Nightmare frequency and nightmare distress: Socio-demographic and personality factors

Michael Schredl[1]
Anja S. Goeritz[2]

[1] Central Insitute of Mental Health, Sleep laboratory - Mannheim - BaWue - Germany
[2] University of Freiburg, Psychology Department - Freiburg - BaWue - Germany

ABSTRACT

The diagnosis of a nightmare disorder is based on clinically significant distress caused by the nightmares, e.g., sleep or mood disturbances. In order to understand nightmare etiology better empirical research should focus on studying factors that affect nightmare distress in addition to nightmare frequency. Overall, 2492 persons (1437 woman, 1055 men) completed the online survey. Nightmare frequency, global nightmare distress, and personality traits were measured. The findings indicate that in addition to nightmare frequency heightened emotional reactivity measured as neuroticism contribute to global nightmare distress and, thus, supporting the neurocognitive model of Levin and Nielsen (2007). Moreover, the recurring nightmares that relate to a waking-life event were associated with higher nightmare distress. From a clinical viewpoint, it would be desirable to carry out similar surveys using diagnostic interviews in order to determine the presence of a nightmare disorder and study the variables that are related to that diagnosis.

Keywords: Nightmares; Sleep Disorders; Neuroticism; Mood Disorders; Surveys and Questionnaires.

Corresponding author:
Michael Schredl
E-mail: michael.schredl@zi-mannheim.de

INTRODUCTION

Nightmares are characterized by awakenings primarily from REM sleep with clear recall of disturbing mentation, typically fear-related but also other emotions like anger, disgust, grief can occur[1]. As nightmares are experienced by a large percentage of the population at least occasionally[2-4] the diagnosis of a nightmare disorder can only be given if the nightmares cause clinically significant distress[5,6]. That is, in order to look empirically into etiological factors of the nightmare disorder it is not sufficient to measure only nightmare frequency but also nightmare distress[7].

Although the ICSD-3 lists areas of possible distressing effects of nightmares on the well-being of the person, e.g., mood disturbances during the day due to persisting nightmare affect, fear of sleep because of the likelihood to experience a nightmare again, intrusive nightmare imagery during the day (Table 1), current instruments measuring nightmare distress like the Nightmare Distress Questionnaire (NDQ)[8], the Nightmare Behavioral Questionnaire (NBQ)[9], the Nightmare Effects Survey (NES)[10], and Nightmare Effects Questionnaire (NEQ)[11] not tailored to reflect this list presented in the ICSD-3 and, thus, do not allow a differentiation regarding the presence or absence of a nightmare disorder. Wood & Bootzin[12] adopted the approach to ask the overall distressing effect of nightmares: "Are you currently troubled by nightmares?" (Yes/no) which might be an option for researcher to study factors associated with nightmare distress.

In the following factors associated with nightmare distress found so far will be reviewed. The most obvious factor is, of course, nightmare frequency. The NDQ total score typically correlated between r = .26 to r = .44 with nightmare frequency[8,13-16], clearly showing that nightmare frequency is not completely explaining nightmare distress. Using a diary measure for eliciting nightmare

Table 1. Nightmare disorder (ICSD-3).

Diagnostic criteria
A. Repeated occurrences of extended, extremely dysphoric, and well-remembered dreams that usually involve threats to survival, security, or physical integrity.
B. On awakening from the dysphoric dreams, the person rapidly becomes oriented and alert.
C. The dream experience, or the sleep disturbance produced by awakening from it, causes clinically significant distress or impairment in social, occupational, or other important areas of functioning as indicated by the report of at least one of the following:
1. Mood disturbance (e.g., persistence of nightmare affect, anxiety, dysphoria
2. Sleep resistance (e.g., bedtime anxiety, fear of sleep/subsequent nightmares)
3. Cognitive impairments (e.g., intrusive nightmare imagery, impaired concentration, or memory)
4. Negative impact on caregiver or family functioning (e.g., nighttime disruption)
5. Behavioral problems (e.g., bedtime avoidance, fear of the dark)
6. Daytime sleepiness
7. Fatigue or low energy
8. Impaired occupational or educational function
9. Impaired interpersonal/social function

