Published in final edited form as:
J Clin Psychol. 2010 December ; 66(12): 1292–1306. doi:10.1002/jclp.20724.

Isolated Sleep Paralysis and Fearful Isolated Sleep Paralysis in Outpatients With Panic Attacks

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Abstract

Isolated sleep paralysis (ISP) has received scant attention in clinical populations, and there has been little empirical consideration of the role of fear in ISP episodes. To facilitate research and clinical work in this area, the authors developed a reliable semistructured interview (the Fearful Isolated Sleep Paralysis Interview) to assess ISP and their proposed fearful ISP (FISP) episode criteria in 133 patients presenting for panic disorder treatment. Of these, 29.3% met lifetime ISP episode criteria, 20.3% met the authors' lifetime FISP episode criteria, and 12.8% met their recurrent FISP criteria. Both ISP and FISP were associated with minority status and comorbidity. However, only FISP was significantly associated with posttraumatic stress disorder, body mass, anxiety sensitivity, and mood and anxiety disorder symptomatology.

Keywords

sleep paralysis; isolated sleep paralysis; panic disorder; anxiety; fear; parasomnia; sleep disorder

Sleep is a basic requirement of life and an important indicator of health. Not surprisingly, the relation between sleep and psychopathology appears to be quite complex. Certain problematic symptoms are known to impede sleep (e.g., chronic worry and depressive ruminations), whereas others occur in the context of sleep (e.g., sleep terrors, nocturnal panic attacks, and sleep paralysis). The focus of this article is on sleep paralysis (SP), a potentially frightening experience that can occur during the onset of sleep or upon awakening.

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Sleep paralysis is characterized by a period of time during which voluntary muscle movement is inhibited, yet ocular and respiratory movements are intact and the senses remain relatively clear (American Academy of Sleep Medicine [AASM], 2005). When SP occurs in otherwise healthy individuals, it is termed *isolated sleep paralysis* (ISP). In the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Revised* (*DSM-IV-TR*; American Psychiatric Association, 2000), ISP is classified as a parasomnia not otherwise specified. Through the use of sleep studies, inroads have been made towards understanding some of the origins of SP and ISP. These conditions have been associated with rapid eye movement (REM) activity and are often considered to result from a perseveration of aspects of REM sleep into sleep transitions (AASM, 2005).

Prevalence Rates

A review of the SP and ISP literature indicates these episodes are not uncommon, but their prevalence rates are quite variable across studies. For instance, the lifetime prevalence rate in nonclinical samples ranges from 2.2% (Ohayon & Shapiro, 2000) to 39.6% (Kotorii et al., 2001), and in clinical samples ranges from 7.4% (Ohayon & Shapiro, 2000) to 50.0% (Bell, Hildreth, Jenkins, & Carter, 1988). Given the wide range of SP assessment methods (i.e., various self-report instruments and structured interviews), differing definitions of sleep paralysis, and different levels of reported detail, it is perhaps not surprising that the interstudy variability is so pronounced. Further, differentiation between SP and ISP is obscured by the fact that individuals with other conditions (especially narcolepsy, seizure disorder) were often not documented and/or excluded from the samples, a factor making diagnosis of ISP impossible. Few systematic demographic correlates have been found, yet some evidence exists that persons of African descent may experience higher rates of SP than those of European descent (e.g., Paradis, Friedman, & Hatch, 1997).

Associated Features

Sleep paralysis and isolated sleep paralysis episodes are often accompanied by hallucinations that can be extremely vivid and sometimes disturbing. Cheyne, Rueffer, and Newby-Clark (1999) found that these hallucinations reliably cluster into three main categories: intruder, incubus (nocturnally assaulting demon), and vestibular–motor. These categories are consistent with known aspects of low-level neural mechanisms found in REM neurophysiology. For instance, the first two categories are consistent with threat-activated vigilance systems that typically involve the amygdala, and the third appears to be associated with REM stages that typically involve activation of the brainstem, cerebellar, and cortical vestibular centers (as reviewed in Cheyne, 2006).

Several other features of SP and ISP are noteworthy. The age of onset is typically in adolescence (Fukuda, Miyasita, Inugami, & Ishihara, 1987), and episodes are much more likely to occur when individuals sleep in a supine position (Cheyne, 2002). Sleep paralysis and isolated sleep paralysis episodes average 6 minutes in length (Hinton, Pich, Chhean, Pollack, & McNally, 2005), but episodes lasting more than an hour have been reported (e.g., De Jong, 2005). Episodes have also been linked with narcolepsy, hypertension, seizure disorders, lack of sleep, jet lag, shift work (e.g., AASM, 2005, Friedman & Paradis, 2002), and with the use of antidepressants and benzodiazepines (e.g., Ohayon, Zulley, Guilleminault, & Smirne, 1999).

