morning and had difficulty in going back to sleep, compared to 23.8% of those with no SP history ($p=0.048$). 23.6% of the participants with SP felt excessive sleepiness during the daytime in comparison to 23.8% of those without SP, with a borderline statistical significance ($p=0.060$). Sleep-related hygiene was insignificantly associated with SP phenomena.

Table 5 shows determinants of SP phenomena among the general population. Sleep paralysis was detected among 85.7% of participants aged 55 years and over, compared to 65.8% of those who were aged under 35, with a recorded statistical significance ($p=0.010$). Likewise, 76.3% of the married participants had experienced SP, compared to 63% of the single participants ($p=0.001$). Sleep paralysis was detected among 94.7% of retired respondents in comparison to 63.1% of students ($p=0.007$). Furthermore, 73.2% of the respondents, who had psychological disorders also experienced SP, relative to 65.3% of those whose health status were normal ($p=0.029$). In similar fashion, SP was detected among 77.5% of those with family history of SP, compared to 47.7% of others without a family history of SP ($p=0.001$).

**Discussion.** The aim of this study was to investigate the SP phenomenon among people in Al-Ahsa. The results obtained from this study revealed that the prevalence of SP in Al-Ahsas 68.7%. On the other hand, a study published in Japan shows that prevalence of SP reached 40% of the whole sample.19 Similarly, a cross sectional study held in Bremen, Germany,
Table 4 - Relation between public sleep pattern and sleep paralysis phenomena, Al-Hasa, Saudi Arabia.

| Sleep pattern               | Total | Yes | No | P-value |
|-----------------------------|-------|-----|----|---------|
| **Sleep hours daily**       |       |     |    |         |
| <5                          | 83    | 15.8| 66 | 18.3    | 17 | 10.4 |
| 5-6                         | 178   | 34.0| 124| 34.4    | 54 | 32.9 |
| 7-8                         | 191   | 36.5| 128| 35.6    | 63 | 38.4 |
| >8                          | 72    | 13.7| 42 | 11.7    | 30 | 18.3 |
| **Sleep quality**           |       |     |    |         |
| Very poor                   | 7     | 1.3 | 6  | 1.7     | 1  | 0.6  |
| Poor                        | 72    | 13.7| 52 | 14.4    | 20 | 12.2 |
| Good                        | 263   | 50.2| 184| 51.1    | 79 | 48.2 |
| Very good                   | 182   | 34.7| 118| 32.8    | 64 | 39.0 |
| **Have difficulty sleeping at night?** |       |     |    |         |
| Never                       | 35    | 6.7 | 22 | 6.1     | 13 | 7.9  |
| Rarely                      | 85    | 16.2| 60 | 16.7    | 25 | 15.2 |
| Sometimes                   | 275   | 52.5| 187| 51.9    | 88 | 53.7 |
| Always                      | 66    | 12.6| 49 | 13.6    | 17 | 10.4 |
| Usually                     | 63    | 12.0| 42 | 11.7    | 21 | 12.8 |
| **Wake up during the night after falling asleep** |       |     |    |         |
| Never                       | 27    | 5.2 | 19 | 5.3     | 8  | 4.9  |
| Rarely                      | 117   | 23.2| 85 | 23.6    | 32 | 19.5 |
| Sometimes                   | 259   | 49.4| 171| 47.5    | 88 | 53.7 |
| Always                      | 44    | 8.4 | 33 | 9.2     | 11 | 6.7  |
| Usually                     | 77    | 14.7| 52 | 14.4    | 25 | 15.2 |
| **Wake up early in the morning and have difficulty getting back to sleep** |       |     |    |         |
| Never                       | 37    | 7.1 | 25 | 6.9     | 12 | 7.3  |
| Rarely                      | 85    | 16.2| 56 | 15.6    | 29 | 17.7 |
| Sometimes                   | 243   | 46.4| 159| 44.2    | 84 | 51.2 |
| Always                      | 54    | 10.3| 44 | 12.2    | 10 | 6.1  |
| Usually                     | 105   | 20.0| 76 | 21.1    | 29 | 17.7 |
| **Feel excessive sleepiness during the daytime** |       |     |    |         |
| Never                       | 44    | 8.4 | 24 | 6.7     | 20 | 12.2 |
| Rarely                      | 88    | 16.8| 65 | 18.1    | 23 | 14.0 |
| Sometimes                   | 268   | 51.1| 186| 51.7    | 82 | 50.0 |
| Always                      | 55    | 10.5| 35 | 9.7     | 20 | 12.2 |
| Usually                     | 69    | 13.2| 50 | 13.9    | 19 | 11.6 |

Table 5 - Determinants of sleep paralysis phenomena among general population, Al-Hasa, Saudi Arabia.