frequency and nightmare distress, the correlation between nightmare frequency and nightmare distress was even non-significant[17]. A marked relationship between nightmare distress and sleep problems (as it is mentioned in the diagnostic criteria of the ICSD-3; see Table 1) was reported by two studies[13,18]. Women tend to rate their nightmare distress higher than men[14,18-20] but these studies did not control for nightmare frequency which is higher in women compared to men[21].

Nightmare distress is related to general psychopathology[17], depression[13,22], and neuroticism[9,16,22-24]. However, one has to keep in mind that nightmare frequency is also correlated with psychopathology and neuroticism (e.g.[25]), even though some studies[14,16,26] reported higher correlation coefficients for nightmare distress-psychopathology relationship compared to the nightmare frequency-psychopathology relationship. However, similar correlation coefficients for nightmare distress and nightmare frequency with measures of psychopathology were also reported[22,24,27].

Nightmare distress was also related to boundary thinness[14,23,28] and stress-related health problems[29]. In addition, high nightmare distress is correlated with interest in therapy; however, research[30,31] indicated that nightmare sufferers actually rarely seek help for their condition. To summarize, nightmare distress is generally related to the same factors, e.g., gender, neuroticism, psychopathology, than nightmare frequency but there are also differences regarding these relationship, e.g., nightmare distress but not nightmare frequency were related interest in therapy[8]. Levin et al.[17] reported that general psychopathology was related to nightmare distress whereas negative life-events were related to nightmare frequency supporting the etiological model of Levin & Nielsen[7] differentiating between affect distress defined as heightened emotional reactivity as a trait factor and affect load (frequency of current stressors and/or negative emotional events) as factors contribution to the nightmare etiology.

That is, this model stresses the importance to investigate both nightmare distress and nightmare frequency[1,7]. However, regression analytic studies predicting nightmare distress using nightmare frequency, psychopathology measures, personality traits etc. in order to determine the contribution of each measure to the total distress (which is important for the diagnosis of a nightmare disorder) have rarely been carried out. Belicki[14] reported that nightmare frequency, psychopathology, absorption/boundaries, richness of dream experience, and hypnotic ability explained about 34% of the variance in nightmare distress.

The aim of this study was to examine the contribution of socio-demographic variables, nightmare frequency, and neuroticism to global nightmare distress. Based on the etiological model of Nielsen & Levin[1] it was hypothesized that both nightmare frequency and neuroticism are significantly related to nightmare distress. In addition, Levin & Nielsen[7] predicted according to their nightmare typology that nightmares that are related to trauma are more distressing than idiopathic nightmares; this was also tested.

METHODS

Research Instruments

The dream variables were measured via the German version of the MADRE questionnaire[32]. The full version of the MADRE is available online[33]. For eliciting nightmare frequency, an eight-point rating scale was presented ("How often did you experience nightmares recently (in the past several months)?") 0 = never, 1 = less than once a year, 2 = about once a year, 3 = about two to four times a year, 4 = about once a month, 5 = two to three times a month, 6 = about once a week, 7 = several times a week). With this rating scale the following definition was presented: "Nightmares are dreams with strong negative emotions that result in awakening from the dreams. The dream plot can be recalled very vividly upon awakening." The retest reliability of this scale was r = .765[32]. The item "Do you experience recurring nightmares that relate to a situation that you have experienced in your waking life?" could be answered with Yes and No. If the participant experienced recurrent nightmares, s/he should estimate the percentages of how many of their nightmares are recurrent nightmares.

