ISSN: 3029-0708

*Review Article*

**Journal of Clinical Psychology and Neurology**

# Nightmares A Narrative Review

**Tiffany Field, PhD**

*University of Miami/Miller School of Medicine and Fielding Graduate University, USA*

**Corresponding author**

Tiffany Field, University of Miami/Miller School of Medicine and Fielding Graduate University, USA.

**Received:** June 26, 2026; **Accepted:** July 14, 2026; **Published:** July 20, 2026

**ABSTRACT**

The prevalence of nightmares appears to be highly variable in this current literature on nightmares, ranging from low in healthy populations (6% to 11%), to slightly higher in those with medical problems (12% to 13%), significantly higher in individuals with neurological conditions (24% to 30%) and again significantly higher in those with psychiatric diagnoses (27% to 62%). Medical comorbidities of nightmares include cardiocerebrovascular disease and cardiometabolic disease. Neurological comorbidities include functional neurological diseases and dementia. Psychiatric comorbidities Include anxiety/depression, PTSD, and REM sleep behavior disorder. Several negative effects of nightmares have been noted in this literature including poor sleep quality, stress, anxiety and depression, suicidal ideation, and suicide attempts. Several risks for nightmares have been addressed including childhood trauma, stress, arousal, and anxiety. Potential underlying biological mechanisms for nightmares include a surprisingly small effect for heritability and parasympathetic dysregulation and increased beta waves suggesting hyper- arousal. Despite the severity of the negative effects of nightmares, only three interventions have appeared in this literature including imagery rescripting, cognitive behavioral therapy for nightmares and telehealth cognitive behavioral therapy.

Nightmares have been defined as vivid, disturbing dreams that typically occur during rapid eye movement (REM) sleep and cause strong feelings of anxiety, fear or terror. They can interfere with sleep quality and cause distressful awakenings. Nightmares generally derive from a combination of psychological and physical factors including thoughts, images and emotions that occur during sleep. These include stress and anxiety related to daily life stressors, major life changes or anxiety disorders. They also can involve traumatic events and are a core symptom of post-traumatic stress disorder (PTSD). Sleep deprivation, an irregular sleep schedule or underlying disorders like sleep apnea can lead to bad dreams. Eating heavy meals that increase brain activity prior to bedtime or starting new medications can also lead to nightmares.

New strategies for the cognitive science of dreaming have been outlined in a recent paper suggesting that observable dreaming, neural decoding and real time reporting have led to more direct measures of the content of dreams [1]. In addition, dream engineering, targeted stimulation and lucidity have led to the experimental manipulation of dream content. Further, with computational dream analysis, the generation and exploration of large dream report databases have become possible.

Nightmare research is dependent on **dream recall** by the participants. However, in a study on dream recall in 16 countries (N= 15,854, 18–99 years old, mean= 42 years), only 54% reported frequent dream recall [2]. Surprisingly, **nightmares** were reported by as few as **11% of the participants.**

This narrative review includes current research on the prevalence of nightmares, comorbidities of nightmares, negative effects, risk factors, potential underlying biological mechanisms and interventions. This research was found on PubMed and PsycINFO by entering the term nightmares and the years 2024-2026. Exclusion criteria were protocols, case studies, and non-English language papers.

The 36 papers in this current literature review can be categorized as prevalence of nightmares (11 papers), comorbidities of nightmares (8 papers), negative effects (7), risk factors (4), potential underlying biological mechanisms (3) and interventions (3). These sections are followed by a discussion on methodological limitations of this current literature.

## Prevalence of Nightmares

The prevalence of nightmares appears to be highly variable in this current literature on nightmares, **ranging from 11% to 62%.** The prevalence range is **low in healthy populations (6% to 11%),** slightly higher in those with **medical problems (12% to 13%),** significantly higher in individuals with **neurological conditions (24% to 30%)** and still higher in those with

**Citation:** Tiffany Field. Nightmares A Narrative Review. J Clin Psychol Neurol. 2026. 4(3): 1-6. DOI: doi.org/10.61440/JCPN.2026.v4.87

**psychiatric diagnoses (27% to 62%).** The most representative sample of the general population for its sampling in 16 countries, its large sample size, and its broad age range was the sample already described as 11% experiencing nightmares [2].