Diagnostically, evidence is accruing that ISP is associated with the anxiety disorders. As one example, a large community study (Ohayon et al., 1999) found that participants with ISP evidenced higher rates of anxiety disorders than those without ISP. This gap widened as ISP became more frequent, with 31.3% of patients who experienced weekly episodes meeting anxiety disorder criteria versus 7% of the no-ISP group. Further, Otto et al. (2006) found an

association between anxiety disorder comorbidity and higher rates of ISP in a clinical sample of anxious patients. More generally, Ramsawh, Raffa, White, and Barlow (2008) found elevated rates of anxiety sensitivity in a nonclinical sample of patients with ISP and, as implied in earlier reports (e.g., Payne, 1965; Rushton, 1944), it is conceivable that there may be a relationship between ISP and general negative affectivity. Consonant with all the above, evidence exists that stress, chronic fear, and anxiety may serve as predisposing factors that may make the occurrence of ISP more likely (Simard & Nielsen, 2005).

There is also evidence that SP and ISP are associated with panic disorder (e.g., Paradis et al., 1997; Suarez, 1991) and posttraumatic stress disorder (PTSD; e.g., Hinton et al., 2005; Ohayon & Shapiro, 2000) in particular. In a recent community study assessing ISP in the past year, Ramsawh et al. (2008) found that 30.6% of the ISP group also met criteria for panic disorder compared to 0% of the non-ISP group. Similarly, 27.8% of the ISP group had PTSD versus 5.6% of the non-ISP group. Interestingly, exposure to traumatic events did not differ between these groups.

In summary, the exact nature of the relationship between ISP and the anxiety disorders awaits further clarification. However, the best available evidence favors a relationship between the two and, more specifically, associations with ISP and both panic disorder and PTSD.

The Importance of Fear During ISP Episodes

Although chronic fear may be a predisposing factor in general (as noted above), fear also appears to be a common consequence of ISP episodes. From the earliest descriptions of ISP, fear has often played a prominent role, and this is consistent with empirical data. For instance, Cheyne, Rueffer, and Newby-Clark (1999) found that 90% of their student sample and 98% of their Web-based sample reported fear. This high rate of fear during ISP episodes is in contrast to the rate in normal dreaming, during which fear occurs approximately 30% of the time (e.g., Schredl & Doll, 1998). Data also exist showing that fear arises not only from the feelings of paralysis, but from the hallucinatory experiences as well (Cheyne, Rueffer, & Newby-Clark, 1999).

Although fear appears to be a frequent and distressing aspect of ISP, it is not included in the criteria for isolated sleep paralysis episodes or recurrent isolated sleep paralysis (AASM, 2005). This is perhaps not surprising due to the relatively early state of the literature and the fact that that the experience of ISP itself may be important for sleep researchers to note regardless of its positive or negative valence. However, psychopathology researchers and mental health clinicians are likely to be most interested in ISP when patients are distressed by its occurrence. Given their potentially troubling nature, episodes of what we term *fearful ISP* (FISP) may bear a stronger relation to other aspects of psychopathology than neutral or pleasant episodes. Further, it is conceivable that FISP episodes may involve processes analogous to those present in other psychopathological conditions (e.g., misinterpretation or misappraisal of bodily sensations) and that specific individual differences may serve as predisposing factors.

Another important question concerns the range and degree of clinically significant distress and interference that accompanies ISP and FISP. It has rarely been systematically assessed and articulated in either clinical or nonclinical samples (see Ramsawh et al., 2008, for an exception using a nonclinical population.). Therefore, we believe that it is important to begin assessing the impact of ISP and FISP on the lives and wellbeing of patients.

Given the above and our primary goal of assessing both ISP and FISP in a clinical context, we propose to explore a potential subtype of ISP (i.e., FISP, see Table 1) by adding the

presence of clinically significant fear to the currently accepted diagnostic definition (AASM, 2005) of ISP episodes. As we are also interested in assessing individuals who experience clinically significant distress and/or impairment, we have also proposed additional criteria for a subtype of recurrent ISP (AASM, 2005) which we term *recurrent FISP* (see Table 1). The assessment of FISP episodes (in combination with relevant medical questions) is likely to provide a more conservative and accurate estimate of the prevalence of clinically meaningful ISP than would be otherwise possible with presently available measures that may focus on all SP and ISP episodes, including those that are affectively neutral or pleasant. Whereas interviewers cannot definitively rule out conditions such as undiagnosed narcolepsy without a more specific medical assessment, a thorough inquiry into already-known conditions will provide additional reassurance that fearful and clinically significant episodes of ISP, and not just SP, are being reported. We must be clear, however, that our study-specific diagnostic proposals for FISP are tentative, based upon the consensus of the investigators, and require further empirical study.