To determine the distress associated with the nightmares, a 5-point scale "If you currently experience nightmares, how distressing are the nightmares?" (0 = Not at all distressing, 1 = Not that distressing, 2 = Somewhat distressing, 3 = Quite distressing, and 4 = Very distressing) was presented. The item measuring nightmare frequency during childhood ("How often did you experience nightmares during your childhood (from 6 to 12 year of age)?") was of a similar eight-point format as the current nightmare frequency scale with retest reliability of r = .791[32].

The big five personality factors were measured with the German version of the NEO-FFI-30, which includes 30 Items[34]. Each personality factor (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) were computed as the sum score of the six corresponding items. The internal consistencies (Cronbach's alpha) of the five scales of the 30 item version given by the test authors ranged from r = .67 (openness to experience) to r = .81 (neuroticism) and were comparable to those of the 60 item version of the NEO-FFI[35].

Procedure and Participants

Overall, 2492 persons (1437 woman, 1055 men) completed the online survey between March 23, 2015 and April 8, 2015. The mean age of the sample was 47.75 ± 14.41 years (range: 17 to 93 years). Within the online panel www.wisopanel.net panel, about 10.000 persons with an interest in online studies and with heterogenic demographic backgrounds are registered. The link of this study was send via email to all registered persons and participation was voluntary and unpaid (even though some studies but not this one offers small monetary compensations). Concerning educational level, 0.8% had no degree, 10.47% had 9 years of schooling, 28.33% had O-level (middle degree, "Realschule", about 10 years), 26.00% A-level ("Abitur"), 31.7% obtained a University degree, and 2.69% had doctorate.

Statistical procedures were carried out with the SAS 9.4 software package for Windows. An ordinal regression was used for analyzing the effect of different predictors (the Big Five personality dimensions) on the nightmare frequency and nightmare distress controlled for age, sex and education. The variables were entered simultaneously. As the distribution of the percentage of recurrent dreams was extremely left-screwed the responses were categorized in five groups to construct an ordinal scale for non-parametric analysis (0% → 0, 0.01% to 10% → 1, 10.01% to 20% → 2, 20.01% to 50% → 3, and above 50% → 4).

RESULTS

The distributions of the two nightmare frequency scales are depicted in Table 2. About 9% of the participants reported that they had nightmares at least once a week whereas almost 18% reported that – during childhood – they experienced nightmares once a week or more often. Ninety-seven participants (3.91%) reported frequent nightmares (once a week or more often) currently and during childhood. The correlation between the two scales was r = .441 (N = 2483, p < .0001). The Sign Rank test showed that childhood nightmare frequency was higher compared to current nightmare frequency (S = 259589.5, p < .0001).

The ordinal regression for current nightmare frequency including the socio-demographic variables indicated that age was negatively associated (standardized estimate = -.2321, χ^2 = 131.4, p < .0001), women tended to report more nightmares (standardized estimate = .0979, χ^2 = 24.3, p < .0001, whereas there was no significant effect of education (standardized estimate = .0345, χ^2 = 3.1, p = .0771). Adding the Big Five personality dimensions to the regression analysis affected the gender effect which is no longer significant (Table 3). The age effect is still significant, and higher education showed a small negative correlation to nightmare frequency. Neuroticism showed the strongest influence on nightmare frequency but also openness to experience and to a smaller extend conscientiousness were related to nightmare frequency (Table 3). Even if current nightmare frequency is statistically controlled, childhood nightmare frequency was related to openness to experience, neuroticism, and low agreeableness (Table 3).

Table 2. Current and childhood nightmare frequency.

Category	Current nightmare frequency	Childhood nightmare frequency
	(N = 2492)	(N = 2483)
Several times a week	3.53%	8.22%
About once a week	5.14%	9.59%
two or three times a month	9.43%	13.98%
About once a month	12.56%	12.81%
About two or four times a year	20.55%	15.99%
About once a year	11.88%	6.36%
Less than once a year	17.50%	10.19%
Never	19.42%	22.88%

Table 3. Ordinal regression analyses for the nightmare frequency scales.