**Table 1: Prevalence of Nightmares (And First Authors)**

| Prevalence | First Authors |
|---|---|
| 11% across 16 countries | Bolstad |
| 6% college students | He |
| 16% medical school students | Rashi |
| 12% cardiometabolic diseases | Liu |
| 13% cardiocerebrovascular diseases | Lee |
| 24% across 6 countries | Lipnicki |
| 30% functional neurological disorder | Schade |
| 27% childhood trauma | Que |
| 34-70% psychiatric disorders | Encephale |
| 62% post-traumatic stress disorder | Schredl |

In a smaller, more select sample of Chinese **college students** (N= 5,824), 6% reported nightmares at least one time per month and 32% at least one time last month [3]. Females, sophomores and juniors reported more nightmares, even when family income was high. The interpretation of these results was not clear. Perhaps females were more open in reporting problems, as were sophomores and juniors who were already adjusted to college and not fearful of expressing themselves.

The prevalence of nightmares was slightly higher in Syrian **medical students** at 16% (N= 1,237, mean age = 20) [4]. In this sample, the prevalence of insomnia was as great as 47% of medical students, and insomnia and nightmares were highly correlated, as they are in all the studies that have included correlation analyses. This greater prevalence for medical students (10% higher) than the prevalence for college students in the previous study may relate to medical students experiencing more stress, or living in Syria may have been more stressful than living in China.

The average prevalence of nightmares has been slightly higher in those with **medical conditions.** In a sample of adults experiencing **cardiometabolic diseases** (N= 4223), for example, 12% reported having frequent nightmares [5].

In a sample of older adults with **cardiocerebrovascular disease, hypertension, and hyperlipidemia** (N=2824, mean age= 64), the Disturbing Dream and Nightmare Severity Index was administered to the participants [6]. This index revealed that 13% were experiencing nightmares more than once per year and 3% had a nightmare disorder diagnosis.

The prevalence of disturbing dreams was greater at 24% in a survey across six countries (N= 10,238) [7]. In a paper entitled "Nightmares and insomnia are frequent in patients with functional neurological disorders", those patients (N=87) were compared with psychosomatic patients (N=97) and post stroke patients (N=92) [8]. More than 70% of the patients with **functional neurological disorder and psychosomatic problems** experienced insomnia, and 30% of those patients reported nightmares one time a week versus 10% for those with stroke.

In a younger sample 12–25 years old (N= 6145), **childhood trauma** was related to frequent nightmares at a prevalence of 27% [9]. Emotional neglect and abuse increased the prevalence of nightmares. This high prevalence of nightmares could be associated with the participants' close proximity in age to the childhood trauma itself.

In a paper entitled "Nightmares and insomnia within the acute aftermath of trauma predicts suicidal ideation", the researchers followed patients with **traumatic injury** (N= 61, mean age= 40) [10]. Insomnia and nightmares at one month predicted suicidal ideation at two months. Nighttime awakenings and total awake time also predicted suicidal ideation with nightmares as a moderator increasing that association.

The prevalence of nightmares ranged between 34% and 70% for individuals with **psychiatric disorders** [11]. This range included those with nightmare disorder who were advised to receive Imagery Rehearsal Therapy. In another sample of psychiatric inpatients, nightmare frequency was greatest in those with **PTSD** (N= 75) [13]. In this sample, 62% of those with PTSD had nightmares once a week or more often as compared to 40% of those without PTSD.

**Comorbidities of Nightmares**

Nightmares have been associated with several comorbidities. They can be categorized as medical, neurological and psychological comorbidities. The medical comorbidities include cardiocerebrovascular disease and cardiometabolic disease. The neurological conditions include functional neurological diseases and dementia. The psychiatric problems Include anxiety/depression, PTSD, and REM sleep behavior disorder.

**Table 2: Comorbidities of Nightmares (And First Authors)**

| Comorbidities | First Authors |
|---|---|
| Cardiovascular diseases | Lee |
| Cardiometabolic diseases | Liu |
| Psychiatric disorders | Blanchard |
| Insomnia | Schlarb |
| Depression and post-traumatic stress disorder | Schredl |
| REM sleep behavior disorder | Jigalin |

In the study on **cardiocerebrovascular disease,** the sample also included **hypertension** and **hyperlipidemia** [6]. Hypertension was noted in 52% of the sample and hyperlipidemia in 48%. The nightmares group had twice the number of individuals with hyperlipidemia versus hypertension. That effect may be due to the medications that are frequently prescribed for elevated cholesterol which are a well-documented cause of vivid dreams and nightmares.