| Factors                   | Yes | %   | No | %   | P-value |
|---------------------------|-----|-----|----|-----|---------|
| **Age in years**          |     |     |    |     |         |
| 18-35                     | 281 | 65.8| 146| 34.2| 0.010*  |
| 36-55                     | 67  | 80.7| 16 | 19.3|         |
| > 55                      | 12  | 85.7| 2  | 14.3|         |
| **Gender**                |     |     |    |     |         |
| Male                      | 104 | 71.7| 41 | 28.3| 0.356  |
| Female                    | 256 | 67.5| 123| 32.5|         |
| **Marital status**        |     |     |    |     |         |
| Single                    | 189 | 63.0| 111| 37.0| 0.001* |
| Married                   | 171 | 76.3| 53 | 23.7|         |
| **Educational level**     |     |     |    |     |         |
| Below secondary           | 5   | 55.6| 4  | 44.4| 0.511  |
| Secondary                 | 56  | 72.7| 21 | 27.3|         |
| University / above        | 299 | 68.3| 139| 31.7|         |
| **Work**                  |     |     |    |     |         |
| Not working               | 92  | 71.9| 36 | 28.1|         |
| Student                   | 171 | 63.1| 100| 36.9| 0.007* |
| Working                   | 79  | 74.5| 27 | 25.5|         |
| Retired                   | 18  | 94.7| 1  | 5.3  |         |
| **Had psychological disorders** |   |     |    |     |         |
| None                      | 198 | 65.3| 105| 34.7| 0.029* |
| Yes                       | 153 | 73.2| 56 | 26.8|         |
| **FH of sleep paralysis** |     |     |    |     |         |
| Yes                       | 286 | 77.5| 83 | 22.5| 0.001* |
| No                        | 74  | 47.7| 81 | 52.3|         |

 FH: family history, *p<0.05 (significant)

does not show any significant differences with respect to gender. However, variable measures of SP have been reported in adults in several countries, but the difference in prevalence between adolescents and adults is still unknown and thus, additional studies are required to further explore the subject. As stated in this study, females have a higher prevalence of sleep disorder than males. Likewise, a study by Shengli et al displays predominance of females on SP by 7.4%, whereas other studies observe higher rates in men. However, most of the studies do not show any significant differences with respect to gender.

Based on outcomes, age is an important factor regarding the occurrence of SP. According to our study, 2 adult groups experience SP, ranging in age from 18 to 35 and 36 to 55 years old, with prevalence percentages of 65.8% and 80.7%, sequentially. This increase may be due to mental and physical pressures, such as educational expectations, irregular life rhythms, delayed sleep, or interpersonal stressors.

Moreover, 77.5% have a family history of sleep paralysis. Identically, in a study of a single-family, it was noticed that within the 64 members studied, 33 of them reported at least one episode of SP experience. Moreover, a study held in UK revealed that 19 out of the 22 individuals in the same family had at least one attack of SP in their lives. This indicates that family studies can illustrate such characteristics within families, but they are not able to differentiate if the similarity within
family members emerges from genetic or environmental factors.\textsuperscript{28}

The present study indicates that SP was correlated with psychological disorders. Similarly, patients with a diagnosis of post-traumatic disorder (PTSD) in Cambodian, Chinese, and American samples showed higher prevalence of SP (65-100%) compared to healthy controls (20-25%).\textsuperscript{1} Furthermore, in a study focusing on fearful isolated SP in outpatients with panic attacks disorder, participants who confirmed diagnosis with panic attacks only were significantly less likely to experience frequent fearful isolated SP compared to patients diagnosed with both PTSD and pain attacks.\textsuperscript{29} Nevertheless, there is less evidence for an association between SP and depression, and in patients with anxiety disorder, a comorbid depression diagnosis was not linked to an increased prevalence in SP, compared to patients without comorbid depression.\textsuperscript{14}

This study has shown that the supine position was the most common sleeping position for participants when SP occurred. Among the few studies on the association between SP and sleeping position, a study by Cheyne et al\textsuperscript{12} found that a greater number of individuals reported SP in the supine position than all other positions combined.

This study indicates a few differences in the factors associated with SP. The first factor is association with medication. Our study suggests that there is no association between SP and medication. Specifically, a study by Otto et al\textsuperscript{14} found that the study results did not support an independent association between antidepressant/anxiolytic use and SP. In contrast, a study by Ohayon et al\textsuperscript{28} reported that SP was frequently observed in the users of anxiolytic medication. The second factor includes the association with anxiety. The present study found that there is a significant association between anxiety disorder and SP. However, most studies have not assessed a link of direct association between anxiety disorder and SP.\textsuperscript{29}

In conclusion, the SP phenomenon is a common condition in Al-Ahsa, Saudi Arabia. However, it is still under-researched. A higher percentage of the society holds wrong beliefs regarding SP, deeming of it as merely a nightmare rather than a medical condition. Moreover, many thought that the right way to prevent such events from happening is to do religious rituals. Therefore, it is important to raise public awareness on SP and how it should be approached. This condition is significantly associated with people who are married, retired, more than 55 years old, have a psychological disorder or a family history of SP. Most of the participants believed that psychiatric disorders and sleeping positions, especially being on the back, are the common risk factors of SP.