Goals and Hypotheses

The goals in this study are threefold. First, we will determine the prevalence rates of lifetime ISP episodes (using International Classification of Sleep Disorders criteria; AASM, 2005) in a carefully diagnosed, urban sample of participants experiencing panic attacks. Given the fact that available research indicates that both panic disorder and African descent may be risk factors for ISP, this particular sample seemed well-suited to our research questions.

Second, using the same sample, we will assess the prevalence rate of lifetime FISP episodes and the current prevalence rate of recurrent FISP. We will present summary statistics for level of fear experienced *during* episodes by those who meet lifetime FISP episode criteria as well as the range of distress and impairment found in our proposed recurrent FISP.

Third, we will assess relationships between ISP and FISP and various measures of both psychopathology and participant characteristics. With regard to demographics, we predict that patients of African descent will evidence higher rates of both ISP and FISP. We also hypothesize that the presence of FISP will be associated with anxiety and mood disorder symptomatology and will not be associated with intelligence quotient (IQ). Further, given its possible linkage to panic and anxiety, as well as the frightening nature of paralysis, we predict that catastrophic misinterpretations of bodily sensations will be associated with FISP. We also predict that patients meeting PTSD criteria will be more likely to endorse FISP (e.g., Ohayon & Shapiro, 2000). A potential relationship between selective serotonin reuptake inhibitor (SSRI) use and ISP and FISP (e.g., Ohayon et al., 1999) will also be examined. Finally, given the relationship between body mass index (BMI) and narcolepsy (e.g., Schuld, Hebebrand, Geller, & Pollmächer, 2000) as well as sleep apnea (e.g., Vgontzas et al., 1994), we hypothesize a positive relationship between ISP and FISP and BMI. Testing our measure's discriminant validity, we predict that ISP and FISP will not be significantly associated with intelligence test scores.

Method

Participants

Participants in this study include 133 individuals who consecutively presented for intake assessment during the first 24 months of a randomized controlled trial of psychotherapies for panic disorder. Participants were recruited by advertising, word of mouth, and referrals from other professionals. The mean age was 38.8 (SD = 12.8), 66.9% were women, and 46 (34.8%) were married. Ninety-seven (73.5%) were Caucasian, 23 (17.4%) were African American, 7 (5.3%) were Hispanic, 3 (2.3%) were Asian, 2 (1.5%) classified themselves as

mixed race or other, and 1 did not report ethnicity. At evaluation, 23.3% of participants were taking an SSRI.

Diagnosticians

The diagnosticians were eight doctoral-level graduate students in clinical psychology and one licensed clinical psychologist (who also served as a diagnostic supervisor). All interviewers received Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV) training to reliability in accordance with Brown, DiNardo, Lehman, and Campbell (2001) and had extensive training on the diagnostic and symptom measures listed below. Cases were presented and discussed in weekly consensus meetings, and any diagnostic or symptomatic uncertainties were resolved through consensus between the diagnosticians and the primary investigators. Diagnostic and reliability ratings for ISP were conducted by four of the nine interviewers. All of these raters were trained in use of the Fearful Isolated Sleep Paralysis Interview (FISPI) and its structured scoring system by the first author using didactics and presentations, as well as independent and group ratings of written vignettes of ISP. This training required approximately 5 hours.

Measures

Clinician-rated measures—The Anxiety Disorders Interview Schedule-Adult Version (ADIS-IV; Dinardo, Brown, & Barlow, 1994) was used to assess Axis I disorders in all participants. It is a semistructured clinical interview designed to evaluate *DSM-IV* criteria for many Axis I disorders (Brown, DiNardo, Lehman, & Campbell, 2001). It is in widespread use and is reliable and valid.

The Fearful Isolated Sleep Paralysis Interview (FISPI), developed for the present investigation, is a semistructured clinical interview meant to be used in conjunction with the ADIS. It utilizes similar conventions (e.g., 0–8 Likert-type scales and style of prompting) and is administered following the panic and agoraphobia modules. The FISPI assesses for the presence of ISP and FISP and the breadth of ISP hallucinatory experiences (Cheyne, Rueffer, & Newby-Clark, 1999), and individually inquires into the manifestations of ISP that cause clinically significant fear, distress, and interference. Areas relevant for differential diagnosis (e.g., history of narcolepsy, substance use) are also assessed. As the clinical range of ISP experiences is not yet well understood, we created a 0–9, three-component Structured Severity Scale score (similar to the format of the Panic Disorder Severity Scale) composed of frequency, fear/distress, and interference ratings in lieu of using the standard 0–8 ADIS severity score (Table 1).