In the study on **cardiometabolic comorbidities,** physiological measures suggested no dysregulation of the autonomic nervous system or the hypothalamic pituitary adrenal system [5]. For example, no differences were noted in cortisol levels between those with and without cardiometabolic diseases. More nightmares might be expected for medical conditions because of the worry/stress about potential chronicity, but the absence of cortisol effects was surprising.

For functional neurological disorders, 30% reported nightmares one time a week versus 10% for those with stroke [8]. Nightmare frequency was related to current mental health, dissociative symptoms, and childhood trauma. The greater frequency of nightmares in those with functional neurological disorder and psychosomatic problems versus those with stroke may relate to those being chronic conditions while stroke is typically an acute condition.

Many disturbing dreams were associated with **dementia** in 60- to 69-year-old adults but only among men. This may relate to the faster decline in cognitive function in women with dementia due to greater brain atrophy, making them less likely to have dreams [7].

In a **psychiatric inpatient** sample (N=1215, mean age=37), nightmares were related to depression [12]. This relationship was moderated (lessened) by emotional regulation. Nightmares were also related to suicidal ideation and moderated by emotional regulation. Nightmares and anxiety were surprisingly not related, as they have been related in other studies.

In another sample of psychiatric inpatients, nightmare frequency was greatest in those with **PTSD** (N= 75) [13]. In this sample, 62% of those with PTSD had nightmares once a week or more often as compared to 40% of those without PTSD. High depression scores and PTSD were linked with nightmares. The comorbid depression would increase the risk of experiencing nightmares. And those with PTSD frequently re-experience their traumatic events in nightmares.

In a sample of children and adolescents, insomnia was comorbid with nightmares for 15% to 24% of the sample [14]. Sleep problems were greater in the combined insomnia and nightmares group. Insomnia and nightmares have been linked in most of the studies in this current literature on nightmares. The adolescents also had more anxiety and depression than the children which could relate to the greater prevalence of **anxiety and depression** in adolescents in general. And anxiety and depression have been comorbid especially in adolescents in many studies in other literatures. Depression has also been linked with nightmares in 60% of those with PTSD in the sample of inpatients already described [13].

In a study entitled "Dream recall, nightmares, and aggression – related dream content in patients with REM sleep behavior disorder", the results are in the title [15]. In this sample (N=102 with **REM sleep behavior disorder** (RBD) and 208 controls), both nightmares and aggression – related dream content were more frequent for the RBD group based on reports from two consecutive nights in a sleep lab. REM sleep behavior disorder can be self-injurious. When the normal temporary paralysis of REM sleep fails, individuals with that disorder physically act out their vivid, often violent dreams.

**Negative Effects**

Several negative effects of nightmares have been noted in this literature. They include poor sleep quality, stress, anxiety, and depression, suicidal ideation, and suicide attempts.

In a hierarchical regression, nightmares were the only significant predictor of **sleep quality, stress and anxiety** [16]. In this sample (N= 1332), nightmares and the interaction between nightmares and lucid dreaming, not surprisingly, contributed to **depression.**

**Table 3: Negative Effects of Nightmares (And First Authors)**

| Negative Effects | First Authors |
|---|---|
| sleep quality, stress and anxiety | Carr |
| depression | Carr, Li |
| suicidal ideation | Amandas, Patell, Staples, Bolstad |
| suicide attempts | Smith |

Nightmares also contributed to depression in a sample of adolescents (N= 210, 13–24 years-old) [17]. in this sample, nightmares contributed to anxiety, which in turn contributed to depression. This finding would be expected given that anxiety and depression are frequently comorbid especially in adolescents.

Nightmares have contributed to **suicidal ideation** in several studies. In a study entitled "Nightmares and capability for suicide implications in adolescents at high risk for suicide", suicidal ideation was noted [18]. In the presence of high suicidal ideation in this sample (N=340), nightmares were associated with suicide attempts. Depression was also likely associated with both the nightmares and the suicidal ideation. A stepwise regression or structural equation modeling with multiple predictor variables would be informative.

