

Nightmare Frequency in Patients with Primary Insomnia

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Summary. The present study investigated the nightmare frequency of patients with insomnia. Patients reported nightmares more often, especially when overall dream recall frequency was statistically controlled. Moreover, nightmare frequency was related to the severity of insomnia. It would be interesting to study whether specific techniques for treating nightmares (for example; imagery rehearsal therapy) are beneficial for insomnia patients with nightmares.

Keywords: Nightmare; Insomnia

Nightmares are defined as disturbing mental experiences that generally occur during REM sleep and that often result in awakening (ICSD-2, American Academy of Sleep Medicine, 2005). Nightmares are very common; up to 80 % of adults reported that they had occasionally experienced nightmares (Englehart & Hale, 1990; Schredl, Morlock & Bozzer, 1996). Representative studies indicate that about 5% of the general population has a current problem with nightmares (Bixler et al., 1979; Cirignotta et al., 1983, Stepansky et al., 1998). The etiology of nightmare is modeled by a disposition-stress model. Research indicates that genetic factors, (Hublin et al., 1999), as well as current stressors, (Schredl, 2003; Schredl et al., 2008), are related to nightmare frequency. Since stressors, for example negative life events, are also of importance in the etiology of primary insomnia (e.g., Harvey, 2002), it seems logical to hypothesize that these patients should experience nightmares more often than persons without insomnia. Where as the relationship between insomnia symptoms like frequency of nocturnal awakenings and nightmares have been shown in a large number of studies (e.g., Charney et al., 1977; Krakow et al., 1995; Ohayon, Morselli & Guilleminault, 1997; Schredl, 2003), Ohayon et al. (1997) stated that the prevalence of primary insomnia were lower in the patients having nightmares compared to the patients with insomniac complaints and no nightmares. In this study, the occurrence of nightmares was related to depression and anxiety disorders; both mental disorders are often accompanied by sleep disorders. The result of elevated nightmare frequency in insomnia patients reported by Hoffmann et al. (1996) can also be interpreted in that way because their sample included patients with primary insomnia and patients with secondary insomnia due to a mental

disorder. On the other hand, several studies (Schredl, 1991; Ermann, 1995; Schredl et al., 1998) demonstrated that patients with primary insomnia reported more negatively toned dreams in comparison to healthy controls.

The aim of the present study was to compare the nightmare frequency of patients with primary insomnia (diagnosed in a sleep clinic in order to rule out other causes for the insomnia symptoms) with persons without insomnia. The second aim was to determine whether nightmare frequency was related to severity of the insomnia complaints.

1. Method

1.1. Participants

Patients. 295 patients (178 women, 117 men) diagnosed for primary insomnia both by polysomnographic recording of their night sleep and by psychiatric interviews were included in the study. Common diagnostic criteria (DSM IV, American Psychiatric Association, 1996; ICD 10, Deutsches Institut für Medizinische Dokumentation und Information, 1994; ICSD-2, American Academy of Sleep Medicine, 2005) were applied. Patients with diagnosis of mental disorders such as major depression, dysthymia or anxiety disorder were excluded. Sleep apnea and periodic leg movements were ruled out by measuring nasal and oral airflow, chest and abdomen movements, blood oxygen saturation and anterior tibialis electromyogram in both legs. The patients mean age was 45.8 ± 14.9 yrs.

Healthy controls. The sample included 444 persons whose mean age was 23.5 ± 5.7 years. These 376 women and 68 men were mainly psychology students. The participants were recruited at the Universities of Mannheim, Heidelberg, and Landau for a study entitled "Sleep, dreams, and personality" (Schredl et al., 2003). Participants were paid for participation.

1.2. Research instruments

The LISST sleep questionnaire (Landecker Inventar zur Erfassung von Schlafstörungen; Schürmann et al., 2001) is comprised of 75 items and was constructed as a screening instrument to detect different sleep disorders. Sum scores

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Submitted for publication: February 2009

Accepted for publication: March 2009

Table 1. Nightmare frequency and dream recall frequency of patients with insomnia and healthy controls (Means \pm SD)

Variable	Insomnia patients	Healthy Controls
Nightmare frequency (Total sample)	2.39 \pm 1.36	2.30 \pm 1.10
Nightmare frequency (women)	2.41 \pm 1.33	2.36 \pm 1.10
Nightmare frequency (men)	2.36 \pm 1.41	1.94 \pm 1.01
Dream recall frequency (Total)	2.99 \pm 1.91	4.31 \pm 1.21

were computed for self-reported symptoms of insomnia (6 items), nocturnal breathing disorders (4 items), restless legs syndrome (5 items), daytime tiredness (5 items), sleep quality (8 items) and disturbances of the sleep/wake rhythm. The single scales followed a six-point Likert scale format (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often, 6 = always). The item measuring nightmare frequency was also of this six-point scale format. Sufficient internal consistencies as well as accurate discrimination of patients with sleep disorders (diagnosed in sleep medicine centers including two polysomnographic procedures) have been demonstrated (Schürmann et al., 2001). For eliciting dream recall, a seven-point dream recall frequency scale (coded from 0 = never, 1 = less than once a month, 2 = about once a month, 3 = two or three times a month, 4 = about once a week, 5 = several times a week, and 6 = almost every morning) was included in the sleep questionnaire. The dream recall frequency scale has a high retest reliability ($r = .85$; Schredl, 2004).