Variable	Current nightmare frequency			Childhood nightmare frequency[1]		
	SE	χ^2	*p*	SE	χ^2	*p*
Age	-.1826	75.9	<.0001	-.1100	27.1	<.0001
Gender	.0229	1.2	.2720	.0133	0.4	.5255
Education	.0451	5.0	.0248	.0407	4.1	.0437
Nightmare frequency				.4115	320.1	<.0001
Neuroticism	.3966	254.6	<.0001	.1117	19.5	<.0001
Extraversion	-.0188	0.7	.3925	.0362	2.7	.1017
Openness to experience	.1356	43.3	<.0001	.1628	60.2	<.0001
Agreeableness	-.0107	0.2	.6203	-.0589	7.4	.0066
Conscientiousness	.0584	7.0	.0079	-.0018	0.0	.9357
	N = 2481, R^2=.1999			N = 2472, R^2 = .2457		

SE=Standardized estimates, analyses includes age, gender, education, and all five personality factors entered simultaneously, [1]current nightmare frequency was also entered.

26.89% of all participants with nightmares (N = 2,008) stated that they experienced recurring nightmares that relate to a situation that you have experienced in their waking life. The participants who reported nightmares estimated the percentage of recurrent dreams in relation to all nightmares on average to be 15.33% ± 24.08% (N = 2,004). 895 participants reported 0% recurrent dreams, 189 participants 0.01% to 10%, 167 participants 10.01% to 20%, 271 participants 20.01% to 50%, and 182 participants more than 50% recurrent dreams. Only 17 participants reported that all of their nightmares were recurrent. In Table 4, the logistic regression for having recurrent dreams (Yes/No) is depicted. Age was positively related, as was nightmare frequency, whereas persons with high education reported less likely recurrent dreams. Although openness to experience and conscientiousness showed minor relationships to the occurrence of recurrent nightmares, neuroticism was the most influential factor. For the recoded ordinal scale regarding the percentage of recurrent nightmares in relation to all nightmares neuroticism was again the personality dimension that correlated (in addition to age, education, and nightmare frequency).

The distribution of nightmare distress is presented in Table 5. For about 20% of the participants nightmares were quite or very distressing. The ordinal regression of nightmare distress is depicted in Table 6. Nightmare frequency and neuroticism were the major factors associated with nightmare distress. Interestingly, distress was higher if the participants stated that at least some of the nightmares were of a recurring nature. Women tend to report higher nightmare distress (keep in mind that nightmare frequency and neuroticism in addition to the other variables are statistically controlled for). Higher age is also related to higher nightmare distress. In addition to neuroticism, openness to experience was also related to nightmare distress.

DISCUSSION

The findings indicate that global nightmare distress is not only explained by nightmare frequency but also by heightened emotional reactivity measured as neuroticism and, thus, provide empirical evidence for the neurocognitive model of nightmare etiology formulated by Levin & Nielsen[7]. Moreover, the finding that recurring nightmares that relate to a waking-life event are associated with higher nightmare distress also fits into Levin and Nielsen's typology of dreams.

The major factors explaining nightmare distress are nightmare frequency and neuroticism; a findings with is in line with the literature[14,16,22,24,28]. The present findings including both factors (and other factors like gender, age, education) into one regression analysis clearly indicate that it is not enough to study factors affecting nightmare frequency as there are additional factors contributing to nightmare distress. Therefore, a paradigm shift in nightmare research is necessary. Interestingly, women tend to report more nightmare distress than men[14,18,19,32] - even though nightmare frequency and neuroticism are statistically controlled for. Claridge et al.[20] found that feminine sex role orientation was related to heightened distress, indicating that women might be more vulnerable to nightmare distress. Even though the age effect is quite small, it might also be the case that older persons are more vulnerable to nightmare distress.