The FISPI displayed good psychometric properties in the present sample. Internal consistency was demonstrated by large and significant item-remainder correlations for the three Structured Severity Scale items, with *r*s ranging from 0.83 to 0.93. Interrater agreement (four raters, two categories; Shrout & Fleiss, 1979) on presence or absence was 0.93 for lifetime ISP episode, 0.95 for lifetime FISP episode, and 0.97 for recurrent fearful ISP. Reliability for severity (ICC 2, 2) was 0.98 for lifetime ISP episode and 0.97 for lifetime FISP episode. Agreement for the individual components of the Structured Severity Score was 0.99 for Frequency, 0.95 for Fear/Distress, and 0.96 for Interference.

The Panic Disorder Severity Scale is a widely used, 7-item clinician-administered rating scale for panic disorder phenomena occurring in the past month. Interrater reliabilities are excellent, and internal consistencies are adequate (Shear et al., 1997). It has demonstrated both convergent and discriminant validity (Shear et al., 2001).

The Hamilton Anxiety Rating Scale (Hamilton, 1959) and Hamilton Depression Rating Scale (Hamilton, 1960, 17-item version) are widely used dimensional measures of their respective symptom sets.

Self-report measures—The Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986) is a 16-item scale that measures fear of the social and physical consequences of certain bodily sensations associated with anxiety. It is internally consistent, reliable, and possesses good criterion validity (Peterson & Reiss, 1992).

The Brief Bodily Sensations Interpretation Questionnaire (Clark et al., 1997) is a 7-item measure of catastrophic misinterpretation of panic-related bodily sensations. It has demonstrated adequate test-retest reliability and validity (e.g., Clark et al., 1997).

The Shipley Institute of Living Scale (Shipley, 1940) is a widely used, brief assessment of general intellectual functioning which will be used as a measure of discriminant validity. Shipley total IQ scores are highly correlated with longer and more intensive IQ tests (Zachary, Crumpton, & Spiegel, 1985).

Procedure

All participants who completed the FISPI were included in this report irrespective of whether they were randomized to the study or completed all assessment instruments. A subsample of study diagnosticians (three graduate students and the first author) independently rated relevant ADIS sections for the presence and severity of ISP and FISP. Copies of all ADISes (with all symptom scores and diagnostician comments) were provided to the four raters. When available, video/audio recordings of the intake sessions were also used.

Statistical Analyses

Chi-square tests were used to assess dichotomous associations. Due to positively skewed distribution of ISP in the sample, point-biserial correlations (0 = *absent*; 1 = *present*) were used to assess ISP's relationship with other constructs. Due to limited sample size and the exploratory nature of the analyses, no corrections for multiple comparisons were made.

Results

Prevalence of ISP, FISP, and Panic Disorder

Two (1.5%) patients who endorsed SP episodes were excluded from the ISP groups due to preexisting medical conditions likely responsible for their SP experiences (one patient had narcolepsy and one had a seizure disorder). As is evident from Table 2, definitions of SP have an impact on reported prevalence: 29.3% of the sample reported having a lifetime experience of ISP using International Classification of Sleep Disorders criteria.

The majority of the ISP patients in this sample endorsed significant fear. Of the total sample, 20.3% met criteria for a lifetime FISP episode and 12.8% met recurrent FISP criteria. Of note, 12.8% of the total sample reported experiencing at least one FISP episode in the past month.

Prevalence rates using the three definitions of ISP as a function of ethnicity are presented in Table 2. Although small sample sizes for three of the five ethnicities precluded individual analyses for each group, non-Caucasians were more likely to have ISP regardless of definition (lifetime ISP $\chi^2[1, N = 132] = 8.28$, $p < .005$; lifetime FISP episode $\chi^2[1, N = 132] = 14.69$, $p < .001$; recurrent FISP $\chi^2[1, N = 132] = 10.45$, $p < .004$). Gender

differences were found as well, with men being more likely to report lifetime ISP, $\chi^2[1, N = 133] = 4.26$, $p < .04$, but this pattern was not evident for lifetime FISP episode or recurrent FISP.