In another study on suicidal ideation in adolescents (N= 86, Mean age =14), daily sleep diaries were kept for 28 days post discharge from a psychiatric unit [19]. In this study, nightmares led to negative affect which led to self-injurious thoughts and suicidal ideation. Negative affect was a mediator of the relationship between nightmares and self-injurious thoughts and suicidal ideation based on a structural equation model. Nightmares may have involved re-experiencing days on the psychiatric unit and concerns about returning there. Content analyses have been missing from this literature which is surprising given that they could inform intervention research.

In a paper entitled "Nightmares, insomnia, and suicide within a trauma – exposed sample" (N= 223), the results are in the title [20]. Twenty-one percent of the variance in suicidal ideation was explained by nightmares and insomnia. Although this is a respectable amount of variance, entering more variables like the trauma itself along with post-traumatic symptoms, anxiety and depression would have likely increased the amount of variance in suicidal ideation.

In a large sample from 16 countries (N= 9328), nightmare frequency was a risk factor for suicidal ideation during COVID-19 [21]. Nightmare frequency increased 5% during COVID leading to suicidal ideation, but frequent dream recall was a protective factor during COVID. Although suicidal ideation decreased during the pandemic, greater suicidal ideation occurred in long COVID patients. This finding was not surprising as severe symptoms are associated with long COVID including brain fog and loss of smell and taste [22].

**Suicide attempts** were associated with nightmares in a study entitled "Prospective associations of insomnia and nightmares with suicidal behavior among primary care patients" (N=1792)

[23]. Three percent of this sample attempted suicide within a 12-month follow-up after discharge from primary care.

**Risks for Nightmares**

Several risks for nightmares have been addressed in this literature. They include childhood trauma, stress, arousal, and anxiety.

**Table 4: Risks for Nightmares (And First Authors)**

| Risks | First Authors |
|---|---|
| Childhood trauma | Que |
| Stress | Schredl |
| Pre-sleep arousal and sleep onset latency | Youngren |
| Trait-based anxiety | Gratton |

**Childhood trauma** predicted frequent nightmares among youth 12 to 25 years of age (N=6145) [9]. This varied from 26% of the sample having nightmares related to one trauma, 36% for two traumas and 51% for three or more traumas. The increase in prevalence of nightmares related to the increased number of traumas would be expected.

**Stress** was a risk for nightmares in research on Swiss elite athletes (N=2297) [13]. Nightmares were not only related to stress level, but also to being female and having alcohol for four hours before bedtime. **Pre-sleep arousal and sleep onset latency** have also led to nightmares and physical arousal following trauma in a sample of male inpatient veterans (N=15) who also have frequently experienced PTSD symptoms [24].

**Trait-based anxiety** symptoms were also associated with a greater incidence of nightmares in a longitudinal study (N=758) [25]. Baseline anxiety in this sample led to follow-up nightmares.

**Potential Underlying Biological Mechanisms**

Only three studies on potential underlying biological mechanisms for nightmares appeared in this current literature. They include parasympathetic dysregulation, increased beta waves suggesting hyper- arousal, and heritability.

**Table 5: Potential Underlying Biological Mechanisms (And First Authors)**

| Mechanisms | First Authors |
|---|---|
| Parasympathetic dysregulation | Tomacsek |
| Cortical hyperarousal | Sayk |
| Heritability | Ollila |

In a paper entitled "Altered parasympathetic activity during sleep and emotionally arousing wakefulness in frequent nightmare recallers", a nightmare group (N=24) and control group(N=30) were compared [26]. Heart rate was recorded during an emotionally evoking picture rating task. Greater heart rate was noted in the nightmare group during sleep, and greater heart rate and lower heart rate variability were noted during the picture rating task. These data suggest **greater parasympathetic dysregulation** in the nightmare group. That greater parasympathetic dysregulation occurred both during nightmares and the emotionally evoking picture rating task suggests that parasympathetic dysregulation was not unique to nightmares. The nightmare individuals appeared to have parasympathetic dysregulation in general.

