Nightmare frequency in a representative German sample

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Summary. Nightmares are defined as dreams with strong negative emotions that result in awakening. Overall, the findings of the present representative survey (N = 915) indicate that nightmare frequency decrease with age and that urban living is associated with heightened nightmare frequency. Longitudinal studies are needed to clarify how age affects nightmare frequency because the findings of cross-sectional studies are conflicting. In addition, it would be interesting to test whether increased nightmare frequency is explained by the presence of a mental disorder or whether urban environment is an independent risk factor for nightmares. As nightmares are underdiagnosed and undertreated, it would also make sense to carry out studies that try to clarify the reasons behind this problem so that nightmare sufferers can receive adequate treatment.

Keywords: Nightmares, dream recall, age effects, gender differences, urbanization

1. Introduction

Nightmares are defined as disturbing mental experiences that generally occur during REM sleep and often result in awakening (ICSD-2; American Academy of Sleep Medicine, 2005). In representative samples about 5% of the participants stated that they suffer from nightmares (Bixler, Kales, Soldatos, Kales, & Healey, 1979; Hublin, Kaprio, Partinen, & Koskenvuo, 1999; Janson et al., 1995; Li, Zhang, Li, & Wing, 2010; Stepansky et al., 1998). Despite the number of studies eliciting prevalence of nightmare disorder (frequent nightmares associated with significant impairment of waking-life functioning), representative studies regarding nightmare frequency and possible effects of socio-demographic variables on nightmare frequency are relatively scarce. Schredl (2010a) found that socio-economic status, education level, and marital status were not related in a representative German sample (N = 2019). Whereas many studies – see meta-analysis by Schredl and Reinhard (2011) – found a clear gender difference with women reporting nightmares more often than men (between ages of 10 yrs. to 60 yrs.). The findings regarding the relationship between age and nightmare frequency are inhomogeneous. Three cross-sectional studies (Franke, 1979; Salvio, Wood, Schwartz, & Eichling, 1992; Schredl, Lahl, & Göritz, 2010) found a decrease in nightmare frequency with age but other studies (Bixler et al., 1979; Sandman et al., 2013; Schredl, 2010a), analyzing representative samples, found no age effect or even an increase of nightmare frequency with age in men (Sandman et al., 2013).

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The aim of the present study is to determine nightmare frequency in a representative sample by presenting a clear definition of the phenomenon (American Academy of Sleep Medicine, 2005) and absolute categories, e.g. about once a week. These scales are more informative and reliable compared to scales with 'often', 'sometimes', and 'never' as possible responses as, for example, used in the study of Sandman et al. (2013). In addition, the effects of socio-demographic variables on nightmare frequency and possible mediating effects of dream recall frequency were studied.

2. Method

The participants were interviewed at home. For measuring nightmare frequency, an eight-point rating scale was presented ("How often do you experience nightmares (see definition)?" 0 = never, 1 = less than once a year, 2 = about once a year, 3 = about 2 to 4 times a year, 4 = about once a month, 5 = about 2 to 3 times a month, 6 = about once a week, 7 = several times a week). In order to ensure a clear understanding of the phenomenon, a brief definition was also presented: "Nightmares are dreams with strong negative emotions that result in awakening. The action of the dream can be remembered well upon awakening." In order to obtain units in frequency per month, the scales were recoded using the class means (0 → 0, 1 → 0.042, 2 → 0.083, 3 → 0.25, 4 → 1.0, 5 → 2.5, 6 → 4.0, 7 → 18.0).

Dream recall frequency was measured by a seven-point rating scale (0 = never, 1 = less than once a month, 2 = about once a month, 3 = twice or three times a month, 4 = about once a week, 5 = several times a week and 6 = almost every morning). The retest reliability of this scale for an average interval of 70 days is high (r = .85, Schredl, 2004). The following socio-demographic variables were included in the study: age, gender, education (five levels), income (15 levels ranging from 'below 249 Euro per month' to 'over 5000 Euro per month'), marital status (married/living with partner, single/living without partner), and place of residence size (6 levels ranging from 'below 5000 inhabitants' to 'over 500,000 inhabitants').

Table 1. Nightmare frequency (N = 915).