The majority of the sample met diagnostic criteria for panic disorder (95.5%). Further, 100% of the recurrent fearful ISP, 96.3% of the lifetime fearful ISP episode, and 92.3% of lifetime ISP episode groups met full panic disorder criteria.

Severity, Fear, and Interference

Mean lifetime ISP episode severity (which is actually a measure of frequency in AASM, 2001) was 1.37 (*SD* = 0.74; range = 0–3), indicating ISP occurred approximately once per month. Mean lifetime FISP episode fear severity was 5.53 (*SD* = 1.04; range = 0–8), indicating moderate to severe levels of fear. The overall recurrent FISP severity was assessed using Structured Severity Scale scoring. Total mean score was 5.22 (*SD* = 1.94; range = 0–9) with individual component means of 1.98 (*SD* = 0.67) for frequency, 2.18 (*SD* = 0.61) for fear/distress, and 1.06 (*SD* = 0.95) for interference.

Duration, Frequency, and Sleeping Position of ISP and FISP Episodes

The average self-reported duration of FISP episodes was 6.9 minutes (*SD* = 10.0; range = 6 seconds–45 minutes), with 3.5 minutes being the median score. For those meeting criteria for recurrent FISP, the mean number of episodes for the past month was 4.1 (*SD* = 5.7; range = 0–22) with a median of 2.0. Past 6-month frequencies for the same group averaged 20.1 (*SD* = 31.0; range = 2–132) with a median frequency of 9.0. 58.3% of participants experienced lifetime FISP episodes while sleeping in a supine position, 8.3% on their chest, 16.7% on their side, and 16.7% reported more than one position.

Hallucinatory Content of FISP

Hypnagogic and hypnopompic hallucinations were frequent in individuals who met lifetime FISP episode criteria. Only 11.5% of these (and 11.7% of the recurrent FISP group) did not describe hallucinatory experiences. An average of 5.54 of 15 hallucinatory symptoms (Table 3) were endorsed in the lifetime FISP episode group (*SD* = 4.08, range = 0–15).

ISP's and FISP's Relationship to Mood and Anxiety Symptomatology

As a preliminary step toward better understanding its relation to other forms of psychopathology, we correlated the three definitions of ISP to several clinician-administered (Hamilton Anxiety and Depression Scales, Panic Disorder Severity Scale) and self-report (Anxiety Sensitivity Index, Brief Bodily Sensations Interpretation Questionnaire) measures. Contrary to expectation (see Table 4), ISP and FISP were largely unrelated to interview measures of depression, anxiety, and panic with the exception of a small significant positive correlation between the Hamilton Depression Scale and recurrent FISP. With regard to self-report instruments, the Anxiety Sensitivity Index was significantly correlated with lifetime FISP episode and recurrent FISP, and the Brief Bodily Sensations Interpretation Questionnaire was significantly associated only with lifetime FISP episode. The presence of a lifetime ISP episode was not significantly associated with any symptom measures. Supplementary analyses (Table 4) indicated a positive relation between each of the definitions of ISP and increasing numbers of nonpsychotic mood and anxiety disorder diagnoses.

ISP's and FISP's Relation to PTSD

Individuals with PTSD were significantly more likely to have recurrent FISP than those without, $\chi^2(1, N = 128) = 11.94$, $p < .004$. Although only 17 participants met PTSD criteria,

6 of these also met recurrent FISP criteria, and comprised 42.9% of the total recurrent FISP sample. Similar results were evidenced with the lifetime FISP episode group, $\chi^2[1, N = 128] = 6.47$, $p < .02$, but not the lifetime ISP episode group ($p = .052$).

ISP's and FISP's Relationship to IQ

Contrary to expectation, lower IQs are associated with all three definitions of ISP (see Table 4).

ISP's and FISP's Relationship to SSRI Use

SSRI use was not found to be associated with any of the definitions of ISP (range of rs = −.07–−.14, all ps > .10).

ISP's and FISP's Relationship to BMI

As can be seen in Table 4, BMI was positively and consistently correlated with lifetime FISP episodes and recurrent FISP, but not lifetime ISP episodes.

Untangling the Relationship Between Race and FISP

As FISP, recurrent FISP, and ISP appear to be associated with ethnicity, it is important to assess whether these relationships were due to other variables (i.e., BMI, PTSD). When controlling for BMI and PTSD, the correlation between non-Caucasian status and lifetime FISP episode ($r = .209$; $p = .029$) remains significant, but not for recurrent FISP ($r = .125$; $p = .196$). Further, the correlation between PTSD and recurrent FISP remains significant ($r = .208$; $p = .030$) when BMI and non-Caucasian status are partialed out, but the correlation for lifetime FISP episode ($r = .107$; $p = .269$) does not. Due to the relatively small and nonsignificant differences between correlations as well as the relatively small Ns involved in these analyses, caution should be exercised in their interpretation.