1.3. Procedure

The patients completed the LISST sleep questionnaire prior to their first diagnostic interview in the outpatient sleep center. Subsequently, they spent two consecutive nights with standard polysomnographic recordings (EEG, EOG, EMG, ECG, respiratory parameters, blood oxygen saturation and anterior tibialis EMG) in the sleep laboratory.

Statistical analyses included ANCOVAs and regression models in order to control for age and gender (because age and gender distributions differed between the patient group and the healthy controls).

2. Results

2.1. Nightmare frequency

The comparison between patients with insomnia and healthy controls in terms of nightmare frequency is depicted in Table 1. Although the mean difference is not large, the statistical analysis (ANCOVA with the factors diagnosis and gender and the covariate age) yielded a significant difference between insomnia patients and controls ($F = 7.3$, $p = .0070$) after controlling for gender ($F = 4.5$, $p = .0341$) and age ($F = 2.8$, $p = .0958$). The mean difference is larger for men (see Table 1) but the interaction term of the ANCOVA did not reach significance ($F = 2.2$, $p = .1361$). Interestingly, the statistical analysis showed that the difference between insomnia patients and healthy controls regarding nightmare frequency is even more pronounced ($F = 17.8$, $p < .0001$) if dream recall frequency is statistically controlled (added as second covariate).

2.2. Factors related to nightmare frequency

Nightmare frequency was not related to age, gender and sleep quality. On the other hand, complaints regarding insomnia symptoms, restless legs symptoms, apnea symptoms, sleep/wake rhythm disturbances and daytime tiredness were positively correlated with nightmare frequency. As expected, the correlation between nightmare frequency and dream recall frequency was quite high. The regression analysis explained 24.5 % of the variance ($F = 10.4$, $p < .0001$) and indicated that insomnia symptoms as well as apnea symptoms were the factors most closely associated with nightmare frequency (in addition to dream recall frequency which was introduced as a control variable).

3. Discussion

The results indicate that, as predicted, insomnia patients report nightmares more often than controls, confirming the findings of more negatively toned dreams in these patients (e.g., Schredl et al., 1998). This difference is even more pronounced if dream recall frequency was statistically controlled, i.e. the percentage of negatively toned dreams in relation to the total number of recalled dreams is larger in the patient group. In addition, nightmare frequency was related to the severity of insomnia symptoms. To carry on this line of research, it would be interesting to study whether the occurrence of current stressors solely explain the heightened nightmare frequency in insomnia patients. Schredl (2003) reported that although stress reduced the correlation coefficients between sleep quality and nightmare frequency the correlation coefficient was still significant. The interaction between nightmares and insomnia symptoms can be two-fold. First, the nightmare is, by definition, interrupting sleep and thus increases insomnia symptoms (nocturnal awakenings). Second, fears that nightmares might occur during the night impairs sleep onset and may lead to light sleep. It would be interesting to study insomnia patients with nightmares in the sleep laboratory in order to determine whether the increased number of insomnia complaints is reflected in altered sleep physiology, i.e. number of brief awakenings or arousal indices.

The significant relationship between nightmare frequency and apnea symptoms is in line with previous research (Hicks & Bautista, 2003; Schredl, 2008). It should be kept in mind that sleep apnea as possible co-morbid sleep disorder was ruled out in this patient group. Moreover, two studies (Schredl et al., 2006; Schredl & Schmitt, 2009) clearly demonstrated that sleep apnea patient do not report nightmares more often than healthy controls. The hypothesis put forward by Boerner (1855) that breathing pauses accompanied by oxygen desaturations cause nightmares is very

Table 2. Factors associated with nightmare frequency in patients with insomnia.

Variable	Correlation coefficient	Standardized Regression coefficient
Age	-.093	.047
Gender (1 = female, 0 = male)	.039	.014
Restless legs symptoms	.155 **	.025
Insomnia symptoms	.285 ***	.250 ***
Apnea symptoms	.156 **	.167 **
Sleep/wake rhythm disturbances	.190 **	.013
Sleep quality	.023	-.167
Daytime tiredness	.206 ***	.102
Dream recall frequency	.428 ***	.379 ***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

unlikely to be valid. So, future research has to investigate whether breathing pauses, measured by polygraphy (ambulatory measurement unit) or polysomnography (sleep laboratory), occur more often in persons with nightmares; as a link between dream content and sleep physiology (body-mind interaction, see Erlacher & Schredl, 2008), or whether the subjective reporting of apnea symptoms are related to the nightmares directly, i.e. waking up from a nightmare and having the impression of gasping for air.

The correlation between nightmare frequency and daytime tiredness reflects the negative effects nightmares exert on the next day (e.g., Köthe & Piotrowski, 2001). Also warranting further investigation, is why restless legs symptoms, as well as complaints regarding the sleep/wake rhythm, are related to nightmare frequency (at least in the correlation analyses).

To summarize, nightmare frequency was elevated in insomnia patients and related to the severity of insomnia symptoms within the patient group. From a clinical viewpoint, it would be very interesting to study whether imagery rehearsal therapy (Krakow & Zadra, 2006) which has been shown to reduce nightmare frequency effectively is also beneficial for insomnia patients with additional nightmare complaints. The brief intervention can easily fit into the standard cognitive-behavioral therapy for insomnia.

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