	Total sample (N = 915)		Women (N = 496)	Men (N = 419)
Categories	**Frequency**	**Percentage**	**Percentage**	**Percentage**
never	436	47.65%	45.77%	49.88%
less than once a year	176	19.23%	19.96%	18.38%
about once a year	85	9.29%	8.87%	9.79%
about 2 to 4 times a year	93	10.16%	10.08%	10.26%
about once a month	59	6.45%	6.45%	6.44%
about 2 to 3 times a month	50	5.46%	6.65%	4.06%
about once a week	12	1.31%	1.61%	0.95%
several times a week	4	0.44%	0.60%	0.24%

Overall, a representative sample of 1350 persons was drawn from German households that included persons over 14 years old. The drawing procedure was a three-step process. First, 258 areas were randomly selected (German demoscopic institutes have divided Germany into 53.000 non-overlapping areas with a least 350 households, the ADM sample network). Using again a random procedure every third household was selected. Third, within the household the person (over 14 yrs.) who was nearest his or her birthday was selected. The study was carried out by Ipsos GmbH, Mölln, Germany. The nightmare questions were part of a multi-themes survey, often about consumer behavior. The sample size was reduced to 915 (496 women, 419 men) because of drop outs due to the following reasons: "not available for the interview" (*N* = 178), refusing to participate (*N* = 172), not completing the nightmare frequency scale (*N* = 72), and other reasons (*N* = 13). The response rate was 67.8%. The mean age of the sample was 48.16 years (*SD* = 18.40). The age range was from 14 years to 93 years, the median was 48 yrs. The distribution for the variable place of residence size was as follows: up to 4,999 inhabitants (*N* = 123), 5,000 to 19,999 inhabitants (*N* = 237), 20,000 to 49,999 inhabitants (*N* = 174), 50,000 to 99,999 inhabitants (*N* = 83), 100,000 to 499,999 inhabitants (*N* = 178), and 500,000 or more inhabitants (*N* = 120).

Logistic regressions were calculated with the statistical software SAS 9.2 for Windows. All independent variables were entered simultaneously into the regression equation.

3. Results

In Table 1, the frequencies of the nightmare frequency scale are depicted. About 48% of the participants stated that they had never experienced a nightmare in their adulthood. The percentage of persons with frequency nightmares (once a week or more often) was 1.75%. The average nightmare frequency was 0.37 ± 1.38 nightmares per month. The effects of the socio-demographic variables on nightmare frequency are depicted in Table 2. Marital status, education, and monthly income were not related to nightmare frequency but there was a clear effect of age and place of residence size. Nightmare frequency decreased with age and was higher in persons living in larger cities. Nightmare frequency was slightly higher in women (marginally significant in Analysis 1) but gender was not associated with nightmare frequency if dream recall frequency was statistically controlled, (see Analysis 2 in Table 2). Even though the age effect was smaller in the second logistic regression where dream recall frequency was added, the effect was still significant, and controlling dream recall frequency did not affect the relationship between nightmare frequency and place of residence size.

Table 2. Logistic regression for nightmare frequency (*N* = 915).

		Analysis 1		Analysis 2 (with dream recall frequency)		
Variables	**SE[1]**	**Wald χ^2**	**p -value**	**SE[1]**	**Wald χ^2**	**p -value**
Age	-.1357	14.1	.0002	-.0887	5.6	.0176
Gender	.0568	2.8	.0947	-.0195	0.3	.5822
Marital status	-.0140	0.1	.7152	.0008	0.0	.9835
Education	-.0139	0.2	.6971	-.0577	2.4	.1202
Monthly income	.0303	0.6	.4405	.0183	0.2	.6536
Place of resident size	.0738	4.6	.0314	.0743	4.3	.0375
Dream recall frequency				.5896	227.8	<.0001

Note. [1] SE = Standardized Estimates

4. Discussion

Overall, the findings of the present study indicate that 1.75% of the general adult population experience nightmares once a week or more often. This is comparable with the figure of 2.4% reported by Schredl (2010a). As the prevalence of frequent and distressing nightmares is about 5% in most studies, (Bixler et al., 1979; Janson et al., 1995; Sandman et al., 2013), it would be very interesting to study the relationship between nightmare distress and nightmare frequency in a representative sample, i.e., for some persons a nightmare per week might be not very distressing whereas for others a horrifying nightmare every other week might cause significant distress. The data of Schredl (2010a) suggest that every other week to once a week might be an indicator for the nightmare disorder, i.e., nightmares significantly impair waking-life functioning. In the ICSD-2, frequency was not explicitly specified.