Furthermore, we recommend applying the study in other cities within Saudi Arabia to identify common risk factors and perceptions among the society and to correct the wrong beliefs held as well as limit risk factors.

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Awareness of sleep paralysis phenomenon ... Aledili et al

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APPENDIX 1 - Sleep paralysis questionnaires (English version).

This questionnaire is a part of research project to assess the Perception and Most Common Risk Factors of Sleep Paralysis Phenomena (Old Hag Syndrome) among People from Saudi Arabia, Alhassa. Your accurate input will be a great value to contribute in further research studies and the importance of identifying SP as a medical condition in Saudi Arabia. Your responses will be anonymous and confidential and never associated with any information that could identify you personally. Only aggregated data from this survey will be reported. Thank you for your precious time.

* Completion of this survey indicates your consent to participate. *

Do you agree to participate in the research?
- Yes
- No

* Biographical data:

1. Do you live in Alhassa?
- Yes
- No
  (if no stop here)

2. Are you Saudi?
- Yes
- No

3. Gender:

4. Marital status:
- Married
- Single

5. Your age:
- 18-35
- 36-55
- Older than 55

6. Education level:
- Uneducated
- Primary school
- Intermediate school
- High school
- University
- More (write down):

7. Current job:
- Students
- Employee
- Unemployed
- Retired

* SP phenomena:

1. Have you heard of an experience in which hands, feet, and body cannot move when waking up or filing a sleep?
- Yes
- No

2. Have you ever had sleep paralysis experience during your life?
- Yes
- No

- If yes, Did you consult a physician to make sense of this experience?
  - Yes
  - No

3. How many times in your life have you experienced sleep paralysis?
  - 1-3
  - 4-6
  - More than 6

4. At what age did you first have this experience?
  - 18-35
  - 36-55
  - Older than 55

5. While experiencing the sleep paralysis event, how often individuals feel pressure on their chest or other parts of their bodies?
  - Never
  - Occasionally
  - Frequently
  - Always

- If you choose either occasionally, frequently, or always, answer the following question:
  - How does the pressure may feel like?
    - A weight pressing down.
    - A person or creature sitting on my chest.
    - Other. Explain (writing).

6. Do you think that people with sleep paralysis may hear unusual sounds/odds during this phenomenon?
  - Never
  - Occasionally
  - Frequently
  - Always

7. Do you think that people with sleep paralysis phenomenon are trying to speak or call out but are unable to?
  - Never
  - Occasionally
  - Frequently
  - Always

* Perception:

1. Do you think sleep paralysis is:
Awareness of sleep paralysis phenomenon ... Aledili et al

1. It is a nightmare.
2. It is a visit of an evil being or witches at night that threatens to press the very life
3. Out of its terrified victim.
4. It is a neurological medical Condition that can be triggered by some risk factors or not.
5. It is some alien forces like "jinn" attack and can result in death.
6. It is attack by dead body of someone.

Others (write it).

2. What is the proper approach to manage sleep paralysis phenomenon and prevent further episodes?

- Doing some local rituals to free of bad omen and envy.
- Visiting religious leader “sheikh” or traditional healer to get an explanation of sleep.
- Sprinkling of holy water.
- Performing some relaxation methods, such as meditation or drinking water.
- Having a person in the room whom a person trust that can rescue him/her.
- Visiting a doctor to learn about sleep paralysis event, its possible risk factors, and to be educated on proper sleep hygiene.
- Visiting the interpreter of dreams.

3. Do any member from your family experience sleep paralysis?

- Yes
- No

4. Do you think other sleep problems like narcolepsy or night -me leg cramps, and obstructive sleep apnea are risk factors of sleep paralysis?

- Yes
- No

5. Do you think watching a lot of horror movies is risk factor of sleep paralysis?

- Yes
- No

6. Do you think being away from god religiously is risk factor of sleep paralysis?

- Yes
- No

7. Do you think sleeping at late night rather than early night is risk factor of sleep paralysis?

- Yes
- No

* Sleep quality related questions:

National Health and Nutrition Survey (NHNS) Link: https://link.springer.com/article/10.1007/s41105-017-0138-2

The six Questions for sleep-related factors over the previous month were phrased as follows:

1. How many hours did you sleep at night on average?
   - less than 5h
   - 5-6h
   - 7-8h
   - more than 8h

2. How would you rate your amount of sleep?

   With response choices of “very good”, “good”, “bad”, and “very bad”.

   Responses of “bad” and “very bad” were considered to signify Subjective Insufficient sleep (SIS).