As mentioned above the distressing effect of recurrent nightmares would fit in the typology of dreaming proposed by Levin & Nielsen[7] that trauma-related nightmares are more distressing that idiopathic nightmares. Even though not all recurrent dreams in this sample might be trauma-related, a previous study[36] showed that normal dreams (not trauma-related) that were affected by the previous day more likely affected the mood of the following day – a second-order continuity effect. This would indicate that distress associated with day-time problems might be intensified if the problems show up in nightmares.

The finding that neuroticism affects nightmare frequency is in line with previous research[7,37] and, thus, support the validity of the findings. The additional effect of openness to experience (controlling for neuroticism) is corroborating a previous finding in a student sample[25] using Hartmann's boundary questionnaire as thin boundaries are closely related to openness to experience[38]. The previous findings[23,28] reporting a relationship between boundary thinness and nightmare frequency have to be viewed with caution as the sum score Hartmann's boundary questionnaire correlated substantially with neuroticism[39].

It is also interesting that the typical gender difference in nightmare frequency[21] was no longer significant when neuroticism was introduced in the regression analysis, supporting

Table 4. Ordinal regression analyses for the occurrence and frequency of recurrent nightmares.

Variable	Recurrent nightmares (Yes/No)			Frequency of recurrent nightmares		
	SE	χ^2	*p*	SE	χ^2	*p*
Age	.1826	10.2	.0014	.0601	5.9	.0150
Gender	.0208	0.4	.5245	.0144	0.3	.5670
Education	-.1047	10.8	.0006	-.0490	4.2	.0399
Nightmare frequency	.4265	169.0	<.0001	.4448	285.9	<.0001
Neuroticism	.1233	11.3	.0008	.0914	10.1	.0015
Extraversion	-.0024	0.0	.9410	-.0156	0.4	.5459
Openness to experience	.0782	6.2	.0131	.0201	0.7	.4103
Agreeableness	-.0563	3.0	.0826	-.0166	0.4	.5148
Conscientiousness	.0711	4.6	.0321	.0288	0.0	.8653
	N = 1999, R²= .1938			N = 1995, R² = .1984		

SE = Standardized estimates, analyses includes age, gender, education, current nightmare frequency, and all five personality factors entered simultaneously.

Table 5. Nightmare distress scale.

Category	Nightmare distress (N = 2008)
Very distressing	4.73%
Quite distressing	16.19%
Somewhat distressing	32.77%
Not that distressing	30.38%
Not at all distressing	15.94%

Table 6. Ordinal regression analysis for nightmare distress

Variable	Nightmare distress		
	SE	χ^2	*p*
Age	.0626	6.7	.0094
Gender	.1237	25.8	<.0001
Education	-.0204	0.6	.4276
Nightmare frequency	.3882	179.2	<.0001
Recurrent (Yes/No)	.1138	21.7	<.0001
Neuroticism	.3312	130.7	<.0001
Extraversion	.0248	1.0	.3278
Openness to experience	.0736	9.6	.0020
Agreeableness	.0182	0.5	.4658
Conscientiousness	.0030	0.0	.9038
	N = 1999, R² = .3019		

SE = Standardized estimates, analyses includes age, gender, education, current nightmare frequency, recurrent nightmares (Yes/No), and all five personality factors entered simultaneously.

a previous study[40] showing that neuroticism is a factor that at least partly explains gender differences in nightmare frequency. The negative age effect is in line with one representative study[3] but not with others[2,4], so there is no clear picture as these correlations might be attributable to cohort effects and not represent an intra-individual decline of nightmare frequency. The small effect of education on nightmare frequency have not found previously[2,3] and so it is unclear whether this socio-demographic variable is related to nightmare frequency. Similar, explanations why conscientiousness is related to nightmare frequency are still lacking.