From the methodological viewpoint, the strength of this study is the eight-point scale for measuring nightmare frequency, providing categories with explicit specification regarding frequency. In dream recall research, it was shown that frequency scales with relative categories like 'often', 'sometimes', 'rare' etc. have lower re-test reliability compared to this type of scale (Schredl, 2004, 2007). Even though the response rate was fairly high (about 68%), it is necessary to discuss whether there are possible biases due to selection. Most participants refused to participate in general not knowing that nightmare questions will be asked; the nightmare section was only a small part of the multi-topic survey. Less than 10% (N = 72) specifically refused to answer the nightmare question. Two reasons seem plausible. First, the person has no nightmares and does not want to waste their time with this topic. Secondly, talking about nightmares, or even reporting the frequency of nightmares, might seem too personal to relate to a stranger (the interviewer). The first explanation is more likely as two-thirds of the participants who did not answer the nightmare question also did not answer the question regarding dream recall frequency. If this explanation is valid, the present data may be slightly overestimating nightmare frequency because a few people not experiencing nightmares are missing from the sample. Therefore, it would be interesting to study the willingness to answer dream-related questions in more detail. Another methodological issue was studied by Robert and Zadra (2007) showing that retrospective scales might underestimate nightmare frequency compared to eliciting nightmare frequency with daily logs. Although there is evidence that keeping a dream diary affects dream recall in general (Schredl, 2002), and possibly nightmare frequency as well, it would be very interesting to conduct a population study with daily logs in order to obtain more precise prevalence data.

The gender effect regarding nightmare frequency was very small compared to other studies (Schredl & Reinhard, 2011) and vanished completely if dream recall frequency was statistically controlled; suggesting that women report nightmares more often because their dream recall frequency is generally is higher. It would be interesting to follow-up these findings and investigate whether the gender difference in dream recall frequency (Schredl & Reinhard, 2008) might be explained, at least in part, by the gender difference in nightmare frequency.

The age effect – nightmare frequency is declining with age – is not in line with other representative studies (Sandman et al., 2013; Schredl, 2010a). One problem might be that cohort effects play a role. For example, Sandman et al. (2013) excluded the generation of persons who were older than 18 yrs. during World War II, because the increase in nightmare frequency with age in men might indicate that persons who experienced World War II as children might have more nightmares because of these experiences. Therefore, it would be necessary to replicate the present findings (and including persons who had experienced World War II) in other samples in which major stress did not occur, at least on a nation-wide level. It would be very interesting to have longitudinal data in order to study whether nightmare frequency changes within the person's lifetime. Clinical studies indicate that the frequency of nightmares in frequent nightmare sufferers started in childhood and stayed quite stable over the years (Kales et al., 1980).

A very interesting finding was that living in a city was associated with heightened nightmare frequency even though other parameters like social status, education, and monthly income were statistically controlled. Previous findings (Schredl, 2008, 2009) found a positive relationship between place of residence size and dream recall frequency in general. The present finding fits in with the fact that living in an urban area is increasing the risk for mental disorders, especially mood and anxiety disorders (Peen, Schoevers, Beekman, & Dekker, 2010). In order to test whether increased nightmare frequency and dream recall frequency are explained by the presence of a mental disorder which are associated with heightened nightmare frequency (Li et al., 2010; Swart, van Schagen, Lancee, & van den Bout, 2013) or whether urban environment is an independent risk factor for nightmares, representative studies eliciting mental disorders symptoms and nightmare frequency should be carried out.

Overall, the findings of the present representative survey indicate that nightmare frequency decrease with age and living in urban areas are associated with heightened nightmare frequency. Longitudinal studies are needed to clarify how age affects nightmare frequency, and more sophisticated studies should be carried out to understand the effect of urbanization on nightmares. As nightmares are underdiagnosed and undertreated (Schredl, 2010b), it would also make sense to carry out studies that try to clarify the reasons behind this problem so that nightmare sufferers can receive adequate treatment.

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