In a paper entitled "Cortical hyperarousal in individuals with frequent nightmares", a frequent nightmare group (N=30) and a control group (N=27) were observed for four nights in a sleep lab over the course of eight weeks [27]. The nightmare group also received six sessions of imagery rehearsal therapy (the "gold standard" of cognitive behavioral therapy for nightmares). The nightmare group showed increased beta and low gamma power during the entire night, but not when comparing nights with nightmares versus those without nightmares. Gamma waves are the fastest and most energetic brain waves and are typically tied to information processing and memory recall. Low gamma activity occurred in REM sleep after therapy in the nightmare group. The authors concluded that **cortical hyperarousal** is a trait in people with frequent nightmares. They also highlighted the finding that cortical hyperarousal was treatable.

In a study entitled " Nightmares share genetic risk factors with sleep and psychiatric traits", the genome wide association database (N=45,255) was used [28]. Insomnia was noted to predict nightmares. **Heritability** contributed to 5% of the variance. Nightmares were correlated with anxiety (.67). with depression (.56), with PTSD (.41), and with neuroticism (.67). The heritability of nightmares estimate (5%) seems low especially given that they are comorbid with anxiety, depression and neuroticism that have relatively high heritability rates in themselves.

**Interventions**

Despite the severity of the negative effects of nightmares, only three interventions have appeared in this literature. They include imagery rescripting therapy, cognitive behavioral therapy for nightmares and telehealth cognitive behavioral therapy.

**Table 6: Interventions for Nightmares (And First Authors)**

| Interventions | First Authors |
|---|---|
| Imagery rehearsal therapy | So |
| Imagery scripting | Hicks |
| Telehealth cognitive behavioral therapy | Cromer |

In a review of the literature on nightmare therapy for those who have PTSD, **imagery rehearsal therapy** was the most supportive treatment [29]. New consensus guidelines suggest, however, that **cognitive behavioral therapy for nightmares** (which integrates scripting, exposure and sleep strategies) is effective for nightmare treatment for those who have PTSD.

In a review paper entitled “The effectiveness of imagery scripting interventions for military veterans with nightmares and sleep disturbances: a-systematic review and meta-analysis”, 15 studies were included (N=658) [30]. The meta-analysis suggested that sleep quality improved, but nightmares, surprisingly, did not change

In a paper entitled “Efficacy of a telehealth cognitive behavioral therapy for improving sleep and nightmares in children age 6–17”, 46 were randomly assigned to a **CBT telehealth** or waitlist group [31]. Results are in the title suggesting that

exposure, relaxation and rescription (revisiting the nightmare using imagery and imagination) decreased sleep problems including awakenings and nightmares. They also decreased internalizing and externalizing symptoms as well as suicidal thoughts and behaviors.

**Methodological Limitations of this Literature**

Several methodological limitations can be noted for this current literature. They include limited sampling, variable definitions of nightmares and dependence on dream recall.

The samples have been limited to students and to patients with chronic clinical conditions, suggesting lack of generalizability of findings to healthy adults. The clinical conditions may also be confounding the effects of nightmares.The prevalence of nightmares was highly variable across studies, which may relate to the differences in samples, but could also relate to varying definitions of nightmare frequency, as in so many nightmares per week or so many nightmares per year.

The nightmare reports depend on nightmare recall which is not reliable given that nightmares often lead to awakenings, and the nightmares are then quickly forgotten. Forgetting nightmares may be adaptive for experiencing less stress, but the reliability of recall is questionable. More sleep lab studies need to be conducted so that the nightmare reporting occurs immediately after awakening and is therefore less subject to recall bias.

The gender effects have been mixed with males having more nightmares in some samples and females having more nightmares in other samples. Some effects have been common to nightmares and arousing situations such as parasympathetic dysregulation that was noted both during a wakeful arousing task and during nightmares, suggesting that the dysregulation was not unique to nightmares.

The direction of effects is not possible to determine from cross-sectional data, highlighting the need for more longitudinal studies. In addition, content analyses that could reveal common themes would be informative for intervention purposes. Surprisingly, only a few intervention studies appeared in this literature given the severity of the negative nightmare effects. Despite these methodological limitations, this current literature can help inform future research on nightmares.

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