Childhood nightmare frequency was related to current nightmare frequency indicating longitudinal stability but this result might be biased as participants with high current nightmare frequency might overestimate childhood nightmare frequency retrospectively. However, in clinical samples adult nightmare sufferers often report that their nightmares started in childhood[41,42]. Within a three-year interval nightmare frequency was relatively stable (r = .616[43]) but more extended longitudinal studies are warranted. These longitudinal studies would also be necessary to corroborate the found decline of nightmare frequency from childhood to adulthood. The findings that neuroticism and openness to experience are related to childhood nightmare frequency – even if current nightmare frequency is statistically controlled for – support the idea that predisposition plays a role in nightmare etiology, e.g., thin boundaries[44] and/or heightened emotional reactivity[7].

Recurring nightmares that relate to a waking-life situation were reported by one quarter of the participants. Although the item was constructed to measure the occurrence of trauma-related dreams, a previous study[45] using the same question "Do you experience recurring nightmares that relate to a situation that you have experienced in your waking life?" and including an open-ended item eliciting the themes of the recurrent nightmares indicated that about one third of all responses (N = 126) were very likely trauma-related (physical and sexual abuse, war experiences, car accidents etc.) but the other two thirds were most likely not trauma-related (interpersonal problems, occupational stress, death of a close person, chronic illness etc.). It would be desirable to include an open-ended item measuring the themes of the recurrent nightmares in future studies.

It seems plausible that persons with high nightmare frequency are also more likely to report recurrent nightmares. Whether neuroticism is related to more trauma-related dreams or whether persons with higher neuroticism scores have more non-traumatic waking-life issues that are likely to be reflected in their dreams is an open empirical question. Similar, the finding that low education is related to more recurrent nightmares is not easy to understand. The positive relationship of age with recurrent nightmares might be explained by previous findings showing a higher incidence of war-related dreams in the elderly who experiences World War II[4,46].

From a methodological viewpoint it has to be noted that the present sample was not representative; the participants

enlisted in the panel volunteered to participate in a study entitled "Dreaming and personality". A comparison to a representative sample eliciting nightmare frequency with the same scale[3] or a comparable scale[2] indicated that nightmare frequency in the present sample is higher, e.g., about 8.5% of the participants reported nightmares once a week or more often whereas in the representative samples the figure was about 2%. Similar, about 20% of the participants reported no nightmares which is lower than the 42% to 48% in the representative samples[2,3]. Nevertheless, the range in nightmare frequency is large and specific inclusion criteria like more than three nightmares per year[17] were not applied.

Not restricting the sample (e.g., students, clinical samples) is a clear advantage of the present study looking into factors that explain the occurrence of the nightmare disorder (experiences nightmares with clinically significant distress) in the general population. Also high education was overrepresented in the sample[47], however, the educational background was divers, especially compared to student samples. Unfortunately, no information regarding mental disorders which are related to nightmare frequency[48] or medication, e.g., antidepressants with a possible side effect of inducing nightmares[49], was available for the participants.

A retrospective measure for eliciting nightmare frequency was used; several studies (overview[50]) indicated that retrospective measures might underestimate nightmare frequency compared to prospective measures (daily logs). However, Zunker et al.[51] showed that the effect size of the underestimation is quite small (d = 0.101) and correlation coefficients to other measures like well-being did not differ whether retrospective or prospective measures of nightmare frequency were used[52]. Moreover, in clinical samples retrospective nightmare frequency was higher than log measures of nightmare frequency[18,28]. Taken together, it is unlikely that the retrospective approach of the present study biased the results in a marked way.

To summarize, the findings of the present study clearly implicate that nightmare distress is not only related to nightmare frequency but also to other factors like neuroticism, recurrent nightmare topics, gender, and age. From a clinical viewpoint, it would be desirable to carry out similar surveys using diagnostic interviews in order to determine the presence of a nightmare disorder (and other mental disorders) and study the variables related to that diagnosis. It would also be of interest to develop a nightmare distress questionnaire based on the distress areas listed by the ICSD-3 (Table 1) similar to the Beck Depression Inventory[53] with cut-off criteria to indicate a probably presence of a nightmare disorder. As nightmares are underdiagnosed and undertreated[54,55], such a screening instrument might be helpful to identify and treat persons suffering from nightmares.

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