Discussion

We have developed a new semistructured interview of ISP (the FISPI) to focus upon the fear-laden and clinically significant manifestations of this phenomenon (i.e., FISP) in patients suffering from panic attacks. It is intended to supplement traditional diagnostic interviews such as the ADIS and, along with assessing for the presence and overall severity of FISP episodes and recurrent FISP, also assesses for specific hallucinatory content and the presence of relevant medical diagnoses. The FISPI is brief and relatively easy to use, and graduate students with experience in conducting common structured clinical interviews were able to reliably rate the presence and severity of ISP and FISP with little additional training. Further, our preliminary results from a relatively large, well-assessed, and ethnically diverse clinical sample appear promising and point towards the potential importance of assessing the fearful manifestations of ISP.

Lifetime prevalence rates of ISP for our entire sample and our African-American subsample were similar to those derived from other clinical studies (e.g., Smith, Friedman, & Nevid, 1999; Yeung, Xu, & Chang, 2005). This implies the sample's representativeness with regard to general ISP phenomena. Prevalence decreased as our additional criteria were introduced, indicating increased specificity, and 12.8% of the sample met our proposed criteria for recurrent FISP. It is noteworthy that almost 13% of our patients endorsed recurrent and clinically significant ISP phenomena. Thus, the regular assessment of FISP may be a useful addition to typical assessment practices when working with similar patients.

The majority of FISP (55.6%) patients were non-Caucasians. This association between race and presence of FISP was not explained by the co-occurrence of PTSD or high BMI.

Reasons for this association require further study. Similarly, a small correlation between PTSD and recurrent FISP remains when non-Caucasian status and BMI are partialed out. It may be that minorities are more likely to experience lifetime episodes of FISP, but that a history of trauma is associated with an increased risk to experience multiple and distressing episodes of FISP consistent with recurrent FISP. Replication of these findings with larger samples is clearly needed.

Several other findings warrant mention. First, as in Cheyne (2002), most participants with FISP episodes experienced hallucinatory phenomena. Second, participants were most likely to experience ISP and FISP when sleeping in a supine position. Third, the importance of the unexpected negative correlations between ISP and FISP and IQ remains unclear. The strength of these associations, however, warrants additional exploration into the individual and group differences present in the manifestation and experiences of ISP and FISP.

FISP's Relation to Anxious and Depressive Symptomatology

The relationship of FISP to anxious and depressive symptoms appears to be complex. FISP episodes and recurrent FISP were ambiguously associated with self-report measures and a depression interview, but displayed no significant correlations with clinician-administered measures of anxiety and panic. It is noteworthy that all the correlations with anxiety and depression symptom measures (including the replication of ISP's association with anxiety sensitivity from Ramsawh et al., 2008) only reached significance when using the FISP criteria that we developed. Thus, these more troubling experiences of ISP appear to bear a closer relationship to anxious and depressive symptomatology. It is also possible that, due to the nature of the sample, a restriction of range in the mood and anxiety disorder measures occurred, making the detection of significant effects more difficult.

Further, increased levels of mood and anxiety disorder comorbidity appear to have a relationship with both ISP and FISP. As comorbidity may indicate greater psychiatric severity, it is possible that the presence of ISP and FISP phenomena may serve as a marker of higher overall severity within these classes of diagnoses (i.e., ISP and FISP may indicate higher "disorderedness") or could be another manifestation of high levels of negative affectivity. Another possibility is that patients with multiple mood and anxiety disorders may regularly experience poorer and more disrupted sleep than those with more circumscribed symptomatology. If this is indeed the case, theses patients may, in effect, be inadvertently priming themselves to experience ISP and FISP episodes (e.g., Cheyne, 2002).

Limitations

There are five limitations to this study. First, caution must be exercised in generalizing the results, as the sample consisted exclusively of treatment-seeking patients experiencing panic attacks. It remains an open question whether or not similar rates of FISP will be found in other clinical samples of anxiety disorder patients. Second, as no sleep studies were conducted in the context of our study, it is impossible to rule out the possibility that some patients had undiagnosed narcolepsy (or were experiencing the beginnings of narcolepsy) despite the fact that we inquired into these and other medically relevant areas. Related to this reliance on self-report as opposed to sleep study data, it is possible that the reported subjective duration of FISP episodes may be distorted. Third, our formulations of FISP episodes and recurrent FISP were based on the clinical consensus of the investigators, not on empirically determined criteria. Fourth, the skewed nature of the data as well as the relatively small number of recurrent FISP positive patients precluded the assessment of certain psychometric properties of the FISPI. Fifth, use of multiple comparisons without correction may have inflated Type I error. However, in light of the limited number of FISP patients in our sample, we chose to eschew Bonferroni correction to avoid Type II error.