3. Did you have difficulty falling asleep at night?

   With response choices of “never”, “seldom”, “Sometimes”, “often”, and “always”.

   Responses of “often” and “always” were considered to signify DIS.

4. Did you wake up during the night after you went to sleep?

   With response choices of “never”, “seldom”, “sometimes”, “often”, and “always”.

   Responses of “often” and “always” were considered to signify DMS.

5. Did you wake up too early in the morning and had difficulty going back to sleep?

   With response choices of “never”, “seldom”, “sometimes”, “often”, and “always”.

   Responses of “often” and “always” were considered to signify EMA.

6. Did you feel excessively sleepy during the daytime?

   With response choices of “never”, “seldom”, “sometimes”, “often”, and “always”.

   Responses of “often” and “always” were considered to signify EDS.
APPENDIX 2 - Sleep paralysis questionnaires (Arabic version).

1. سمت عن عدم القدرة على تحريك اليدين، الرفوف أو الجسم عند الاستيقاظ من النوم أو أثناء النوم?
   ○ نعم
   ○ لا

2. هل قمت بإلغاء ما تُعرف بالتشتيت النوم (الجلوم) خلال حياته؟
   ○ نعم
   ○ لا

3. إذا كانت الإجابة بـ "نعم"، فهل استمرت في نقطة هذه التجربة؟
   ○ نعم
   ○ لا

4. كم مرة في حياتك عانيت من تشتيت النوم (الجلوم)؟
   ○ 1-3
   ○ 4-6
   ○ أكثر من 6

5. في أي سن تعرضت لهذه التجربة؟
   ○ 18-35
   ○ 36-55
   ○ أكثر من 55 سنة

6. أثناء تجربة تشتيت النوم (الجلوم)، كنت تشعر بالأرق بالضغط على صدرك أو عن أجزاء أخرى من الجسم؟
   ○ نعم
   ○ لا

7. إذا كنت إما من حين لآخر، أو بشكل متكرر، أو دائمًا، أجب عن السؤال التالي: كيف سيكون الشعور بالضغط؟
   ○ شعر بالضغط بالجلوم أو أثناء نومك
   ○ شعر بالضغط جالس على مصلك
   ○ أخر، أدرج (اختيار)
   ○ أخر

8. هل تعتقد أن الأشخاص المصابين بتشتيت النوم (الجلوم) قد ي任何形式 غير عادية/بطرق مختلفة من النوم؟
   ○ نعم
   ○ لا

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- Awareness of sleep paralysis phenomenon ... Aledili et al

1. 1311

https://smj.org.sa  Saudi Med J 2021; Vol. 42 (12) 1311
Awareness of sleep paralysis phenomenon ... Aledili et al

1. Has there been an increase in the number of cases of sleep paralysis in the past few years? 

No.

2. Have there been any studies conducted on patients with sleep paralysis? 

Yes.

3. What are the possible causes of sleep paralysis? 

Factors such as sleep deprivation, sleep disorders, and certain medications can contribute to sleep paralysis.

4. How does sleep paralysis affect daily life? 

Sleep paralysis can affect daily life by causing disruptions in sleep quality and leading to fatigue during the day.

5. What is the best treatment for sleep paralysis? 

There is no specific treatment for sleep paralysis, but strategies like improving sleep hygiene and managing sleep disorders can help.

6. Are there any risks associated with sleep paralysis? 

No, there are no known risks associated with sleep paralysis.

7. Is there a genetic link to sleep paralysis? 

Research is ongoing, but there is no definitive evidence for a genetic link to sleep paralysis.

8. How can people cope with sleep paralysis? 

Practicing relaxation techniques and maintaining a regular sleep schedule can help manage symptoms of sleep paralysis.

9. Are there any preventative measures to avoid sleep paralysis? 

No preventative measures are currently available to avoid sleep paralysis.

10. What is the current understanding of sleep paralysis? 

Sleep paralysis is understood to be a symptom of the sleep-wake cycle, and research is ongoing to better understand its mechanisms.

11. How can sleep paralysis be treated? 

Sleep paralysis cannot be treated, but it can be managed with lifestyle changes and sleep hygiene.

12. Are there any known cases of sleep paralysis leading to death? 

No known cases have been reported, but sleep paralysis is a risk factor for sleep apnea and other sleep disorders.

13. What is the role of healthcare providers in managing sleep paralysis? 

Healthcare providers can help diagnose and manage sleep paralysis, and provide recommendations for treatment and lifestyle changes.

14. Are there any supports or resources available for people with sleep paralysis? 

Yes, support groups and online communities can provide support and information for people with sleep paralysis.

15. What is the future outlook for sleep paralysis research? 

Research continues to explore the mechanisms of sleep paralysis, with the goal of developing more effective treatments and understanding its underlying causes.