Future Directions

Recurrent FISP was found to be a significant problem for a subset of patients with panic attacks. Therefore, future research should continue to assess the clinically meaningful experiences of FISP in clinical samples, further delineate the boundaries between normative and problematic experiences of ISP, and work towards developing more empirically based thresholds for recurrent FISP criteria. It may also be fruitful to assess the impact of different therapeutic interventions on the frequency and occurrence of FISP as well as exploring potential relationships between background factors (e.g., types of past trauma), personality traits, and specific ISP hallucinogenic phenomena. With additional work it may emerge that our own or other formulations of FISP, either as a diagnostic entity or as an associated feature of other disorders, will represent a meaningful addition to our current diagnostic system.

Apart from psychopathology research, there may be important clinical reasons to assess FISP. A number of our patients regularly experienced FISP and also experienced anxiety about what these experiences might mean for them (i.e., “I’m going crazy”). Further, many would not have disclosed this information had they not been directly prompted. Thus, regular assessment of FISP as part of routine clinical care may allow for further discussion and psychoeducation. Our patients have often found it to be very reassuring to learn that they are not uniquely “weird” or “crazy” in having these experiences, and having forthright discussions of these events with a health care provider may serve to simultaneously build rapport and alleviate unnecessary anxiety.

Acknowledgments

Supported in part by NIMH R01 MH 070664 (held by Jacques Barber) and NIMH R01 MH070918 (held by Barbara Milrod).

The authors would like to thank Taylor DiGravina, Libby Graf, Julia Hormes, Sarah Kay, Jared Minkel, Rachel Simmons, and Tempe Watts.

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Table 1

Study Criteria for Fearful Isolated Sleep Paralysis Episodes and Recurrent Fearful Isolated Sleep Paralysis

Fearful Isolated Sleep Paralysis Episode

- **A.** A period of time at sleep onset or upon awakening during which voluntary movement is not possible, yet some degree of awareness is present
- **B.** The episode(s) of sleep paralysis is/are accompanied by significant fear, anxiety, or dread that may be associated with either the paralysis itself or the presence of hypnagogic (sleep onset) or hypnopompic (sleep offset) hallucinations
- **C.** The episode(s) of sleep paralysis is/are not better accounted for by the direct physiological effects of a substance (e.g., alcohol, drug of abuse, or medications)
- **D.** Isolated sleep paralysis is not better accounted for by a general medical condition (e.g., narcolepsy, seizure disorder, hypokalemia) or other psychiatric diagnosis (e.g., sleep terror disorder)

Recurrent Fearful Isolated Sleep Paralysis

- **A.** At least two episodes of fearful Isolated Sleep Paralysis (as defined above) taking place in the past 6 months
- **B.** The episodes of sleep paralysis are accompanied by clinically significant distress and/or impairment
- **C.** The episodes of sleep paralysis are not better accounted for by the direct physiological effects of a substance (e.g., alcohol, drug of abuse, or medications)
- **D.** The sleep paralysis episodes are not better accounted for by a general medical condition (e.g., narcolepsy, seizure disorder, hypokalemia) or other psychiatric diagnosis (e.g., sleep terror disorder)

Standardized Scoring for Fearful Isolated Sleep Paralysis (ISP) Episodes and Recurrent Fearful Isolated Sleep Paralysis

1 Fearful ISP frequency in the past 6 months

0 = *No episodes*

1 = *Less than 1 episode per month*

2 = *1– 3 episodes per month*

3 = *At least 4 episodes per month*

2 Overall fear/distress during and as a result of fearful ISP episodes in the past 6 months

0 = *No fear/distress*

1 = *Mild fear/distress*

2 = *Moderate fear/distress*

3 = *Severe fear/distress*

3 Interference from fearful ISP episodes in the past 6 months

0 = *No interference*

1 = Mild, slight interference—patient feels as if at least one aspect of his/her life has been negatively affected or impaired, but only to a limited degree

2 = *Moderate interference*—ISP symptoms cause definite and noticeable interference in one or more areas, but these areas remain manageable

3 = *Severe interference*—ISP symptoms cause substantial impairment, and patient may feel unable to manage required affairs or, following ISP episodes, may be unable to function for a time

Total score range: 0–9

Table 2

Isolated Sleep Paralysis, Fearful Isolated Sleep Paralysis, and Recurrent Fearful Isolated Sleep Paralysis Prevalence Rates and Percentages by Ethnicity

		Caucasian *N* (%)	African American *N* (%)	Hispanic *N* (%)	Asian *N* (%)	Other *N* (%)	Total sample *N*
Lifetime ISP episode	No	75 (77.3)	12 (52.2)	3 (42.9)	2 (66.7)	1 (50.0)	94
	Yes	22 (22.7)	11 (47.8)	4 (57.1)	1 (33.3)	1 (50.0)	39
Lifetime fearful	No	85 (87.6)	13 (56.5)	4 (57.1)	2 (66.7)	1 (50.0)	106
ISP episode	Yes	12 (12.4)	10 (43.5)	3 (42.9)	1 (33.3)	1 (50.0)	27
Recurrent fearful ISP	No	90 (92.8)	17 (73.9)	5 (71.4)	2 (66.7)	1 (50.0)	116
	Yes	7 (7.2)	6 (26.1)	2 (28.6)	1 (33.3)	1 (50.0)	17
	Total	97	23	7	3	2	133

Note: The discrepancy between ethnicity *N* and total sample *N* is due to the fact that one patient did not report ethnicity. ISP = Isolated sleep paralysis.

J Clin Psychol. Author manuscript; available in PMC 2013 April 12.

Table 3

Fearful Isolated Sleep Paralysis Hallucinatory Content—Percentage Endorsing Symptoms and Distress/ Severity Means (Standard Deviation)

	Fearful ISP episode		Recurrent fearful ISP	
ISP Hallucination	**%**	***M* (*SD*)**	**%**	***M* (*SD*)**
Try to speak or call out, but can't	61.5	4.31 (3.73)	52.9	3.88 (3.90)
Pressure on chest/smothering	57.7	3.58 (3.37)	52.9	3.35 (3.48)
Feel that body has moved	38.5	2.08 (2.88)	52.9	3.00 (3.14)
Hear unusual sounds	38.5	2.23 (3.02)	35.3	2.12 (3.00)
Numbness/vibrating/tingling sensations	46.2	2.50 (3.02)	52.9	2.71 (2.85)
Leave or see body from outside	30.8	1.69 (2.78)	41.2	2.12 (2.83)
Feel a presence in the room	50.0	2.81 (3.29)	47.1	2.76 (3.31)
See something in room	34.6	1.96 (2.99)	47.1	2.53 (3.06)
Falling/flying/floating/spinning	34.6	1.81 (2.71)	35.3	1.94 (2.90)
Feel like might die	57.7	3.73 (3.61)	52.9	3.12 (3.50)
Feel pain	19.2	0.85 (1.91)	29.4	1.29 (2.26)
Feel cold	23.1	1.08 (2.37)	29.4	1.47 (2.79)
Feel erotic feelings	19.2	0.69 (1.67)	23.5	0.65 (1.27)
Feel like being strangled	19.2	1.04 (2.24)	17.6	0.88 (2.06)
Feel like being touched	23.1	1.38 (2.74)	23.5	1.35 (2.76)

Note: Those participants meeting ISP criteria only were not assessed due to the presence of cut-out questions contained in the measure. ISP = Isolated sleep paralysis; N for fearful ISP lifetime episode = 27; *N* for recurrent fearful ISP = 17.

Table 4

Correlations Between Isolated Sleep Paralysis, Fearful Isolated Sleep Paralysis, Recurrent Fearful Isolated Sleep Paralysis, and Other Measures

	Lifetime ISP episode	Lifetime FISP episode	Recurrent FISP
Lifetime ISP episode	–	.78**	.59**
Lifetime fearful ISP episode	–	–	.76**
Recurrent fearful ISP	–	–	–
Number of diagnoses	.23**	.35**	.31**
Hamilton Anxiety Rating Scale	−.09	.04	.11
Hamilton Rating Scale for Depression	.01	.19	.27**
Panic Disorder Severity Scale	.08	.14	.11
Anxiety Sensitivity Index	.17	.35**	.23*
Brief Bodily Sensations Interpretation Questionnaire	−.02	.25*	.09
Shipley Institute of Living Scale IQ score	−.22*	−.29**	−.28*
Body Mass Index	.08	.21*	.23*

Note: Number of diagnoses only includes the anxiety disorders, major depressive disorder, and dysthymic disorder. ISP = Isolated sleep paralysis.

* $p < .05$;

** $p < .001$.